

Sand Creek Stabilization Project

Section 13, T14S, R66W; 6th PM

UTM NAD 83: Zone 13N; 523100mE, 4298339mN

Longitude 104.733851°W, Latitude 38.833544°N

USGS Elsmere, CO Quadrangle

El Paso County, Colorado

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
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Figure 1
Vicinity Map

Prepared for: Colorado Springs Utilities
File: 210001_Figure 1.mxd [dlH]
February 2, 2021

ERO
ERO Resources Corp.



WATER SERVICES DIVISION WASTEWATER PLANNING AND DESIGN SANITARY SEWER CREEK CROSSINGS

UTILITIES' REPRESENTATIVE:

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COLORADO SPRINGS UTILITIES
WASTEWATER PROGRAMS
1521 HANCOCK EXPRESSWAY
COLORADO SPRINGS, CO 80903
EMAIL: jmessamer@csu.org

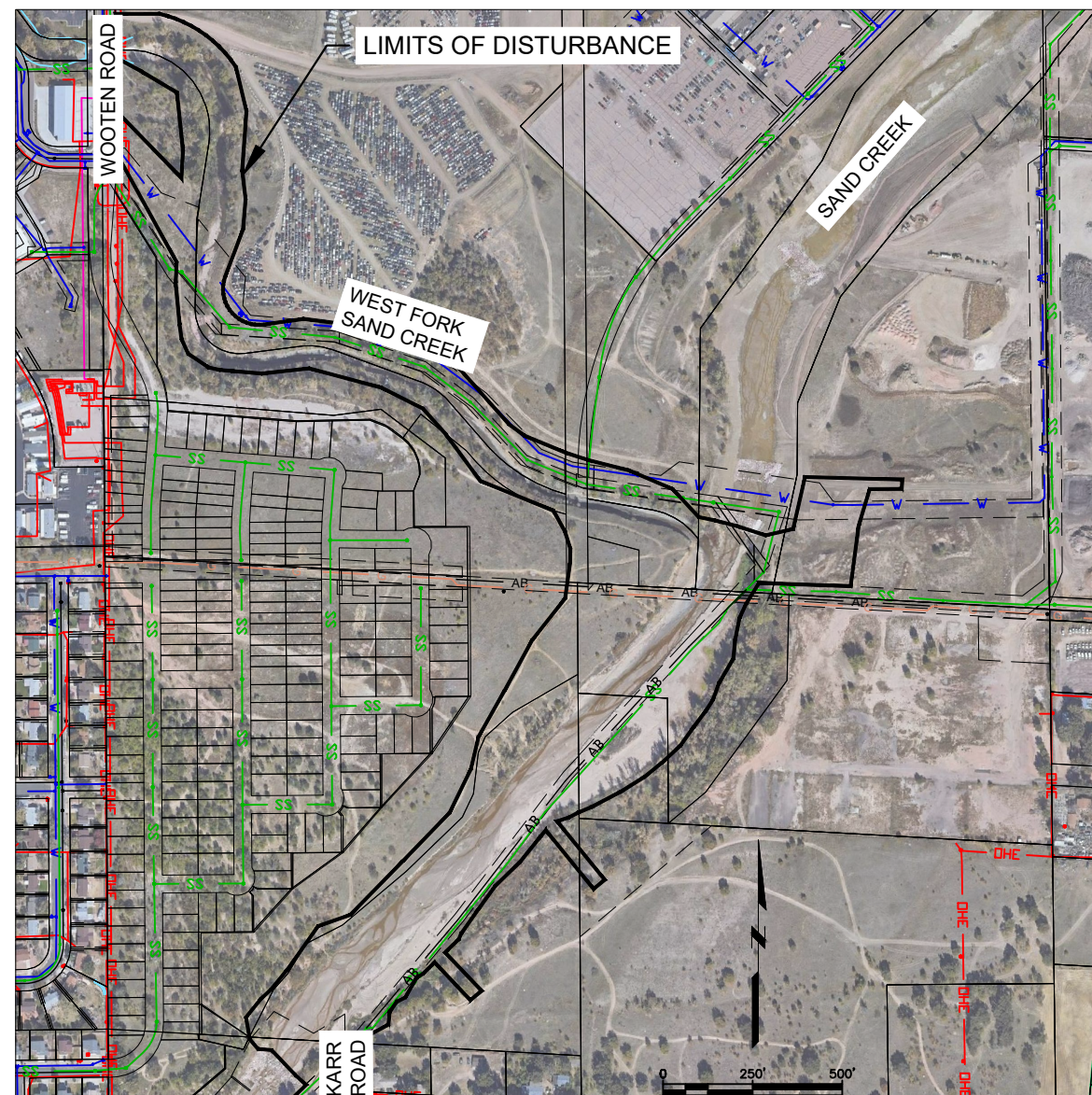
Approved for Construction

By: _____
Colorado Springs Utilities Date

By: _____
Water Resources Engineering Date

STATEMENT: THE CITY OF COLORADO SPRINGS RECOGNIZES THE DESIGN ENGINEER AS HAVING RESPONSIBILITY FOR THE DESIGN; THE CITY HAS LIMITED ITS SCOPE OF REVIEW ACCORDINGLY. RESUBMITTAL REQUIRED IF CONSTRUCTION HAS NOT COMMENCED WITHIN 180 DAYS AFTER THE REVIEW DATE

