

VICINITY MAP

# BOULDER COUNTY PARKS AND OPEN SPACE FLOOD-PLANNING & PRELIMINARY DESIGN SERVICES SOUTH ST. VRAIN CREEK RESTORATION AT HALL RANCH

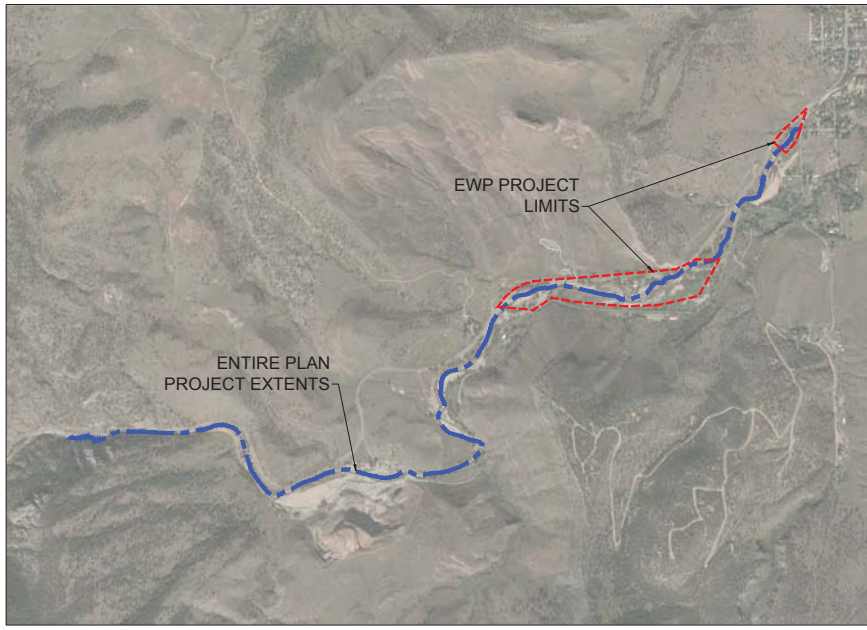
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BOULDER COUNTY PARKS AND OPEN SPACE

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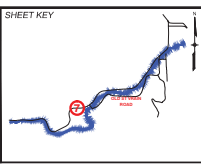
LOCATION MAP  
1" = 1000'

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L11	56	REVEGETATION PLANS	74+50 TO 60+50
L12	57	REVEGETATION PLANS	60+50 TO 46+50
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REFERENCE	DATE	DESCRIPTION	BY
DRAWINGS			
AERIALS			
No.	DATE	DESCRIPTION	BY
		REVISIONS	
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CIB FILE:			
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PREPARED FOR:	SEAL
FOR AND ON BEHALF OF MATRIX DESIGN GROUP, INC. PROJECT No. 16.812.003	<b>PRELIMINARY</b> THIS DRAWING HAS NOT BEEN APPROVED BY GOVERNING AGENCIES AND IS SUBJECT TO CHANGE
DESIGNED BY: SDS	DATE ISSUED: 10/17/16
CHECKED BY: JON	DRAWING No. C1
RDK	
VERT	
NO	
SHEET	
1 OF 62	

SOUTH ST. VRAIN CREEK RESTORATION	
BOULDER COUNTY PARKS AND OPEN SPACE	
30% DESIGNS	
COVER SHEET	

## GENERAL PROJECT INFORMATION

THE SOUTH ST VRAIN CREEK HEADWATERS ORIGINATE AT THE CONTINENTAL DIVIDE AND FLOW EAST TO THE CONFLUENCE WITH THE NORTH ST VRAIN CREEK. THE SOUTH ST VRAIN CREEK EXPERIENCED DAMAGE TO THE STREAM COURSE, BANKS, RIPARIAN AND UPLAND AREAS, AS WELL AS DITCHES, BRIDGES, ROADS AND PRIVATE HOMES FROM THE 2013 FLOOD. BELOW IS AN EXCERPT FROM THE ST. VRAIN CREEK CHANNEL FLOOD RECOVERY DESIGN-BUILD SERVICES (OTAK, 2016) WHICH CAN ALSO BE APPLIED TO THE SOUTH ST. VRAIN CREEK:

"ST. VRAIN CREEK IS AN ALLUVIAL SYSTEM THAT WAS HIGHLY ALTERED DURING THE HISTORIC 2013 FLOOD EVENT. NATURAL ALLUVIAL CHANNELS IN LOWER GRADIENT REACHES GENERALLY MEANDER THROUGH THE VALLEY, OCCASIONALLY SHIFTING LATERAL AND/OR VERTICAL POSITION ON THE LANDSCAPE DURING LARGE FLOOD EVENTS. IN THE CASE OF THE RECENT FLOOD, ST. VRAIN CREEK EXPERIENCED AN EPISODIC SHIFT IN THE CHANNEL PLANFORM AND CROSS-SECTION GEOMETRY AND SUBSTANTIAL SEDIMENT AGGRADATION AND DEPOSITION OCCURRED THROUGHOUT THE PROJECT AREA. AS A RESULT, THE CHANNEL WIDENED AS THE BANKS RECEDED AND NEW FLOW PATHS FORMED THROUGH THE FLOODPLAIN. IF GIVEN ENOUGH TIME, THE CHANNEL MAY EVENTUALLY ADJUST TO THE SEVERELY ALTERED CONDITION. HOWEVER, THIS PROCESS COULD TAKE MANY YEARS, AND WITHOUT INTERVENTION, THE CHANNEL COULD CONTINUE TO SHIFT POSITION, TO MINIMIZE THE THREAT TO EXISTING INFRASTRUCTURE, ENGINEERED IMPROVEMENTS ARE REQUIRED TO STABILIZE THE CHANNEL AND RESTORE ECOLOGIC FUNCTION."

THIS FLOOD-PLANNING AND PRELIMINARY DESIGN SERVICES FOR THE SOUTH ST VRAIN CREEK RESTORATION AT HALL RANCH (PROJECT) WAS FUNDED THROUGH A COMMUNITY DEVELOPMENT BLOCK GRANT DISASTER RECOVERY (CDBG-DR) RESILIENCE PLANNING PROGRAM GRANT BY THE STATE OF COLORADO DEPARTMENT OF LOCAL AFFAIRS (DOLA) THROUGH BOULDER COUNTY PARKS AND OPEN SPACE (BCPOS) FOR 30% DESIGN SERVICES OF A 3.2 MILE REACH OF THE SOUTH ST VRAIN CREEK IN BOULDER COUNTY. THE PROJECT LIMITS EXTEND FROM UPSTREAM OF THE ANDESITE QUARRY TO THE EASTERN OLD ST VRAIN ROAD BRIDGE. THE PLANNING AREAS CONTAINS LANDS MANAGED BY BCPOS ALONG WITH PRIVATE PROPERTIES AND THE CITY OF LONGMONT.

## FAST TRACK

THE MATRIX DESIGN GROUP TEAM (DESIGN TEAM) CONSISTS OF FIVE DIFFERENT FIRMS ACROSS A RANGE OF DISCIPLINES. ALL OF THE MEMBERS ON OUR TEAM HAVE WORKED ON FLOOD RECOVERY PROJECTS WITH OTHER MEMBERS OF THE TEAM. BELOW ARE DESCRIPTIONS OF EACH FIRMS ROLE ON THIS PROJECT.

- MATRIX--PROJECT MANAGEMENT, CHANNEL RESTORATION DESIGN, HYDROLOGY AND HYDRAULICS
- OTAK--CHANNEL RESTORATION DESIGN, FLUVIAL GEOMORPHOLOGY, AND SEDIMENT TRANSPORT
- THK--NATIVE REVEGETATION AND PUBLIC ENGAGEMENT
- ERO--ENVIRONMENTAL RESOURCES AND PERMITTING
- BLUE MOUNTAIN CONSULTANTS--FISHERY BIOLOGY

## DESIGN INFORMATION:

INCLUDED WITH THE DESIGN PLAN SUBMITTAL IS A PRELIMINARY BASIS OF DESIGN REPORT. PLEASE REVIEW THE REPORT FOR FURTHER INFORMATION ON DESIGNS. BELOW ARE GENERAL COMMENTS TO HELP THE READER UNDERSTAND BACKGROUND INFORMATION WITH REGARD TO THESE PLANS.

FOUR ALTERNATIVES WERE DEVELOPED TO MEET ISSUE/REACH BASED CONCERNS: FLOODPLAIN CONNECTIVITY, CHANNEL COMPLEXITY, REVEGETATION AND INFRASTRUCTURE PROTECTION. FLOODPLAIN CONNECTIVITY WAS DETERMINED TO BE THE PREFERRED ALTERNATIVE, BUT ALL ALTERNATIVES WILL BE USED THROUGH OUT THE CORRIDOR AND IN COMBINATION AT MULTIPLE LOCATIONS.

FLOODPLAIN CONNECTIVITY WAS DEVELOPED THROUGH THE USE OF A MULTISTAGE CHANNEL WITH A LOW FLOW CHANNEL. THE BANKFULL CHANNEL WAS BASED UPON THE 1.5 YEAR RECURRENCE INTERVAL HYDRAULICS. THE LOW FLOW CHANNEL WAS BASED UPON TYPICAL AND MINIMAL DAILY FLOWS. IN AREAS WHERE THE FLOODPLAIN COULD BE CONNECTED ACROSS THE ENTIRE VALLEY IT WAS. IN SOME AREAS THE FLOODPLAIN CONNECTIVITY WAS REDUCED DUE TO EXISTING VEGETATION PROVIDING BENEFIT TO THE CORRIDOR. OVERFLOW CHANNELS WERE ALSO USED IN NUMEROUS PLACES TO ACTIVATE EXISTING CHANNELS AND ALLOW FOR GREATER CONNECTIVITY.

CHANNEL COMPLEXITY TOOK THE FORM OF ROOT WADS, RIFFLE-POOL SEQUENCES, BOULDER CLUSTERS AND BIO-ENGINEERING. ROOTS WADS ARE BEING USED IN MULTIPLE LOCATIONS TO INCREASE CHANNEL COMPLEXITIES AND ROUGHNESS TO ENCOURAGE THE FORMATION OF SCOUR POOLS AND ADDITIONAL SOURCES OF CARBON. BOULDER CLUSTER PLACEMENT REQUIRES FIELD FITTING, THEREFORE IS NOT INCLUDED ON THESE DESIGN PLANS BUT WILL BE DEVELOPED AS

## DESIGNS PROGRESS.

REVEGETATION IS BEING PERFORMED USING A WIDE ARRANGEMENT OF PLANT MATERIALS. BIO-DIVERSITY WAS PARAMOUNT WHEN DEVELOPING THE PLANTING PLAN. REVEGETATION IS ALSO TAKING PLACE IN THE FORM OF BIO-ENGINEERING TO STABILIZE AREAS DETERMINED NECESSARY IN THE HYDRAULIC MODELING. SOIL TREATMENTS MIGHT BE NECESSARY IN CERTAIN AREAS TO ADD ORGANIC MATERIAL TO THE PROPOSED VEGETATION SITES. THIS INFORMATION IS SHOWN ON THE REVEGETATION PLANS.

PROTECTION OF INFRASTRUCTURE IS A BYPRODUCT OF THE PREVIOUS THREE RESTORATION TECHNIQUES, BUT TO FURTHER STABILIZE AREAS WHERE PUBLIC SAFETY OR INFRASTRUCTURE ARE OF GREATER CONCERN OFFSET BURIED RIPRAP REVETMENTS HAVE BEEN DESIGNED.

SOME AREAS WITHIN THE CORRIDOR DO NOT SHOW A PROPOSED PROFILE, IN THESE AREAS THE EXISTING PROFILE WILL BE USED. THE EXISTING PROFILE WITHING SOME OF THE PROJECT AREA IS STABLE OR WILL REACH AN EQUILIBRIUM WHEN DESIGN MEASURES ARE IMPLEMENTED.

THIS STRETCH OF THE SOUTH ST VRAIN CREEK HAS BEEN DESIGNED TO STORE SEDIMENT LOADS FROM UPSTREAM TO REDUCE SEDIMENT IMPACTS DOWNSTREAM. THIS IS A NATURAL DEPOSITIONAL AREA ACTING AS AN ALLUVIAL FAN. IN SOME AREAS PROPOSED GRADING IS BEING SHOWN TO NARROW THE BANKFULL AND LOW FLOW CHANNEL WIDTHS TO PROVIDE A BETTER HYDRAULIC SCENARIO. THESE AREAS CAN BE DESIGNED WITH THE USE OF BOULDER RIBS OR SILLS TO ALLOW THE AREA TO NATURALLY FILL IN BY CAUSING DEPOSITIONAL ZONES AROUND THE MEASURES.

IN SOME AREAS, EXISTING, POST-FLOOD, CHANNEL ALIGNMENTS WILL BE USED AS OVERFLOW CHANNELS. IT IS RECOMMENDED TO ALLOW THESE CHANNELS TO FILL IN NATURALLY FROM SEDIMENT DEPOSITION. SILLS WILL BE INSTALLED AT THE UPSTREAM INVERT OF THESE CHANNELS WITH ELEVATIONS BASED UPON RECURRENCE INTERVALS.

A FEW DIVERSION STRUCTURES WERE DAMAGED IN THE FLOOD. PRELIMINARY INVESTIGATIONS AND PLANNING ASPECTS HAVE BEEN INCLUDED AS PART OF THIS PLAN TO ENSURE COHESIVENESS BETWEEN THE STREAM RESTORATION PLANS AND FUTURE DIVERSION RE-CONSTRUCTION PLANS.

EXISTING BANK STABILIZATION MEASURES IN THE FORM OF RIPRAP PLACEMENT AND ROOT WADS WERE FOUND THROUGHOUT THE PROJECT SITE. EXISTING BANK STABILIZATION MEASURES WILL BE LEFT IN PLACE WHERE APPROPRIATE BUT SHOULD BE FURTHER EVALUATED.

THE OPERATOR OF THE ANDESITE QUARRY IS CURRENTLY FINALIZING MINE RECLAMATION PLANS; THESE PLANS SHOULD BE EVALUATED AS THIS PROCESS PROCEEDS.

THERE ARE TWO CONCURRENT UNRELATED PROJECTS TAKING PLACE THROUGH THIS REACH. THE MOST UPSTREAM PROJECT IS THE REPAIR OF HALL RANCH II ROAD, WHICH PROVIDES ACCESS TO THE QUARRY. THE DOWNSTREAM PROJECT IS TO REPAIR THE WESTERN OLD ST VRAIN ROAD BRIDGE, OTHERWISE KNOWN AS THE ANDESITE BRIDGE. BOTH PROJECT ASPECTS WERE INCORPORATED INTO THIS DESIGN FOR REFERENCE.

WITHIN THE 3.2 MILE PLANNING REACH OF THIS STUDY THERE ARE TWO PROJECT AREAS ELIGIBLE FOR FUNDING THROUGH EWP. THESE AREAS DESIGN WILL BE FURTHER EVALUATED AND REFINED INTO 80% DESIGN DRAWINGS THAT WILL THEN BE USED FOR CONSTRUCTION. CHANNEL REALIGNMENT AND SINUOSITY WILL BE FURTHER REFINED BASED UPON COMMENTS FROM THE EWP TEAM. FURTHER REFINEMENT OF THE DESIGN WILL ALLOW FOR PERMITTING ASPECTS INCLUDING 404 AND FLOODPLAIN PERMITTING ALONG WITH OTHERS.

THE PLANS RECOMMEND DESIGN MODIFICATIONS TO TWO DIVERSIONS WITHIN THE PROJECT REACH. THIS DESIGN INFORMATION WAS PROVIDED AS GUIDANCE AND TO ALLOW FURTHER DEVELOPMENT OF PLANS TO ADDRESS THE SITES WITH BOTH OF THESE DIVERSION. THE SOUTH LEDGE AND MEADOWS COMBINED DIVERSION IS KNOWN TO HAVE SEDIMENTATION ISSUES, WHILE THE LONGMONT DIVERSION IS A LOW HEAD DAM THAT HAS SAFETY CONCERNS.

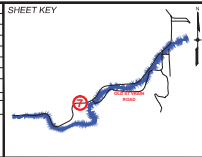
THE DOWNSTREAM EXTENTS OF THIS PROJECT ARE NEAR THE EASTERN MOST OLD ST VRAIN ROAD BRIDGE. THERE IS KNOWN OVERTOPPING OF THIS BRIDGE AND THE ROADWAY TO THE SOUTH BASED UPON PREVIOUS FLOODS AND HYDRAULIC MODELING. THE CHANNEL DOWNSTREAM OF THIS BRIDGE HAS INADEQUATE CAPACITY TO CONVEY A 100 YEAR STORM. FURTHER EVALUATIONS ON DESIGN ASPECTS ARE TO BE VISITED AS PART OF THE DOWNSTREAM EWP WORK. AN OVERFLOW CHANNEL HAS BEEN SHOWN ON THE DOWNSTREAM SIDE OF THE OLD ST VRAIN ROAD TO HELP CONVEY OVERTOPPING BACK TO THE CREEK. CHANNEL CAPACITY DOWNSTREAM OF THE BRIDGE NEEDS TO BE INCREASED TO HANDLE THIS FLOW.

REFINEMENT OF DESIGNS:

ABBREVIATIONS	
US	UPSTREAM
D/S	DOWNSTREAM
GB	GRADE BREAK
OFC	OVERFLOW CHANNEL
Wbf	WIDTH BANKFULL
Dbf	DEPTH BANKFULL
DF	DEPTH LOWFLOW

LEGEND	
	FLOODPLAIN BENCH
	RIFFLE-POOL SEQUENCES
	LARGE WOOD STRUCTURE
	PROTECT INFRASTRUCTURE
	OFFSET BURIED REVETMENT
	PARCELS
	EXISTING BANK STABILIZATION
	1.5 YEAR OVERFLOW CHANNEL
	5 YEAR OVERFLOW CHANNEL
	MAIN CHANNEL ALIGNMENT
	SILLS
	BANKFULL
	PROPOSED DITCH
	EXISTING DITCH
	EXISTING CONTOUR
	PROPOSED CONTOUR

REFERENCE				
DRAWINGS				
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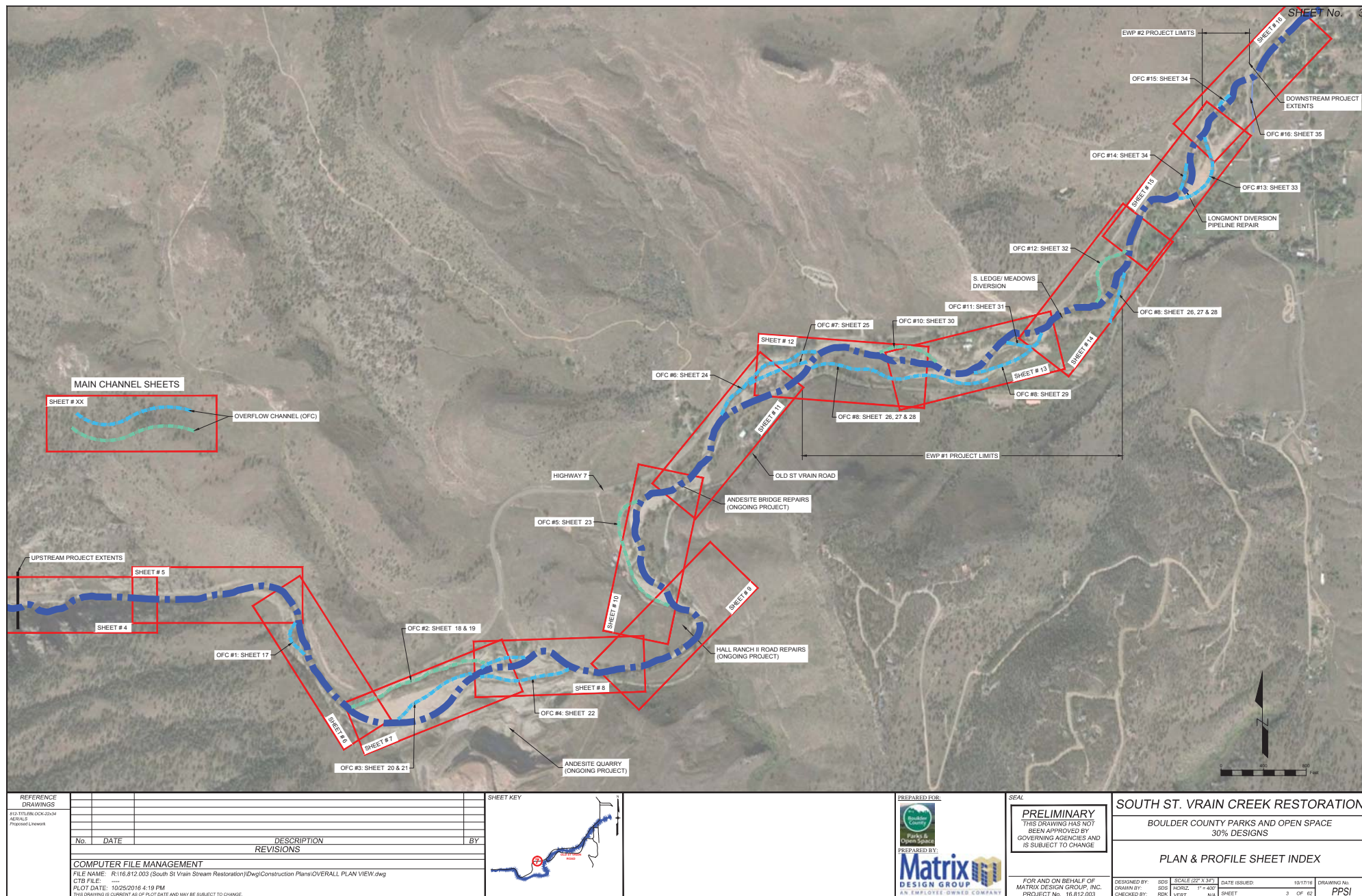
## SOUTH ST. VRAIN CREEK RESTORATION

BOULDER COUNTY PARKS AND OPEN SPACE  
30% DESIGNS

## NOTES AND LEGEND

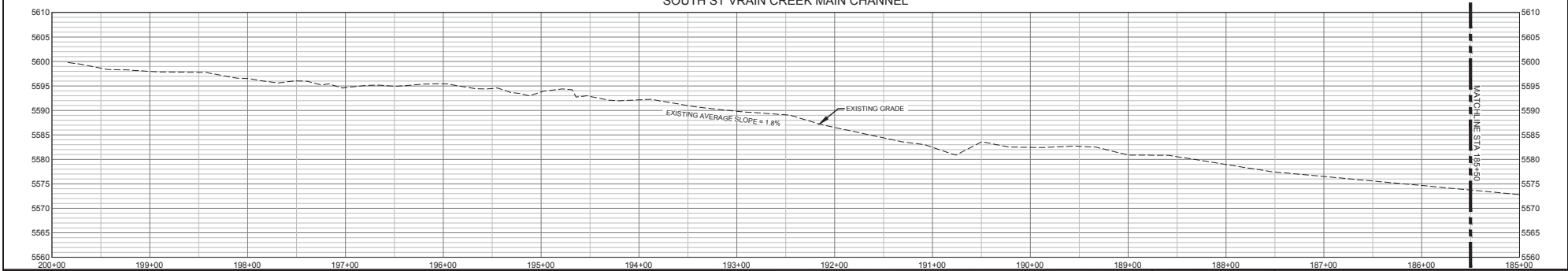
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CHECKED BY:	RDK	NOZ	SHEET	2 OF 62	C2







SOUTH ST VRAIN CREEK MAIN CHANNEL



<b>REFERENCE DRAWINGS</b>		<b>REVISIONS</b>		<b>BY</b>	
R116.812.003-2203		No.		DATE	
AERIALS		DESCRIPTION		REVISIONS	
CONCURRENT PROJECTS		BY		DATE	
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Proposed Layout		SHEET KEY		LEGEND	
PROPOSED CONTOURS		FLOODPLAIN BENCH		1.5 YEAR OVERFLOW CHANNEL	
City of Longmont Utilities		POOL-RIPPLE ENHANCEMENT		5 YEAR OVERFLOW CHANNEL	
Creek Diversion Structure		LARGE WOOD STRUCTURE		MAIN CHANNEL ALIGNMENT	
		PROTECT INFRASTRUCTURE		SILLS	
		OFFSET BURIED REVEITEMENT		BANKFULL	
		PARCELS		PROPOSED DITCH	
		EXISTING BANK STABILIZATION		EXISTING DITCH	

PREPARED FOR:

PREPARED BY:

AN EMPLOYEE OWNED COMPANY

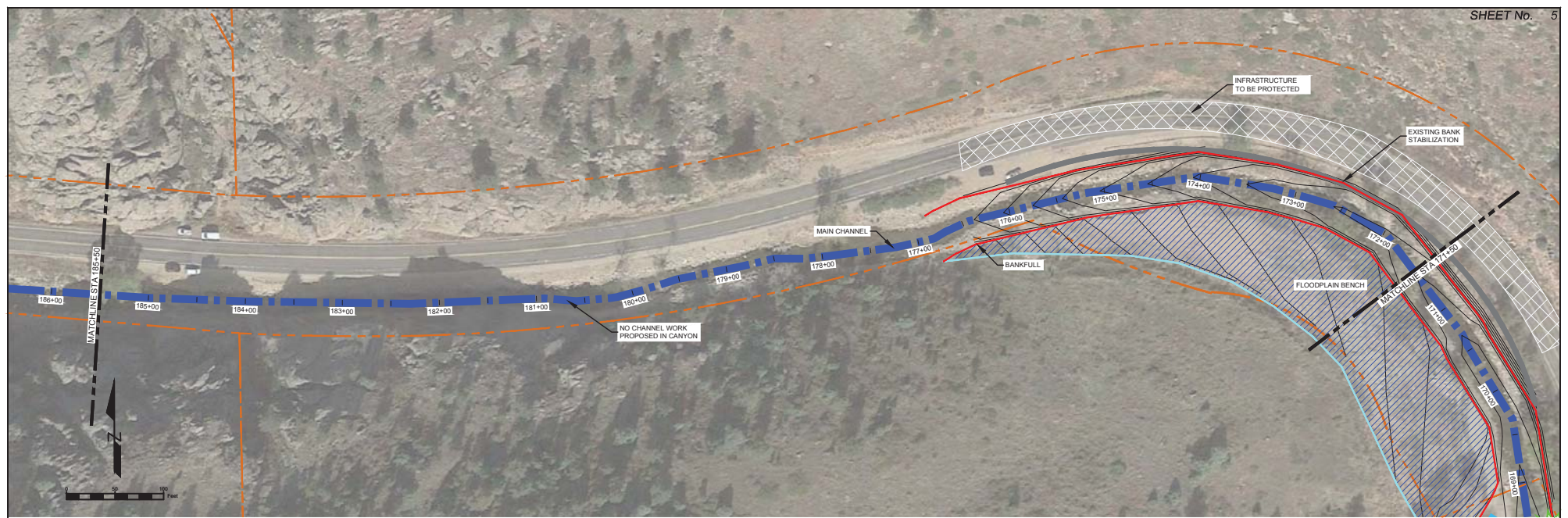
**PRELIMINARY**  
THIS DRAWING HAS NOT BEEN APPROVED BY GOVERNING AGENCIES AND IS SUBJECT TO CHANGE

**SOUTH ST. VRAIN CREEK RESTORATION**  
BOULDER COUNTY PARKS AND OPEN SPACE  
30% DESIGN

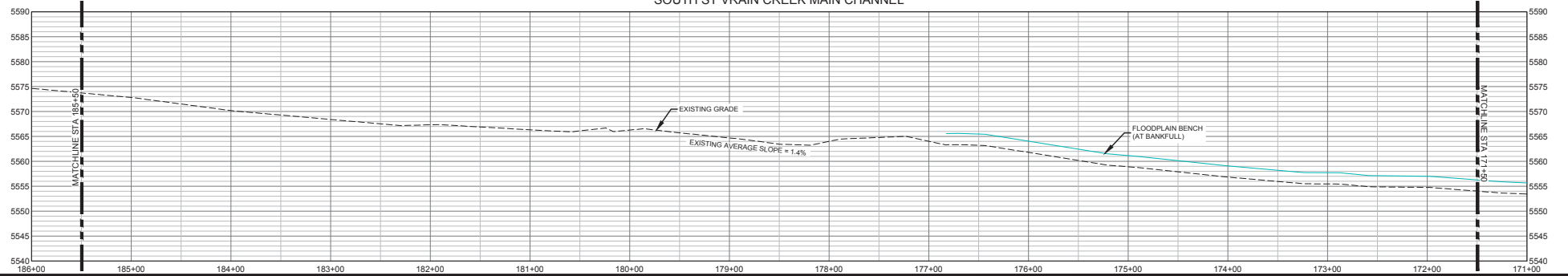
**MAIN CHANNEL PLAN & PROFILE**  
STA: 200+00 TO STA: 185+50

DESIGNED BY:	SDB	SCALE (22' x 36")	DATE ISSUED:	10/17/16	DRAWING NO.
CHECKED BY:	RDK	HORIZ. 1" = 50'	SHEET	4 OF 62	MCPP 1
FOR AND ON BEHALF OF:	MATRIX DESIGN GROUP, INC.	VERT. 1" = 10'	PROJECT NO.	16.812.003	

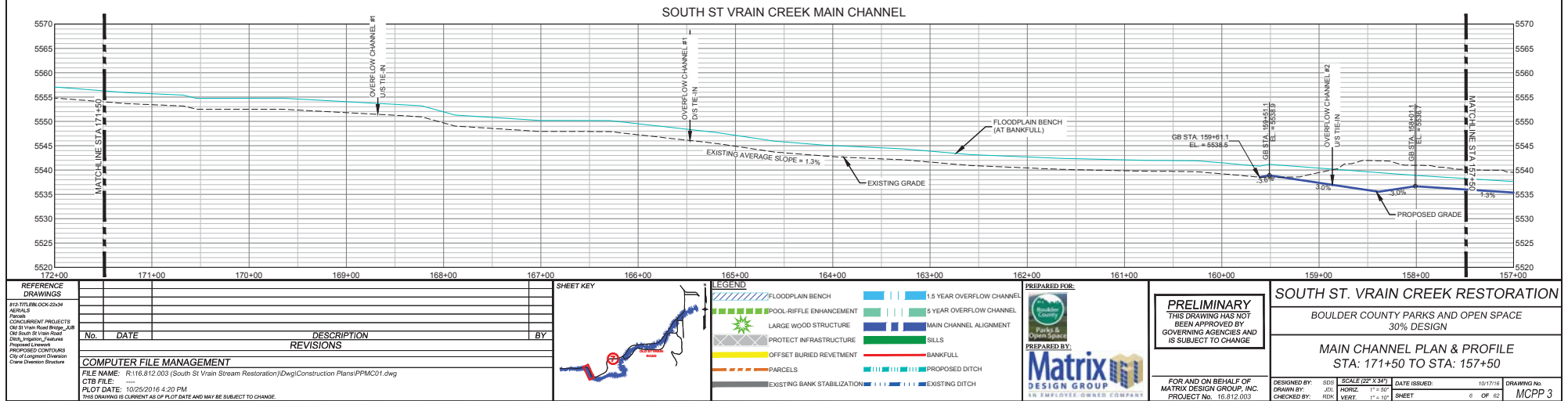
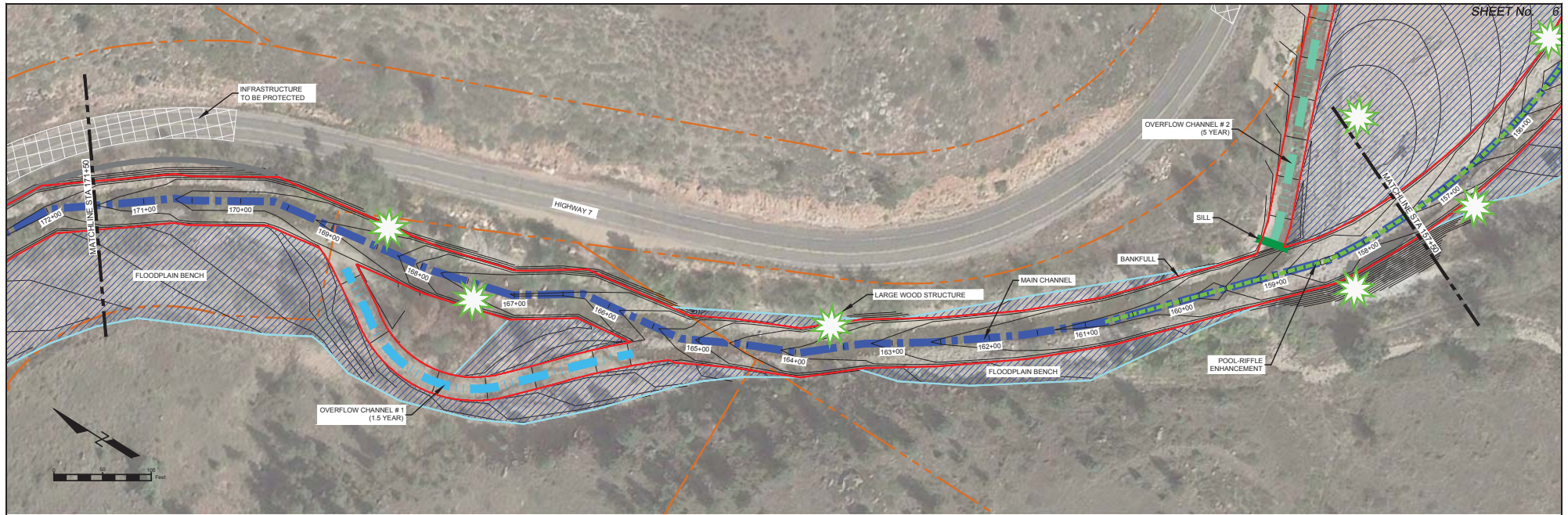




SOUTH ST VRAIN CREEK MAIN CHANNEL

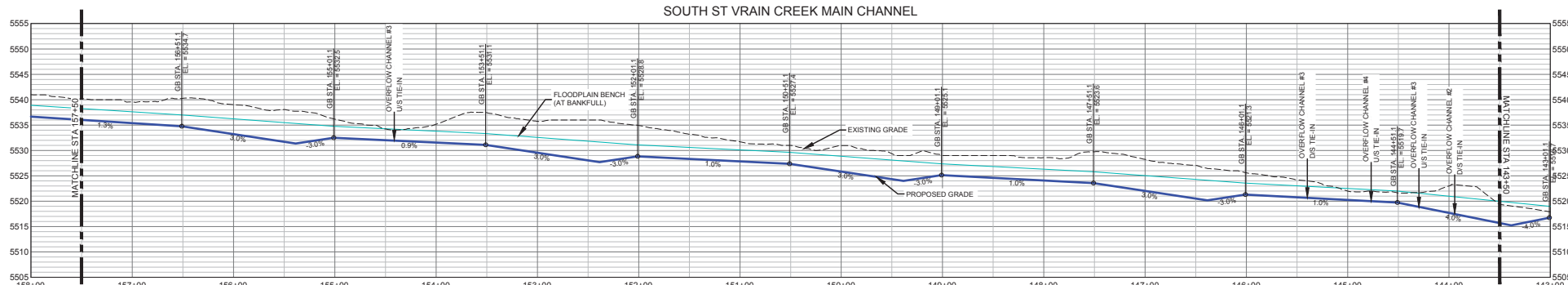


<b>REFERENCE DRAWINGS</b>		<b>SHEET KEY</b>		<b>LEGEND</b>		<b>PREPARED FOR:</b>		<b>PRELIMINARY</b> THIS DRAWING HAS NOT BEEN APPROVED BY GOVERNING AGENCIES AND IS SUBJECT TO CHANGE		<b>SOUTH ST. VRAIN CREEK RESTORATION</b> BOULDER COUNTY PARKS AND OPEN SPACE 30% DESIGN	
B10-TITLE-BLOCK-22031 AERIALS CONCURRENT PROJECTS ONE St Vrain Road Bridge, JAB ONE South St Vrain Road Dwg: Engineering, Boulder Prepared: Laramie PROJECTED: CONTOURS City of Longmont Division Crew: Division Structure						 <b>Matrix</b> DESIGN GROUP AN EMPLOYEE OWNED COMPANY				<b>MAIN CHANNEL PLAN &amp; PROFILE</b> STA: 185+50 TO STA: 171+50	
<b>COMPUTER FILE MANAGEMENT</b> FILE NAME: R:\116.812.003 (South St Vrain Stream Restoration)\Dwg\Construction Plans\PPMC01.dwg CTB FILE: — PLOT DATE: 10/25/2016 4:20 PM THIS DRAWING IS CURRENT AS OF PLOT DATE AND MAY BE SUBJECT TO CHANGE.						<b>FOR AND ON BEHALF OF</b> MATRIX DESIGN GROUP, INC. PROJECT No. 16,812.003		<b>DESIGNED BY:</b> SDS <b>DRAWN BY:</b> JDI <b>CHECKED BY:</b> RDK <b>SCALE:</b> 1/2" = 1'-0" <b>DATE ISSUED:</b> 10/17/16 <b>SHEET:</b> 5 OF 62		<b>DRAWING NO.:</b> MCPP 2	