SAND CREEK KARR ROAD TO WEST FORK CONFLUENCE AND WEST FORK BELOW WOOTEN ROAD 90% DESIGN DRAWINGS



SITE MAP

CITY OF COLORADO SPRINGS GRADING AND EROSION CONTROL REVIEW

THIS GRADING PLAN IS FILED IN ACCORDANCE WITH SECTION 7.7.1503 (ENACTED AS ORD. 82-56) OF THE CODE OF THE CITY OF COLORADO SPRINGS, 2001, AS AMENDED. EROSION CONTROL IS REVIEWED IN ACCORDANCE WITH THE DRAINAGE CRITERIA MANUAL, VOL.1 (MAY 2014) AND VOL. II (MAY 2014); LATEST REVISIONS

DATE: _____
FOR CITY REVIEW ENGINEER
CONDITIONS:

CONTRACTOR'S STATEMENT

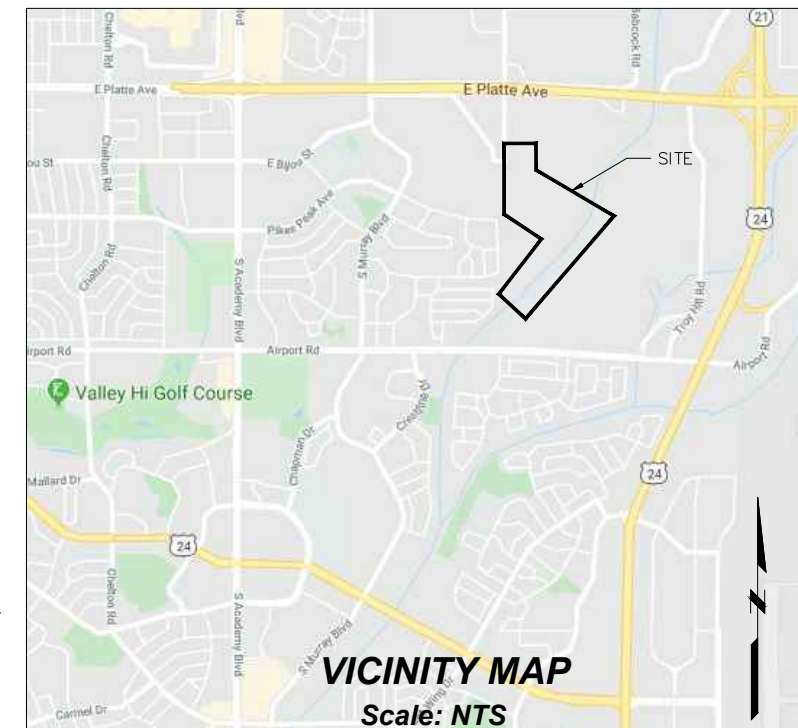
I WILL COMPLY WITH THE REQUIREMENTS OF THE EROSION AND STORMWATER QUALITY CONTROL PLAN INCLUDING TEMPORARY BMP INSPECTION REQUIREMENTS AND FINAL STABILIZATION REQUIREMENTS. I ACKNOWLEDGE THE RESPONSIBILITY TO DETERMINE WHETHER THE CONSTRUCTION ACTIVITIES ON THESE PLANS REQUIRE CDP'S PERMITTING FOR STORMWATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACTIVITY.

NAME OF CONTRACTOR: _____
AUTHORIZED SIGNATURE: _____ DATE: _____
PRINTED NAME: _____ PHONE: _____
TITLE: _____ EMAIL: _____
ADDRESS: _____ FAX: _____

PROJECT ENGINEER'S STATEMENT

I HEREBY CERTIFY THAT THE DRAINAGE AND GRADING FOR SAND CREEK DOWNSTREAM OF THE WEST FORK CONFLUENCE BANK STABILIZATION SHALL BE CONSTRUCTED ACCORDING TO THE DESIGN PRESENTED IN THIS PLAN. I FURTHER UNDERSTAND THAT FIELD CHANGES MUST BE REVIEWED BY THE CITY REVIEW ENGINEER TO ENSURE CONFORMANCE WITH THE ORIGINAL DESIGN INTENT. I AM EMPLOYED BY AND PERFORM ENGINEERING SERVICES SOLELY FOR THE CITY OF COLORADO SPRINGS, AND THEREFORE AM EXEMPT FROM COLORADO REVISED STATUTE TITLE 12, ARTICLE 25, PART 1 ACCORDING TO §12-25-103(1), C.R.S.

SIGNATURE: _____ DATE: _____
PRINTED NAME: _____



SHEET NO.	SHEET TITLE
1	COVER SHEET
2-5	GENERAL NOTES
6	EXISTING CONDITIONS OVERVIEW
7	PROPOSED CONDITIONS OVERVIEW
8-15	GRADING, EROSION, AND STORMWATER QUALITY CONTROL PLAN
16-21	PLAN AND PROFILE PAGES
22-35	SAND CREEK CROSS SECTIONS
36-46	WEST FORK SAND CREEK CROSS SECTIONS
47-53	DROP STRUCTURE DETAILS
54-56	BOULDER WALL DETAILS
57-59	TYPICAL CHANNEL DESIGN SECTIONS
60-63	MISC. DETAILS
64-70	PLANTING PLAN



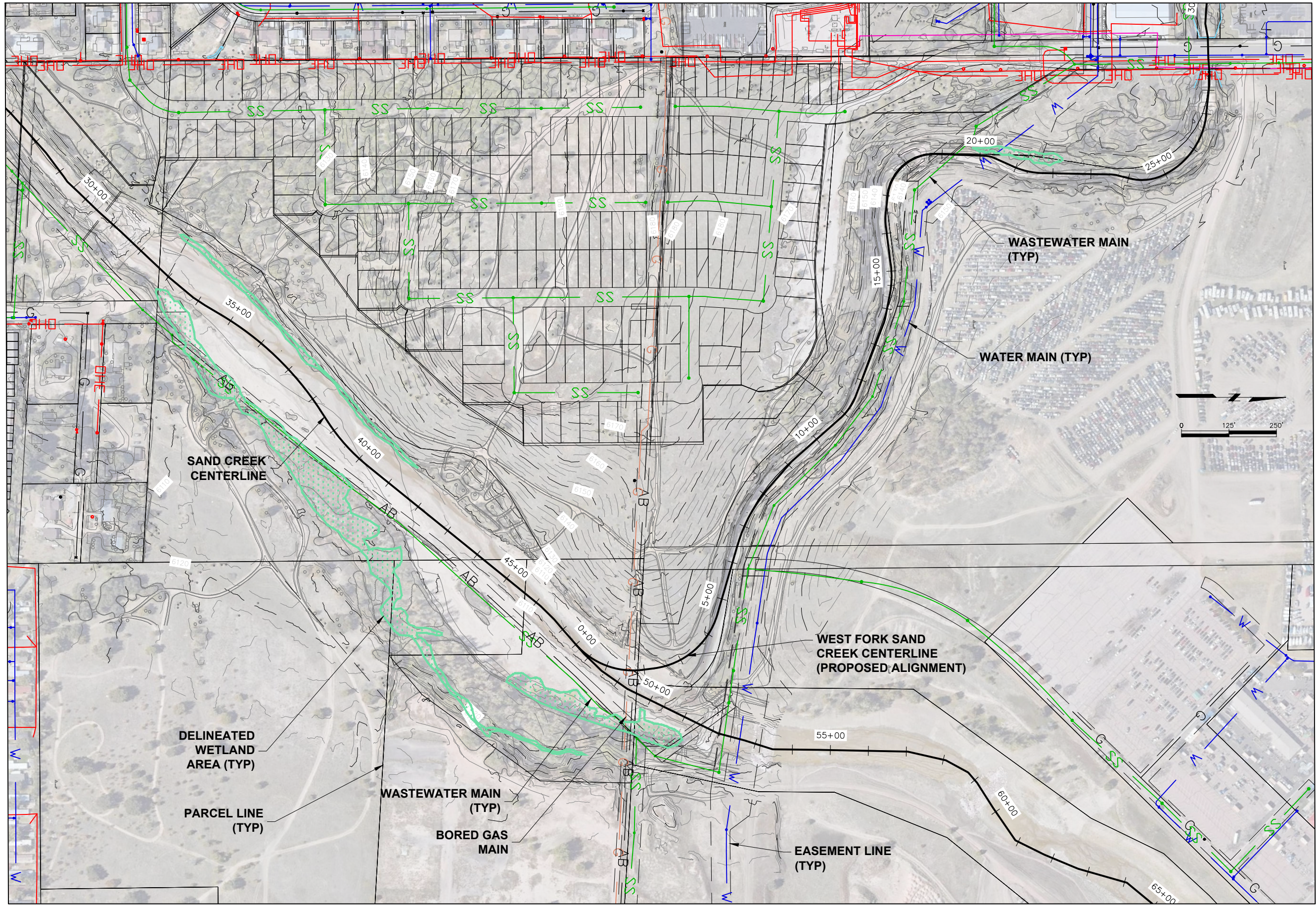
(AS BUILT INFORMATION)