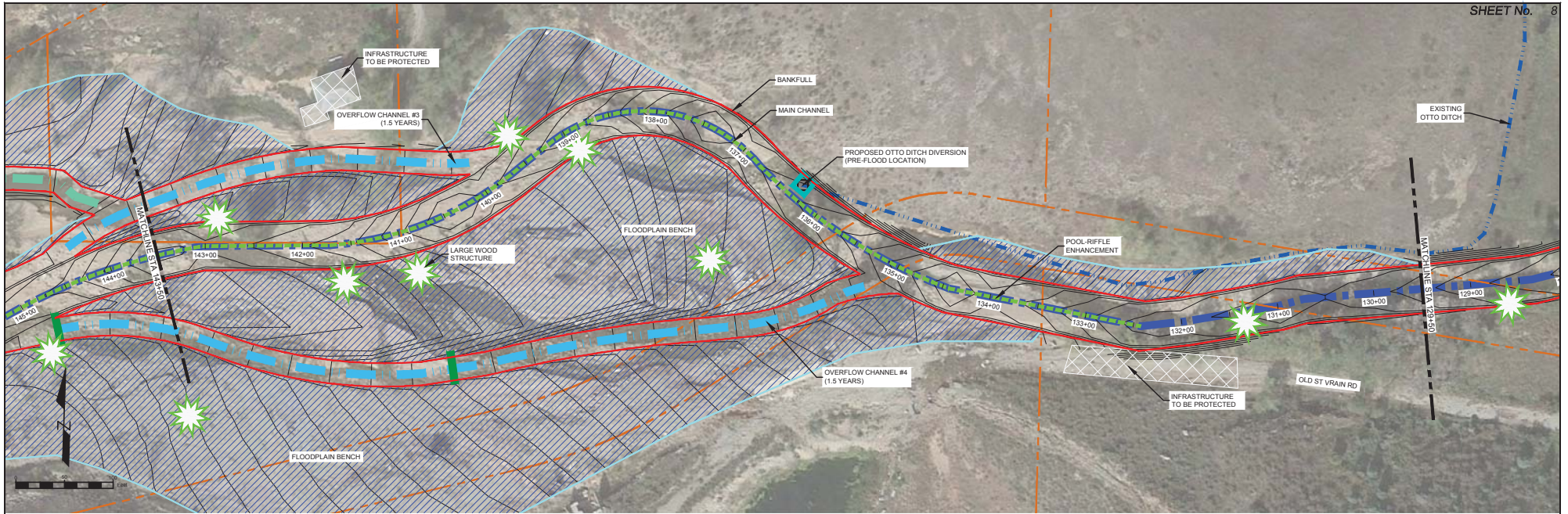


SOUTH ST VRAIN CREEK MAIN CHANNEL



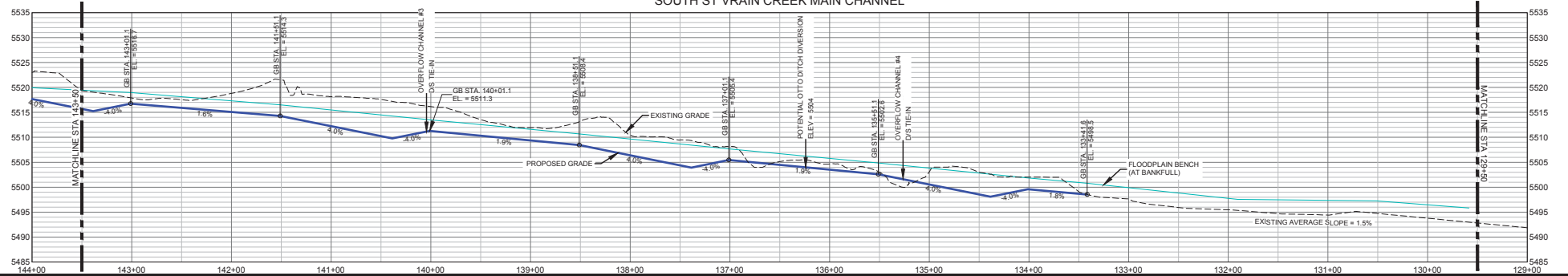
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812-TITLE-BLOCK-2204.dwg A000.dwg PROJECT CONCURRENT PROJECTS Old St Vrain Road Bridge_A00 Old South St Vrain Road 2006_Improvements PROPOSED CHANNEL City of Longmont																															





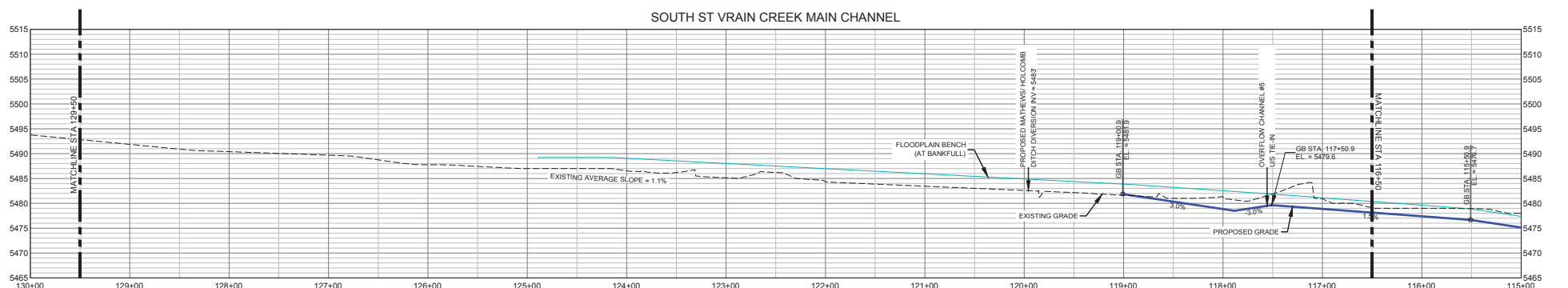
NOTE:  
• OTTO DITCH HAS DEGRADED BY 3' WHEN COMPARING 2011 LIDAR TO 2016 FIELD SURVEY. MIGHT BE DUE TO BEDROCK OUTCROPS IN AREA.  
• LONG TERM PLAN FOR OTTO DITCH UNKNOWN

SOUTH ST VRAIN CREEK MAIN CHANNEL

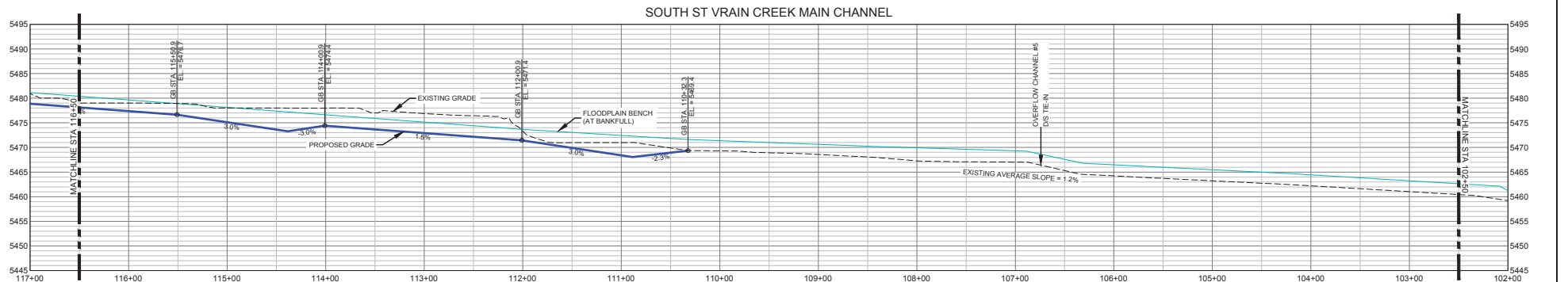


<b>REFERENCE DRAWINGS</b>		<b>SHEET KEY</b>		<b>LEGEND</b>		<b>PREPARED FOR:</b>		<b>PRELIMINARY</b> THIS DRAWING HAS NOT BEEN APPROVED BY GOVERNING AGENCIES AND IS SUBJECT TO CHANGE		<b>SOUTH ST. VRAIN CREEK RESTORATION</b> BOULDER COUNTY PARKS AND OPEN SPACE 30% DESIGNS	
B10-TITLE-BLOCK-25031 A10-PLAN CONCURRENT PROJECTS C10-South St Vrain Road Bridge, Job D10-South St Vrain Road E10-Proposed Contours F10-Long Term Plan G10-Channel Diversion H10-Channel Structure								<b>FOR AND ON BEHALF OF</b> MATRIX DESIGN GROUP, INC. PROJECT No. 16.812.003		<b>DESIGNED BY:</b> SDB <b>CHECKED BY:</b> JDB <b>SCALE:</b> 1"=10' <b>DATE ISSUED:</b> 10/17/16 <b>SHEET:</b> 8 OF 62 <b>DRAWING No.:</b> MCPP 5	
<b>COMPUTER FILE MANAGEMENT</b> FILE NAME: R:116.812.003 (South St Vrain Stream Restoration)\Dwg\Construction Plans\PPMC01.dwg C10 FILE: PLOT DATE: 10/25/2016 4:22 PM THIS DRAWING IS CURRENT AS OF PLOT DATE AND MAY BE SUBJECT TO CHANGE.		<b>REVISIONS</b>									
No.	DATE	DESCRIPTION		BY							



[illegible]



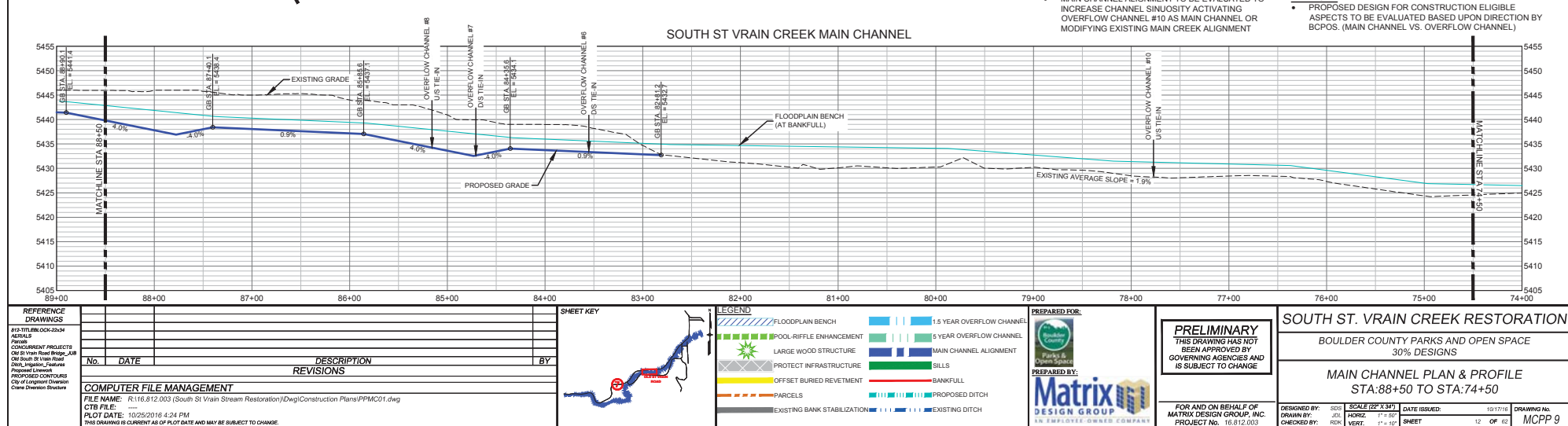


REFERENCE DRAWINGS				SHEET KEY				PREPARED FOR: 		<b>PRELIMINARY</b> THIS DRAWING HAS NOT BEEN APPROVED BY GOVERNING AGENCIES AND IS SUBJECT TO CHANGE		<b>SOUTH ST. VRAIN CREEK RESTORATION</b>  BOULDER COUNTY PARKS AND OPEN SPACE 30% DESIGNS  MAIN CHANNEL PLAN & PROFILE STA:116+50 TO STA:102+50	
116+115 TO 102+50 AERIAL CONCURRENT PROJECTS OR St Vrain Road Bridge, AB OR South St Vrain Road OR St Vrain Road Request Linework PROPOSED CONTOURS City of Longmont Division Open Channel Division		No. DATE DESCRIPTION REVISIONS BY		LEGEND FLOODPLAIN BENCH 5 YEAR OVERFLOW CHANNEL 15 YEAR OVERFLOW CHANNEL LARGE WOOD STRUCTURE PROTECT INFRASTRUCTURE OFFSET BURIED RETENTION PARCELS EXISTING BANK STABILIZATION 5 YEAR OVERFLOW CHANNEL 15 YEAR OVERFLOW CHANNEL MAIN CHANNEL ALIGNMENT BILLS BANQUET PROPOSED DITCH EXISTING DITCH		Matrix DESIGN GROUP AN EMPLOYEE OWNED COMPANY		FOR AND ON BEHALF OF MATRIX DESIGN GROUP, INC. PROJECT No. 16.612.003		DESIGNED BY: SDC DATE ISSUED: 10/17/16 DRAWN BY: JDI CHECKED BY: REK SCALE 1"= 20' SHEET 10 OF 42		DRAWING NO. MCPP 7	
<b>COMPUTER FILE MANAGEMENT</b> FILE NAME: R:116.612.003 (South St Vrain Creek Restoration)\Dwg\Construction Plans\PMPC01.dwg CTP FILE: --- PLOT GROUP: 10/25/2016 4:23 PM THIS DRAWING IS CURRENT AS OF PLOT DATE AND MAY BE SUBJECT TO CHANGE.													

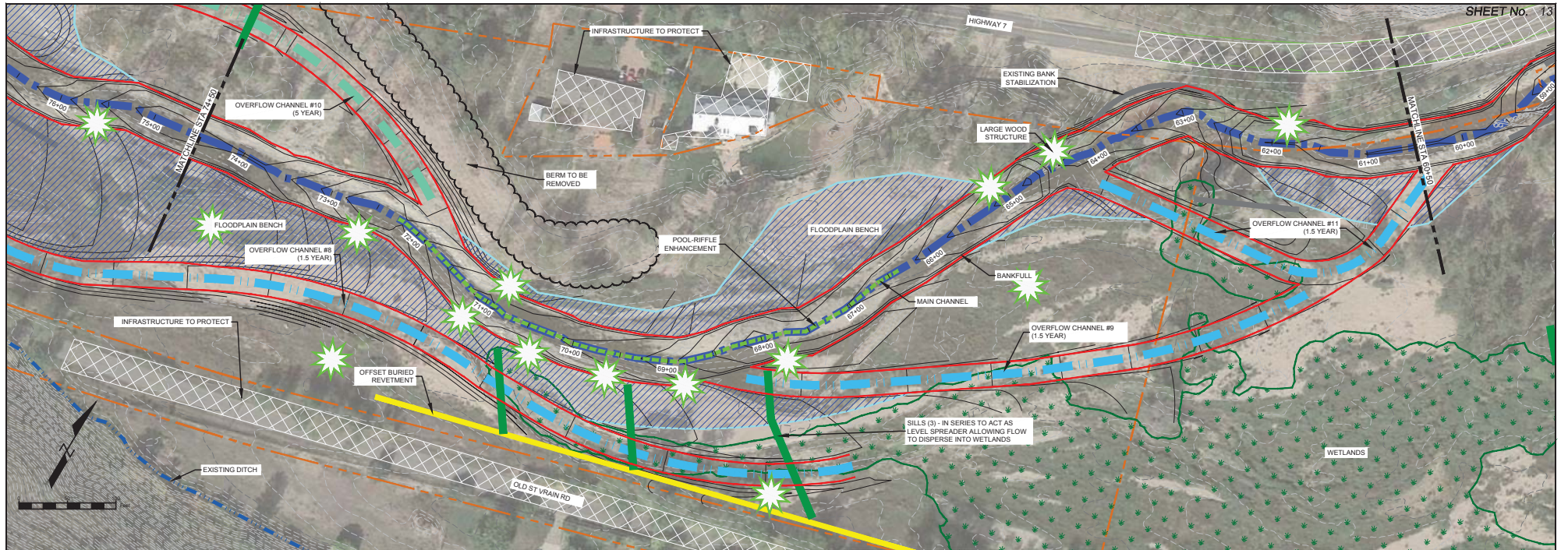








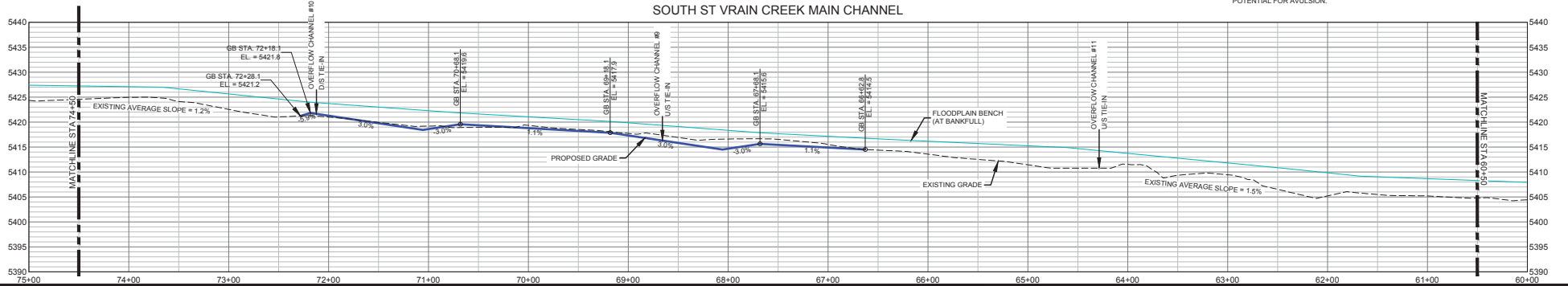




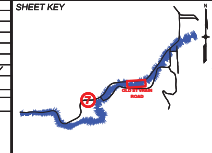
SHEET No. 13

- NOTE:
- OPTION TO STOP OVERFLOW CHANNEL #8 AT ENTRY TO WETLANDS AND PROVIDE SILL TO ENCOURAGE SHEET FLOW INTO WETLANDS.
  - MAIN CHANNEL ALIGNMENT TO BE EVALUATED TO INCREASE CHANNEL SINUOSITY BY ACTIVATING OVERFLOW CHANNEL #9 AS MAIN CHANNEL.
  - WETLAND DELINEATION PERFORMED DURING SUMMER OF 2016 BY ERO.
  - INCREASED BANK STABILIZATION TO BE PROVIDED ON MAIN CHANNEL TO LIMIT POTENTIAL FOR AVULSION.

### SOUTH ST VRAIN CREEK MAIN CHANNEL



REFERENCE DRAWINGS			
#10 TITL 160-000-220-01	APRILS		
CONCURRENT PROJECTS			
C&D St Vrain Road Bridge, Job			
C&D South St Vrain Road			
C&D, Engineering, Inc.			
Prepared by: [Signature]			
PROPOSED CONTOURS			
City of Longmont Division			
Civil Engineering Division			
COMPUTER FILE MANAGEMENT			
FILE NAME: R:\116.812.003 (South St Vrain Stream Restoration)\Dwg\Construction Plans\PPM01.dwg			
CIB FILE			
PLOT DATE: 10/31/2016 5:42 PM			
THIS DRAWING IS CURRENT AS OF PLOT DATE AND MAY BE SUBJECT TO CHANGE.			

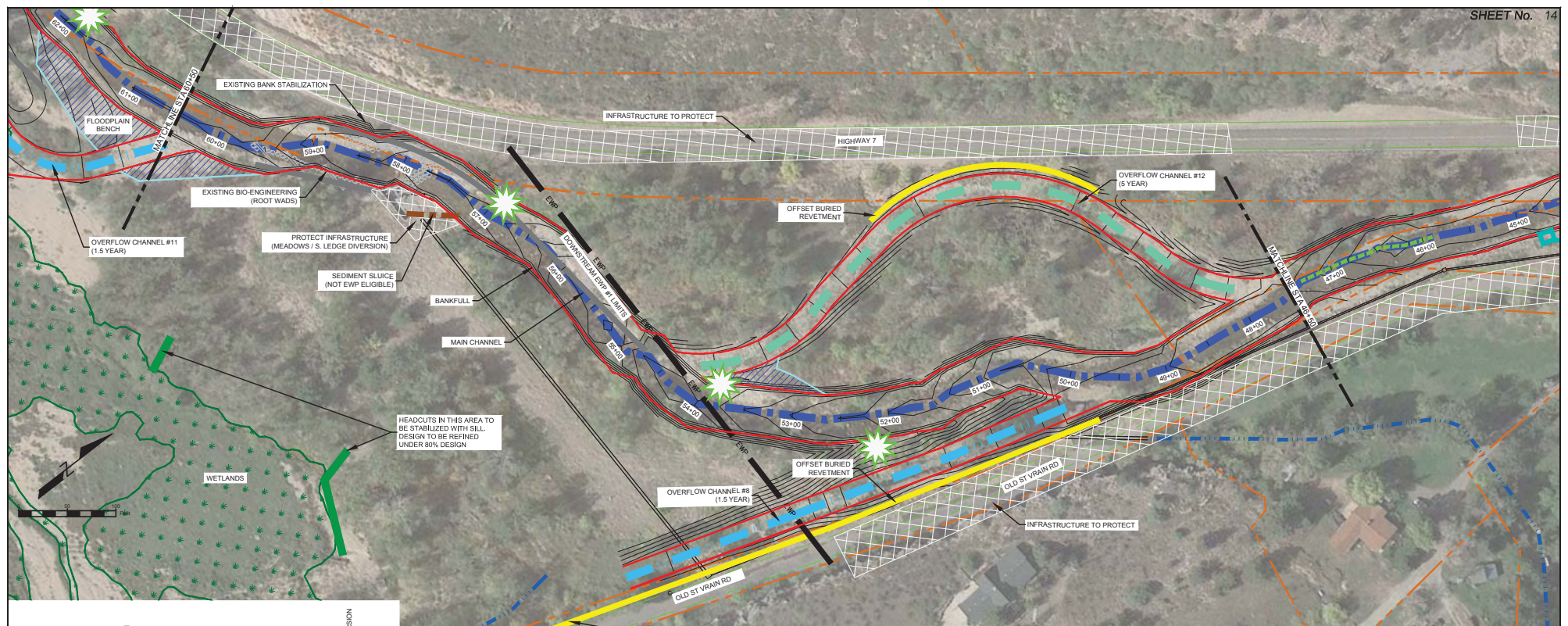


LEGEND	
[Blue dashed line]	FLOODPLAIN BENCH
[Green hatched area]	POOL-RIFLE ENHANCEMENT
[Green star symbol]	LARGE WOOD STRUCTURE
[Orange dashed line]	PROTECT INFRASTRUCTURE
[Yellow line]	OFFSET BURIED REVEITEMENT
[Black dashed line]	PARCELS
[Green hatched area]	EXISTING BANK STABILIZATION
[Blue dashed line]	1.5 YEAR OVERFLOW CHANNEL
[Green dashed line]	5 YEAR OVERFLOW CHANNEL
[Blue solid line]	MAIN CHANNEL ALIGNMENT
[Green solid line]	SILLS
[Green star symbol]	BANKFULL
[Blue dashed line]	PROPOSED DITCH
[Black dashed line]	EXISTING DITCH

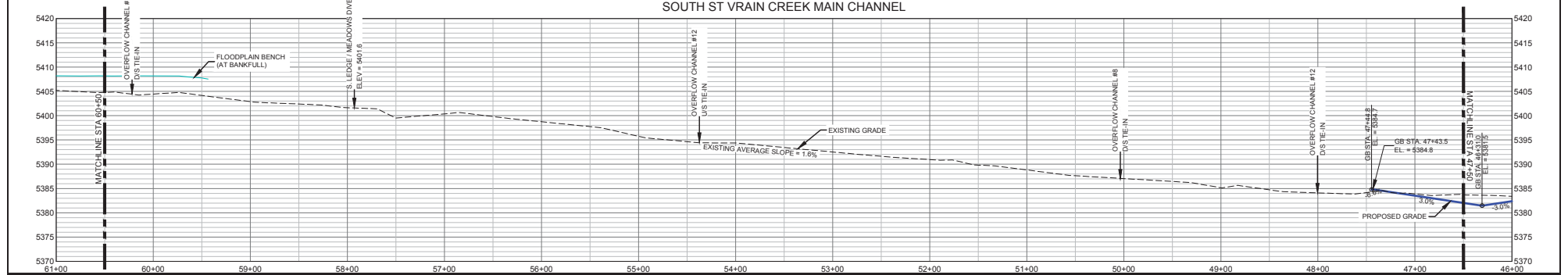
PREPARED FOR:  
Boulder County  
Parks & Open Space  
PREPARED BY:  
**Matrix**  
DESIGN GROUP  
100% EMPLOYEE OWNED COMPANY

PRELIMINARY THIS DRAWING HAS NOT BEEN APPROVED BY GOVERNING AGENCIES AND IS SUBJECT TO CHANGE	
FOR AND ON BEHALF OF MATRIX DESIGN GROUP, INC. PROJECT No. 16.812.003	
DESIGNED BY: [Signature]	DATE ISSUED: 10/17/16
CHECKED BY: [Signature]	SCALE: 1" = 10'
SUB: [Signature]	SHEET: 13 OF 62
DRW: [Signature]	MCPP 10

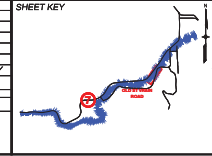




SOUTH ST VRAIN CREEK MAIN CHANNEL



REFERENCE DRAWINGS	
#10 TITLE BLOCK-2201	
#11 PLAN	
#12 CONCURRENT PROJECTS	
#13 OLD ST VRAIN ROAD BRIDGE, JAIL	
#14 OLD SOUTH ST VRAIN ROAD	
#15 DRAINAGE, EROSION	
#16 PREPARED LAYOUT	
#17 PROPOSED CONTOURS	
#18 CITY OF LONGMONT DIVISION	
#19 CROWN DIVISION	
COMPUTER FILE MANAGEMENT	
FILE NAME:	R:\16.812.003 (South St Vrain Stream Restoration)\Dwg\Construction Plans\PPMC01.dwg
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THIS DRAWING IS CURRENT AS OF PLOT DATE AND MAY BE SUBJECT TO CHANGE.	

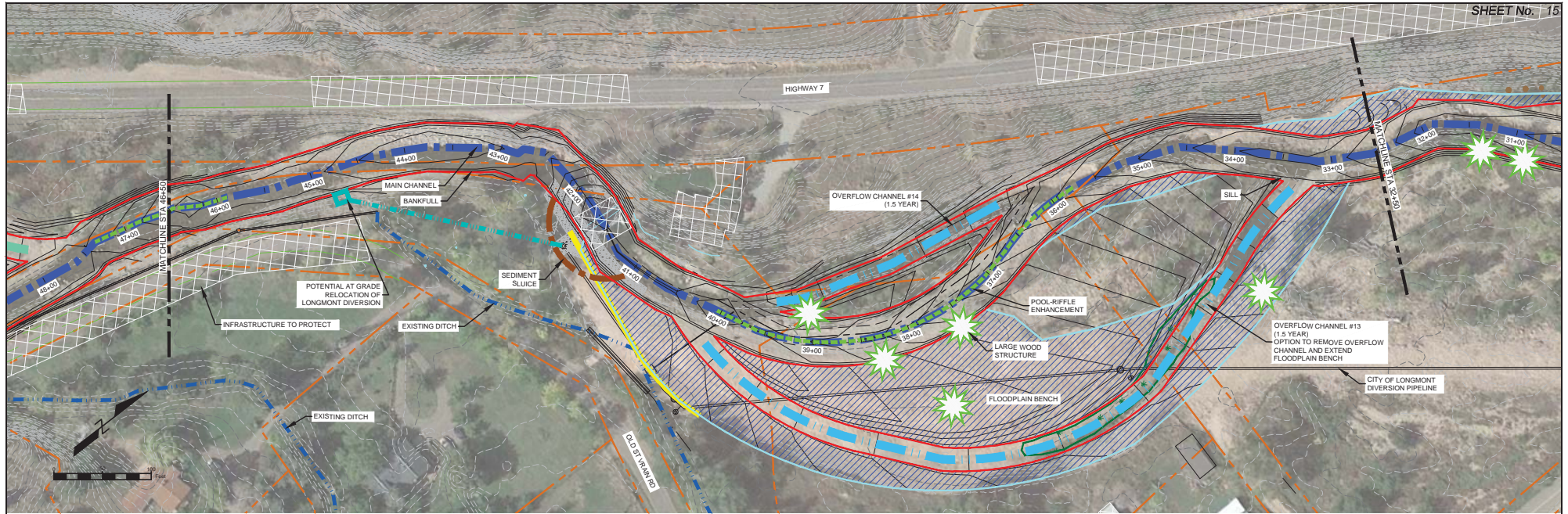


LEGEND	
[Symbol]	FLOODPLAIN BENCH
[Symbol]	POOL-RIPPLE ENHANCEMENT
[Symbol]	LARGE WOOD STRUCTURE
[Symbol]	PROTECT INFRASTRUCTURE
[Symbol]	OFFSET BURIED REVELTMENT
[Symbol]	PARCELS
[Symbol]	EXISTING BANK STABILIZATION
[Symbol]	1.5 YEAR OVERFLOW CHANNEL
[Symbol]	5 YEAR OVERFLOW CHANNEL
[Symbol]	MAIN CHANNEL ALIGNMENT
[Symbol]	SILLS
[Symbol]	BANKFULL
[Symbol]	PROPOSED DITCH
[Symbol]	EXISTING DITCH

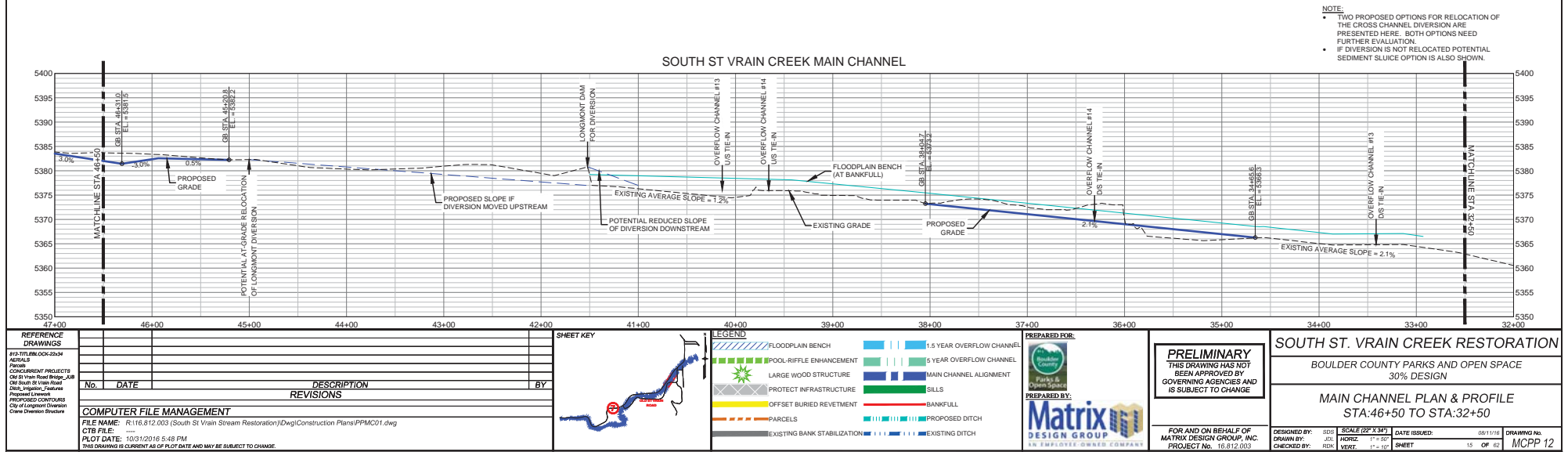
PREPARED FOR:  
Boulder County  
Parks & Open Space  
PREPARED BY:  
Matrix  
DESIGN GROUP  
AN EMPLOYEE OWNED COMPANY

SOUTH ST. VRAIN CREEK RESTORATION			
BOULDER COUNTY PARKS AND OPEN SPACE 30% DESIGN			
MAIN CHANNEL PLAN & PROFILE STA:60+50 TO STA:46+50			
PRELIMINARY THIS DRAWING HAS NOT BEEN APPROVED BY GOVERNING AGENCIES AND IS SUBJECT TO CHANGE			
FOR AND ON BEHALF OF MATRIX DESIGN GROUP, INC. PROJECT No. 16.812.003			
DESIGNED BY:	SDB	SCALE: 1/2" = 1'	DATE ISSUED: 08/11/16
CHECKED BY:	JK	HORIZ. 1" = 20'	DRAWING No. MCPP 11
	RD	VERT. 1" = 10'	
		SHEET	14 OF 62

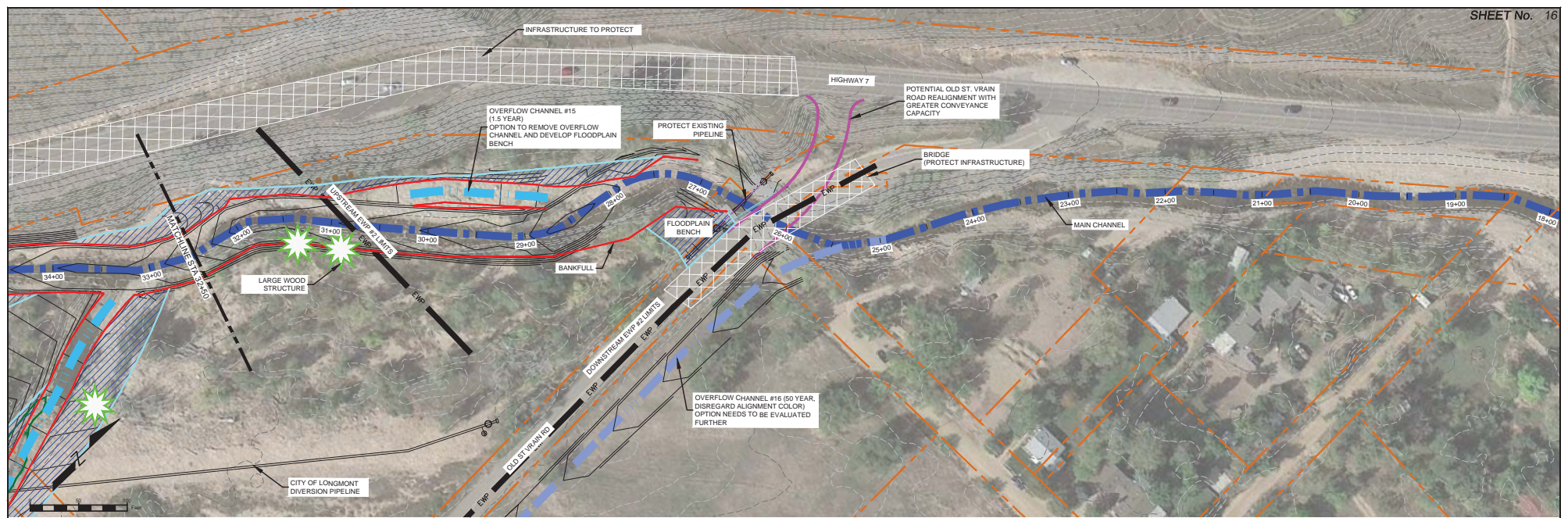




SHEET No. 15

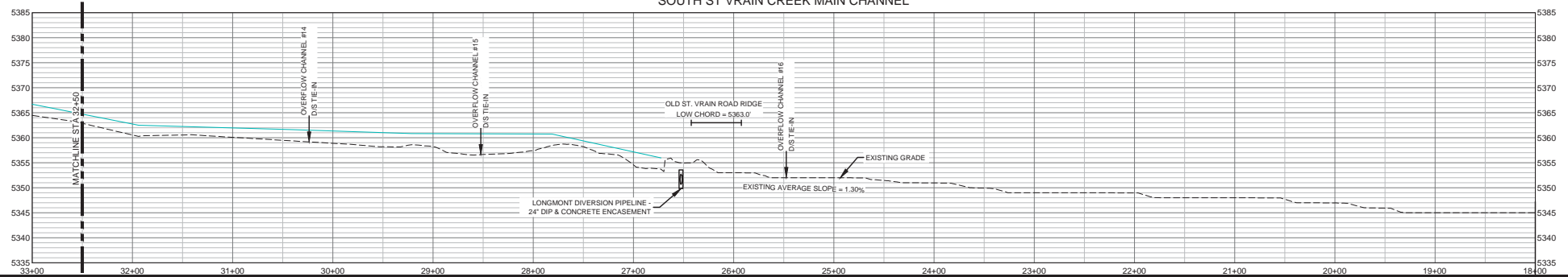






NOTE:  
FURTHER EVALUATION OF ROAD OVERTOPPING NEEDS TO BE PERFORMED. BRIDGE AND DOWNSTREAM CHANNEL HAS INADEQUATE CAPACITY FOR LARGE FLOOD EVENTS. SEE DESIGN REPORT FOR MORE INFORMATION.