DATE STARTED: _____
DATE COMPLETED: _____
FOREMAN: _____
INSPECTOR: _____
CONTRACTOR: _____

SAND CREEK KARR ROAD
TO WEST FORK CONFLUENCE AND
WEST FORK BELOW WOOTEN ROAD
90% DESIGN

(PROJECT RELATED INFORMATION)

PARENT WORK ORDER NUMBER: _____
PROJECT NUMBER: _____
FMS MAP: _____
SHEET NO: 01 OF 63
NETWORK LOCATION & DRAWING TITLE: L:\Work\SSCC\Projects\Sand Creek Karr Road to West Fork\Design\SSCRWF_Cover_Sheet.dwg
REVISIONS: _____



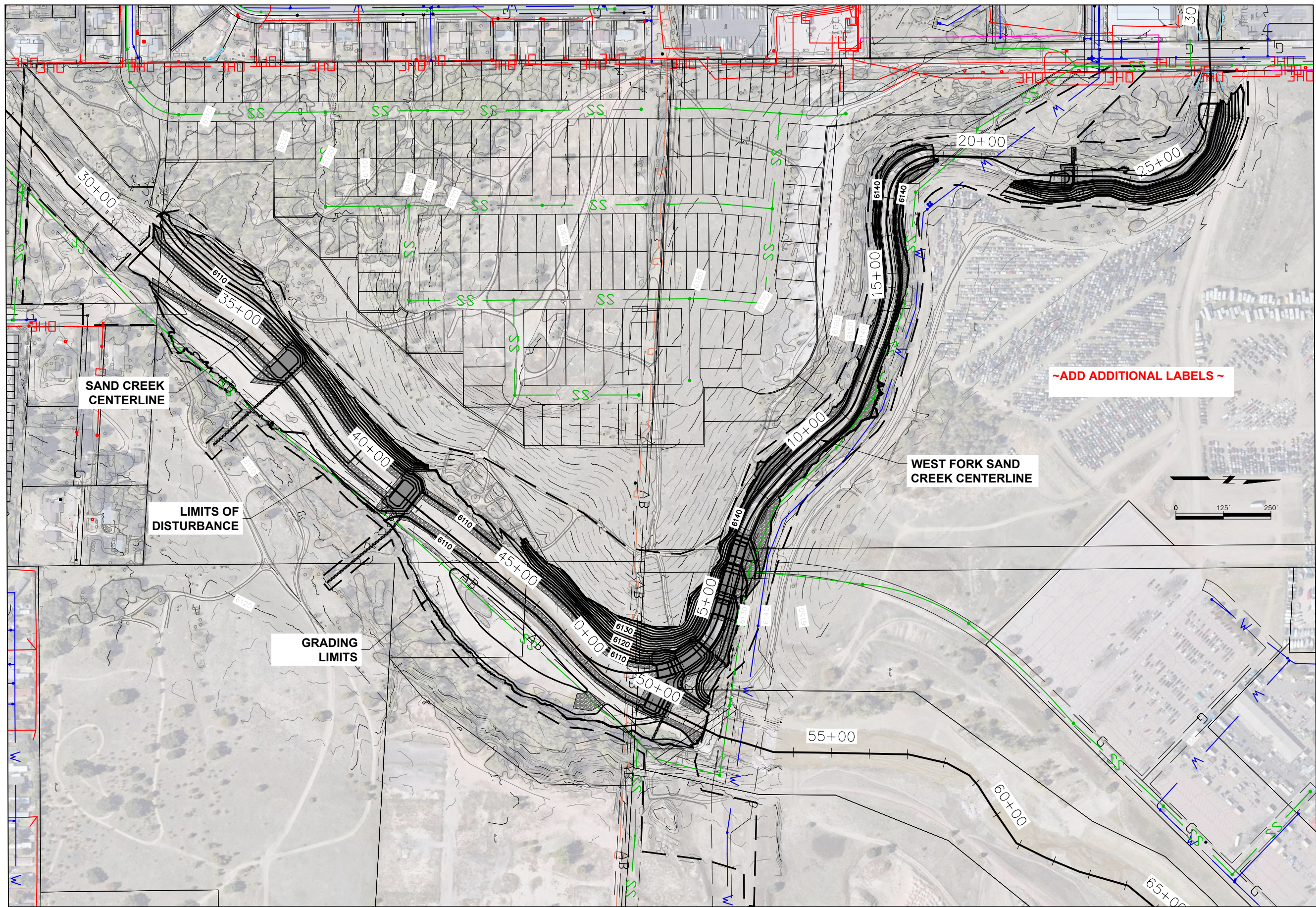
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**SAND CREEK KARR ROAD
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90% DESIGN**