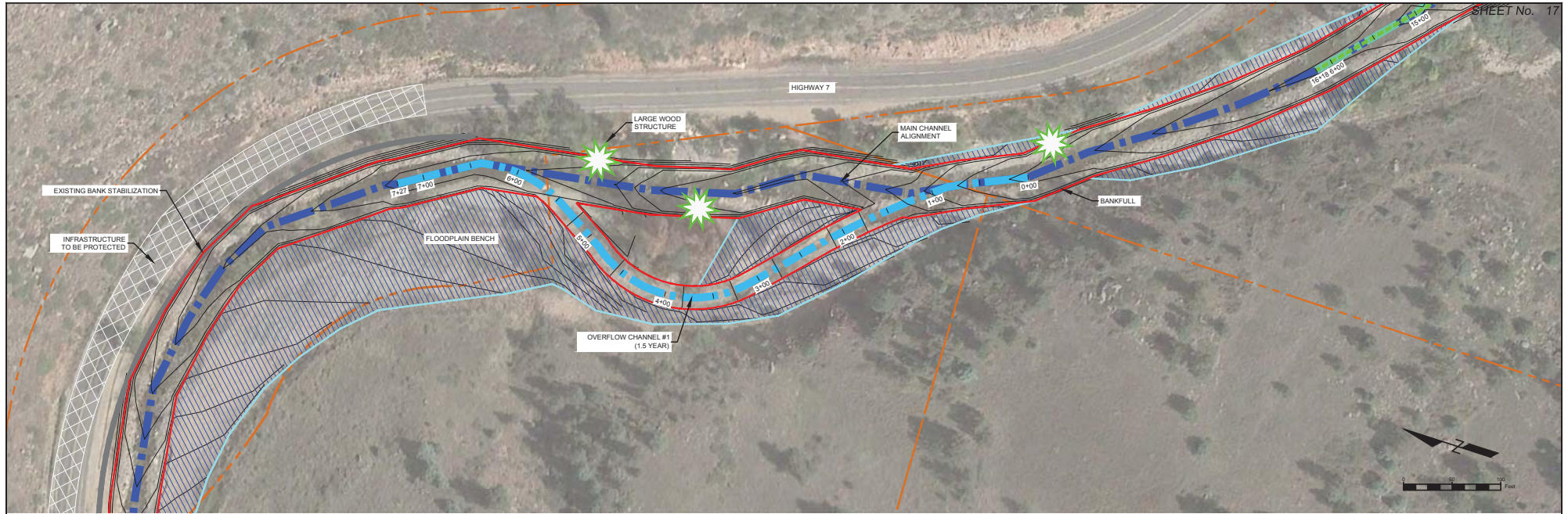
SOUTH ST VRAIN CREEK MAIN CHANNEL



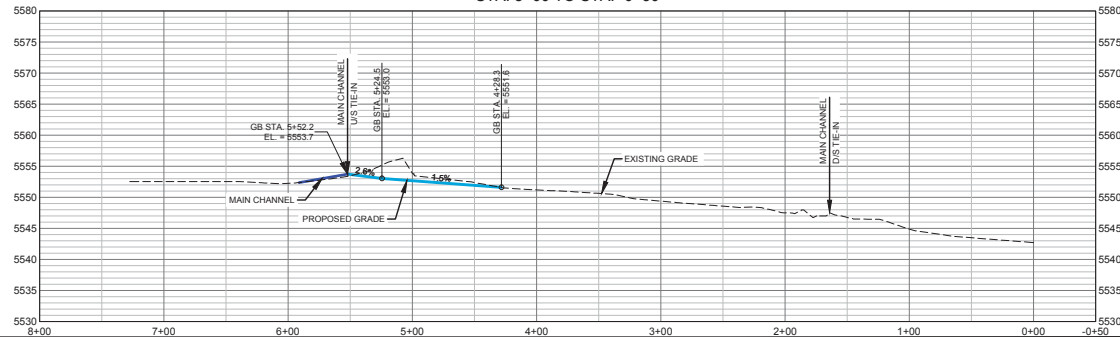
<b>REFERENCE DRAWINGS</b>		<b>SHEET KEY</b>		<b>LEGEND</b>		<b>PREPARED FOR:</b>		<b>PRELIMINARY</b>		<b>SOUTH ST. VRAIN CREEK RESTORATION</b>	
#10 TITLE BLOCK-2504		[Symbol] FLOODPLAIN BENCH		[Symbol] 1.5 YEAR OVERFLOW CHANNEL		[Symbol] BOULDER COUNTY PARKS AND OPEN SPACE		[Symbol] THIS DRAWING HAS NOT BEEN APPROVED BY GOVERNING AGENCIES AND IS SUBJECT TO CHANGE		30% DESIGN	
#11 AERIALS		[Symbol] POOL-RIFFLE ENHANCEMENT		[Symbol] 5 YEAR OVERFLOW CHANNEL		[Symbol] PREPARED BY:		[Symbol] FOR AND ON BEHALF OF		DESIGNED BY:	
#12 CONCURRENT PROJECTS		[Symbol] LARGE WOOD STRUCTURE		[Symbol] MAIN CHANNEL ALIGNMENT		[Symbol] Matrix		[Symbol] MATRIX DESIGN GROUP, INC.		DRAWN BY:	
#13 Old South St Vrain Road		[Symbol] PROTECT INFRASTRUCTURE		[Symbol] SILLS		[Symbol] 15 EMPLOYEE OWNED COMPANY		[Symbol] PROJECT No. 16.812.003		CHECKED BY:	
#14 Old South St Vrain Road		[Symbol] OFFSET BURIED REVEITEMT		[Symbol] BANKFULL						SCALE (2" = 50')	
#15 Old South St Vrain Road		[Symbol] PARCELS		[Symbol] PROPOSED DITCH						DATE ISSUED:	
#16 Old South St Vrain Road		[Symbol] EXISTING BANK STABILIZATION		[Symbol] EXISTING DITCH						10/31/2016	
#17 Old South St Vrain Road										SHEET	
#18 Old South St Vrain Road										16 OF 62	
#19 Old South St Vrain Road										MCPP 13	
#20 Old South St Vrain Road											
#21 Old South St Vrain Road											
#22 Old South St Vrain Road											
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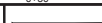

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PLOT DATE: 10/31/2016 5:46 PM  
THIS DRAWING IS CURRENT AS OF PLOT DATE AND MAY BE SUBJECT TO CHANGE.





OVERFLOW CHANNEL #1  
SOUTH ST VRAIN CREEK PROPOSED 1.5 YEAR OVERFLOW CHANNEL  
STA: 8+00 TO STA: -0+50

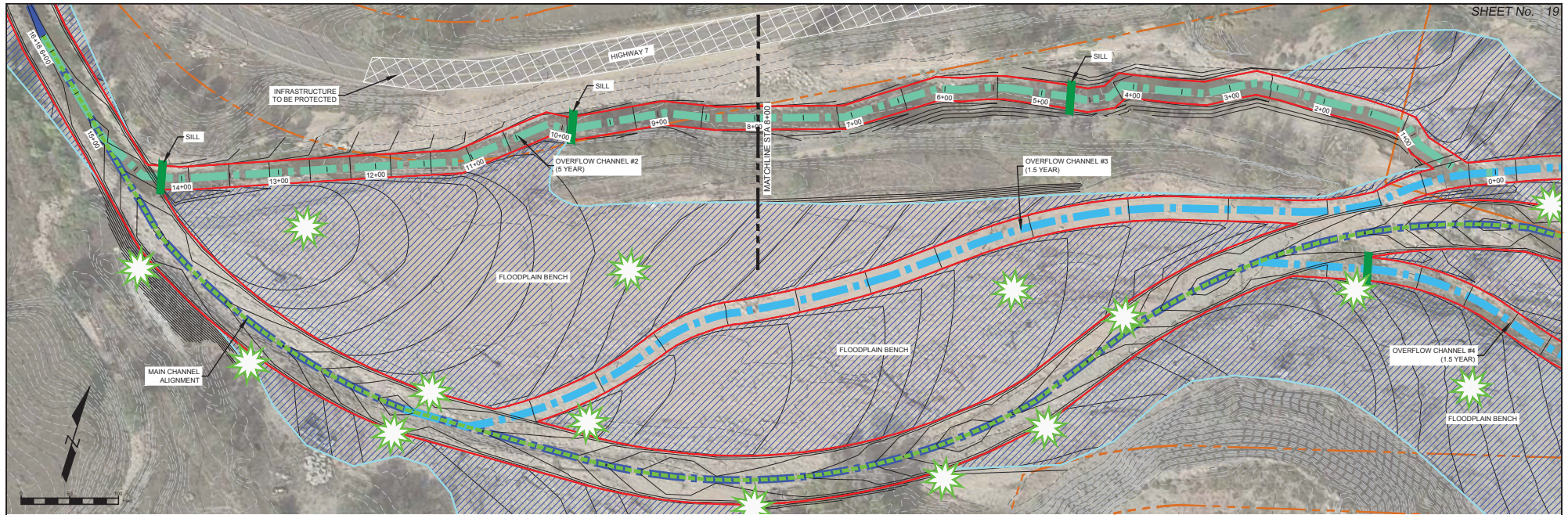


REFERENCE DRAWINGS				SHEET KEY				LEGEND				PREPARED FOR:  PREPARED BY: 		PRELIMINARY THIS DRAWING HAS NOT BEEN APPROVED BY GOVERNING AGENCIES AND IS SUBJECT TO CHANGE		SOUTH ST. VRAIN CREEK RESTORATION BOULDER COUNTY PARKS AND OPEN SPACE 30% DESIGNS OVERFLOW CHANNEL #1 PLAN & PROFILE	
R116.812.003-2203 AERIALS CONCURRENT PROJECTS C&G St. Vrain Road Bridge, J&B C&G St. Vrain Road Bridge, J&B Proposed Channel PROPOSED CHANNELS City of Longmont Division Creek Division Structure	No.	DATE	DESCRIPTION	BY	COMPUTER FILE MANAGEMENT FILE NAME: R116.812.003 (South St Vrain Stream Restoration)/Dwg/Construction Plans/PP0C01.dwg CIB FILE: --- PLOT DATE: 10/25/2016 4:33 PM THIS DRAWING IS CURRENT AS OF PLOT DATE AND MAY BE SUBJECT TO CHANGE.		REVISIONS		FOR AND ON BEHALF OF: MATRIX DESIGN GROUP, INC. PROJECT No. 16.812.003		DESIGNED BY: SDS DRAWN BY: RIM CHECKED BY: RIM SCALE: 1/2" = 1'-0" DATE ISSUED: 10/17/16 SHEET: 17 OF 62 DRAWING No. OCPP1						



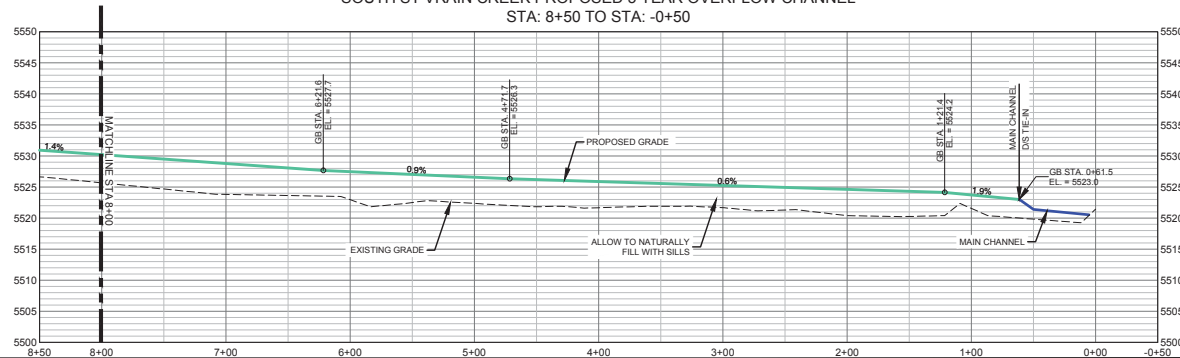




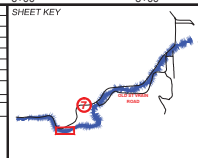


SHEET No. 19

**OVERFLOW CHANNEL #2**  
**SOUTH ST VRAIN CREEK PROPOSED 5 YEAR OVERFLOW CHANNEL**  
**STA: 8+50 TO STA: -0+50**



REFERENCE	DATE	DESCRIPTION	BY
DRAWINGS		REVISIONS	
1.01 TITLE BLOCK-22031			
1.02 AERIALS			
1.03 CONCURRENT PROJECTS			
1.04 C&G ST VRAIN ROAD BRIDGE			
1.05 C&G SOUTH ST VRAIN ROAD			
1.06 C&G SOUTHWEST			
1.07 PROPOSED CONTOURS			
1.08 CITY OF LONGMONT DIVISION			
1.09 C&G DIVISION			



LEGEND	DESCRIPTION
[Blue line]	1.5 YEAR OVERFLOW CHANNEL
[Green line]	5 YEAR OVERFLOW CHANNEL
[Red line]	MAIN CHANNEL ALIGNMENT
[Green star]	SILLS
[Blue star]	BANKFULL
[Blue dashed line]	PROPOSED DITCH
[Blue solid line]	EXISTING DITCH
[Blue hatched area]	FLOODPLAIN BENCH
[Green hatched area]	POOL-RIPPLE ENHANCEMENT
[Blue hatched area]	LARGE WOOD STRUCTURE
[Blue hatched area]	PROTECT INFRASTRUCTURE
[Blue hatched area]	OFFSET BURIED REVEITEMENT
[Blue hatched area]	PARCELS
[Blue hatched area]	EXISTING BANK STABILIZATION

PREPARED FOR:

PREPARED BY:

**Matrix**  
**DESIGN GROUP**  
 AN EMPLOYEE OWNED COMPANY

**PRELIMINARY**  
 THIS DRAWING HAS NOT  
 BEEN APPROVED BY  
 GOVERNING AGENCIES AND  
 IS SUBJECT TO CHANGE

FOR AND ON BEHALF OF  
 MATRIX DESIGN GROUP, INC.  
 PROJECT NO. 16.812.003

SOUTH ST. VRAIN CREEK RESTORATION			
BOULDER COUNTY PARKS AND OPEN SPACE 30% DESIGNS			
OVERFLOW CHANNEL #2 PLAN & PROFILE STA: 8+00 TO STA: 0+00			
DESIGNED BY:	SOS	SCALE: 1/2" = 1'-0"	DATE ISSUED: 10/17/16
CHECKED BY:	RM	HORIZ. 1" = 50'	DRAWING NO. OCPP3
	RD	VERT. 1" = 10'	
		SHEET 19 OF 62	

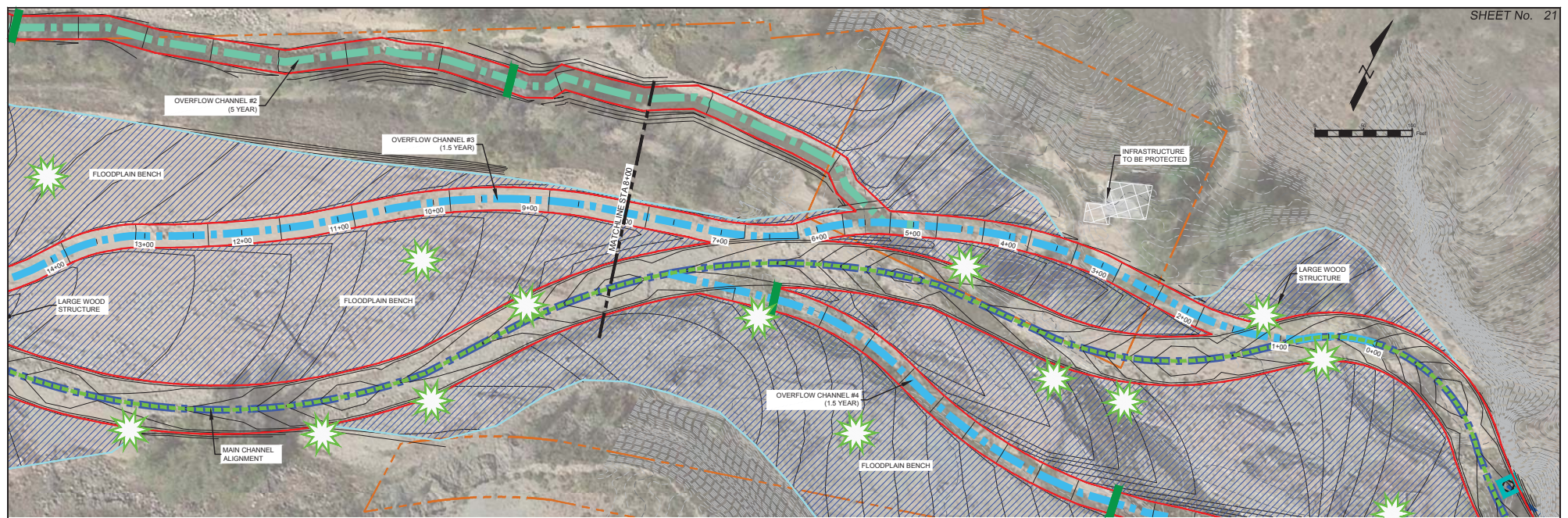


Profile view showing the proposed main channel and existing ground. The profile includes the following data points and labels:

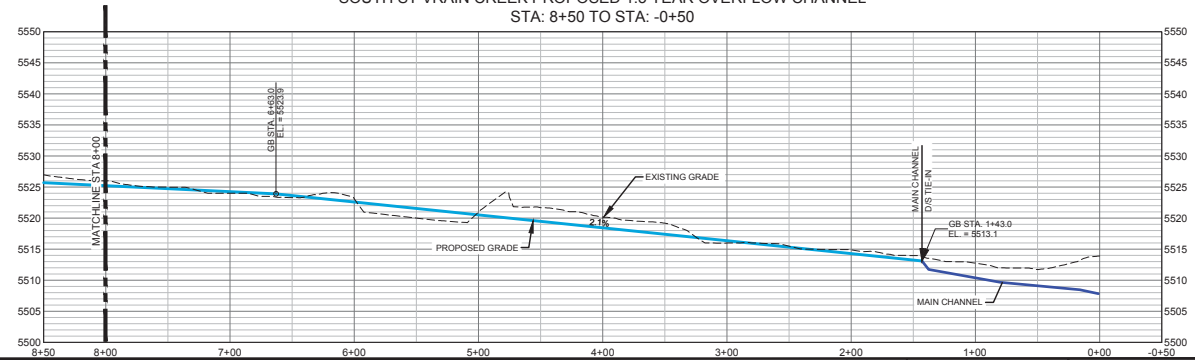
- GB STA. 16+62.1 (EL. = 5534.2)
- MAIN CHANNEL
- U.S. T.E.N.
- EXISTING GRADE
- PROPOSED GRADE
- GB STA. 10+65.2 (EL. = 5528.0)
- MATCHLINE STA+00

REFERENCE DRAWINGS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
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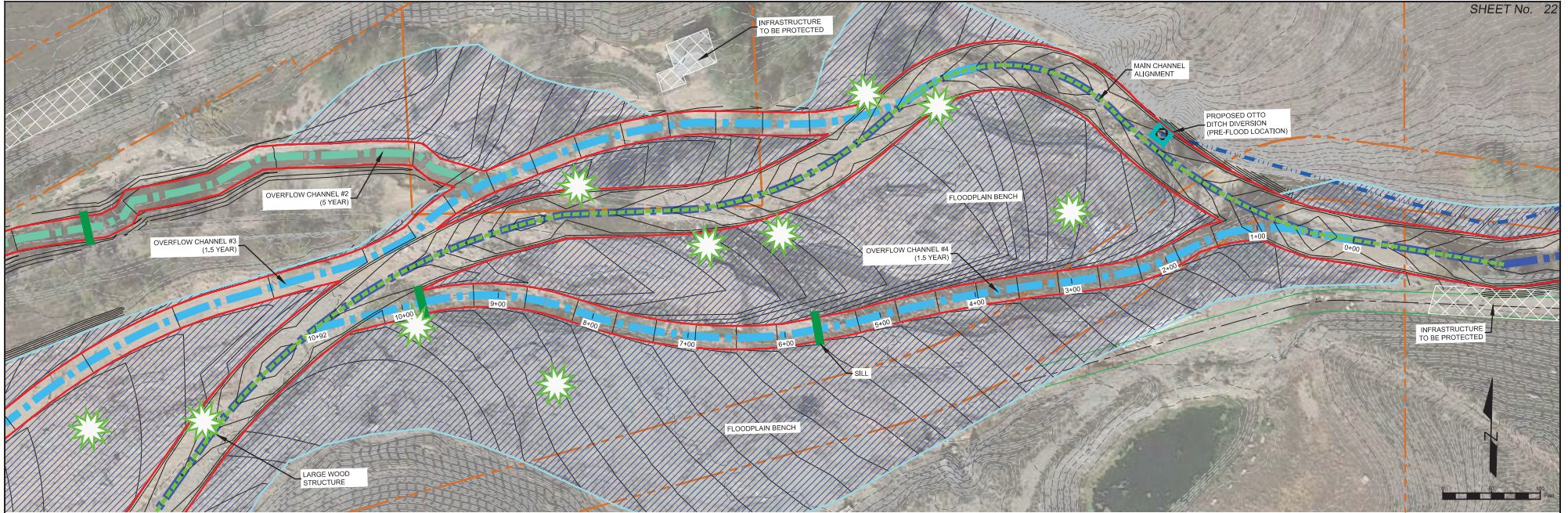


OVERFLOW CHANNEL #3  
SOUTH ST VRAIN CREEK PROPOSED 1.5 YEAR OVERFLOW CHANNEL  
STA: 8+50 TO STA: 0+50

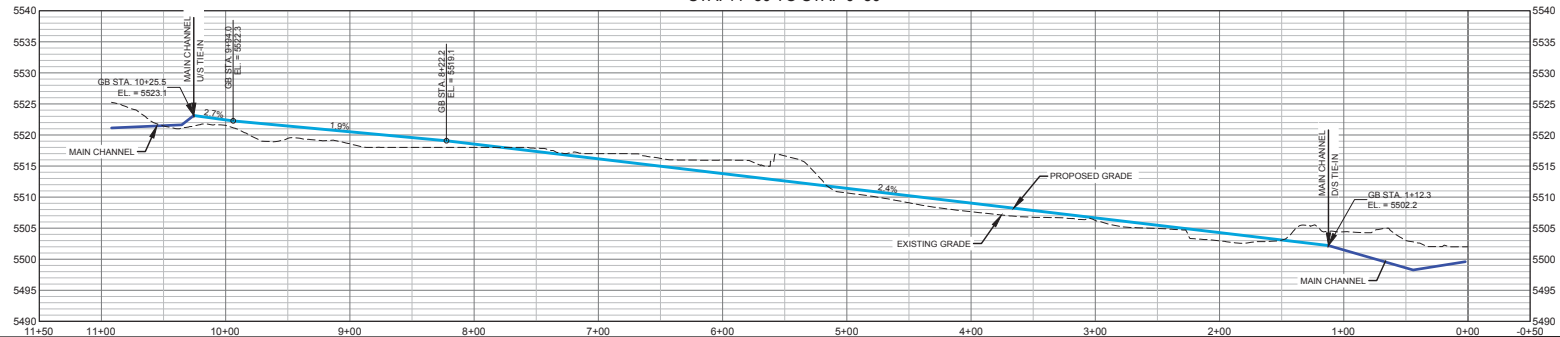


<b>REFERENCE DRAWINGS</b> B10 TITLE BLOCK-22031 AERIALS CONCURRENT PROJECTS CDE St Vrain Road Bridge Job Old South St Vrain Road Design/Construct/Build Proposed Channel PROPOSED CONTOURS City of Longmont Openness Center Division Structure		<b>COMPUTER FILE MANAGEMENT</b> FILE NAME: R:116.812.003 (South St Vrain Stream Restoration)\Dwg\Construction Plans\PP0C01.dwg CIB FILE: --- PLOT DATE: 10/25/2016 4:35 PM THIS DRAWING IS CURRENT AS OF PLOT DATE AND MAY BE SUBJECT TO CHANGE.		<b>REVISIONS</b> <table border="1"> <thead> <tr> <th>No.</th> <th>DATE</th> <th>DESCRIPTION</th> <th>BY</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>		No.	DATE	DESCRIPTION	BY					<b>SHEET KEY</b> 		<b>LEGEND</b> <table border="1"> <tr> <td></td> <td>FLOODPLAIN BENCH</td> <td></td> <td>1.5 YEAR OVERFLOW CHANNEL</td> </tr> <tr> <td></td> <td>POOL-RIFFLE ENHANCEMENT</td> <td></td> <td>5 YEAR OVERFLOW CHANNEL</td> </tr> <tr> <td></td> <td>LARGE WOOD STRUCTURE</td> <td></td> <td>MAIN CHANNEL ALIGNMENT</td> </tr> <tr> <td></td> <td>PROTECT INFRASTRUCTURE</td> <td></td> <td>SILLS</td> </tr> <tr> <td></td> <td>OFFSET BURIED REVETMENT</td> <td></td> <td>BANKFULL</td> </tr> <tr> <td></td> <td>PARCELS</td> <td></td> <td>PROPOSED DITCH</td> </tr> <tr> <td></td> <td>EXISTING BANK STABILIZATION</td> <td></td> <td>EXISTING DITCH</td> </tr> </table>			FLOODPLAIN BENCH		1.5 YEAR OVERFLOW CHANNEL		POOL-RIFFLE ENHANCEMENT		5 YEAR OVERFLOW CHANNEL		LARGE WOOD STRUCTURE		MAIN CHANNEL ALIGNMENT		PROTECT INFRASTRUCTURE		SILLS		OFFSET BURIED REVETMENT		BANKFULL		PARCELS		PROPOSED DITCH		EXISTING BANK STABILIZATION		EXISTING DITCH	<b>PREPARED FOR:</b>  <b>PREPARED BY:</b>  AN EMPLOYEE OWNED COMPANY		<b>PRELIMINARY</b> THIS DRAWING HAS NOT BEEN APPROVED BY GOVERNING AGENCIES AND IS SUBJECT TO CHANGE.		<b>SOUTH ST. VRAIN CREEK RESTORATION</b> BOULDER COUNTY PARKS AND OPEN SPACE 30% DESIGNS <b>OVERFLOW CHANNEL # 3 PLAN &amp; ROFILE</b> STA: 8+00 TO STA: 0+00	
No.	DATE	DESCRIPTION	BY																																																
	FLOODPLAIN BENCH		1.5 YEAR OVERFLOW CHANNEL																																																
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FOR AND ON BEHALF OF MATRIX DESIGN GROUP, INC. PROJECT NO. 16.812.003		DESIGNED BY: SDS CHECKED BY: RDM SCALE: 1" = 40' HORIZ. 1" = 10' VERT.		DATE ISSUED: 10/17/16 SHEET: 21 OF 62		DRAWING NO.: OCPP5																																													





OVERFLOW CHANNEL #4  
SOUTH ST VRAIN CREEK PROPOSED 1.5 YEAR OVERFLOW CHANNEL  
STA: 11+50 TO STA: -0+50



<b>REFERENCE DRAWINGS</b>		<b>REVISIONS</b>		<b>COMPUTER FILE MANAGEMENT</b>	
R116.812.003 (South St Vrain Stream Restoration)DWG/Construction Plans/PP0C01.dwg		No. DATE DESCRIPTION		FILE NAME: R116.812.003 (South St Vrain Stream Restoration)DWG/Construction Plans/PP0C01.dwg	
CIB FILE: 10/25/2016 4:36 PM		BY		CIB FILE: 10/25/2016 4:36 PM	
THIS DRAWING IS CURRENT AS OF PLOT DATE AND MAY BE SUBJECT TO CHANGE.				THIS DRAWING IS CURRENT AS OF PLOT DATE AND MAY BE SUBJECT TO CHANGE.	

**SHEET KEY**

**LEGEND**

- FLOODPLAIN BENCH
- 1.5 YEAR OVERFLOW CHANNEL
- 5 YEAR OVERFLOW CHANNEL
- LARGE WOOD STRUCTURE
- MAIN CHANNEL ALIGNMENT
- PROTECT INFRASTRUCTURE
- OFFSET BURIED REVEITEMENT
- PARCELS
- EXISTING BANK STABILIZATION
- EXISTING DITCH
- PROPOSED DITCH
- BANKFULL

**PRELIMINARY**

THIS DRAWING HAS NOT BEEN APPROVED BY GOVERNING AGENCIES AND IS SUBJECT TO CHANGE

**SOUTH ST. VRAIN CREEK RESTORATION**

BOULDER COUNTY PARKS AND OPEN SPACE  
30% DESIGNS

**OVERFLOW CHANNEL #4 PLAN & PROFILE**

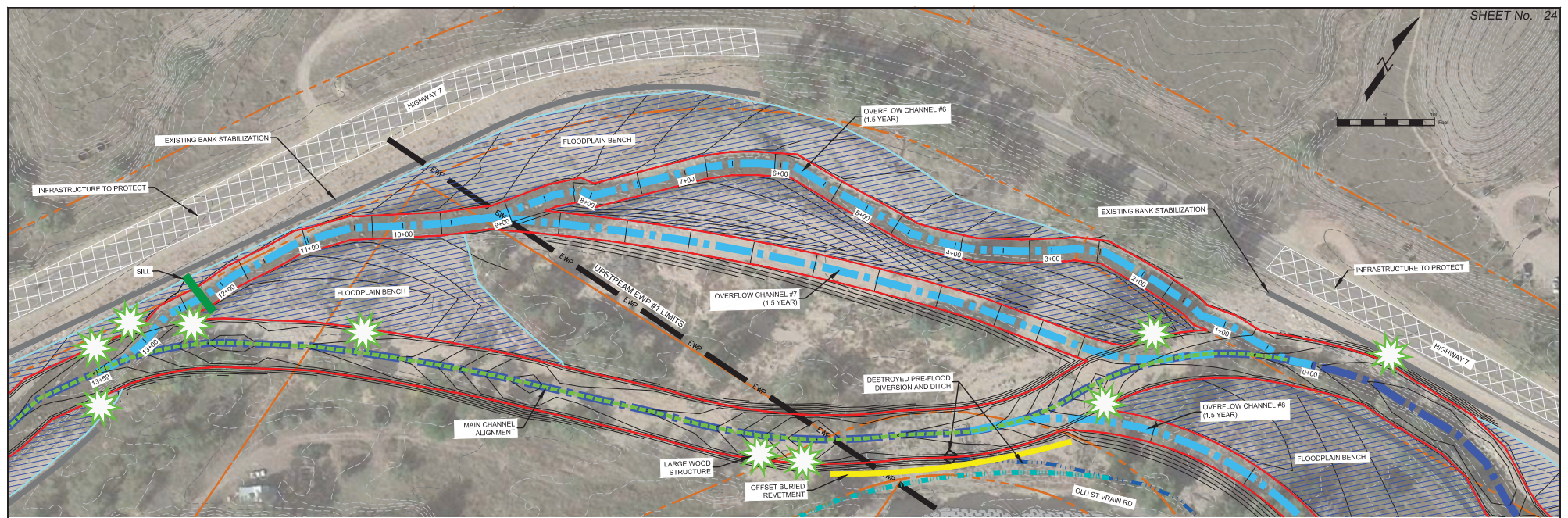
**FOR AND ON BEHALF OF**  
MATRIX DESIGN GROUP, INC.  
PROJECT NO. 16.812.003

**DESIGNED BY:** SDS  
**CHECKED BY:** RDK  
**SCALE:** 1" = 40'  
**DATE ISSUED:** 10/17/16  
**SHEET:** 22 OF 62  
**DRAWING NO.:** OCPP6



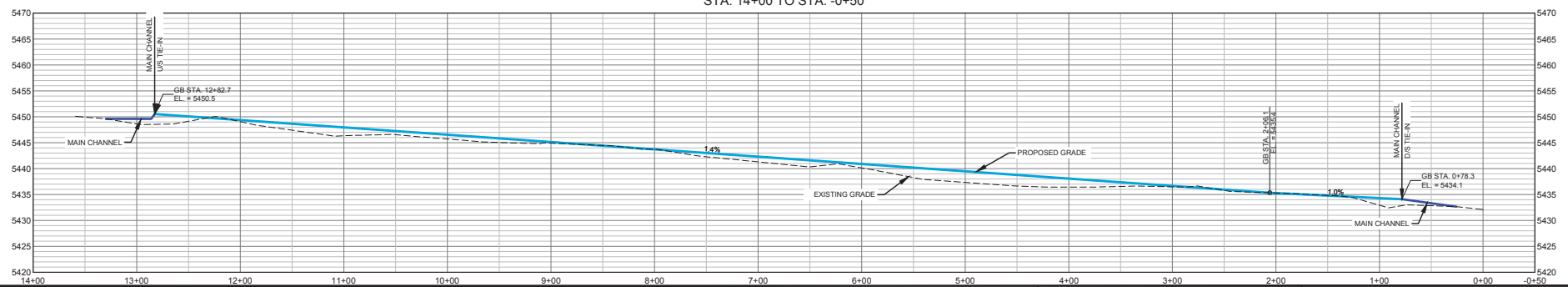






OVERFLOW CHANNEL #6  
SOUTH ST VRAIN CREEK PROPOSED 1.5 YEAR OVERFLOW CHANNEL  
STA: 14+00 TO STA: -0+50

**EWP NOTE:**  
• PROPOSED DESIGN FOR CONSTRUCTION  
ELIGIBLE ASPECTS TO BE EVALUATED  
BASED UPON DIRECTION BY BCPOS. (MAIN  
CHANNEL VS. OVERFLOW CHANNEL)

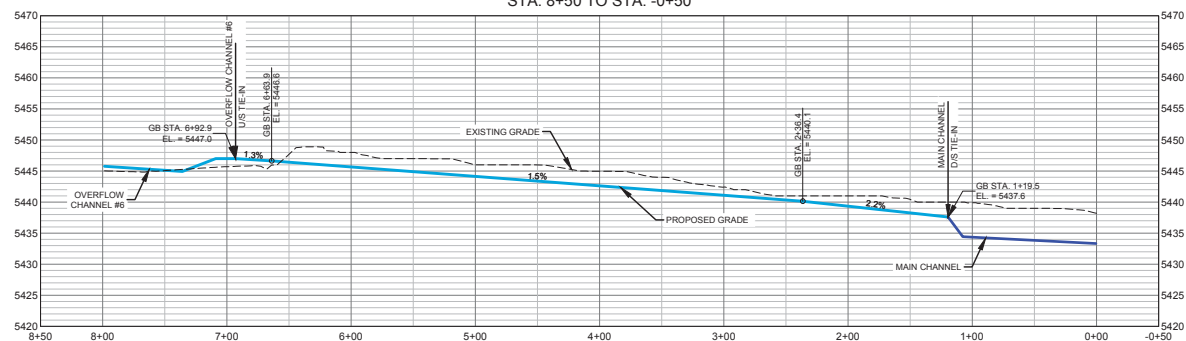


<b>REFERENCE DRAWINGS</b>		<b>SHEET KEY</b>		<b>LEGEND</b>		<b>PREPARED FOR:</b>		<b>PRELIMINARY</b> THIS DRAWING HAS NOT BEEN APPROVED BY GOVERNING AGENCIES AND IS SUBJECT TO CHANGE		<b>SOUTH ST. VRAIN CREEK RESTORATION</b> BOULDER COUNTY PARKS AND OPEN SPACE 30% DESIGNS	
R116.812.003-2203 AERIALS CONCURRENT PROJECTS Old St Vrain Road Bridge, AB Old St Vrain Road Bridge, AB Old St Vrain Road Bridge, AB Proposed Channel PROPOSED CHANNELS City of Longmont Division Creek Diversion Structure										<b>OVERFLOW CHANNEL #6 PLAN &amp; PROFILE</b>	
<b>COMPUTER FILE MANAGEMENT</b> FILE NAME: R116.812.003 (South St Vrain Stream Restoration)\\Dwg\\Construction Plans\\PPOC01.dwg CTB FILE: — PLOT DATE: 10/25/2016 4:37 PM THIS DRAWING IS CURRENT AS OF PLOT DATE AND MAY BE SUBJECT TO CHANGE.								<b>FOR AND ON BEHALF OF</b> MATRIX DESIGN GROUP, INC. PROJECT NO. 16.812.003		<b>DESIGNED BY:</b> SDS <b>CHECKED BY:</b> RDK <b>SCALE:</b> 1/2" = 1'-0" <b>DATE ISSUED:</b> 10/17/16 <b>SHEET:</b> 24 OF 62 <b>DRAWING NO.:</b> OCPP8	

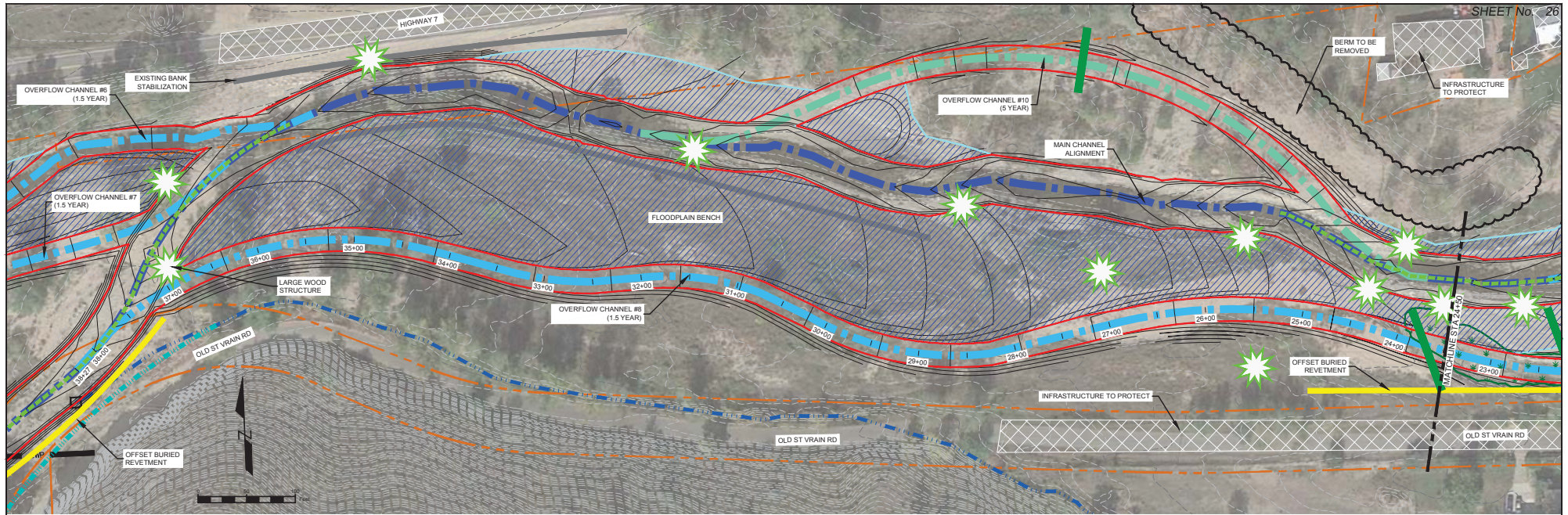


**EWP NOTE:**

- PROPOSED DESIGN FOR CONSTRUCTION ELIGIBLE ASPECTS TO BE EVALUATED BASED UPON DIRECTION BY BCPOS. (MAIN CHANNEL VS. OVERFLOW CHANNEL)

[illegible]

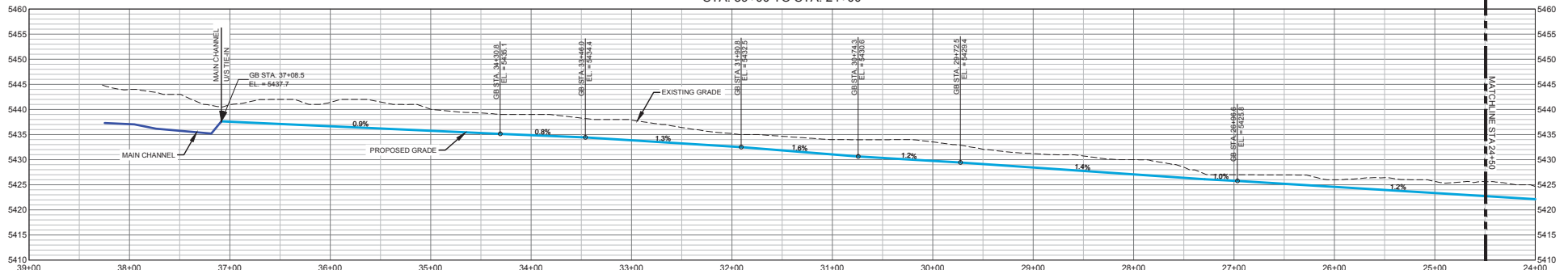




SHEET No. 26

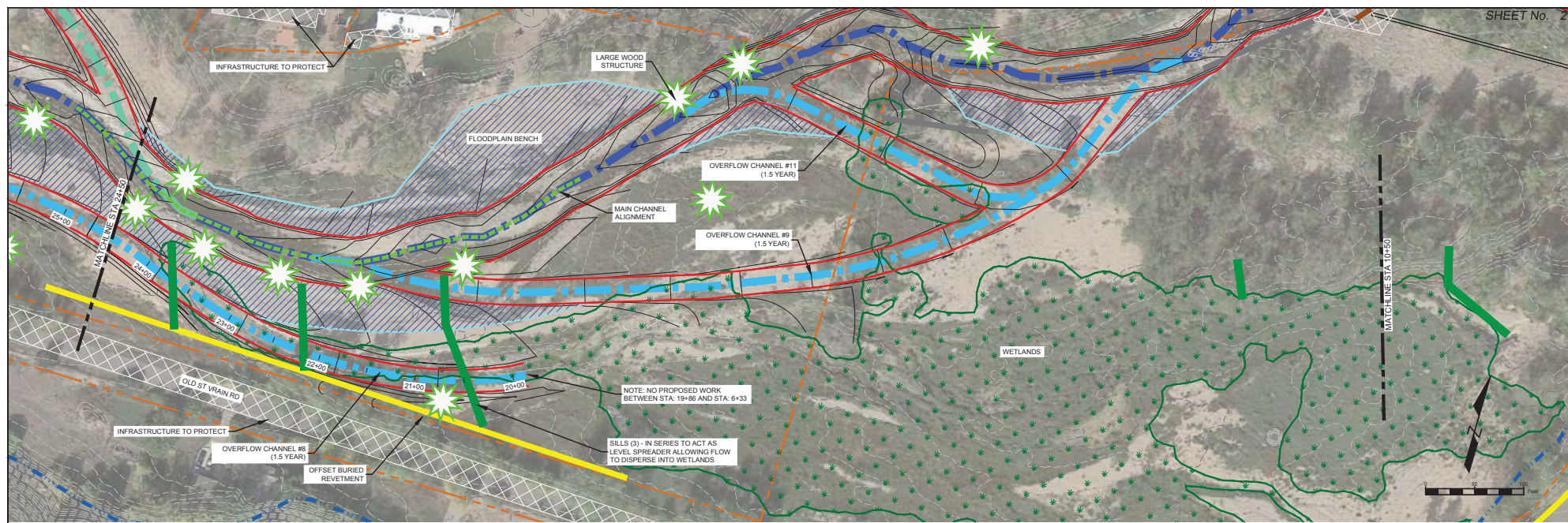
# OVERFLOW CHANNEL #8 SOUTH ST VRAIN CREEK PROPOSED 5 YEAR OVERFLOW CHANNEL STA: 39+00 TO STA: 24+00

- NOTES:**
- OVERFLOW CHANNEL 8 WILL REQUIRE EXTENSIVE GRADING. OPTION TO DEVELOP EITHER 5 YEAR OVERFLOW CHANNEL OR FLOODPLAIN BENCH HERE
  - OVERFLOW CHANNEL #10 AS MAIN CHANNEL OR MODIFYING EXISTING CREEK ALIGNMENT
  - WIP NOTE: PROPOSED DESIGN FOR CONSTRUCTION ELIGIBLE ASPECTS TO BE EVALUATED BASED UPON DIRECTION BY BCPOS. (MAIN CHANNEL VS. OVERFLOW CHANNEL)

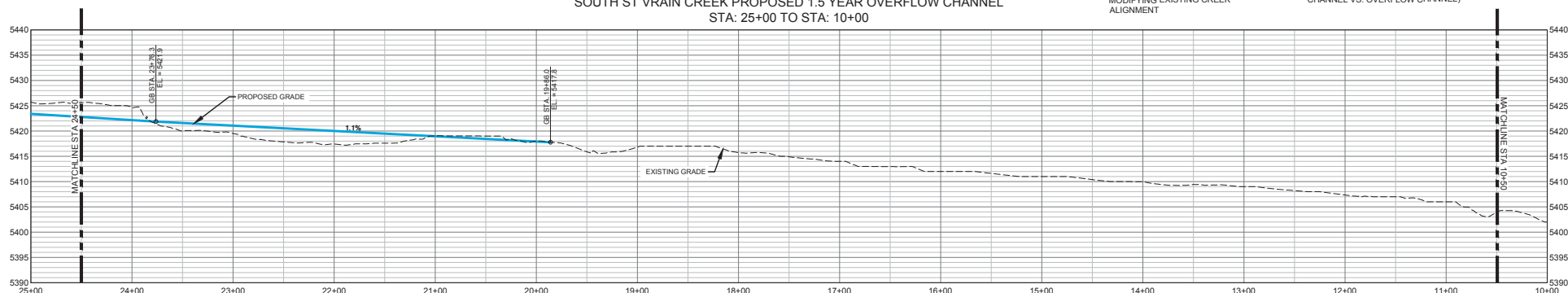


<b>REFERENCE DRAWINGS</b> R116.812.003-2203 AERIALS CONCURRENT PROJECTS Old St Vrain Road Bridge, A-08 Old South St Vrain Road Old St Vrain Road Proposed Channel PROPOSED CONTOURS City of Longmont Division Creek Division Structure		<b>COMPUTER FILE MANAGEMENT</b> FILE NAME: R116.812.003 (South St Vrain Stream Restoration)/Dwg/Construction Plans/PP0C01.dwg CFB FILE: PLOT DATE: 10/25/2016 4:38 PM THIS DRAWING IS CURRENT AS OF PLOT DATE AND MAY BE SUBJECT TO CHANGE.		<b>DESCRIPTION REVISIONS</b> <table border="1"> <thead> <tr> <th>No.</th> <th>DATE</th> <th>DESCRIPTION</th> <th>BY</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>		No.	DATE	DESCRIPTION	BY					<b>SHEET KEY</b> 		<b>LEGEND</b> <table border="1"> <tr> <td></td> <td>FLOODPLAIN BENCH</td> <td></td> <td>1.5 YEAR OVERFLOW CHANNEL</td> </tr> <tr> <td></td> <td>POOL-RIFFLE ENHANCEMENT</td> <td></td> <td>5 YEAR OVERFLOW CHANNEL</td> </tr> <tr> <td></td> <td>LARGE WOOD STRUCTURE</td> <td></td> <td>MAIN CHANNEL ALIGNMENT</td> </tr> <tr> <td></td> <td>PROTECT INFRASTRUCTURE</td> <td></td> <td>SILLS</td> </tr> <tr> <td></td> <td>OFFSET BURIED REVESTMENT</td> <td></td> <td>BANKFULL</td> </tr> <tr> <td></td> <td>PARCELS</td> <td></td> <td>PROPOSED DITCH</td> </tr> <tr> <td></td> <td>EXISTING BANK STABILIZATION</td> <td></td> <td>EXISTING DITCH</td> </tr> </table>			FLOODPLAIN BENCH		1.5 YEAR OVERFLOW CHANNEL		POOL-RIFFLE ENHANCEMENT		5 YEAR OVERFLOW CHANNEL		LARGE WOOD STRUCTURE		MAIN CHANNEL ALIGNMENT		PROTECT INFRASTRUCTURE		SILLS		OFFSET BURIED REVESTMENT		BANKFULL		PARCELS		PROPOSED DITCH		EXISTING BANK STABILIZATION		EXISTING DITCH	<b>PREPARED FOR:</b>  <b>PREPARED BY:</b>  AN EMPLOYEE OWNED COMPANY		<b>PRELIMINARY</b> THIS DRAWING HAS NOT BEEN APPROVED BY GOVERNING AGENCIES AND IS SUBJECT TO CHANGE.		<b>SOUTH ST. VRAIN CREEK RESTORATION</b> BOULDER COUNTY PARKS AND OPEN SPACE 30% DESIGNS <b>OVERFLOW CHANNEL #8 PLAN &amp; PROFILE</b> STA: 38+33 TO STA: 24+50		FOR AND ON BEHALF OF MATRIX DESIGN GROUP, INC. PROJECT No. 16.812.003		DESIGNED BY: SDS DRAWN BY: RDK CHECKED BY: RDK SCALE: 22' = 1" HORIZ. 1" = 10' VERT. DATE ISSUED: 10/17/16 SHEET: 26 OF 62 DRAWING No.: OCPP10	
No.	DATE	DESCRIPTION	BY																																																				
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OVERFLOW CHANNEL #8  
SOUTH ST VRAIN CREEK PROPOSED 1.5 YEAR OVERFLOW CHANNEL  
STA: 25+00 TO STA: 10+00

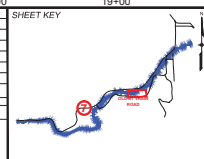


NOTE:

- MAIN CHANNEL ALIGNMENT TO BE EVALUATED TO INCREASE CHANNEL SINUOSITY ACTIVATING OVERFLOW CHANNEL #10 AS MAIN CHANNEL OR MODIFYING EXISTING CREEK ALIGNMENT

EWP NOTE:

- PROPOSED DESIGN FOR CONSTRUCTION ELIGIBLE ASPECTS TO BE EVALUATED BASED UPON DIRECTION BY BCPOS. (MAIN CHANNEL VS. OVERFLOW CHANNEL)

[illegible]

15400	PREPARED FOR
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PREPARED BY:



**PRELIMINARY**  
THIS DRAWING HAS NOT  
BEEN APPROVED BY  
GOVERNING AGENCIES AND  
IS SUBJECT TO CHANGE

FOR AND ON BEHALF OF  
MATRIX DESIGN GROUP, INC.  
PROJECT No. 16.812.003

SOUTH ST. VRAIN CREEK RESTORATION

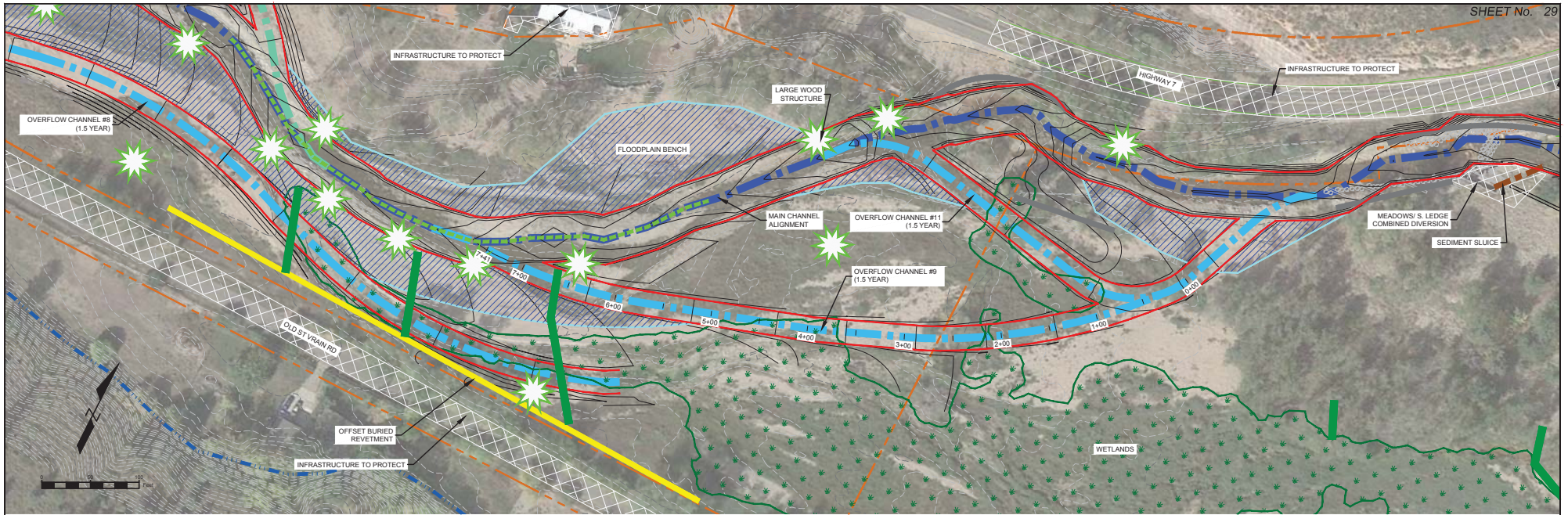
OVERFLOW CHANNEL #8 PLAN & PROFILE  
STA: 24+40 TO STA: 10+50

DESIGNED BY:	SDS	SCALE (22" X 34")	DATE ISSUED:	10/17/16	DRAWING No. <b>OCPP11</b>
DRAWN BY:	BMM	HORIZ. 1" = 50'	SHEET	27 OF 62	
CHECKED BY:	RDK	VERT. 1" = 10'			









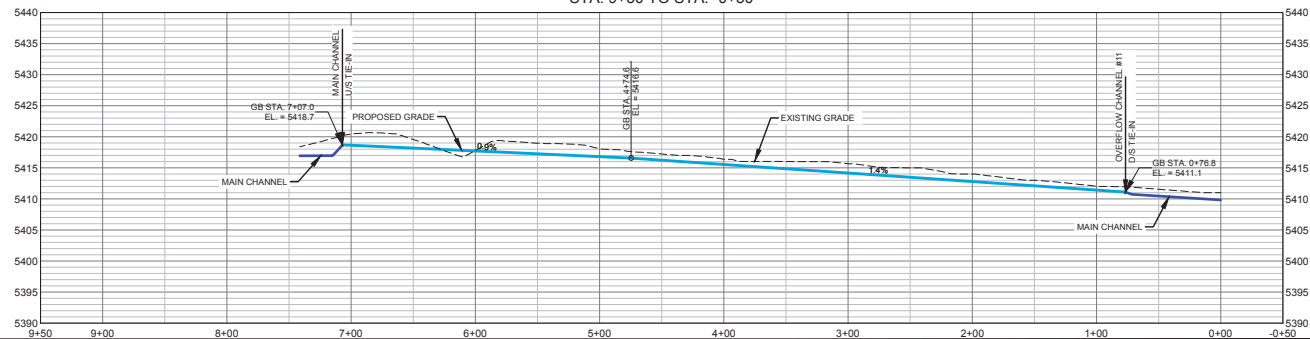
OVERFLOW CHANNEL #9  
SOUTH ST VRAIN CREEK PROPOSED 1.5 YEAR OVERFLOW CHAN  
STA: 9+50 TO STA: -0+50

**NOTE:**

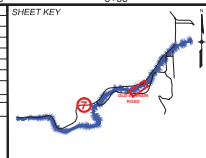
- MAIN CHANNEL ALIGNMENT TO BE EVALUATED TO INCREASE CHANNEL SINUOSITY ACTIVATING OVERFLOW CHANNEL #10 AS MAIN CHANNEL OR MODIFYING EXISTING CREEK ALIGNMENT

**EWPNOTE:**

- PROPOSED DESIGN FOR CONSTRUCTION ELIGIBLE ASPECTS TO BE EVALUATED BASED UPON DIRECTION BY BCPOS. (MAIN CHANNEL VS. OVERFLOW CHANNEL)



REFERENCE DRAWINGS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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LEGEND	
[Symbol]	FLOODPLAIN BENCH
[Symbol]	POOL-RIPPLE ENHANCEMENT
[Symbol]	LARGE WOOD STRUCTURE
[Symbol]	PROTECT INFRASTRUCTURE
[Symbol]	OFFSET BURIED REVEITEMENT
[Symbol]	PARCELS
[Symbol]	EXISTING BANK STABILIZATION
[Symbol]	1.5 YEAR OVERFLOW CHANNEL
[Symbol]	5 YEAR OVERFLOW CHANNEL
[Symbol]	MAIN CHANNEL ALIGNMENT
[Symbol]	SILLS
[Symbol]	BANKFULL
[Symbol]	PROPOSED DITCH
[Symbol]	EXISTING DITCH

PREPARED FOR:

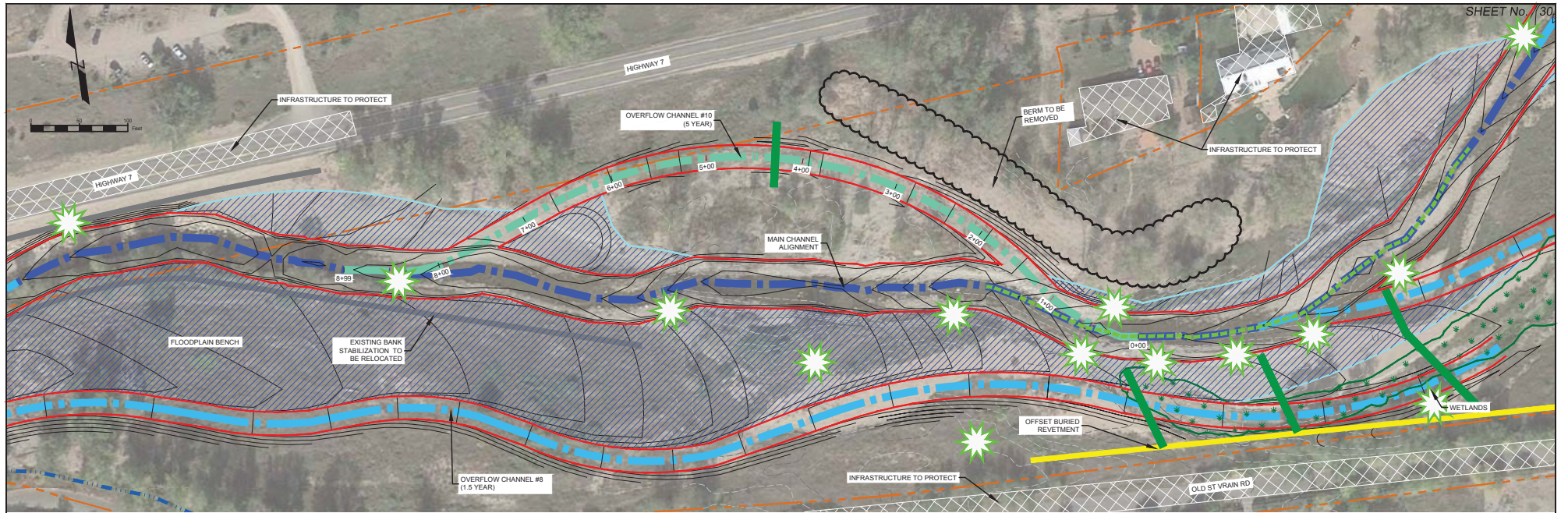
PREPARED BY:

AN EMPLOYEE OWNED COMPANY

**PRELIMINARY**  
THIS DRAWING HAS NOT BEEN APPROVED BY GOVERNING AGENCIES AND IS SUBJECT TO CHANGE

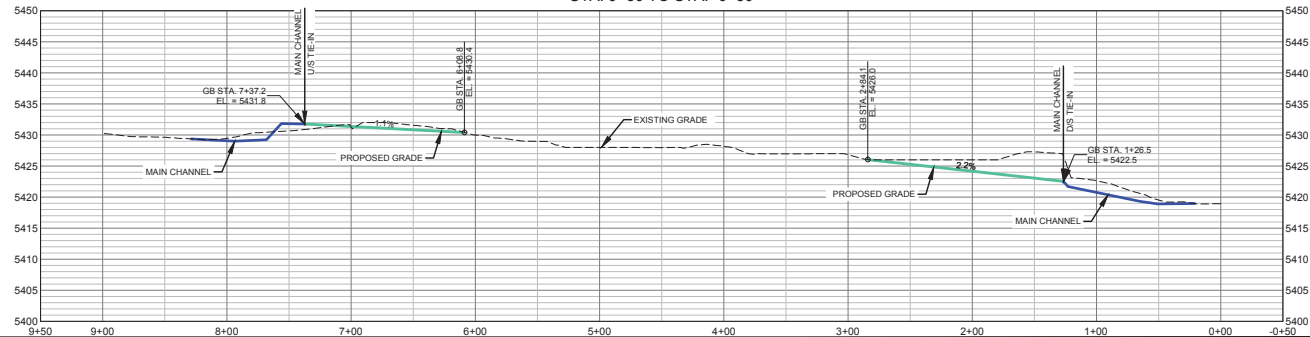
SOUTH ST. VRAIN CREEK RESTORATION			
BOULDER COUNTY PARKS AND OPEN SPACE 30% DESIGNS			
OVERFLOW CHANNEL #9 PLAN & PROFILE			
DESIGNED BY:	SOS	SCALE (22' X 34')	DATE ISSUED:
CHECKED BY:	RM	HORIZ. 1" = 50'	10/17/16
	VERT. 1" = 10'	SHEET	29 OF 62
FOR AND ON BEHALF OF MATRIX DESIGN GROUP, INC. PROJECT No. 16.812.003			DRAWING No. OCPP13





SHEET No. 30

### OVERFLOW CHANNEL #10 SOUTH ST VRAIN CREEK PROPOSED 5 YEAR OVERFLOW CHANNEL STA: 9+50 TO STA: -0+50

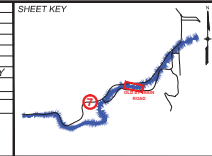


- NOTE:**
- MAIN CHANNEL ALIGNMENT TO BE EVALUATED TO INCREASE CHANNEL SINUOSITY ACTIVATING OVERFLOW CHANNEL #10 AS MAIN CHANNEL OR MODIFYING EXISTING CREEK ALIGNMENT
  - OVERFLOW CHANNEL #10 MIGHT ALSO BE REDESIGNED TO BE ACTIVATED DURING MORE FREQUENT EVENTS BASED UPON FURTHER MODELING

**EWP NOTE:**

- PROPOSED DESIGN FOR CONSTRUCTION ELIGIBLE ASPECTS TO BE EVALUATED BASED UPON DIRECTION BY BCPOS. (MAIN CHANNEL VS. OVERFLOW CHANNEL)

REFERENCE DRAWINGS			
101 TITLE BLOCK-22031			
102 CONCURRENT PROJECTS			
103 CONCURRENT PROJECTS			
104 CONCURRENT PROJECTS			
105 CONCURRENT PROJECTS			
106 CONCURRENT PROJECTS			
107 CONCURRENT PROJECTS			
108 CONCURRENT PROJECTS			
109 CONCURRENT PROJECTS			
110 CONCURRENT PROJECTS			
No.	DATE	DESCRIPTION	BY
REVISIONS			
COMPUTER FILE MANAGEMENT			
FILE NAME: R:\16.812.003 (South St Vrain Stream Restoration)\Dwg\Construction Plans\PP001.dwg			
CIB FILE: ---			
PLOT DATE: 10/25/2016 4:41 PM			
THIS DRAWING IS CURRENT AS OF PLOT DATE AND MAY BE SUBJECT TO CHANGE.			



LEGEND	
	FLOODPLAIN BENCH
	POOL-RIFFLE ENHANCEMENT
	LARGE WOOD STRUCTURE
	PROTECT INFRASTRUCTURE
	OFFSET BURIED REVEITEMENT
	PARCELS
	EXISTING BANK STABILIZATION
	1.5 YEAR OVERFLOW CHANNEL
	5 YEAR OVERFLOW CHANNEL
	MAIN CHANNEL ALIGNMENT
	SILLS
	BANKFULL
	PROPOSED DITCH
	EXISTING DITCH

PREPARED FOR:

PREPARED BY:

AN EMPLOYEE OWNED COMPANY

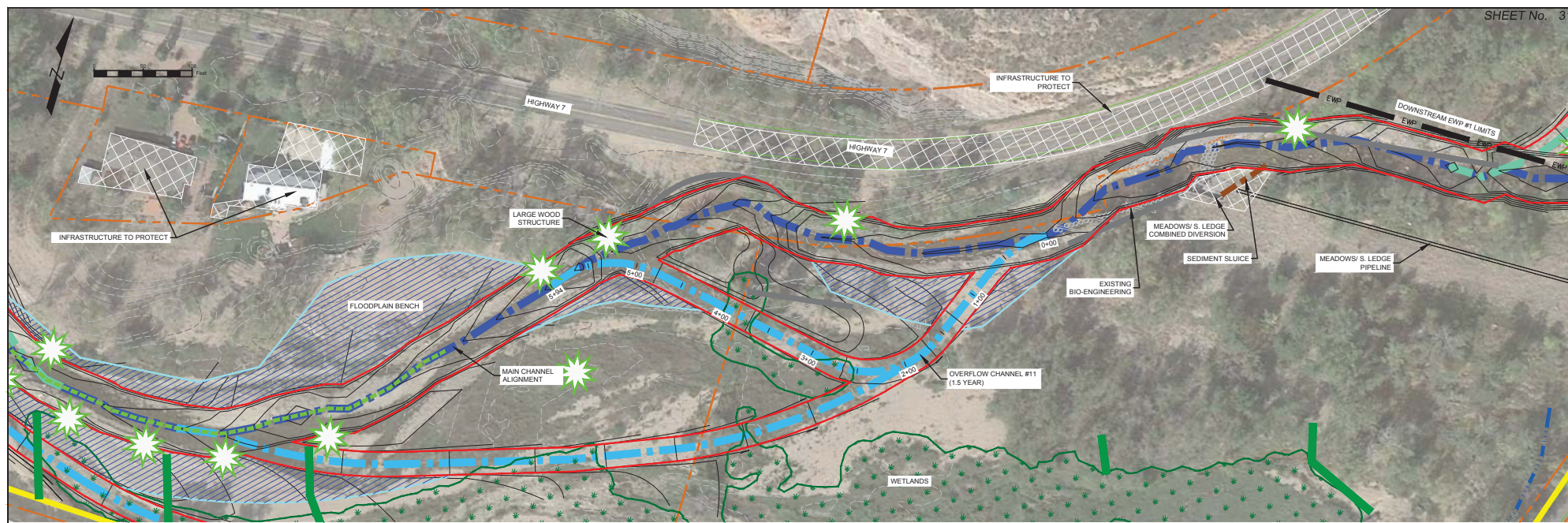
**PRELIMINARY**

THIS DRAWING HAS NOT BEEN APPROVED BY GOVERNING AGENCIES AND IS SUBJECT TO CHANGE

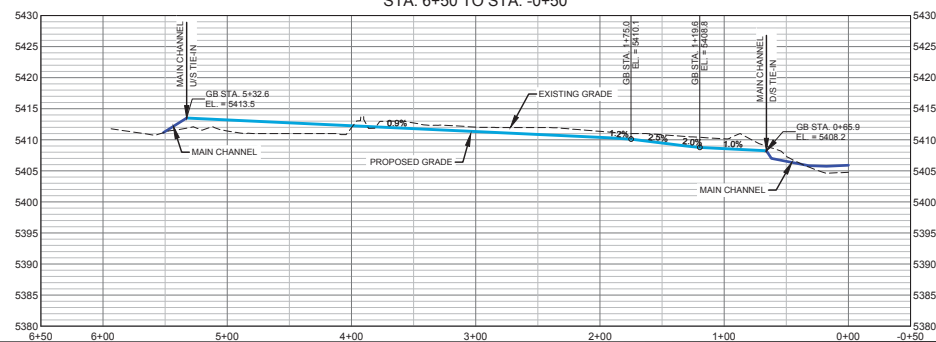
FOR AND ON BEHALF OF  
MATRIX DESIGN GROUP, INC.  
PROJECT No. 16.812.003

SOUTH ST. VRAIN CREEK RESTORATION					
BOULDER COUNTY PARKS AND OPEN SPACE 30% DESIGNS					
OVERFLOW CHANNEL #10 PLAN & PROFILE					
DESIGNED BY	SOS	SCALE (22' X 34")	DATE ISSUED	10/17/16	DRAWING No.
CHECKED BY	RMK	HORIZ. 1" = 50'	SHEET	30	OF 62
					OCPP14





OVERFLOW CHANNEL #11  
SOUTH ST VRAIN CREEK PROPOSED 1.5 YEAR OVERFLOW CHANNEL  
STA: 6+50 TO STA: -0+50



REFERENCE DRAWINGS								D*25	D*10	
112-TITLE BLOCK 25X34 AERIALS Footings CONCURRENT PROJECTS Old St Vrain Road Bridge, Old and South St Vrain Road Drawings, Features Proposed Extension PROPOSED CONSTRUCTION City of Longmont Cane Creek Structure										
	No.	DATE	DESCRIPTION							BY
			REVISIONS							
COMPUTER FILE MANAGEMENT										
FILE NAME: R:\16.812.003\South St Vrain Stream Restoration\Draw\Construction Plans\PP0C01.dwg										
CDS FILE: ----										
PLOT DATE: 10/25/2016 4:41 PM										
THIS DRAWING IS CURRENT AND MAY BE SUBJECT TO CHANGE										



PREPARED FOR:



PREPARED BY:

**Matrix**  
DESIGN GROUP  
AN EMPLOYEE-OWNED COMPANY

**PRELIMINARY**  
THIS DRAWING HAS NOT  
BEEN APPROVED BY  
GOVERNING AGENCIES AND  
IS SUBJECT TO CHANGE

FOR AND ON BEHALF OF  
MATRIX DESIGN GROUP, INC.  
PROJECT No. 16.812.003

SOUTH ST. VRAIN CREEK RESTORATION			
BOULDER COUNTY PARKS AND OPEN SPACE 30% DESIGNS			
OVERFLOW CHANNEL #11 PLAN & PROFILE			
DESIGNED BY: DRAWN BY:	SDS BMM	SCALE (22" X 34") HORIZ. 1" = 50'	DATE ISSUED 10/17/16
CHECKED BY: DATE:		SHEET 31 OF 62	DRAWING NO. OCP15

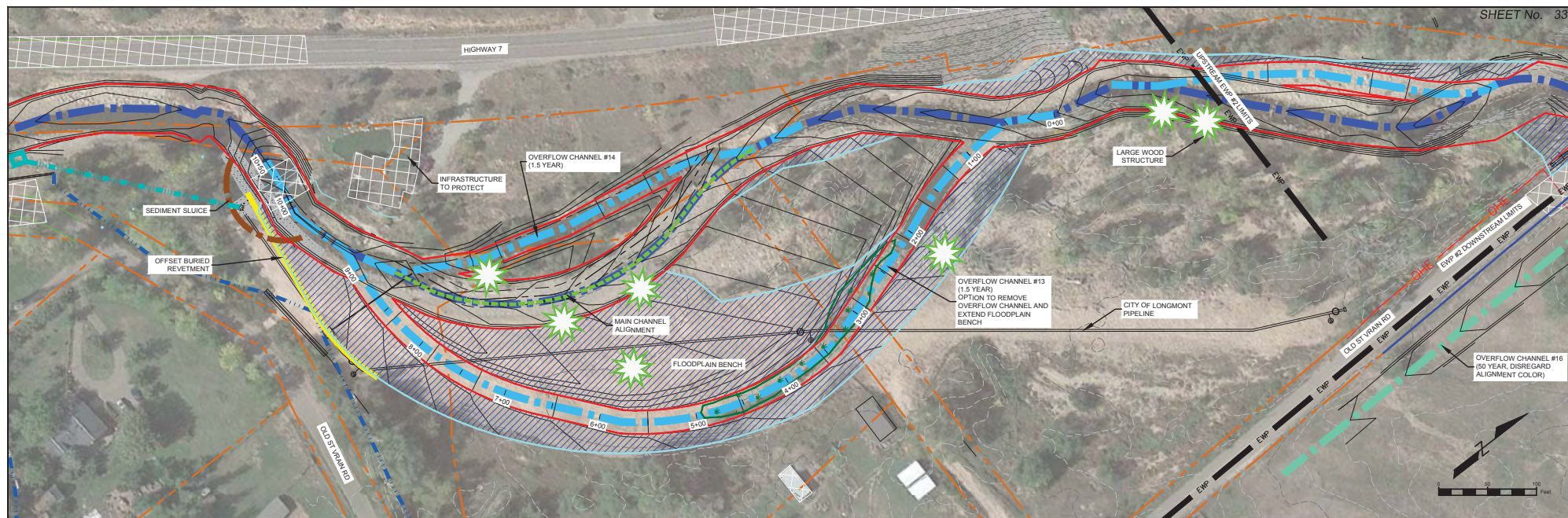


The profile view shows the vertical alignment of the drainage system. The horizontal axis represents stationing from 8+00 to 0+50. The vertical axis represents elevation in feet, ranging from 5370 to 5420. The profile includes the following features:

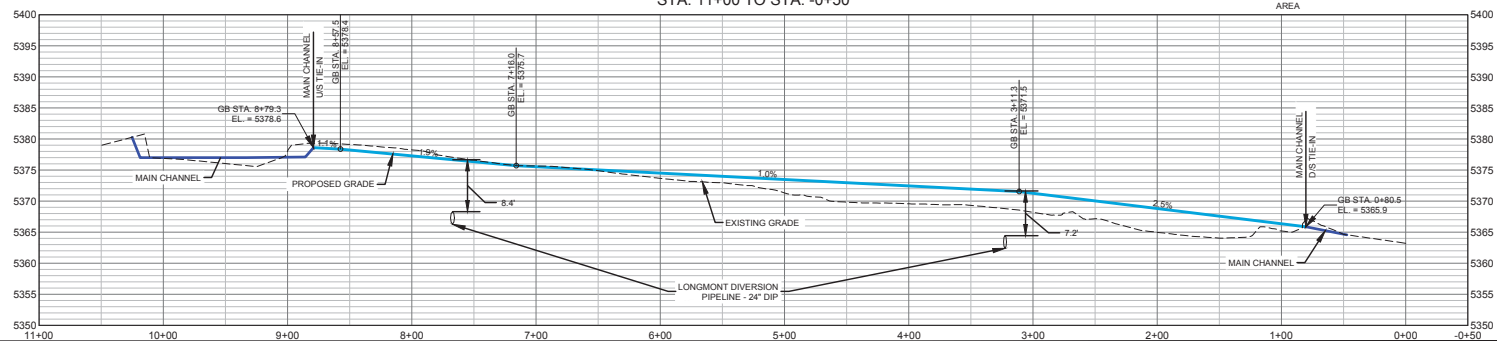
- Existing Grade:** Represented by a dashed line.
- Proposed Grade:** Represented by a solid green line.
- Manholes:** Indicated by vertical lines with labels:
  - GB STA. 7+65.1, EL. = 5398.9
  - GB STA. 6+52.2, EL. = 5399.0
  - GB STA. 4+54.0, EL. = 5399.0
  - GB STA. 2+87.1, EL. = 5399.1
  - GB STA. 0+74.8, EL. = 5398.1
- Channel Sections:** Indicated by labels:
  - MAIN CHANNEL (near station 7+65.1)
  - U.S. FEIN (near station 6+52.2)
  - MAIN CHANNEL (near station 0+74.8)
- Grades:** Slopes are indicated by percentages: 0.5%, 2.4%, 0.5%, and 2.0%.

[illegible]





**OVERFLOW CHANNEL #13  
SOUTH ST VRAIN CREEK PROPOSED 1.5 YEAR OVERFLOW CHANNEL  
STA: 11+00 TO STA: -0+50**



NOTE:  
• OPTION TO REPLACE OVERFLOW CHANNEL WITH FLOODPLAIN BENCH ACROSS ENTIRE AREA

REFERENCE DRAWINGS		11*00	10*00	9*00	8*00	
#10-TITLE BLOCK-22031						
AERIALS						
Plots						
CONCURRENT PROJECTS						
Old St Vrain Road Bridge, Job						
Old South St Vrain Road						
Dwg. Impervious Features						
Proposed Channel						
PROPOSED CONTOURS						
City of Longmont Division						
Creek Division Structure						
		REVISIONS				BY
COMPUTER FILE MANAGEMENT						
FILE NAME: R:116.812.003 (South St Vrain Stream Restoration)/Dwg/Construction Plans/PP0C01.dwg						
CTB FILE: ----						
PLOT DATE: 10/25/2016 4:43 PM						
THIS DRAWING IS CURRENT AS OF PLOT DATE AND MAY BE SUBJECT TO CHANGE.						



LEGEND	
[Blue line]	FLOODPLAIN BENCH
[Red line]	1.5 YEAR OVERFLOW CHANNEL
[Green line]	5 YEAR OVERFLOW CHANNEL
[Blue dashed line]	MAIN CHANNEL ALIGNMENT
[Black dashed line]	SILLS
[Red dashed line]	BANKFULL
[Blue dashed line]	PROPOSED DITCH
[Black dashed line]	EXISTING DITCH
[Green dashed line]	POOL-RIFLE ENHANCEMENT
[Star symbol]	LARGE WOOD STRUCTURE
[Cross-hatch symbol]	PROTECT INFRASTRUCTURE
[Yellow dashed line]	OFFSET BURIED REVEMENT
[Orange dashed line]	PARCELS
[Black dashed line]	EXISTING BANK STABILIZATION

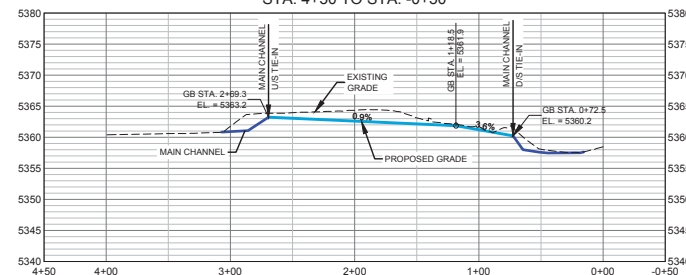
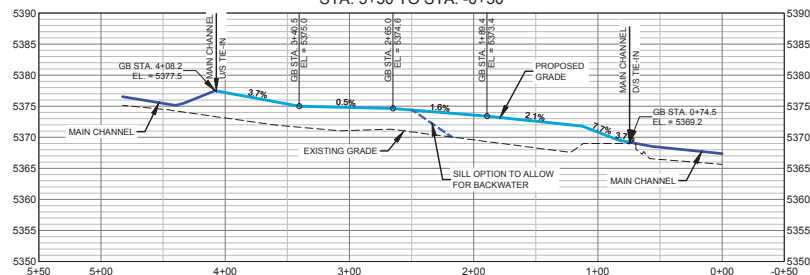
PREPARED FOR:  
**Boulder County**  
Parks & Open Space  
PREPARED BY:  
**Matrix DESIGN GROUP**  
AN EMPLOYEE OWNED COMPANY

**PRELIMINARY**  
THIS DRAWING HAS NOT BEEN APPROVED BY GOVERNING AGENCIES AND IS SUBJECT TO CHANGE

SOUTH ST. VRAIN CREEK RESTORATION			
BOULDER COUNTY PARKS AND OPEN SPACE 30% DESIGNS			
OVERFLOW CHANNEL #13 PLAN & PROFILE			
DESIGNED BY:	SOS	SCALE (22' X 36")	DATE ISSUED:
CHECKED BY:	RM	HORIZ. 1" = 50'	10/17/16
	RD	VERT. 1" = 10'	SHEET
			33 OF 62
			DRAWING No. <b>OCPP17</b>

FOR AND ON BEHALF OF  
MATRIX DESIGN GROUP, INC.  
PROJECT No. 16.812.003





PREPARED FOR:

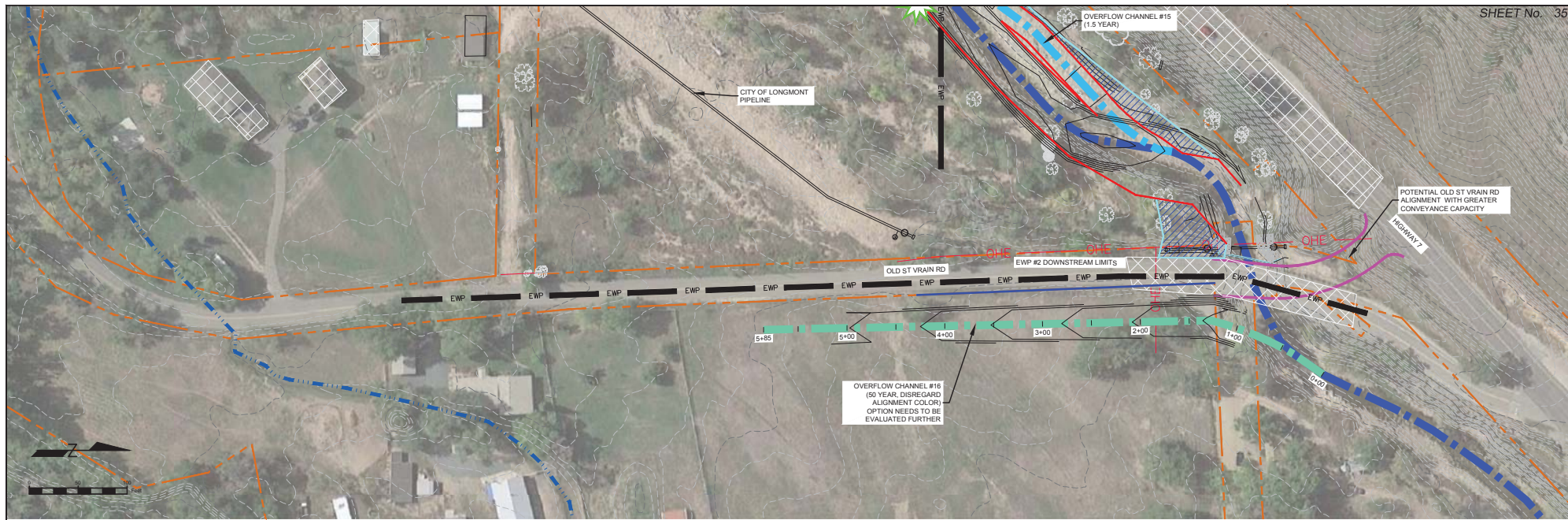


PREPARED BY:

**Matrix**  
DESIGN GROUP  
AN EMPLOYEE-OWNED COMPANY

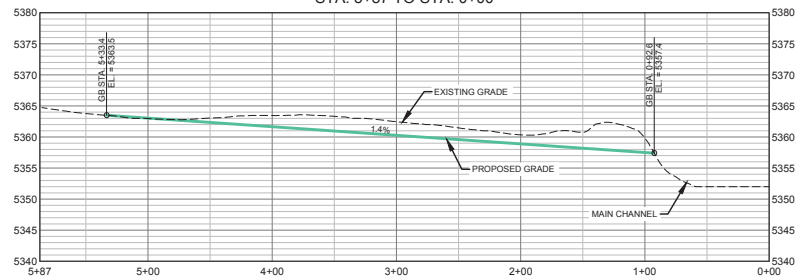
SOUTH ST. VRAIN CREEK RESTORATION			
BOULDER COUNTY PARKS AND OPEN SPACE 30% DESIGNS			
OVERFLOW CHANNELS #14 AND #15 PLAN & PROFILE			
DESIGNED BY: DRAWN BY: CHECKED BY:	SDS (M) (B)	SCALE (22" X 34") HORIZ. 1" = 50' VERT. 1" = 30'	DATE ISSUED: 10/17/16 SHEET 34 OF 62
			DRAWING No. OCPP18





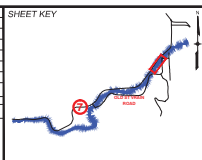
SHEET No. 35

### OVERFLOW CHANNEL #16 SOUTH ST VRAIN CREEK PROPOSED 50 YEAR OVERFLOW CHANNEL STA: 5+87 TO STA: 0+00



**NOTE:**  
THIS 50 YEAR OVERFLOW CHANNEL IS OUTSIDE THE BOUNDARIES OF THIS PROJECT BUT HAS BEEN INCLUDED TO PROVIDE FURTHER COORDINATION WITH DOWNSTREAM PROJECTS. OLD ST VRAIN ROAD IS KNOWN TO OVERTOP AT THE LOW POINT IN THE ROAD TO THE SOUTH OF THE BRIDGE. FURTHER EVALUATION OF PROVIDING RELIEF TO THE OVERTOPPING OR A STABLE WAY FOR THE OVERTOPPING TO BE CONVEYED BACK TO SOUTH ST VRAIN CREEK NEEDS TO BE COMPLETED.

REFERENCE DRAWINGS			
810 TITLE BLOCK-22031			
AERIALS			
CONCURRENT PROJECTS			
Old St Vrain Road Bridge, J&B			
Old South St Vrain Road			
Dwg: Engineering, Boulder			
Prepared: Leland			
PROPOSED CONTIGUOUS			
City of Longmont Division			
Creek Division Structure			
No.	DATE	DESCRIPTION	BY
REVISIONS			
COMPUTER FILE MANAGEMENT			
FILE NAME: R:116.812.003 (South St Vrain Stream Restoration)\Dwg\Construction Plans\PP0C01.dwg			
CTB FILE: ---			
PLOT DATE: 10/25/2016 4:44 PM			
THIS DRAWING IS CURRENT AS OF PLOT DATE AND MAY BE SUBJECT TO CHANGE.			



LEGEND	
	FLOODPLAIN BENCH
	POOL-RIFFLE ENHANCEMENT
	LARGE WOOD STRUCTURE
	PROTECT INFRASTRUCTURE
	OFFSET BURIED REVETMENT
	PARCELS
	EXISTING BANK STABILIZATION
	1.5 YEAR OVERFLOW CHANNEL
	5 YEAR OVERFLOW CHANNEL
	MAIN CHANNEL ALIGNMENT
	SILLS
	BANKFULL
	PROPOSED DITCH
	EXISTING DITCH



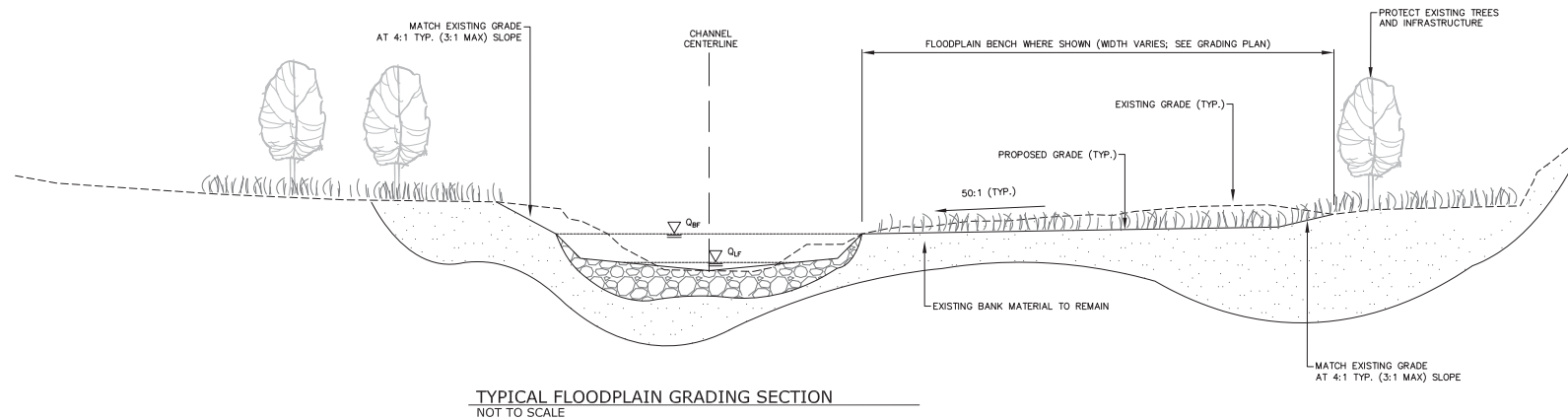
PRELIMINARY	
THIS DRAWING HAS NOT BEEN APPROVED BY GOVERNING AGENCIES AND IS SUBJECT TO CHANGE	
FOR AND ON BEHALF OF	SUB
MATRIX DESIGN GROUP, INC.	JDL
PROJECT No. 16.812.003	10/25/16
CHECKED BY:	RDK
DATE ISSUED:	10/17/16
SCALE: 1" = 20'	1" = 20'
SHEET	35 OF 62
DRAWING No.	OCPP19

SOUTH ST. VRAIN CREEK RESTORATION	
BOULDER COUNTY PARKS AND OPEN SPACE	
30% DESIGNS	
OVERFLOW CHANNEL #16 PLAN & PROFILE	
DESIGNED BY:	SUB
CHECKED BY:	RDK
DATE ISSUED:	10/17/16
SCALE: 1" = 20'	1" = 20'
SHEET	35 OF 62
DRAWING No.	OCPP19





TYPICAL MAIN CHANNEL GRADING SECTION FOR MEANDER REACHES  
NOT TO SCALE



REFERENCE DRAWINGS			
#10-TITLEBLOCK-22x34			
No.	DATE	DESCRIPTION	
		REVISIONS	
<b>COMPUTER FILE MANAGEMENT</b>			
FILE NAME: C:\Dropbox (Otak CO WNR)\Otak CO WNR Team Folder\Projects\322706_SSV-Hall\Ranch\CAD\Otak_Details\SSV_Details.dwg			
CTB FILE: ....			
PLOT DATE: 10/18/2016 10:40 AM			
THIS DRAWING IS CURRENT AS OF PLOT DATE AND MAY BE SUBJECT TO CHANGE			



**PRELIMINARY**  
THIS DRAWING HAS NOT  
BEEN APPROVED BY  
GOVERNING AGENCIES AND  
IS SUBJECT TO CHANGE

FOR AND ON BEHALF OF  
MATRIX DESIGN GROUP, INC.  
PROJECT No. 16.812.003

**SOUTH ST. VRAIN CREEK RESTORATION**  
BOULDER COUNTY PARKS AND OPEN SPACE  
30% DESIGN

### TYPICAL MAIN CHANNEL SECTIONS

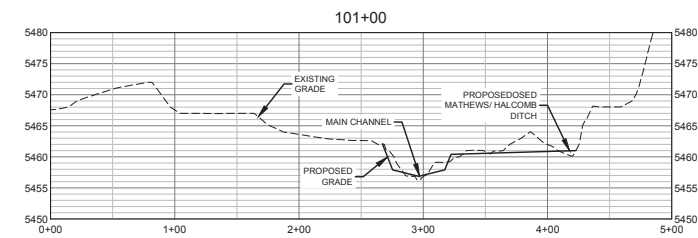
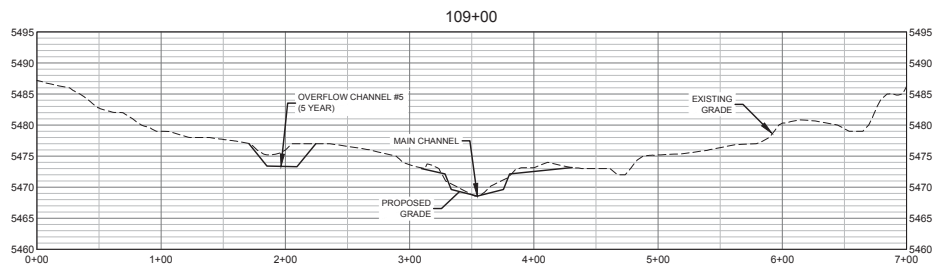
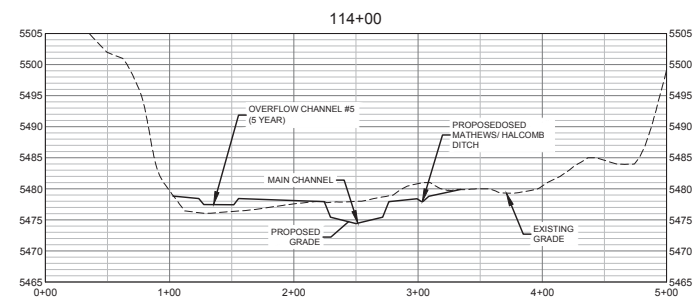
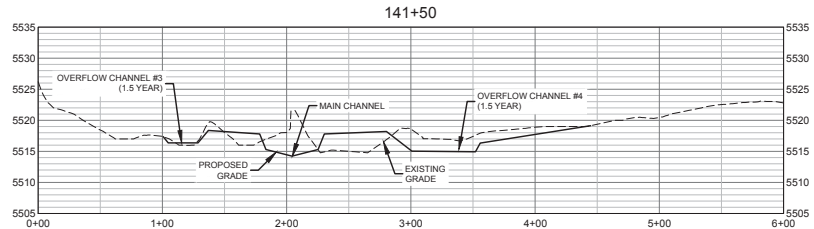
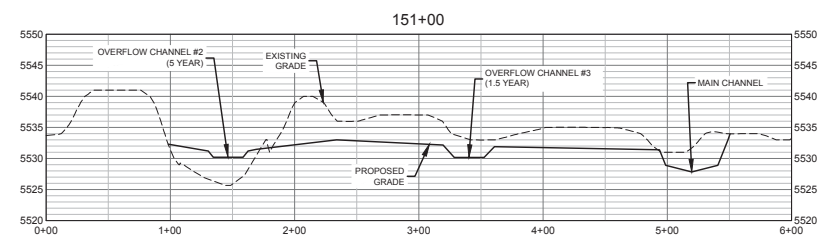
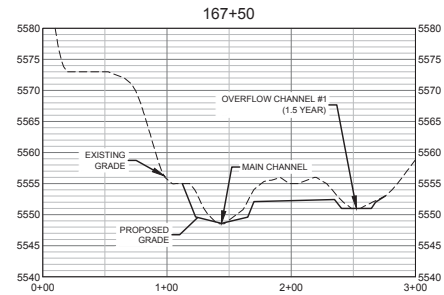
DESIGNED BY:	MGR	SCALE (22" X 34")	DATE ISSUED:	10/17/16	DRAWING No.  <b>SEC 1</b>
DRAWN BY:	RB	HORIZ NTS			
CHECKED BY:	LS	VERT NTS	SHEET	38 OF 62	



REFERENCE DRAWINGS				SHEET KEY				PREPARED FOR: 		<div>PRELIMINARY THIS DRAWING HAS NOT BEEN APPROVED BY GOVERNING AGENCIES AND IS SUBJECT TO CHANGE</div>		SOUTH ST. VRAIN CREEK RESTORATION	
R116.812.003-2024 ADD'L Proposed Linework CONCURRENT PROJECTS Old St Vrain Road Bridge, A-B Old South St Vrain Road Chert Irrigation Feature City of Longmont (client) Crane Division Structure		No.      DATE      DESCRIPTION      BY						PREPARED BY: 				BOULDER COUNTY PARKS AND OPEN SPACE 30% DESIGN	
COMPUTER FILE MANAGEMENT FILE NAME: R:116.812.003 (South St Vrain Stream Restoration)\Dwg\Construction Plans\CROSS SECTIONS.dwg C78 FILE: --- PLOT DATE: 10/25/2016 4:49 PM THIS DRAWING IS CURRENT AS OF PLOT DATE AND MAY BE SUBJECT TO CHANGE.										FOR AND ON BEHALF OF: MATRIX DESIGN GROUP, INC. CHECKED BY: PROJECT No. 16.612.003		DESIGNED BY:      SDS      SCALE 22' = 1"      DATE ISSUED: 10/17/16      DRAWING No. DRAWN BY:      JDL      HORIZ. 1" = 50'      SHEET 37 OF 62      XSO VERIFIED BY:      JDL      SHEET	



- NOTES:
1. CROSS SECTIONS ARE LEFT TO RIGHT LOOKING DOWNSTREAM
  2. USE OF RIBS, COMPOSED OF BOULDERS, OR ROOT WADS IS RECOMMENDED IN AREAS WHERE THE BANKFULL CHANNEL NEEDS TO BE NARROWED TO ALLOW CREEK TO NATURALLY FILL IN.
  3. SOME OVERFLOW CHANNELS SHOW FILL WITH GRADING BUT WILL BE ALLOWED TO FILL IN NATURALLY USING SILLS TO ACTIVATE THE OVERFLOW CHANNELS.



REFERENCE DRAWINGS			
#10 TRILLIUM/2004			
ADRIAN			
REPAIR			
Proposed Elevation			
CONCURRENT PROJECTS			
Old St Vrain Road Bridge, AR			
Old South St Vrain Road			
Old, Impeller, Feature			
City of Englewood, Division			
Crane Division Structure			

No.	DATE	DESCRIPTION	BY
REVISIONS			

COMPUTER FILE MANAGEMENT	
FILE NAME:	R:\16.812.003 (South St Vrain Stream Restoration)\Dwg\Construction Plans\CROSS SECTIONS.dwg
CTB FILE:	---
PLOT DATE:	10/25/2016 4:50 PM
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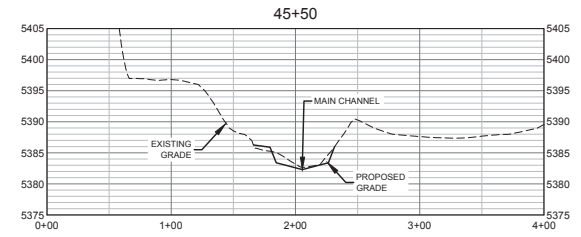
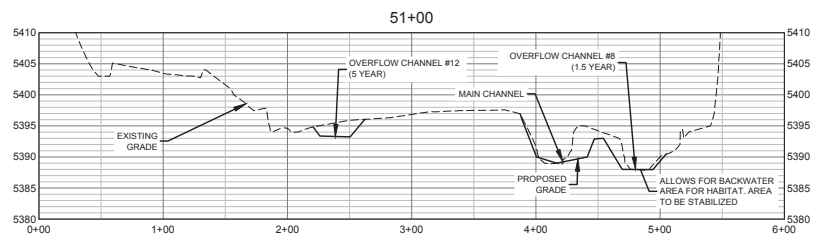
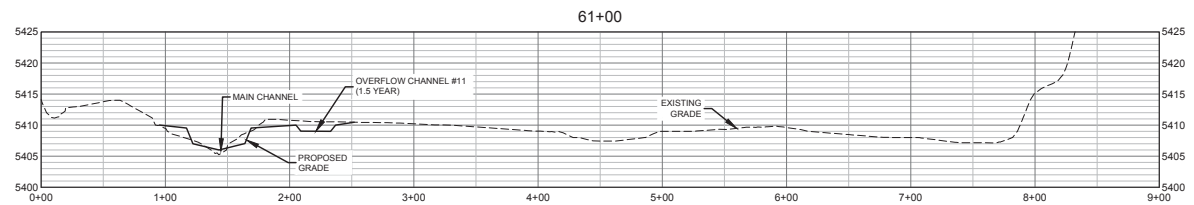
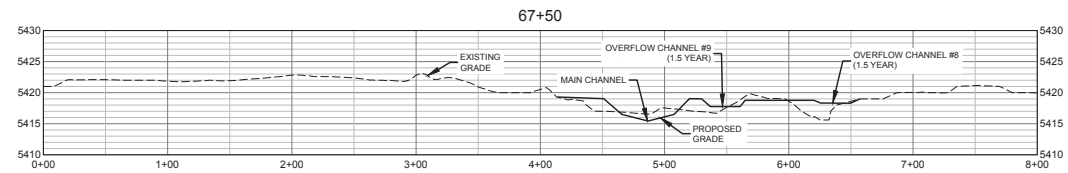
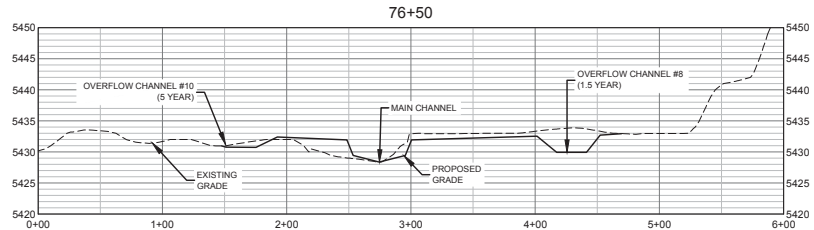
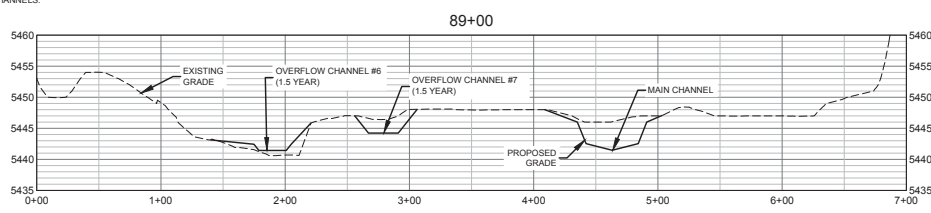


**PRELIMINARY**  
THIS DRAWING HAS NOT BEEN APPROVED BY GOVERNING AGENCIES AND IS SUBJECT TO CHANGE

SOUTH ST. VRAIN CREEK RESTORATION			
BOULDER COUNTY PARKS AND OPEN SPACE 30% DESIGN			
ACTUAL CROSS SECTIONS STA: 167+50 TO STA: 101+00			
DESIGNED BY:	SDB	SCALE (22' X 36")	DATE ISSUED: 10/17/16
CHECKED BY:	JON	HORIZ. 1" = 30'	DRAWING No. XS01
	RDK	VERT. 1" = 10'	
		SHEET	38 OF 62



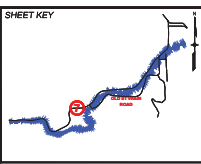
- NOTES:
1. CROSS SECTIONS ARE LEFT TO RIGHT LOOKING DOWNSTREAM
  2. USE OF RIBS, COMPOSED OF BOULDERS, OR ROOT WADS IS RECOMMENDED IN AREAS WHERE THE BANKFULL CHANNEL NEEDS TO BE NARROWED TO ALLOW CREEK TO NATURALLY FILL IN.
  3. SOME OVERFLOW CHANNELS SHOW FILL WITH GRADING BUT WILL BE ALLOWED TO FILL IN NATURALLY USING SILLS TO ACTIVATE THE OVERFLOW CHANNELS.



REFERENCE DRAWINGS			
#10 TITL.BOLDOC-2904			
ADRIALS			
REPAIRS			
Proposed Linework			
CONCURRENT PROJECTS			
Old St Vrain Road Bridge_A88			
Old South St Vrain Road			
Old_Signation_Features			
City of Englewood			
Crane Division Structure			

No.	DATE	DESCRIPTION	BY
REVISIONS			

COMPUTER FILE MANAGEMENT	
FILE NAME:	R:\16.812.003 (South St Vrain Stream Restoration)\Dwg\Construction Plans\CROSS SECTIONS.dwg
CTB FILE:	---
PLOT DATE:	10/25/2016 4:50 PM
THIS DRAWING IS CURRENT AS OF PLOT DATE AND MAY BE SUBJECT TO CHANGE.	

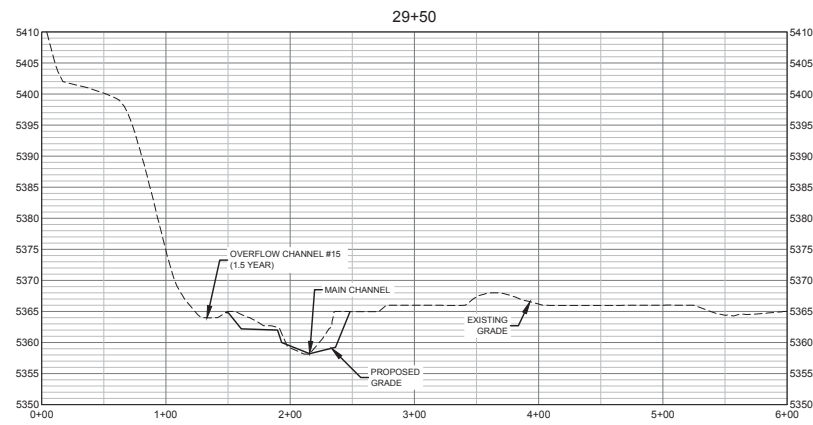
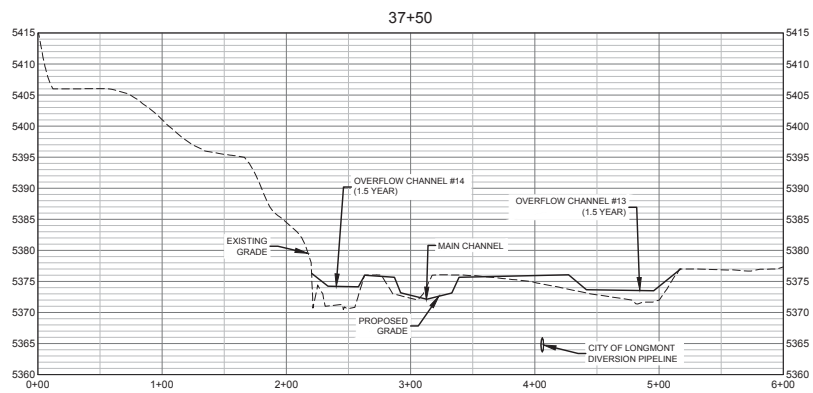


<b>PRELIMINARY</b> THIS DRAWING HAS NOT BEEN APPROVED BY GOVERNING AGENCIES AND IS SUBJECT TO CHANGE	<b>SOUTH ST. VRAIN CREEK RESTORATION</b>			
	BOULDER COUNTY PARKS AND OPEN SPACE 30% DESIGN			
	ACTUAL CROSS SECTIONS STA: 89+00 TO STA: 45+50			
	DESIGNED BY: SDB	SCALE: 1/2" = 1'-0"	DATE ISSUED: 10/17/16	DRAWING NO. XS02
CHECKED BY: RDK	VERT. 1" = 10'	SHEET 39 OF 62		

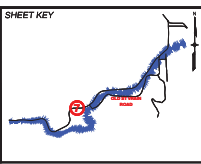
FOR AND ON BEHALF OF  
MATRIX DESIGN GROUP, INC.  
PROJECT NO. 16.812.003



- NOTES:
1. CROSS SECTIONS ARE LEFT TO RIGHT LOOKING DOWNSTREAM
  2. USE OF RIBS, COMPOSED OF BOULDERS, OR ROOT WADS IS RECOMMENDED IN AREAS WHERE THE BANKFULL CHANNEL NEEDS TO BE NARROWED TO ALLOW CREEK TO NATURALLY FILL IN.
  3. SOME OVERFLOW CHANNELS SHOW FILL WITH GRADING BUT WILL BE ALLOWED TO FILL IN NATURALLY USING SILLS TO ACTIVATE THE OVERFLOW CHANNELS.



REFERENCE DRAWINGS			
#10 T11186100K-2904			
AIRIALS			
REMARKS			
Proposed Linework			
CONCURRENT PROJECTS			
Old St Vrain Road Bridge_A08			
Old South St Vrain Road			
Old, Impervious, Features			
City of Longmont Diversion			
Creek Diversion Structure			
No.	DATE	DESCRIPTION	BY
REVISIONS			
COMPUTER FILE MANAGEMENT			
FILE NAME: R:\16.812.003 (South St Vrain Stream Restoration)\Dwg\Construction Plans\CROSS SECTIONS.dwg			
CTB FILE: ---			
PLOT DATE: 10/25/2016 4:50 PM			
THIS DRAWING IS CURRENT AS OF PLOT DATE AND MAY BE SUBJECT TO CHANGE.			



PREPARED FOR:

PREPARED BY:

100% EMPLOYEE OWNED COMPANY

**PRELIMINARY**  
THIS DRAWING HAS NOT BEEN APPROVED BY GOVERNING AGENCIES AND IS SUBJECT TO CHANGE

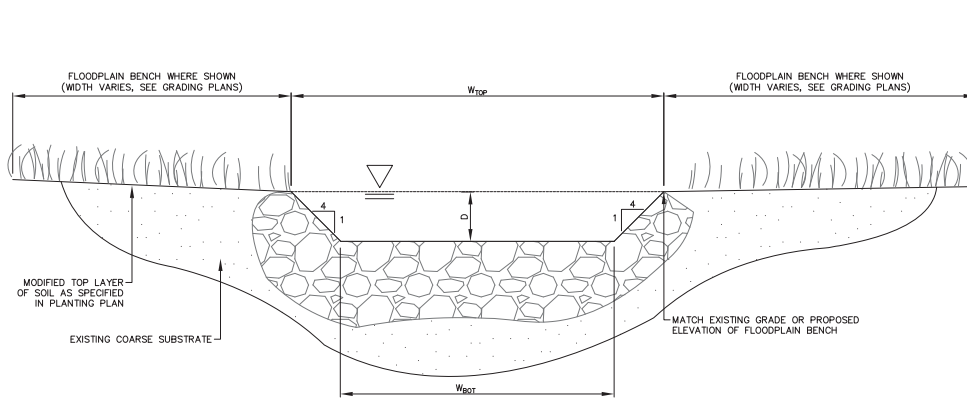
FOR AND ON BEHALF OF  
MATRIX DESIGN GROUP, INC.  
PROJECT NO. 16.812.003

**SOUTH ST. VRAIN CREEK RESTORATION**  
BOULDER COUNTY PARKS AND OPEN SPACE  
30% DESIGN

**ACTUAL CROSS SECTIONS**  
STA: 37+50 TO STA: 29+50

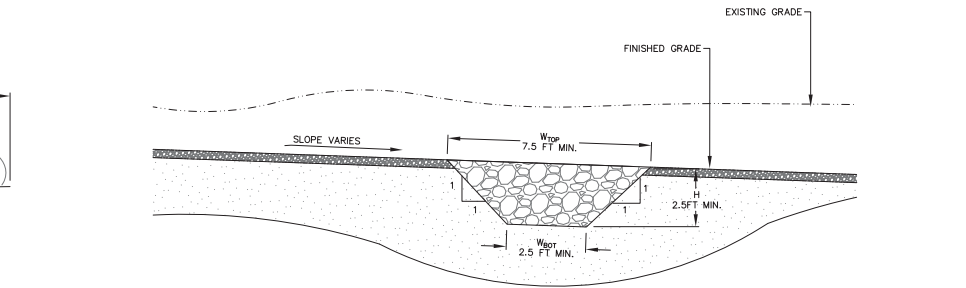
DESIGNED BY:	SDB	SCALE (22' X 34')	DATE ISSUED:	10/17/16	DRAWING NO.
DRAWN BY:	JON	HORIZ. 1" = 30'			
CHECKED BY:	RDH	VERT. 1" = 10'	SHEET	40 OF 62	XS03



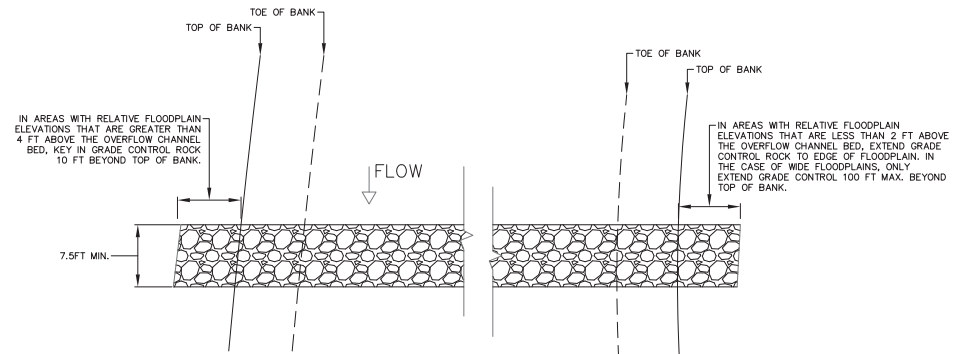


**TYPICAL OVERFLOW CHANNEL SECTION**  
NOT TO SCALE

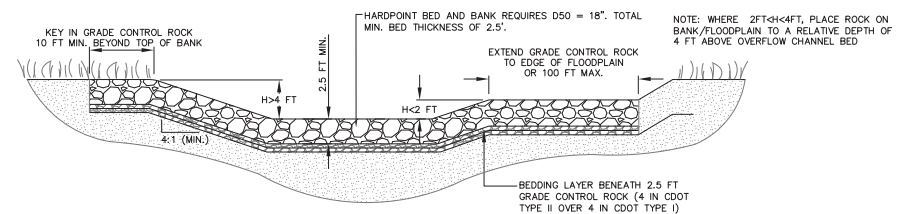
OVERFLOW CHANNEL GEOMETRY (ft)			
DIMENSION	NARROW	TYP	WIDE
W <sub>top</sub>	20	30	40+
W <sub>bot</sub>	12	18	24
D	1	1.5	2+



**PROFILE VIEW**



**PLAN VIEW**

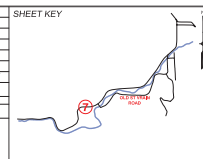


**CROSS SECTION VIEW**

**TYPICAL OVERFLOW CHANNEL GRADE CONTROL DETAILS**  
NOT TO SCALE

OVERFLOW CHANNEL GRADE CONTROLS	
CHANNEL ID	QUANTITY
OFC2	3
OFC4	2
OFC5	1
OFC6	1
OFC8	5
OFC10	1

REFERENCE DRAWINGS	
#10 TITL.BLD (00K-20) 01	
No.	DATE
DESCRIPTION	
REVISIONS	
COMPUTER FILE MANAGEMENT	
FILE NAME: C:\Dropbox (Otak CO WNR)\Otak CO WNR Team\Folder\Projects\32706_SSV-HallRanch\CAD\Otak_Details\SSV_Details.dwg	
C19 FILE: ---	
PLOT DATE: 10/18/2016 10:38 AM	
THIS DRAWING IS CURRENT AS OF PLOT DATE AND MAY BE SUBJECT TO CHANGE.	



PREPARED FOR:

PREPARED BY:

**PRELIMINARY**  
THIS DRAWING HAS NOT BEEN APPROVED BY GOVERNING AGENCIES AND IS SUBJECT TO CHANGE

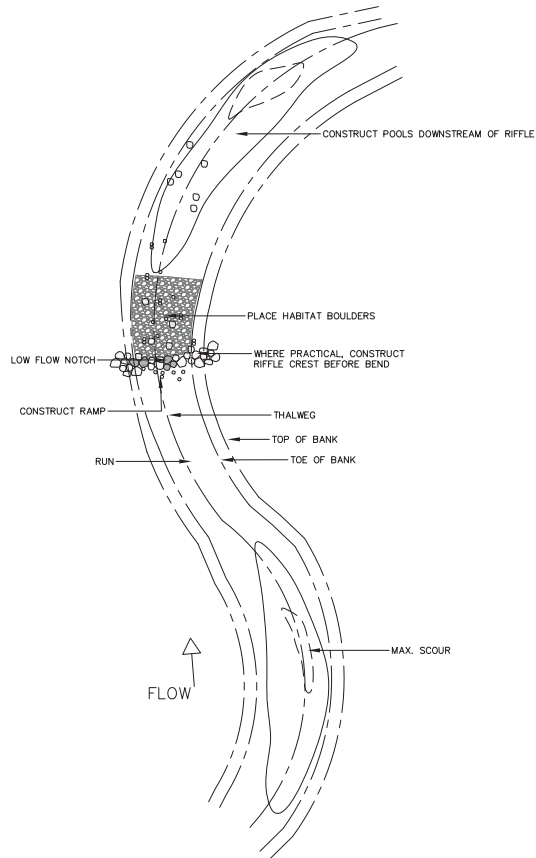
FOR AND ON BEHALF OF  
MATRIX DESIGN GROUP, INC.  
PROJECT No. 16.812.003

**SOUTH ST. VRAIN CREEK RESTORATION**  
BOULDER COUNTY PARKS AND OPEN SPACE  
30% DESIGN

**OVERFLOW CHANNEL DETAILS**

DESIGNED BY: MGR	SCALE: 02" X 36"	DATE ISSUED: 10/17/16	DRAWING No. D1
CHECKED BY: RB	HORIZ: NTS	SHEET: 41 OF 62	

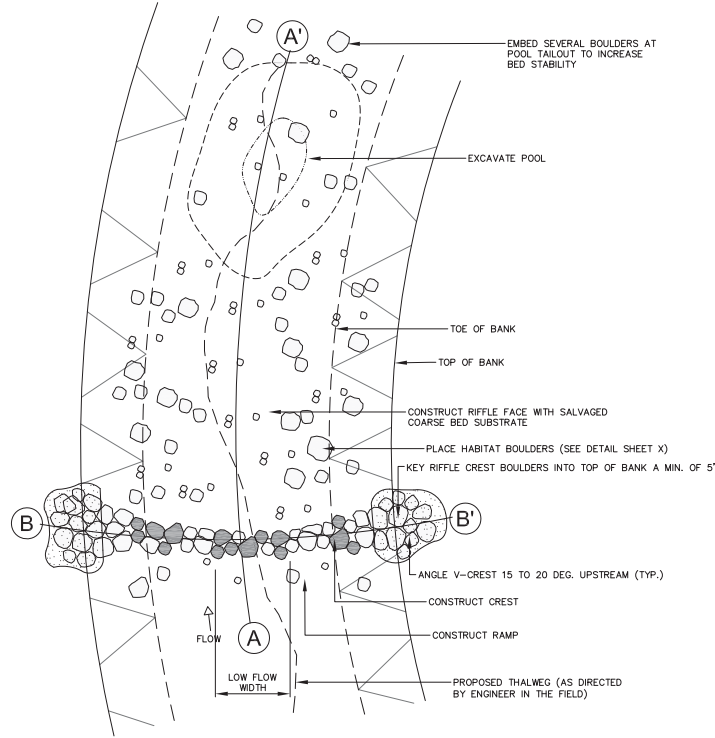




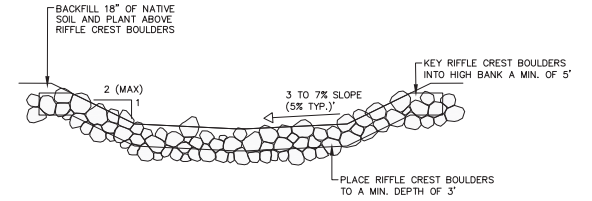
**TYPICAL RIFFLE-POOL SEQUENCE PLAN VIEW**  
NOT TO SCALE

RIFFLE CREST ROCK GRADATION	
DIA. (IN)	
D <sub>MIN</sub>	18
D <sub>MAX</sub>	48

RIFFLE FACE AND POOL ROCK GRADATION	
DIA. (IN)	
D <sub>MIN</sub>	SAND
D <sub>16</sub>	1
D <sub>50</sub>	3
D <sub>84</sub>	8
D <sub>MAX</sub>	20

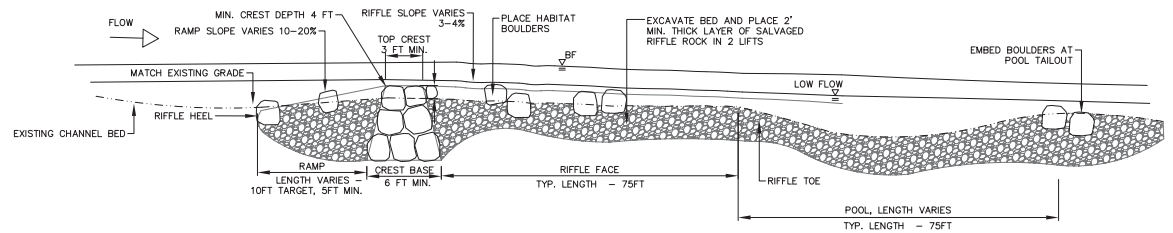


**RIFFLE CREST PLAN VIEW**  
NOT TO SCALE



**RIFFLE CREST PROFILE VIEW (B-B')**  
NOT TO SCALE

POOL-RIFFLE	
CREST STA.	CREST ELEV. (FT)
47+44	5384.83
69+18	5417.87
72+18	5421.82
85+86	5437.05
88+94	5441.39
91+95	5445.73
94+99	5449.60
98+03	5453.46
112+01	5471.43
115+51	5476.66
119+01	5481.88
135+51	5502.60
138+51	5508.44
141+51	5514.27
144+51	5519.74
147+51	5523.55
150+51	5527.37
153+51	5531.09
156+51	5534.75
159+51	5538.91



**RIFFLE CREST PROFILE VIEW (A-A')**  
NOT TO SCALE

REFERENCE DRAWINGS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
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**PRELIMINARY**  
THIS DRAWING HAS NOT BEEN APPROVED BY GOVERNING AGENCIES AND IS SUBJECT TO CHANGE

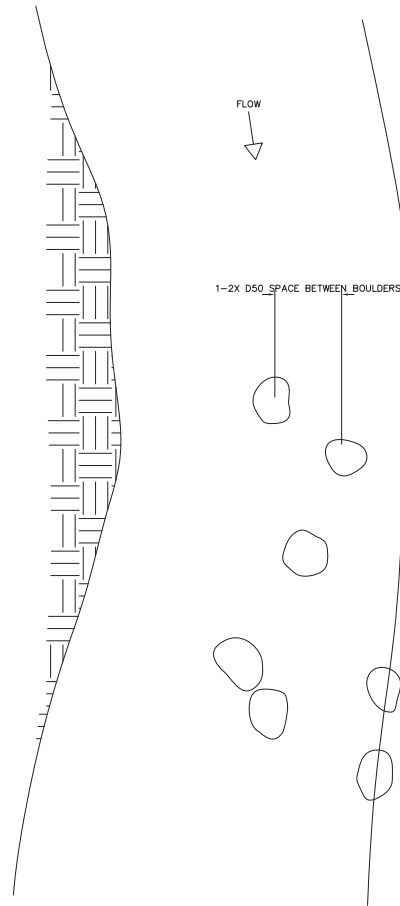
FOR AND ON BEHALF OF  
MATRIX DESIGN GROUP, INC.  
PROJECT No. 16.812.003

**SOUTH ST. VRAIN CREEK RESTORATION**  
BOULDER COUNTY PARKS AND OPEN SPACE  
30% DESIGN

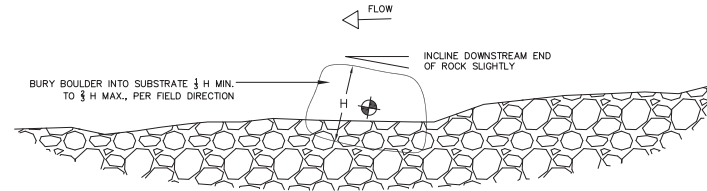
**RIFFLE DETAILS**

DESIGNED BY:	ACR	SCALE: 0.25" = 1'-0"	DATE ISSUED:	9/19/16	DRAWING No.
CHECKED BY:	RB	HORIZ.	NTS		
	LS	VERT.	NTS		
				42 OF 62	D2

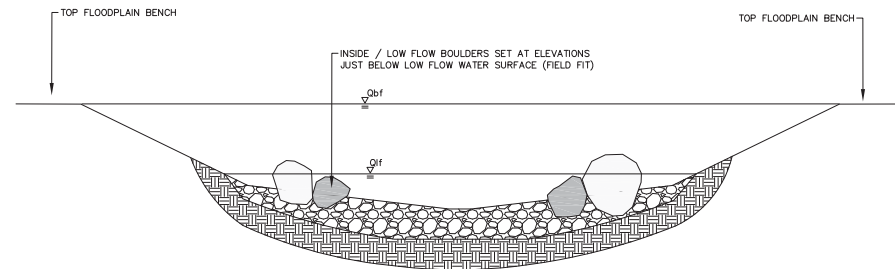




**TYPICAL HABITAT BOULDER PLAN LAYOUT**  
NOT TO SCALE



**TYPICAL HABITAT BOULDER PROFILE**  
NOT TO SCALE

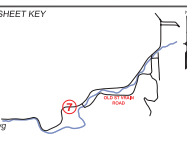


**TYPICAL HABITAT BOULDER CROSS SECTION**  
NOT TO SCALE

- GENERAL NOTES:
1. PLACE HABITAT BOULDERS AS DIRECTED BY ENGINEER IN THE FIELD.
  2. SALVAGE OR IMPORT BOULDERS FOR USE IN RESTORED CHANNEL.
  3. BOULDERS USED FOR HABITAT SHALL BE 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 2-4" INCHES OF THE WATER SURFACE.

HABITAT BOULDER GRADATION	
	DIA (IN)
D,MIN	24
D50	36
D,MAX	60

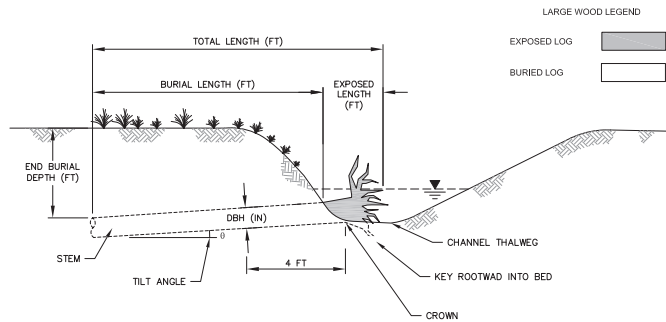
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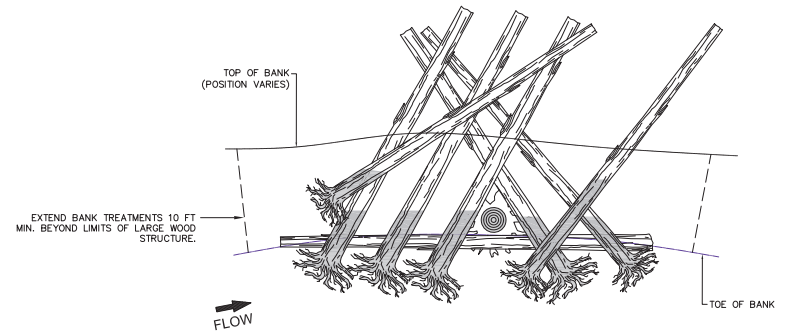
<b>PRELIMINARY</b>	
THIS DRAWING HAS NOT BEEN APPROVED BY GOVERNING AGENCIES AND IS SUBJECT TO CHANGE	
FOR AND ON BEHALF OF	DATE ISSUED: 10/17/16
MATRIX DESIGN GROUP, INC.	CHECKED BY: 43 OF 62
PROJECT No. 16.812.003	

<b>SOUTH ST. VRAIN CREEK RESTORATION</b>	
BOULDER COUNTY PARKS AND OPEN SPACE	
30% DESIGN	
<b>HABITAT BOULDER CLUSTER DETAILS</b>	
DESIGNED BY: MGR	SCALE: 02" X 36"
DRAWN BY: RB	HORIZ: NTS
CHECKED BY: LS	VERT: NTS
DRAWING No. D3	



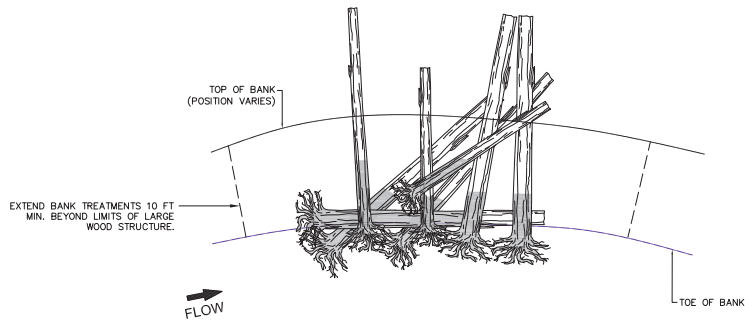


**TYPICAL LOG REFERENCE KEY AND LEGEND**  
NOT TO SCALE

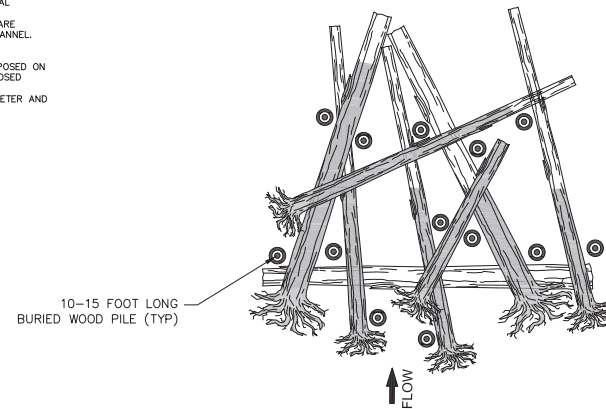


**TYPE A LARGE WOOD INSTREAM STRUCTURE PLAN VIEW**  
NOT TO SCALE

- GENERAL NOTES:**
- 1) ADDITIONAL LARGE WOOD STRUCTURE DETAILS WILL BE PROVIDED DURING 100% DESIGN PHASE AFTER GRADING HAS BEEN FINALIZED AND LARGE WOOD MATERIAL SOURCE HAS BEEN IDENTIFIED.
  - 2) AT TOTAL OF 64 TYPE A AND B STRUCTURES ARE PROPOSED TO BE PLACED ALONG THE MAIN CHANNEL. SEE PLAN SHEETS FOR PROPOSED STRUCTURE LOCATIONS.
  - 3) A TOTAL OF 13 TYPE C STRUCTURES ARE PROPOSED ON THE FLOODPLAIN. SEE PLAN SHEETS FOR PROPOSED STRUCTURE LOCATIONS.
  - 4) PREFERRED LOG DIMENSIONS: 15-30 INCH DIAMETER AND 20-35 FOOT LENGTH



**TYPE B LARGE WOOD INSTREAM STRUCTURE PLAN VIEW**  
NOT TO SCALE



**TYPE C LARGE WOOD FLOODPLAIN STRUCTURE PLAN VIEW**  
NOT TO SCALE

REFERENCE DRAWINGS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
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PREPARED FOR:



PREPARED BY:



**PRELIMINARY**  
THIS DRAWING HAS NOT BEEN APPROVED BY GOVERNING AGENCIES AND IS SUBJECT TO CHANGE

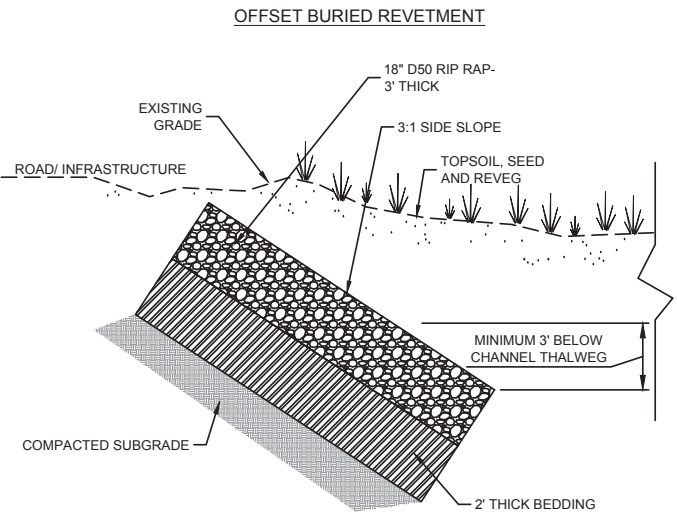
FOR AND ON BEHALF OF  
MATRIX DESIGN GROUP, INC.  
PROJECT No. 16.812.003

**SOUTH ST. VRAIN CREEK RESTORATION**

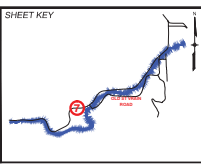
BOULDER COUNTY PARKS AND OPEN SPACE  
30% DESIGN

**LARGE WOOD STRUCTURE DETAILS**

DESIGNED BY:	MSR	SCALE: 02" X 36"	DATE ISSUED:	10/17/16	DRAWING No.
DRAWN BY:	MSR	HORIZ.	NTS		
CHECKED BY:	LS	VERT.	NTS		
			SHEET	44 OF 62	<b>D4</b>



REFERENCE DRAWINGS					
#10-TITLEBLOC-22034					
No.	DATE	DESCRIPTION			
		REVISIONS			
COMPUTER FILE MANAGEMENT					
FILE NAME: R:\116.812.003 (South St Vrain Stream Restoration)\Dwg\Construction Plans\DETAILS.dwg					
CTB FILE: ---					
PLOT DATE: 10/25/2016 4:51 PM					
THIS DRAWING IS CURRENT AS OF PLOT DATE AND MAY BE SUBJECT TO CHANGE					



PREPARED FOR:

PREPARED BY:

AN EMPLOYEE OWNED COMPANY

**PRELIMINARY**  
THIS DRAWING HAS NOT BEEN APPROVED BY GOVERNING AGENCIES AND IS SUBJECT TO CHANGE

FOR AND ON BEHALF OF  
MATRIX DESIGN GROUP, INC.  
PROJECT No. 16.812.003

SOUTH ST. VRAIN CREEK RESTORATION					
BOULDER COUNTY PARKS AND OPEN SPACE 30% DESIGNS					
OFFSET BURIED REVETMENT					
DESIGNED BY:	SDB	SCALE (22' X 34')	DATE ISSUED:	10/17/16	DRAWING No.
DRAWN BY:	JDL	HORIZ.	NO		
CHECKED BY:	RDK	VERT.	NA	SHEET	45 OF 62
					D4





S. ST. VRAIN DR. / STATE HWY 7

MATCHLINE STA 185+50

## NOTES:

1. PLANTING AREAS AND DEPTH TO WATER TABLE ARE PRELIMINARY. PLANTING AREAS AND WATER TABLE DEPTH SHOULD BE VERIFIED BEFORE COMMENCING WORK.
2. AREAS TO REVEGETATE WILL INCORPORATE UPLAND AND RIPARIAN SEED, WILLOW PLANTINGS, TREE AND SHRUB PLANTINGS, PERENNIAL PLANTINGS AND INSTALLATION OF WETLAND/RIPARIAN SOD.
3. ALL AREAS TO RECEIVE BOTH RIPARIAN AND UPLAND SEED SHALL BE SEEDED WITH 70% UPLAND AND 30% RIPARIAN SEED.

## REVEGETATION LEGEND:

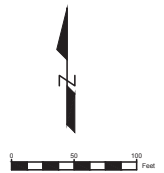
WILLOW STAKES		<b>BANK STABILIZATION</b>	
PERENNIAL TUBELINGS		WILLOW STAKES IN RIPRAP	
RIPARIAN SEED		WILLOW STAKES IN COBBLE TOE	
UPLAND SEED		LIVE WILLOW FASCINE	
RIPARIAN AND UPLAND SEED		BOULDER TOE	
WETLAND/RIPARIAN SOD		VEGETATED REINFORCED SOIL SLOPES (VRSS)	

## PLANT SCHEDULE: L-2

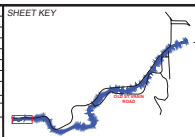
TREES	BOTANICAL NAME / COMMON NAME	SIZE	QTY
	Betula occidentalis / Water Birch	40 CI	0
	Populus angustifolia / Narrowleaf Cottonwood	40 CI/14 INCH/POLE	0
	Populus sargentii / Plains Cottonwood	40 CI/14 INCH/POLE	0
	Salix amygdaloides / Peach Leaf Willow	40 CI/14 INCH	0
EVERGREEN TREES	BOTANICAL NAME / COMMON NAME	SIZE	QTY
	Pinus ponderosa / Ponderosa Pine	40 CI	0

SHRUBS	BOTANICAL NAME / COMMON NAME	SIZE	QTY
	Acer glabrum / Mountain Maple	40 CI	0
	Alnus incana ssp. tenuifolia / Thrinleaf Alder	40 CI	0
	Amelanchier alnifolia / Serviceberry	40 CI	0
	Cornus sericea / Red-Osier Dogwood	40 CI	0
	Prunus americana / American Plum	40 CI	0
	Prunus virginiana / Chokecherry	40 CI	0

REVEGETATION AREAS	AREA (AC.)
WILLOW STAKES	0
PERENNIAL TUBELINGS	0
RIPARIAN SEED	0
UPLAND SEED	0
RIPARIAN AND UPLAND SEED	0
WETLAND/RIPARIAN SOD	0



REFERENCE DRAWINGS					
No.	DATE	DESCRIPTION	BY		
		REVISIONS			
COMPUTER FILE MANAGEMENT					
FILE NAME: L:\1774-000 Matrix-So St. Vrain\04_CAD\4_1_Sheets\L-Landscape Sheets.dwg					
CTB FILE: —					
PLOT DATE: 10/28/2016 8:30 AM					
THIS DRAWING IS CURRENT AS OF PLOT DATE AND MAY BE SUBJECT TO CHANGE.					



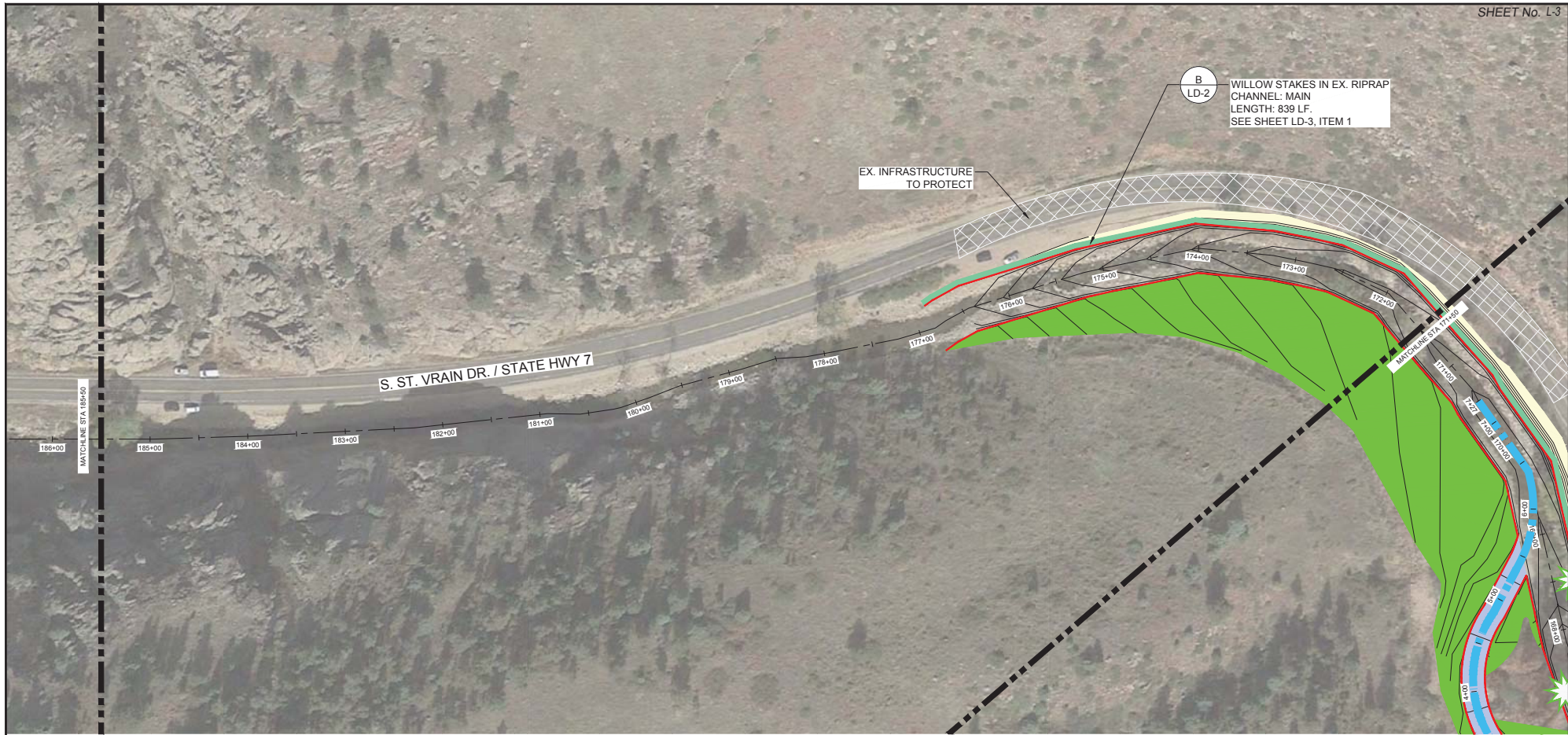
LEGEND	
	FLOODPLAIN BENCH
	POOL-RIFFLE ENHANCEMENT
	LARGE WOOD STRUCTURE
	PROTECT INFRASTRUCTURE
	OFFSET BURIED REVETMENT
	PARCELS
	EXISTING BANK STABILIZATION
	EXISTING DITCH
	1.5 YEAR OVERFLOW CHANNEL
	5 YEAR OVERFLOW CHANNEL
	MAIN CHANNEL ALIGNMENT
	SILLS
	BANKFULL
	PROPOSED DITCH



<b>PRELIMINARY</b>	THIS DRAWING HAS NOT BEEN APPROVED BY GOVERNING AGENCIES AND IS SUBJECT TO CHANGE.
FOR AND ON BEHALF OF	MATRIX DESIGN GROUP, INC.
CHECKED BY:	PROJECT No.

SOUTH ST. VRAIN CREEK RESTORATION			
BOULDER COUNTY PARKS AND OPEN SPACE			
30% DESIGN			
REVEGETATION PLANS			
PROJECT LIMITS TO STA:185+50			
DESIGNED BY:	BP	SCALE (2"=1')	DATE ISSUED: 10/24/2016
CHECKED BY:	MS	HORIZ 1"=50'	SHEET 48 OF 63
	JG	VERT 1"=50'	DRAWING No. L-2



**REVEGETATION LEGEND:**

	<b>BANK STABILIZATION</b>
WILLOW STAKES	
PERENNIAL TUBELINGS	
RIPARIAN SEED	
UPLAND SEED	
RIPARIAN AND UPLAND SEED	
WETLAND/RIPARIAN SOD	

**PLANT SCHEDULE: L-3**

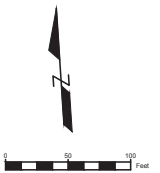
TREES	BOTANICAL NAME / COMMON NAME	SIZE	QTY
	Betula occidentalis / Water Birch	40 CI	0
	Populus angustifolia / Narrowleaf Cottonwood	40 CI/14 INCH/POLE	0
	Populus sargentii / Plains Cottonwood	40 CI/14 INCH/POLE	0
	Salix amygdaloides / Peach Leaf Willow	40 CI/14 INCH	0
EVERGREEN TREES	BOTANICAL NAME / COMMON NAME	SIZE	QTY
	Pinus ponderosa / Ponderosa Pine	40 CI	0

**SHRUBS**

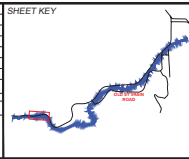
BOTANICAL NAME / COMMON NAME	SIZE	QTY
Acer glabrum / Mountain Maple	40 CI	0
Alnus incana ssp. tenuifolia / Thineleaf Alder	40 CI	0
Amelanchier alnifolia / Serviceberry	40 CI	0
Cornus sericea / Red-Osier Dogwood	40 CI	0
Prunus americana / American Plum	40 CI	0
Prunus virginiana / Chokecherry	40 CI	0

**REVEGETATION AREAS:**

REVEGETATION AREAS:	AREA (AC.)
WILLOW STAKES	0.583
PERENNIAL TUBELINGS	0
RIPARIAN SEED	0
UPLAND SEED	0.139
RIPARIAN AND UPLAND SEED	0
WETLAND/RIPARIAN SOD	0



REFERENCE DRAWINGS	
No.	DATE
	DESCRIPTION
	REVISIONS
	BY
<b>COMPUTER FILE MANAGEMENT</b>	
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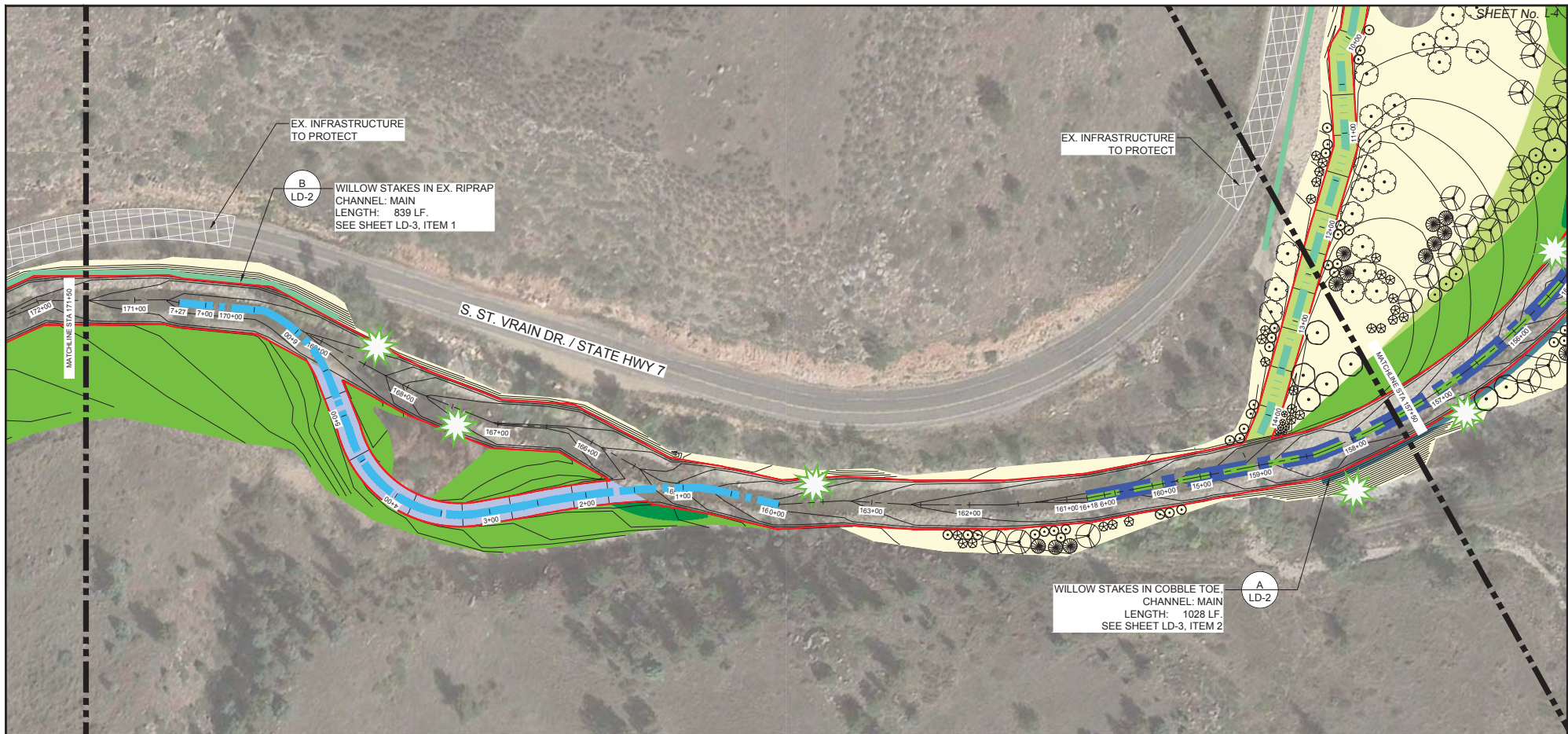
LEGEND	
	FLOODPLAIN BENCH
	POOL RIFFLE ENHANCEMENT
	LARGE WOOD STRUCTURE
	PROTECT INFRASTRUCTURE
	OFFSET BURIED REVETMENT
	PARCELS
	EXISTING BANK STABILIZATION
	1.5 YEAR OVERFLOW CHANNEL
	5 YEAR OVERFLOW CHANNEL
	MAIN CHANNEL ALIGNMENT
	SILLS
	BANKFULL
	PROPOSED DITCH
	EXISTING DITCH



<b>PRELIMINARY</b>
THIS DRAWING HAS NOT BEEN APPROVED BY GOVERNING AGENCIES AND IS SUBJECT TO CHANGE.
FOR AND ON BEHALF OF MATRIX DESIGN GROUP, INC. PROJECT No.

<b>SOUTH ST. VRAIN CREEK RESTORATION</b>
BOULDER COUNTY PARKS AND OPEN SPACE 30% DESIGN
<b>REVEGETATION PLANS</b> STA: 185+50 TO STA: 171+50
DESIGNED BY: BP CHECKED BY: MS SCALE: 1"=50' DATE ISSUED: 10/24/2016 SHEET: 49 OF 63 DRAWING No.: L-3





REVEGETATION LEGEND:				PLANT SCHEDULE: L-4				REVEGETATION AREAS:			
WILLOW STAKES		<b>BANK STABILIZATION</b>		<b>TREES</b>	<b>BOTANICAL NAME / COMMON NAME</b>	<b>SIZE</b>	<b>QTY</b>	<b>SHRUBS</b>	<b>BOTANICAL NAME / COMMON NAME</b>	<b>SIZE</b>	<b>QTY</b>
PERENNIAL TUBELINGS		WILLOW STAKES IN RIPRAP			Betula occidentalis / Water Birch	40 CI	0		Acer glabrum / Mountain Maple	40 CI	0
RIPARIAN SEED		WILLOW STAKES IN COBBLE TOE			Populus angustifolia / Narrowleaf Cottonwood	40 CI/14 INCH/POLE	3		Alnus incana ssp. tenuifolia / Thrinleaf Alder	40 CI	19
UPLAND SEED		LIVE WILLOW FASCINE			Populus sargentii / Plains Cottonwood	40 CI/14 INCH/POLE	3		Amelanchier alnifolia / Serviceberry	40 CI	0
RIPARIAN AND UPLAND SEED		BOULDER TOE			Salix amygdaloides / Peach Leaf Willow	40 CI/14 INCH	5		Cornus sericea / Red-Osier Dogwood	40 CI	6
WETLAND/RIPARIAN SOD		VEGETATED REINFORCED SOIL SLOPES (VRSS)		<b>EVERGREEN TREES</b>	<b>BOTANICAL NAME / COMMON NAME</b>	<b>SIZE</b>	<b>QTY</b>		Prunus americana / American Plum	40 CI	13
					Pinus ponderosa / Ponderosa Pine	40 CI	3		Prunus virginiana / Chokecherry	40 CI	0

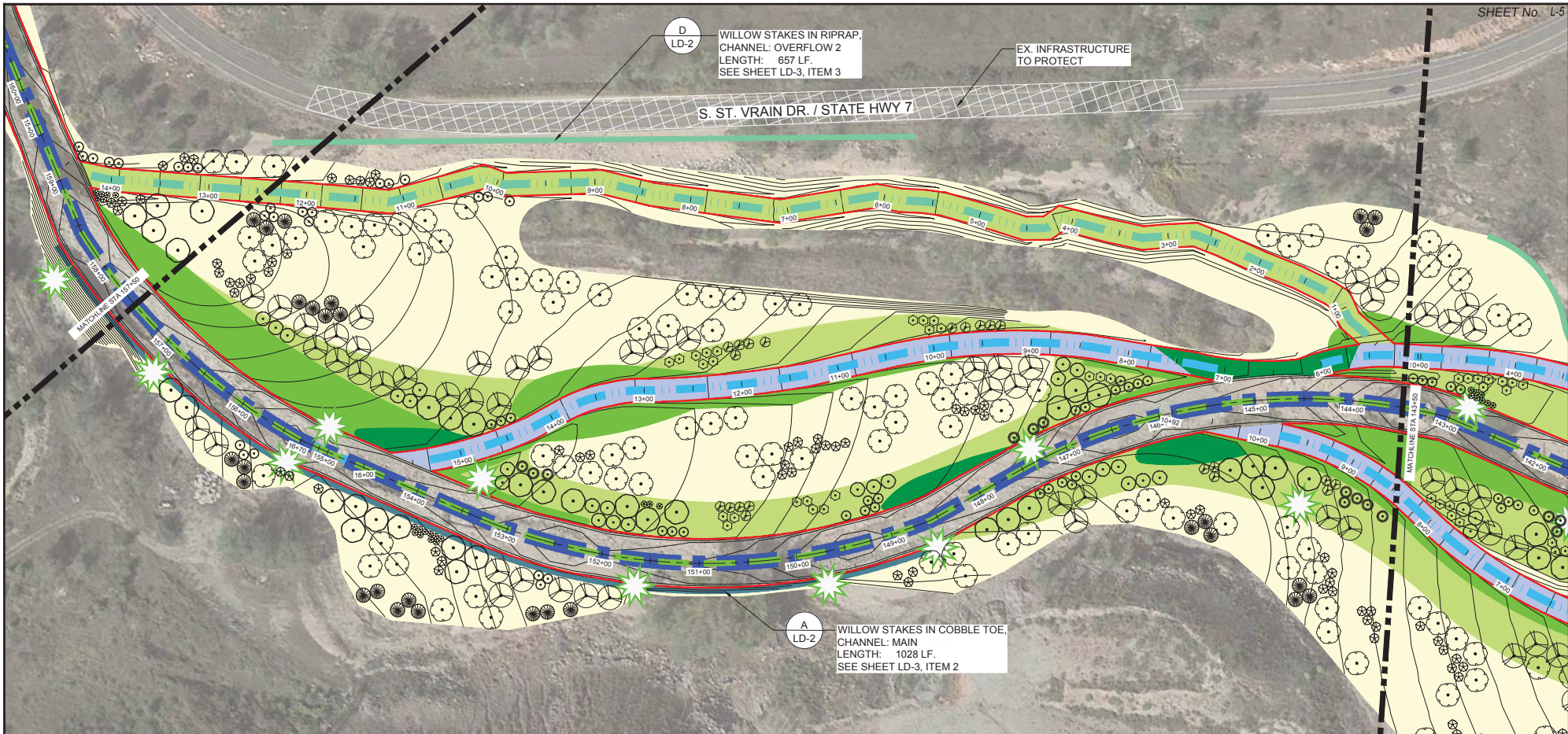
  

SHEET KEY				LEGEND				PREPARED FOR:			
REFERENCE DRAWINGS											
No.	DATE	DESCRIPTION	BY								
		REVISIONS									
COMPUTER FILE MANAGEMENT											
FILE NAME: L:\1774-000 Matrix-So St. Vrain\04_CAD\4.1_Sheets\L-Landscape Sheets.dwg											
CTB FILE: —											
PLOT DATE: 10/28/2016 8:31 AM											
THIS DRAWING IS CURRENT AS OF PLOT DATE AND MAY BE SUBJECT TO CHANGE.											

SOUTH ST. VRAIN CREEK RESTORATION				PRELIMINARY				SOUTH ST. VRAIN CREEK RESTORATION			
BOULDER COUNTY PARKS AND OPEN SPACE				THIS DRAWING HAS NOT BEEN APPROVED BY GOVERNING AGENCIES AND IS SUBJECT TO CHANGE.				BOULDER COUNTY PARKS AND OPEN SPACE			
30% DESIGN				FOR AND ON BEHALF OF				30% DESIGN			
REVEGETATION PLANS				MATRIX DESIGN GROUP, INC.				REVEGETATION PLANS			
STA:171+50 TO STA: 157+50				PROJECT No.				STA:171+50 TO STA: 157+50			
DESIGNED BY:	BP	SCALE (2"=1')	DATE ISSUED:	FOR AND ON BEHALF OF	DATE ISSUED:	10/24/2016	DRAWING No.	DESIGNED BY:	BP	SCALE (2"=1')	DATE ISSUED:
CHECKED BY:	MS	HORIZ 1"=50'	SHEET	MATRIX DESIGN GROUP, INC.	PROJECT No.			CHECKED BY:	JG	VERT 1"=50'	SHEET
			50 OF 63								



**REVEGETATION LEGEND:**

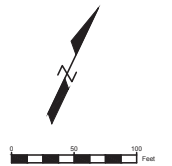
	<b>BANK STABILIZATION</b>
WILLOW STAKES	WILLOW STAKES IN RIPRAP
PERENNIAL TUBELINGS	WILLOW STAKES IN COBBLE TOE
RIPARIAN SEED	LIVE WILLOW FASCINE
UPLAND SEED	BOULDER TOE
RIPARIAN AND UPLAND SEED	VEGETATED REINFORCED SOIL SLOPES (VRSS)
WETLAND/RIPARIAN SOD	

**PLANT SCHEDULE: L-5**

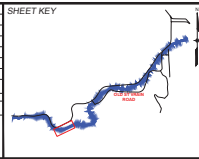
TREES	BOTANICAL NAME / COMMON NAME	SIZE	QTY
	Betula occidentalis / Water Birch	40 CI	25
	Populus angustifolia / Narrowleaf Cottonwood	40 CI/14 INCH POLE	41
	Populus sargentii / Plains Cottonwood	40 CI/14 INCH POLE	63
	Salix amygdaloides / Peach Leaf Willow	40 CI/14 INCH	30
EVERGREEN TREES	BOTANICAL NAME / COMMON NAME	SIZE	QTY
	Pinus ponderosa / Ponderosa Pine	40 CI	28















SHRUBS	BOTANICAL NAME / COMMON NAME	SIZE	QTY
	Acer glabrum / Mountain Maple	40 CI	21
	Alnus incana ssp. tenuifolia / Thrinleaf Alder	40 CI	41
	Amelanchier alnifolia / Serviceberry	40 CI	11
	Cornus sericea / Red-Osier Dogwood	40 CI	13
	Prunus americana / American Plum	40 CI	54
	Prunus virginiana / Chokecherry	40 CI	23

REVEGETATION AREAS	AREA (AC.)
WILLOW STAKES	0.759
PERENNIAL TUBELINGS	0.245
RIPARIAN SEED	0.558
UPLAND SEED	5.265
RIPARIAN AND UPLAND SEED	2.059
WETLAND/RIPARIAN SOD	0



REFERENCE DRAWINGS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																									
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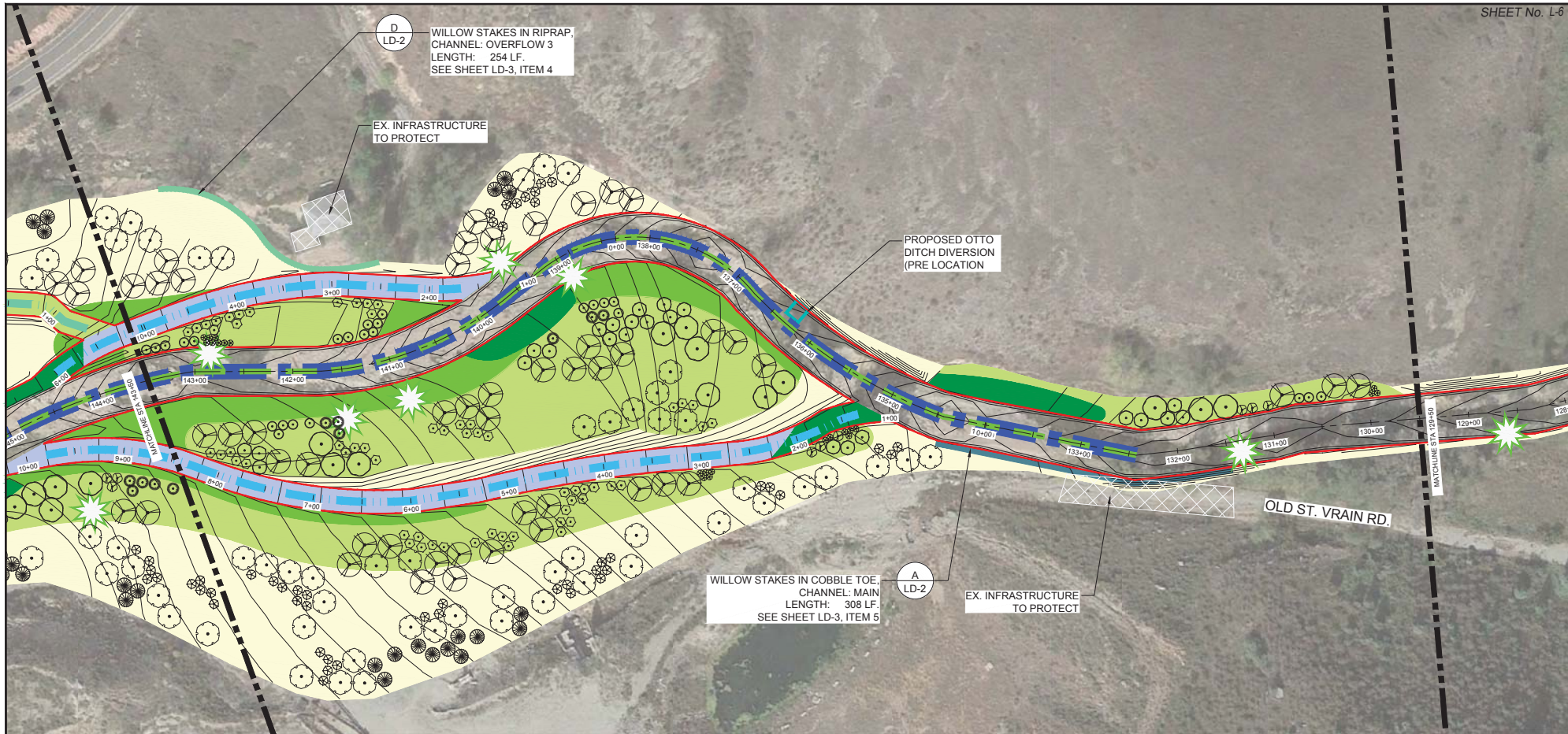
LEGEND	
	FLOODPLAIN BENCH
	POOL-RIFFLE ENHANCEMENT
	LARGE WOOD STRUCTURE
	PROTECT INFRASTRUCTURE
	OFFSET BURIED REVETMENT
	PARCELS
	EXISTING BANK STABILIZATION
	1.5 YEAR OVERFLOW CHANNEL
	5 YEAR OVERFLOW CHANNEL
	MAIN CHANNEL ALIGNMENT
	SKILLS
	BANKFULL
	PROPOSED DITCH
	EXISTING DITCH



<b>PRELIMINARY</b>
THIS DRAWING HAS NOT BEEN APPROVED BY GOVERNING AGENCIES AND IS SUBJECT TO CHANGE.
FOR AND ON BEHALF OF MATRIX DESIGN GROUP, INC.
PROJECT No.

<b>SOUTH ST. VRAIN CREEK RESTORATION</b>	
BOULDER COUNTY PARKS AND OPEN SPACE	
30% DESIGN	
<b>REVEGETATION PLANS</b>	
STA: 157+50 TO STA: 143+50	
DESIGNED BY: BP	SCALE (2" = 30')
CHECKED BY: MS	DATE ISSUED: 10/24/2016
JG	1" = 50'
VERT	1" = 5'
SHEET	51 OF 63
DRAWING No.	L-5



**REVEGETATION LEGEND:**

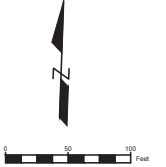
WILLOW STAKES	BANK STABILIZATION
PERENNIAL TUBELINGS	WILLOW STAKES IN RIPRAP
RIPARIAN SEED	WILLOW STAKES IN COBBLE TOE
UPLAND SEED	LIVE WILLOW FASCINE
RIPARIAN AND UPLAND SEED	BOULDER TOE
WETLAND/RIPARIAN SOD	VEGETATED REINFORCED SOIL SLOPES (VRSS)

**PLANT SCHEDULE: L-6**

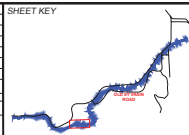
TREES	BOTANICAL NAME / COMMON NAME	SIZE	QTY
	Betula occidentalis / Water Birch	40 CI	24
	Populus angustifolia / Narrowleaf Cottonwood	40 CI/14 INCH/POLE	46
	Populus sargentii / Plains Cottonwood	40 CI/14 INCH/POLE	47
	Salix amygdaloides / Peach Leaf Willow	40 CI/14 INCH	12
EVERGREEN TREES	BOTANICAL NAME / COMMON NAME	SIZE	QTY
	Pinus ponderosa / Ponderosa Pine	40 CI	14

SHRUBS	BOTANICAL NAME / COMMON NAME	SIZE	QTY
	Acer glabrum / Mountain Maple	40 CI	6
	Alnus incana ssp. tenuifolia / Thineleaf Alder	40 CI	25
	Amelanchier alnifolia / Serviceberry	40 CI	6
	Cornus sericea / Red-Osier Dogwood	40 CI	22
	Prunus americana / American Plum	40 CI	39
	Prunus virginiana / Chokecherry	40 CI	59

REVEGETATION AREAS:	AREA (AC.)
WILLOW STAKES	0.517
PERENNIAL TUBELINGS	0.267
RIPARIAN SEED	0.546
UPLAND SEED	1.600
RIPARIAN AND UPLAND SEED	2.296
WETLAND/RIPARIAN SOD	0



REFERENCE DRAWINGS	No.	DATE	DESCRIPTION	BY
			REVISIONS	
<b>COMPUTER FILE MANAGEMENT</b>				
FILE NAME: L:\1774-000 Matrix-So St. Vrain\04_CAD\4_1_Sheets\L-Landscape Sheets.dwg				
CTB FILE: L-				
PLOT DATE: 10/28/2016 8:32 AM				
THIS DRAWING IS CURRENT AS OF PLOT DATE AND MAY BE SUBJECT TO CHANGE.				



LEGEND	DESCRIPTION
	FLOODPLAIN BENCH
	POOL-RIFFLE ENHANCEMENT
	LARGE WOOD STRUCTURE
	PROTECT INFRASTRUCTURE
	OFFSET BURIED REVETMENT
	PARCELS
	EXISTING BANK STABILIZATION
	EXISTING DITCH
	1.5 YEAR OVERFLOW CHANNEL
	5 YEAR OVERFLOW CHANNEL
	MAIN CHANNEL ALIGNMENT
	SILLS
	BANKFULL
	PROPOSED DITCH



**PRELIMINARY**  
THIS DRAWING HAS NOT  
BEEN APPROVED BY  
GOVERNING AGENCIES AND  
IS SUBJECT TO CHANGE

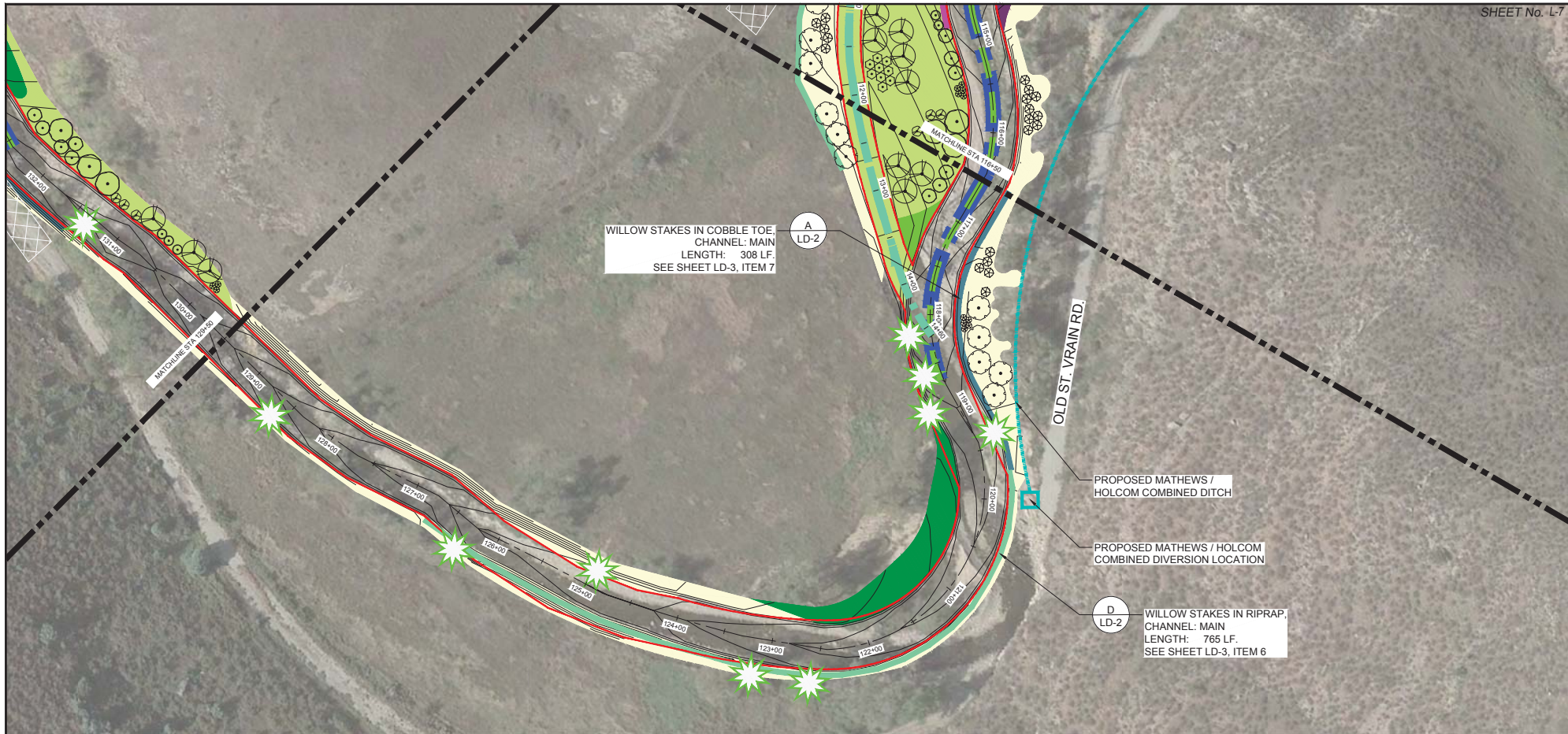
FOR AND ON BEHALF OF  
MATRIX DESIGN GROUP, INC.  
PROJECT No.

**SOUTH ST. VRAIN CREEK RESTORATION**  
BOULDER COUNTY PARKS AND OPEN SPACE  
30% DESIGN

**REVEGETATION PLANS**  
STA: 143+50 TO STA: 129+50

DESIGNED BY:	BP	SCALE (2" = 30')	DATE ISSUED:	10/24/2016	DRAWING No.
CHECKED BY:	MS	HORIZ 1" = 50'	SHEET	52 OF 63	L-6
	JG	VERT 1" = 50'			



**REVEGETATION LEGEND:**

WILLOW STAKES	
PERENNIAL TUBELINGS	
RIPARIAN SEED	
UPLAND SEED	
RIPARIAN AND UPLAND SEED	
WETLAND/RIPARIAN SOD	

**BANK STABILIZATION**

WILLOW STAKES IN RIPRAP	
WILLOW STAKES IN COBBLE TOE	
LIVE WILLOW FASCINE	
BOULDER TOE	
VEGETATED REINFORCED SOIL SLOPES (VRSS)	

**PLANT SCHEDULE: L-7****TREES****EVERGREEN TREES****BOTANICAL NAME / COMMON NAME**

Betula occidentalis / Water Birch	40 CI	3
Populus angustifolia / Narrowleaf Cottonwood	40 CI/14 INCH POLE	3
Populus sargentii / Plains Cottonwood	40 CI/14 INCH POLE	8
Salix amygdaloides / Peach Leaf Willow	40 CI/14 INCH	0

**BOTANICAL NAME / COMMON NAME**

Pinus ponderosa / Ponderosa Pine	40 CI	0
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**SIZE**

40 CI	3
40 CI/14 INCH POLE	3
40 CI/14 INCH POLE	8
40 CI/14 INCH	0

**SIZE**

40 CI	0
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**QTY**

3	3	8	0
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**QTY**

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**SHRUBS****BOTANICAL NAME / COMMON NAME**

Acer glabrum / Mountain Maple	40 CI	0
Alnus incana ssp. tenuifolia / Thineleaf Alder	40 CI	0
Amelanchier alnifolia / Serviceberry	40 CI	0
Cornus sericea / Red-Osier Dogwood	40 CI	5
Prunus americana / American Plum	40 CI	5
Prunus virginiana / Chokecherry	40 CI	0

**SIZE**

40 CI	0	0	5	5	0
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**SIZE**

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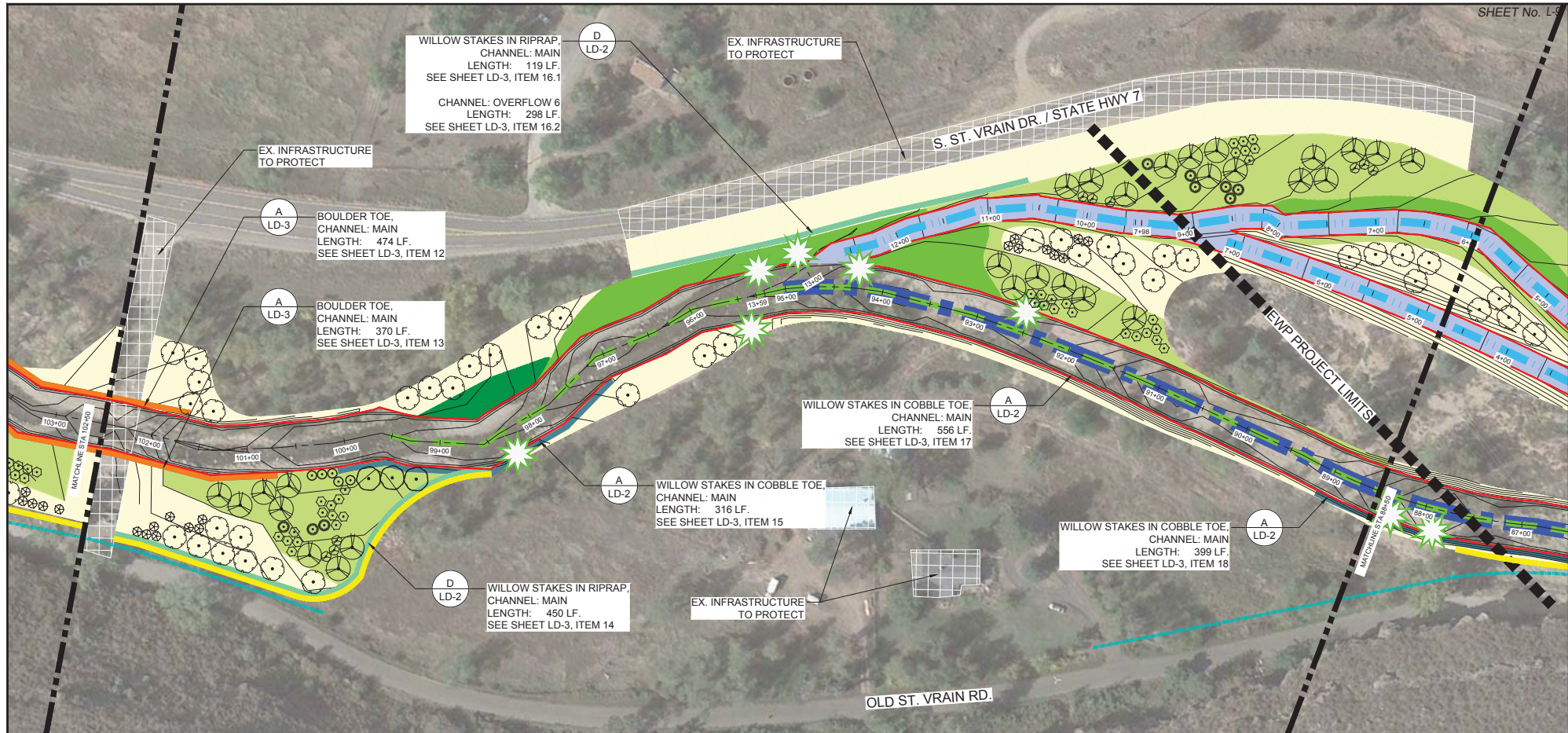
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**REVEGETATION LEGEND:**

	<b>BANK STABILIZATION</b>	
WILLOW STAKES		WILLOW STAKES IN RIPRAP
PERENNIAL TUBELINGS		WILLOW STAKES IN COBBLE TOE
RIPARIAN SEED		LIVE WILLOW FASCINE
UPLAND SEED		BOULDER TOE
RIPARIAN AND UPLAND SEED		VEGETATED REINFORCED SOIL SLOPES (VRSS)
WETLAND/RIPARIAN SOD		

**PLANT SCHEDULE: L-9**

TREES	BOTANICAL NAME / COMMON NAME	SIZE	QTY
	Betula occidentalis / Water Birch	40 CI	0
	Populus angustifolia / Narrowleaf Cottonwood	40 CI/14 INCH POLE	28
	Populus sargentii / Plains Cottonwood	40 CI/14 INCH POLE	36
	Salix amygdaloides / Peach Leaf Willow	40 CI/14 INCH	3
EVERGREEN TREES	BOTANICAL NAME / COMMON NAME	SIZE	QTY
	Pinus ponderosa / Ponderosa Pine	40 CI	0

**SHRUBS**

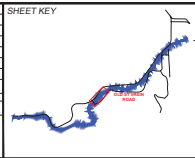
	BOTANICAL NAME / COMMON NAME	SIZE	QTY
	Acer glabrum / Mountain Maple	40 CI	9
	Alnus incana ssp. tenuifolia / Thineleaf Alder	40 CI	5
	Amelanchier alnifolia / Serviceberry	40 CI	9
	Cornus sericea / Red-Osier Dogwood	40 CI	0
	Prunus americana / American Plum	40 CI	16
	Prunus virginiana / Chokecherry	40 CI	35

**REVEGETATION AREAS:**

	AREA (AC.)
WILLOW STAKES	0.384
PERENNIAL TUBELINGS	0.075
RIPARIAN SEED	0.522
UPLAND SEED	2.396
RIPARIAN AND UPLAND SEED	1.064
WETLAND/RIPARIAN SOD	0

0 50 100 Feet

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LEGEND	
	FLOODPLAIN BENCH
	POOL RIFFLE ENHANCEMENT
	LARGE WOOD STRUCTURE
	PROTECT INFRASTRUCTURE
	OFFSET BURIED REVETMENT
	PARCELS
	EXISTING BANK STABILIZATION
	EXISTING DITCH
	1.5 YEAR OVERFLOW CHANNEL
	5 YEAR OVERFLOW CHANNEL
	MAIN CHANNEL ALIGNMENT
	SILLS
	BANKFULL
	PROPOSED DITCH



**PRELIMINARY**  
THIS DRAWING HAS NOT  
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GOVERNING AGENCIES AND  
IS SUBJECT TO CHANGE

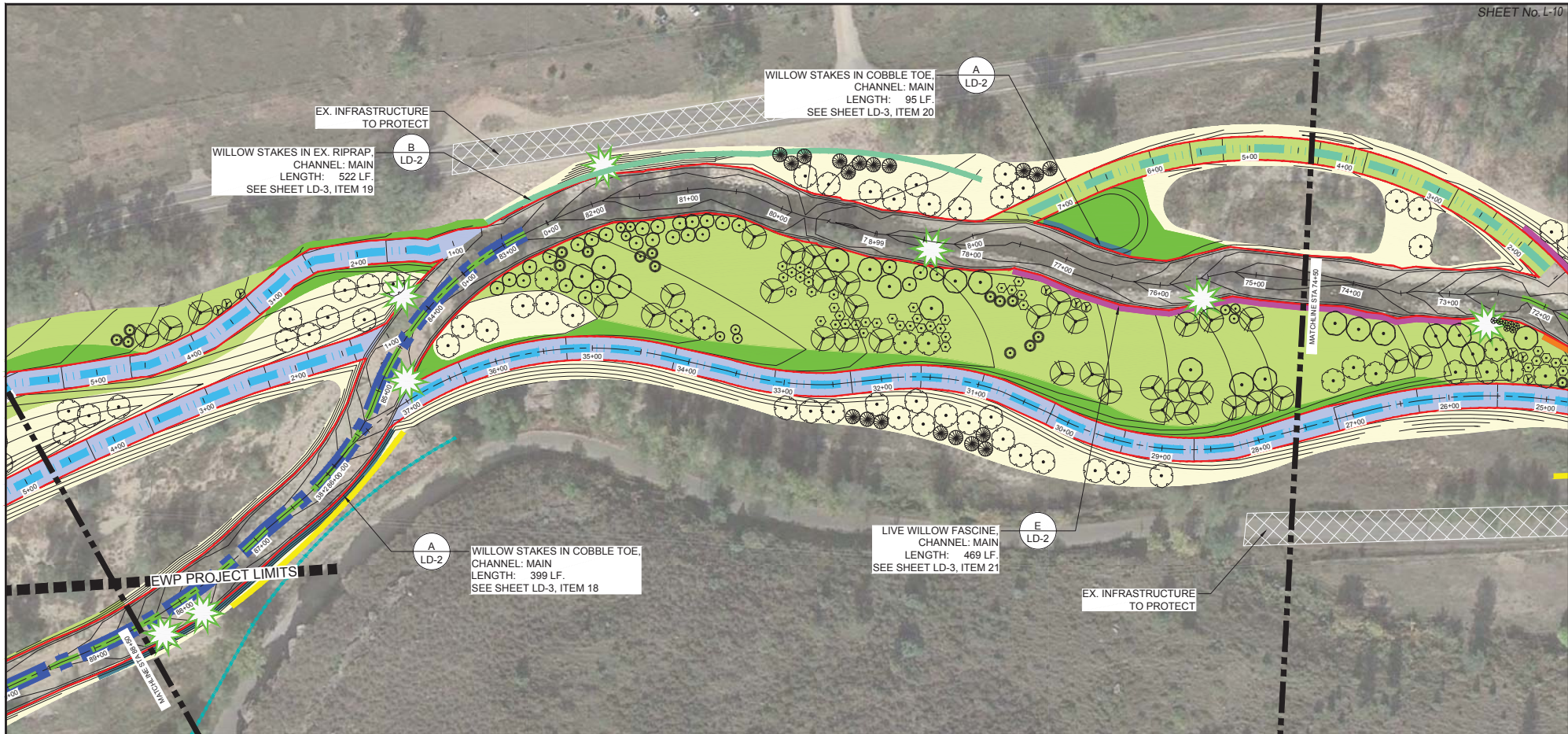
FOR AND ON BEHALF OF  
MATRIX DESIGN GROUP, INC.  
PROJECT No.

**SOUTH ST. VRAIN CREEK RESTORATION**  
BOULDER COUNTY PARKS AND OPEN SPACE  
30% DESIGN

**REVEGETATION PLANS**  
STA: 102+50 TO STA: 88+50

DESIGNED BY:	BP	SCALE (24" X 36")	DATE ISSUED:	10/24/2016	DRAWING No.
CHECKED BY:	MS	HORIZ	1"=50'		L-9
	JG	VERT	1"=50'	SHEET	58 OF 63



**REVEGETATION LEGEND:**

WILLOW STAKES	BANK STABILIZATION
PERENNIAL TUBELINGS	WILLOW STAKES IN RIPRAP
RIPARIAN SEED	WILLOW STAKES IN COBBLE TOE
UPLAND SEED	LIVE WILLOW FASCINE
RIPARIAN AND UPLAND SEED	BOULDER TOE
WETLAND/RIPARIAN SOD	VEGETATED REINFORCED SOIL SLOPES (VRSS)

**PLANT SCHEDULE: L-10**

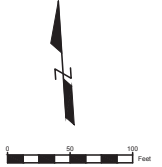
TREES	BOTANICAL NAME / COMMON NAME	SIZE	QTY
	Betula occidentalis / Water Birch	40 CI	27
	Populus angustifolia / Narrowleaf Cottonwood	40 CI/14 INCH POLE	33
	Populus sargentii / Plains Cottonwood	40 CI/14 INCH POLE	49
	Salix amygdaloides / Peach Leaf Willow	40 CI/14 INCH	12
EVERGREEN TREES	BOTANICAL NAME / COMMON NAME	SIZE	QTY
	Pinus ponderosa / Ponderosa Pine	40 CI	19

**SHRUBS**

BOTANICAL NAME / COMMON NAME	SIZE	QTY
Acer glabrum / Mountain Maple	40 CI	6
Alnus incana ssp. tenuifolia / Thineleaf Alder	40 CI	9
Amelanchier alnifolia / Serviceberry	40 CI	15
Cornus sericea / Red-Osier Dogwood	40 CI	0
Prunus americana / American Plum	40 CI	0
Prunus virginiana / Chokecherry	40 CI	35

**REVEGETATION AREAS:**

REVEGETATION AREAS:	AREA (AC.)
WILLOW STAKES	0.590
PERENNIAL TUBELINGS	0
RIPARIAN SEED	1.005
UPLAND SEED	2.005
RIPARIAN AND UPLAND SEED	2.406
WETLAND/RIPARIAN SOD	0



REFERENCE DRAWINGS				
	No.	DATE	DESCRIPTION	
			REVISIONS	
<u>COMPUTER FILE MANAGEMENT</u>				
FILE NAME: L:\1774-000 Matrix-So St. Vrain\04_CAD\4_1_Sheets\L-Landscape Sheets.dwg				
CTB FILE: ---				
PLOT DATE: 10/28/2016 8:33 AM				
THIS DRAWING IS CURRENT AS OF PLOT DATE AND MAY BE SUBJECT TO CHANGE.				

**SHEET KEY****LEGEND**

	FLOODPLAIN BENCH		1.5 YEAR OVERFLOW CHANNEL
	POOL RIFFLE ENHANCEMENT		5 YEAR OVERFLOW CHANNEL
	LARGE WOOD STRUCTURE		MAIN CHANNEL ALIGNMENT
	PROTECT INFRASTRUCTURE		SKILLS
	OFFSET BURIED REVETMENT		BANKFULL
	PARCELS		PROPOSED DITCH
	EXISTING BANK STABILIZATION		EXISTING DITCH

**PREPARED FOR:**

**PRELIMINARY**  
THIS DRAWING HAS NOT  
BEEN APPROVED BY  
GOVERNING AGENCIES AND  
IS SUBJECT TO CHANGE

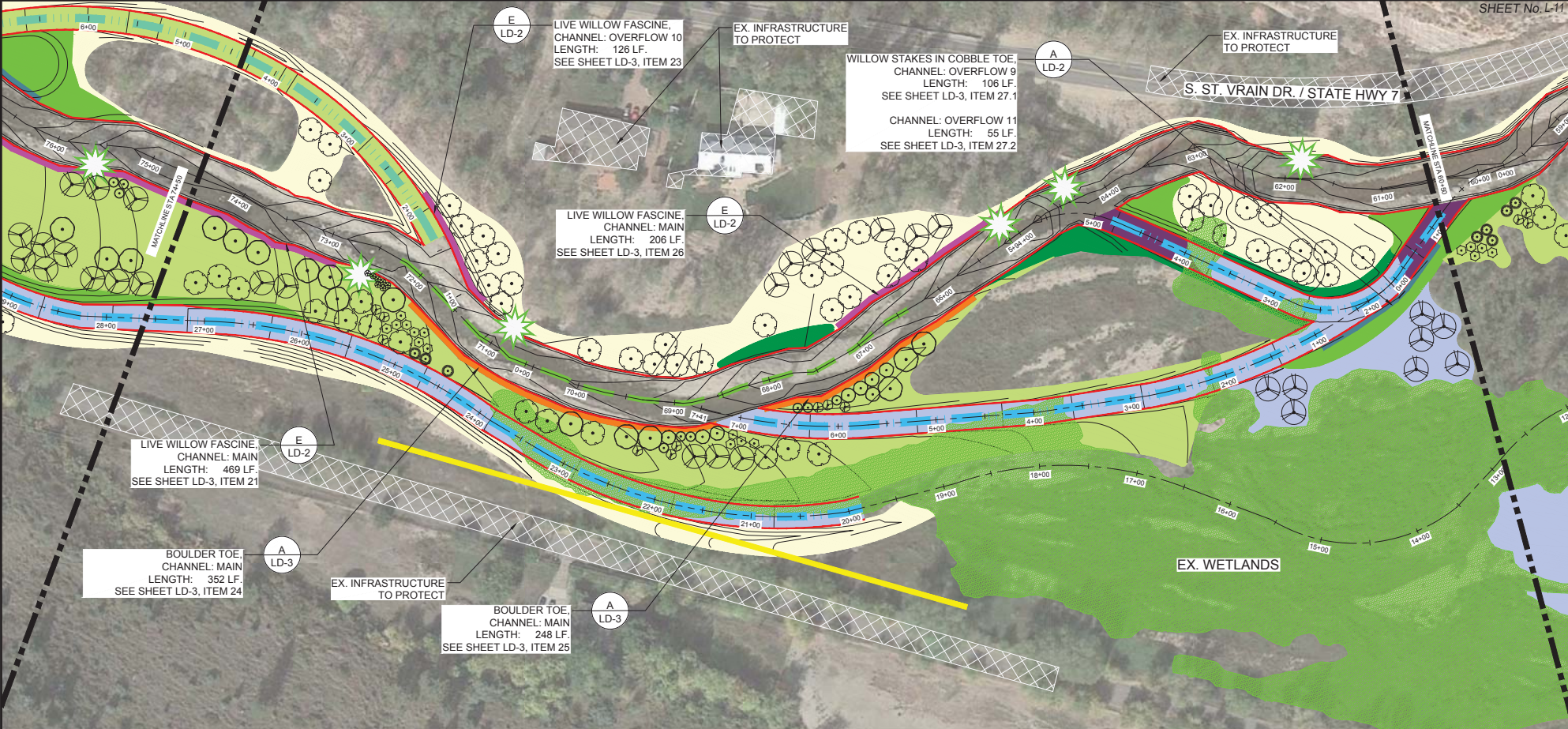
FOR AND ON BEHALF OF  
MATRIX DESIGN GROUP, INC.  
PROJECT No.
























**SOUTH ST. VRAIN CREEK RESTORATION**  
BOULDER COUNTY PARKS AND OPEN SPACE  
30% DESIGN

**REVEGETATION PLANS**  
STA: 88+50 TO STA: 74+50

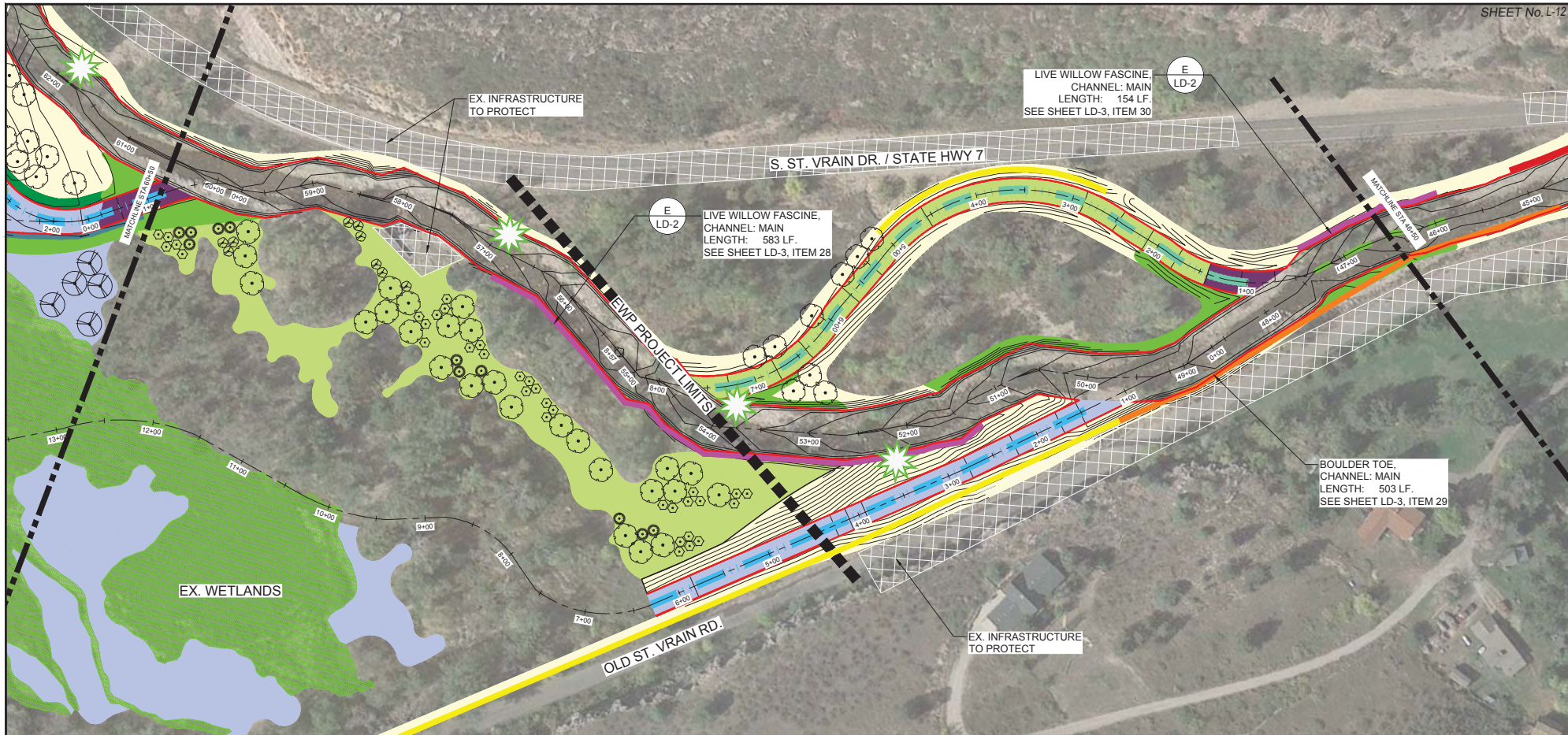
DESIGNED BY:	BP	SCALE (2" = 3')	DATE ISSUED:	10/24/2016	DRAWING No.
CHECKED BY:	MS	HORIZ	1" = 50'	SHEET	56 OF 63
	JG	VERT	1" = 50'		<b>L-10</b>





REVEGETATION LEGEND:			PLANT SCHEDULE: L-11									
WILLOW STAKES		<b>BANK STABILIZATION</b>		<b>TREES</b>	<b>BOTANICAL NAME / COMMON NAME</b>	<b>SIZE</b>	<b>QTY</b>	<b>SHRUBS</b>	<b>BOTANICAL NAME / COMMON NAME</b>	<b>SIZE</b>	<b>QTY</b>	
PERENNIAL TUBELINGS		WILLOW STAKES IN RIPRAP			Betula occidentalis / Water Birch	40 CI	8		Acer glabrum / Mountain Maple	40 CI	9	
RIPARIAN SEED		WILLOW STAKES IN COBBLE TOE			Populus angustifolia / Narrowleaf Cottonwood	40 CI/14 INCHPOLE	19		Alnus incana ssp. tenuifolia / Thineleaf Alder	40 CI	6	
UPLAND SEED		LIVE WILLOW FASCINE			Populus sargentii / Plains Cottonwood	40 CI/14 INCHPOLE	54		Amelanchier alnifolia / Serviceberry	40 CI	3	
RIPARIAN AND UPLAND SEED		BOULDER TOE			Salix amygdaloides / Peach Leaf Willow	40 CI/14 INCH	13		Cornus sericea / Red-Osier Dogwood	40 CI	7	
WETLAND/RIPARIAN SOD		VEGETATED REINFORCED SOIL SLOPES (VRSS)			<b>EVERGREEN TREES</b>	<b>BOTANICAL NAME / COMMON NAME</b>	<b>SIZE</b>	<b>QTY</b>		Prunus americana / American Plum	40 CI	0
					Pinus ponderosa / Ponderosa Pine	40 CI	0		Prunus virginiana / Chokecherry	40 CI	12	



**REVEGETATION LEGEND:**

WILLOW STAKES		<b>BANK STABILIZATION</b>	
PERENNIAL TUBELINGS		WILLOW STAKES IN RIPRAP	
RIPARIAN SEED		WILLOW STAKES IN COBBLE TOE	
UPLAND SEED		LIVE WILLOW FASCINE	
RIPARIAN AND UPLAND SEED		BOULDER TOE	
WETLAND/RIPARIAN SOD		VEGETATED REINFORCED SOIL SLOPES (VRSS)	

**PLANT SCHEDULE: L-12**

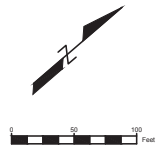
TREES	BOTANICAL NAME / COMMON NAME	SIZE	QTY
	Betula occidentalis / Water Birch	40 CI	0
	Populus angustifolia / Narrowleaf Cottonwood	40 CI/14 INCH POLE	0
	Populus sargentii / Plains Cottonwood	40 CI/14 INCH POLE	35
	Salix amygdaloides / Peach Leaf Willow	40 CI/14 INCH	0
EVERGREEN TREES	BOTANICAL NAME / COMMON NAME	SIZE	QTY
	Pinus ponderosa / Ponderosa Pine	40 CI	0

**SHRUBS**

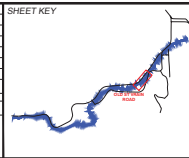
BOTANICAL NAME / COMMON NAME	SIZE	QTY
Acer glabrum / Mountain Maple	40 CI	9
Alnus incana ssp. tenuifolia / Thineleaf Alder	40 CI	0
Amelanchier alnifolia / Serviceberry	40 CI	11
Cornus sericea / Red-Osier Dogwood	40 CI	0
Prunus americana / American Plum	40 CI	0
Prunus virginiana / Chokecherry	40 CI	34

**REVEGETATION AREAS:**

REVEGETATION AREAS:	AREA (AC.)
WILLOW STAKES	0.227
PERENNIAL TUBELINGS	0
RIPARIAN SEED	1.248
UPLAND SEED	1.315
RIPARIAN AND UPLAND SEED	1.419
WETLAND/RIPARIAN SOD	0.044



REFERENCE	DATE	DESCRIPTION	BY
DRAWINGS		REVISIONS	
No.	DATE	DESCRIPTION	BY
<b>COMPUTER FILE MANAGEMENT</b>			
FILE NAME: L:\1774-000 Matrix-So St. Vrain\04_CAD\4.1_Sheets\L-Landscape Sheets.dwg			
C7B FILE: L-			
PLOT DATE: 10/28/2016 8:34 AM			
THIS DRAWING IS CURRENT AS OF PLOT DATE AND MAY BE SUBJECT TO CHANGE.			

**LEGEND**

	FLOODPLAIN BENCH		1.5 YEAR OVERFLOW CHANNEL
	POOL-RIFLE ENHANCEMENT		5 YEAR OVERFLOW CHANNEL
	LARGE WOOD STRUCTURE		MAIN CHANNEL ALIGNMENT
	PROTECT INFRASTRUCTURE		SKILLS
	OFFSET BURIED REVETMENT		BANKFULL
	PARCELS		PROPOSED DITCH
	EXISTING BANK STABILIZATION		EXISTING DITCH

**PREPARED FOR:**

FOR AND ON BEHALF OF  
MATRIX DESIGN GROUP, INC.  
PROJECT No.

**PRELIMINARY**  
THIS DRAWING HAS NOT  
BEEN APPROVED BY  
GOVERNING AGENCIES AND  
IS SUBJECT TO CHANGE

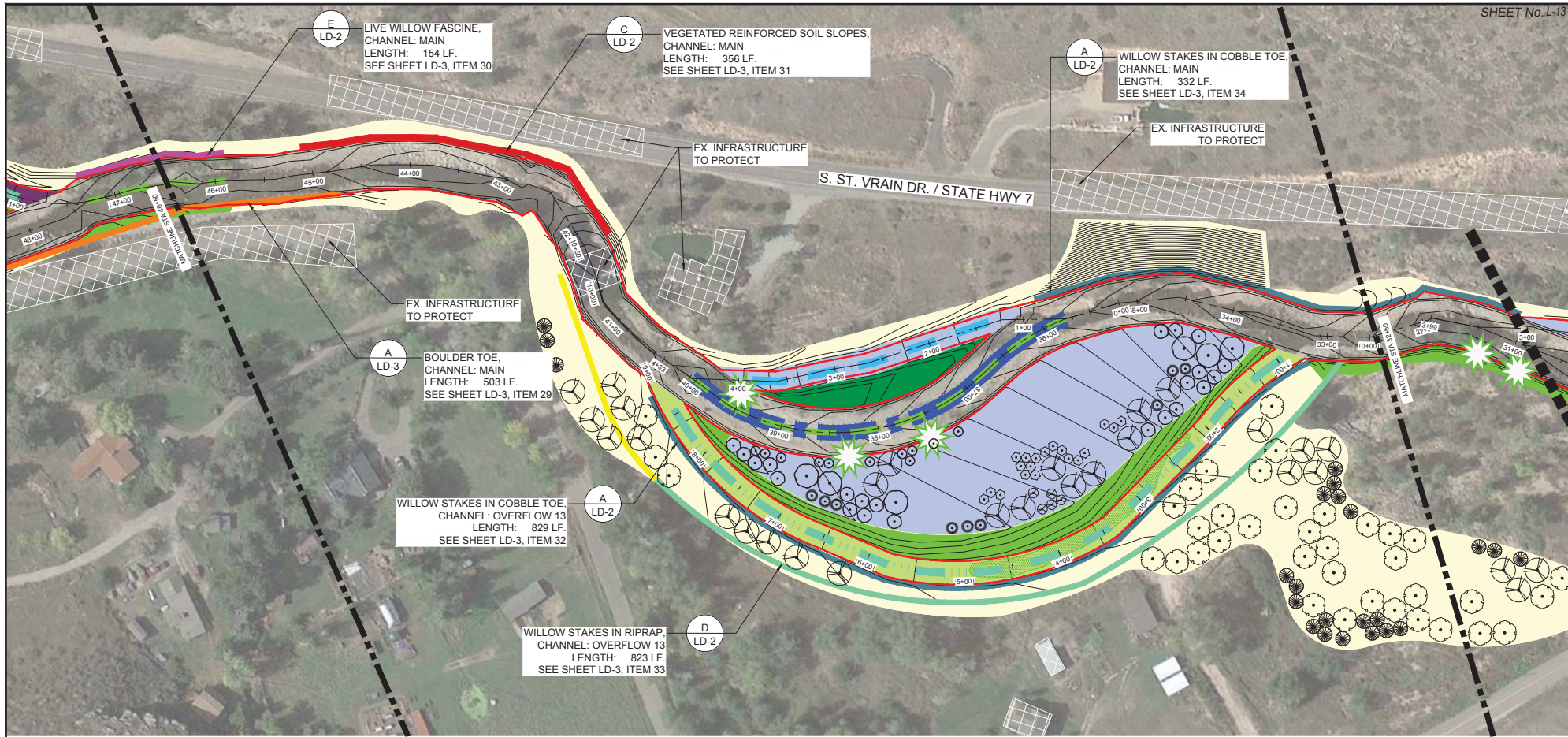
**SOUTH ST. VRAIN CREEK RESTORATION**

BOULDER COUNTY PARKS AND OPEN SPACE  
30% DESIGN

REVEGETATION PLANS  
STA: 60+50 TO STA: 46+50

DESIGNED BY:	BP	SCALE (2" = 1')	DATE ISSUED:	10/24/2016	DRAWING No.
CHECKED BY:	MS	HORIZ	1" = 50'		L-12
	JG	VERT	1" = 50'		
			SHEET	58 OF 63	



**REVEGETATION LEGEND:**

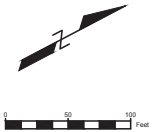
WILLOW STAKES	BANK STABILIZATION
PERENNIAL TUBELINGS	WILLOW STAKES IN RIPRAP
RIPARIAN SEED	WILLOW STAKES IN COBBLE TOE
UPLAND SEED	LIVE WILLOW FASCINE
RIPARIAN AND UPLAND SEED	BOULDER TOE
WETLAND/RIPARIAN SOD	VEGETATED REINFORCED SOIL SLOPES (VRSS)

**PLANT SCHEDULE: L-13**

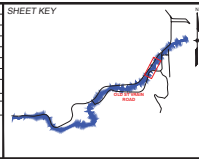
TREES	BOTANICAL NAME / COMMON NAME	SIZE	QTY
	Betula occidentalis / Water Birch	40 CI	22
	Populus angustifolia / Narrowleaf Cottonwood	40 CI/14 INCH POLE	26
	Populus sargentii / Plains Cottonwood	40 CI/14 INCH POLE	33
	Salix amygdaloides / Peach Leaf Willow	40 CI/14 INCH	6
EVERGREEN TREES	BOTANICAL NAME / COMMON NAME	SIZE	QTY
	Pinus ponderosa / Ponderosa Pine	40 CI	20















SHRUBS	BOTANICAL NAME / COMMON NAME	SIZE	QTY
	Acer glabrum / Mountain Maple	40 CI	5
	Alnus incana ssp. tenuifolia / Thineleaf Alder	40 CI	11
	Amelanchier alnifolia / Serviceberry	40 CI	9
	Cornus sericea / Red-Osier Dogwood	40 CI	0
	Prunus americana / American Plum	40 CI	0
	Prunus virginiana / Chokecherry	40 CI	19

REVEGETATION AREAS:	AREA (AC.)
WILLOW STAKES	0.342
PERENNIAL TUBELINGS	0.118
RIPARIAN SEED	1.320
UPLAND SEED	2.588
RIPARIAN AND UPLAND SEED	0.438
WETLAND/RIPARIAN SOD	0



REFERENCE DRAWINGS																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			</
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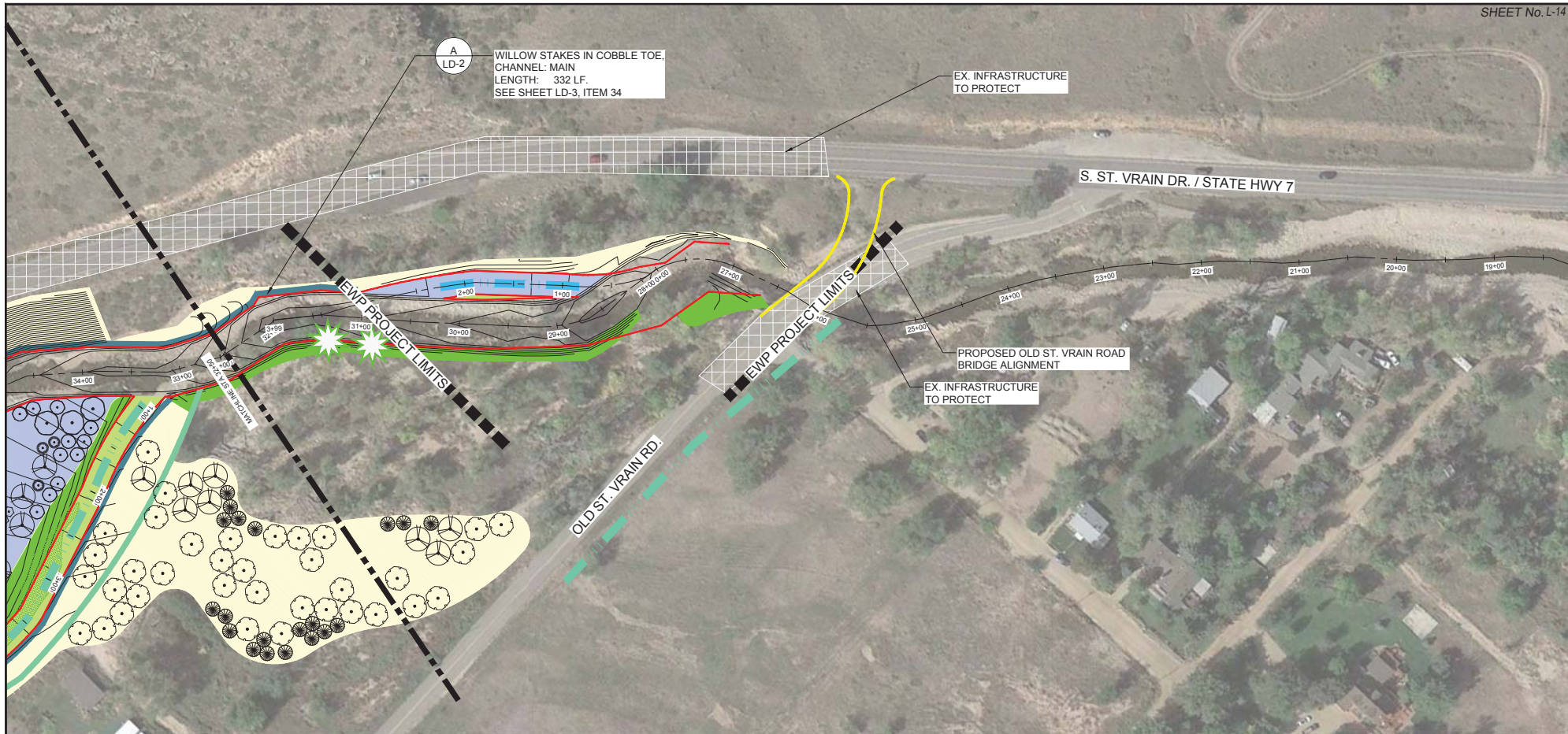


LEGEND	
	FLOODPLAIN BENCH
	POOL RIFFLE ENHANCEMENT
	LARGE WOOD STRUCTURE
	PROTECT INFRASTRUCTURE
	OFFSET BURIED REVETMENT
	PARCELS
	EXISTING BANK STABILIZATION
	1.5 YEAR OVERFLOW CHANNEL
	5 YEAR OVERFLOW CHANNEL
	MAIN CHANNEL ALIGNMENT
	SILLS
	BANKFULL
	PROPOSED DITCH
	EXISTING DITCH



<b>PRELIMINARY</b> THIS DRAWING HAS NOT BEEN APPROVED BY GOVERNING AGENCIES AND IS SUBJECT TO CHANGE.	<b>SOUTH ST. VRAIN CREEK RESTORATION</b> BOULDER COUNTY PARKS AND OPEN SPACE 30% DESIGN			
	REVEGETATION PLANS STA: 46+50 TO STA: 32+50			
	FOR AND ON BEHALF OF MATRIX DESIGN GROUP, INC. PROJECT No.	DESIGNED BY: BP DRAWN BY: MS CHECKED BY: JG	SCALE: 1" = 40' HORIZ: 1" = 80' VERT: 1" = 20' SHEET	DATE ISSUED: 10/24/2016 OF 63 L-13



**REVEGETATION LEGEND:**

WILLOW STAKES	BANK STABILIZATION
PERENNIAL TUBELINGS	WILLOW STAKES IN RIPRAP
RIPARIAN SEED	WILLOW STAKES IN COBBLE TOE
UPLAND SEED	LIVE WILLOW FASCINE
RIPARIAN AND UPLAND SEED	BOULDER TOE
WETLAND/RIPARIAN SOD	VEGETATED REINFORCED SOIL SLOPES (VRSS)

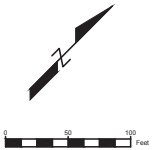
**PLANT SCHEDULE: L-14**

TREES	BOTANICAL NAME / COMMON NAME	SIZE	QTY
	Betula occidentalis / Water Birch	40 CI	0
	Populus angustifolia / Narrowleaf Cottonwood	40 CI/14 INCH/POLE	3
	Populus sargentii / Plains Cottonwood	40 CI/14 INCH/POLE	6
	Salix amygdaloides / Peach Leaf Willow	40 CI/14 INCH	0
EVERGREEN TREES	BOTANICAL NAME / COMMON NAME	SIZE	QTY
	Pinus ponderosa / Ponderosa Pine	40 CI	3

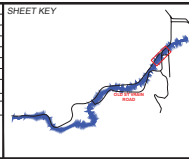
**SHRUBS**

BOTANICAL NAME / COMMON NAME	SIZE	QTY
Acer glabrum / Mountain Maple	40 CI	0
Alnus incana ssp. tenuifolia / Thineleaf Alder	40 CI	0
Amelanchier alnifolia / Serviceberry	40 CI	0
Cornus sericea / Red-Osier Dogwood	40 CI	0
Prunus americana / American Plum	40 CI	0
Prunus virginiana / Chokecherry	40 CI	0

REVEGETATION AREAS	AREA (AC.)
WILLOW STAKES	0.169
PERENNIAL TUBELINGS	0
RIPARIAN SEED	0.111
UPLAND SEED	0.490
RIPARIAN AND UPLAND SEED	0.008
WETLAND/RIPARIAN SOD	0



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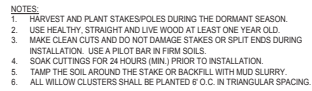
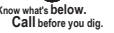
LEGEND	1.5 YEAR OVERFLOW CHANNEL



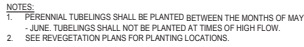
<b>PRELIMINARY</b>	
THIS DRAWING HAS NOT BEEN APPROVED BY GOVERNING AGENCIES AND IS SUBJECT TO CHANGE.	
FOR AND ON BEHALF OF	DATE ISSUED: 10/24/2016
MATRIX DESIGN GROUP, INC.	SHEET 60 OF 63
PROJECT No.	DRAWING No. L-14

<b>SOUTH ST. VRAIN CREEK RESTORATION</b>	
BOULDER COUNTY PARKS AND OPEN SPACE	
30% DESIGN	
<b>REVEGETATION PLANS</b>	
STA: 32+50 TO PROJECT LIMITS	
DESIGNED BY: BP	SCALE (24" X 36")
CHECKED BY: MS	HORIZ 1"=50'
	VERT 1"=50'

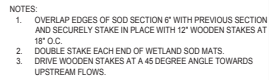




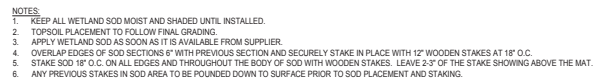
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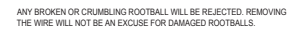
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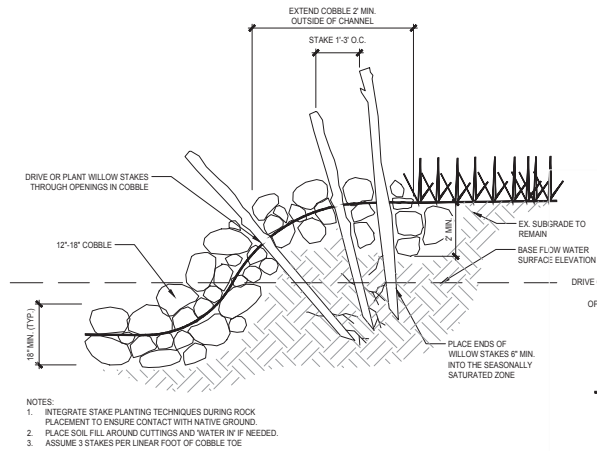
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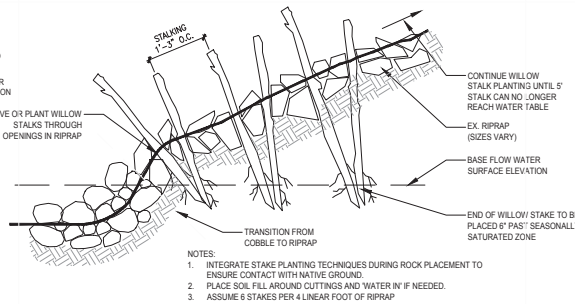
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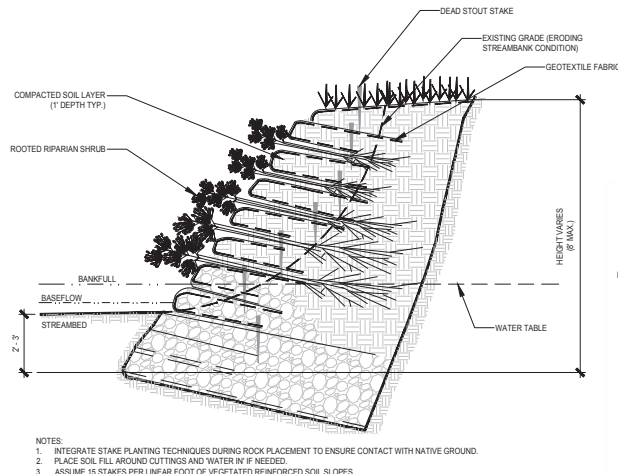
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DRAWN BY:	EG	HORIZ.	SHEET	61 OF 63	
CHECKED BY:	JG	VERT.			



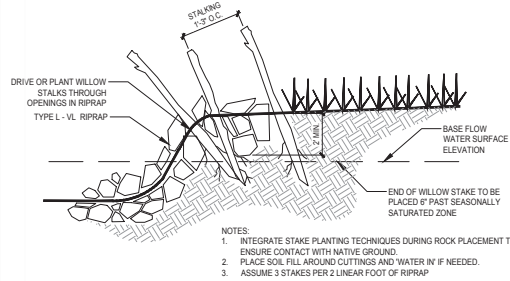
**A** WILLOW STAKE IN COBBLE TOE  
SCALE: N.T.S.



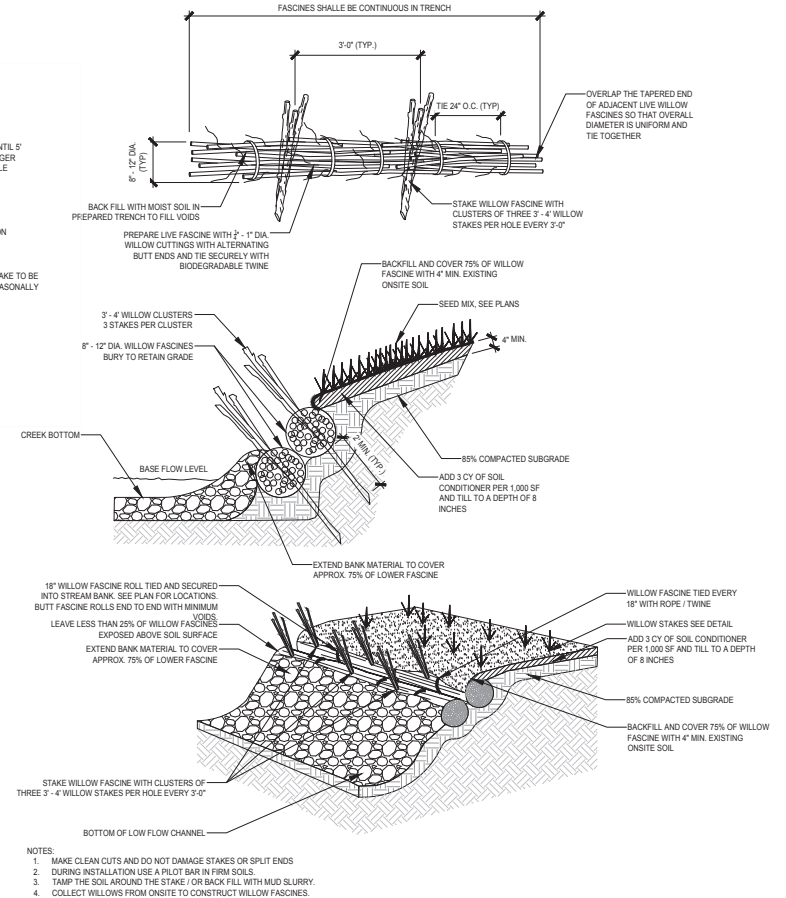
**B** WILLOW STAKES IN EXISTING RIPRAP  
SCALE: N.T.S.



**C** VEGETATED REINFORCED SOIL SLOPES  
SCALE: N.T.S.

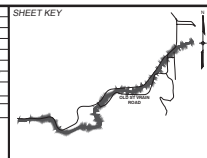


**D** WILLOW STAKES IN RIPRAP  
SCALE: N.T.S.



**E** LIVE WILLOW FASCINE  
SCALE: N.T.S.

REFERENCE DRAWINGS	
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REVISIONS	
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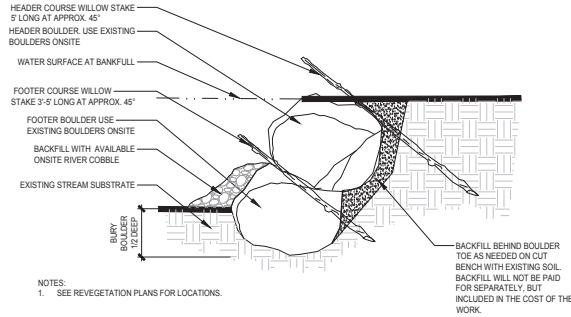
FOR AND ON BEHALF OF  
MATRIX DESIGN GROUP, INC.  
PROJECT NO.

SOUTH ST. VRAIN CREEK RESTORATION			
BOULDER COUNTY PARKS AND OPENSACE 30% DESIGN			
REVEGETATION DETAILS			
DESIGNED BY:	BP	SCALE (22" X 34")	DATE ISSUED:
DRAWN BY:	JS	HORIZ.	10/10/2016
CHECKED BY:		SHEET	62 OF 63
			DRAWING No. LD-2



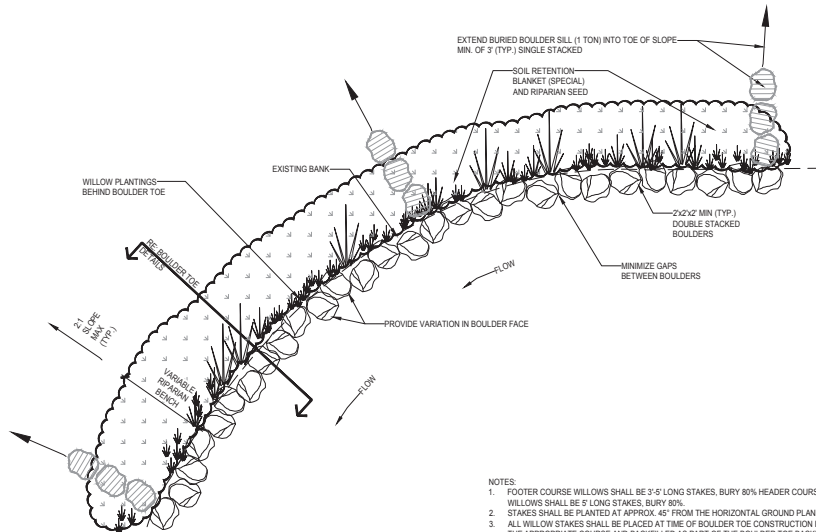
# Bank Stabilization: Bioengineering Treatments

September 14, 2016



NOTES:  
1. SEE REVEGETATION PLANS FOR LOCATIONS.

**A BOULDER TOE WILLOW PLANTING**  
SCALE: N.T.S.



NOTES:  
1. FOOTER COURSE WILLOWS SHALL BE 3'-6" LONG STAKES, BURY 80% HEADER COURSE WILLOWS SHALL BE 5' LONG STAKES, BURY 80%.  
2. STAKES SHALL BE PLANTED AT APPROX. 45° FROM THE HORIZONTAL GROUND PLANE.  
3. ALL WILLOW STAKES SHALL BE PLACED AT TIME OF BOULDER TOE CONSTRUCTION IN THE APPROPRIATE COURSE AND BACKFILLED AS PART OF THE BOULDER TOE BACKFILL OPERATIONS.  
4. SEE REVEGETATION PLANS FOR LOCATIONS OF WILLOW PLANTINGS AND BOULDER TOE LOCATIONS.

**B BOULDER TOE WILLOW PLANTING LAYOUT PLAN**  
SCALE: N.T.S.

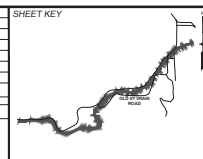
Bioengineering Treatment	Channel	STA Start	STA End	Total Length (lf.)	Initial Permissible Velocity (ft./s)	Established Permissible Velocity (ft./s)
1 Willow Stakes in Riprap	Main	168+96	176+79	839	5 to 10	12+
2 Willow Stakes in Cobble Toe	Main	148+55	158+43	1028	5 to 10	10+
3 Willow Stakes in Riprap	Overflow 2 (5 year)	5+67	12+39	657	5 to 10	12+
4 Willow Stakes in Riprap	Overflow 3 (1.5 year)	2+53	4+40	254	5 to 10	12+
5 Willow Stakes in Cobble Toe	Main	131+47	134+46	308	5 to 10	10+
6 Willow Stakes in Riprap	Main	119+73	126+72	765	5 to 10	12+
7 Willow Stakes in Cobble Toe	Main	116+47	119+73	308	14 to 18	18+
8 Willow Stakes in Riprap	Overflow 5 (5 year)	8+21	12+71	500	5 to 10	12+
9 Live Willow Fascine	Main	111+68	114+85	355	5 to 8	8 to 10+
10 Live Willow Fascine	Main	110+30	111+97	182	5 to 8	8 to 10+
11 Willow Stakes in Cobble Toe	Main	108+45	110+50	225	5 to 10	10+
12 Boulder Toe	Main	101+67	106+43	474	14 to 18	18+
13 Boulder Toe	Main	100+70	104+22	370	14 to 18	18+
14 Willow Stakes in Riprap	Main	98+47	102+14	450	5 to 10	12+
15 Willow Stakes in Cobble Toe	Main	97+13	100+13	316	5 to 10	10+
16.1 Willow Stakes in Riprap	Main	95+31	96+53	119	5 to 10	12+
16.2 Willow Stakes in Riprap	Overflow 6 (1.5 year)	10+54	13+59	298	5 to 10	12+
17 Willow Stakes in Cobble Toe	Main	89+91	95+55	556	5 to 10	10+
18 Willow Stakes in Cobble Toe	Main	85+28	89+08	399	5 to 10	10+
19 Willow Stakes in Riprap	Main	77+89	83+02	522	5 to 10	12+
20 Willow Stakes Cobble Toe	Main	76+39	77+33	95	5 to 10	10+
21 Live Willow Fascine	Main	72+86	77+50	469	5 to 8	8 to 10+
23 Live Willow Fascine	Overflow 10 (1.5 year)	0+78	2+07	126	5 to 8	8 to 10+
24 Boulder Toe	Main	68+63	71+86	352	14 to 18	18+
25 Boulder Toe	Main	65+75	68+13	248	14 to 18	18+
26 Live Willow Fascine	Main	65+00	67+05	206	5 to 8	8 to 10+
27.1 Willow Stakes in Cobble Toe	Overflow 9 (1.5 year)	0+00	1+01	160	5 to 10	10+
27.2 Willow Stakes in Cobble Toe	Overflow 11 (1.5 year)	1+10	1+64	55	5 to 10	10+
28 Live Willow Fascine	Main	51+48	56+84	583	5 to 8	8 to 10+
29 Boulder Toe	Main	44+75	49+88	503	14 to 18	18+
30 Live Willow Fascine	Main	45+88	47+39	154	5 to 8	8 to 10+
31 Vegetated Reinforced Soil Slopes	Main	42+83	45+09	356	4 to 9	10+
32 Willow Stakes in Cobble Toe	Overflow 13 (5 year)	33+29	8+77	829	5 to 10	10+
33 Willow Stakes in Riprap	Overflow 13 (5 year)	0+28	8+11	823	5 to 10	12+
34 Willow Stakes in Cobble Toe	Main	31+06	36+00	514	5 to 10	10+

Total Willow Stakes in Riprap	5227
Total Willow Stakes in Cobble Toe	4793
Total Boulder Toe	1947
Total Live Willow Fascine	2075
Total Vegetated Reinforced Soil Slopes	356

## Notes:

1. All bioengineering treatments and associated permissible velocities were sourced from references in the Manual of Bioengineering Treatments for Colorado Streams.
2. Permissible velocity for Willow Stakes in Cobble Toe was approximated by using the information from Table 4 - Permissible Shear and Velocity for Selected 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)

REFERENCE DRAWINGS	
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REVISIONS	
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**PRELIMINARY**  
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FOR AND ON BEHALF OF  
MATRIX DESIGN GROUP, INC.  
PROJECT NO.

## SOUTH ST. VRAIN CREEK RESTORATION

BOULDER COUNTY PARKS AND OPENSACE  
30% DESIGN

## REVEGETATION DETAILS

DESIGNED BY: EJS	BP	SCALE (22" X 34")	DATE ISSUED: 10/10/2016	DRAWING NO.
CHECKED BY: JVS	JVS	VERT.	SHEET 63 OF 63	LD-3