**EXISTING
CONDITIONS**



(AS BUILT INFORMATION)

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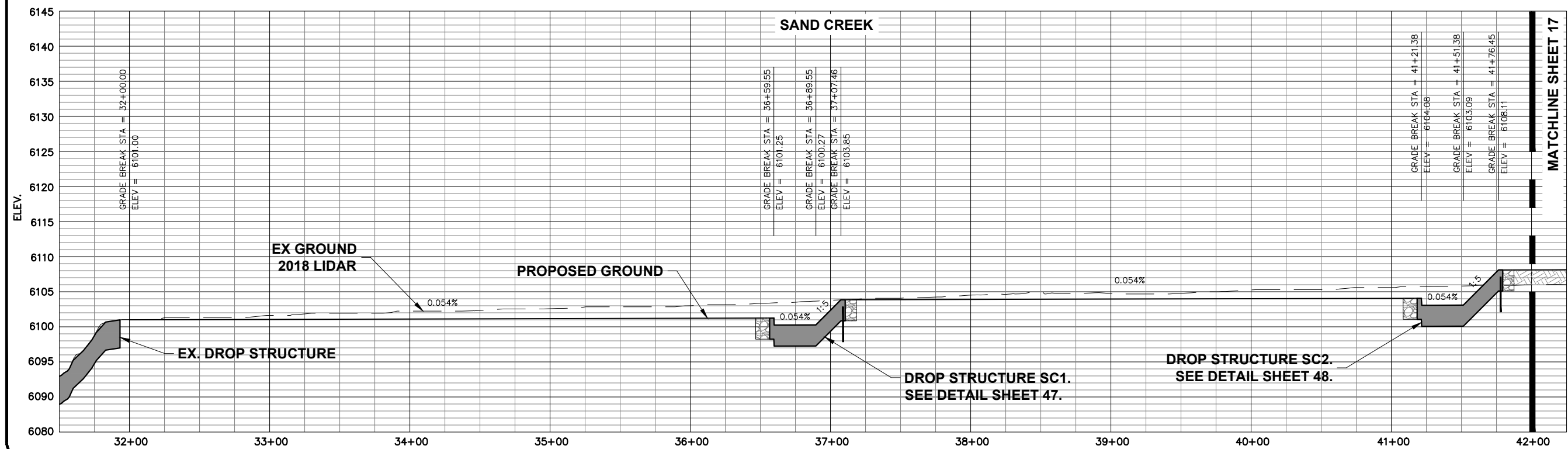
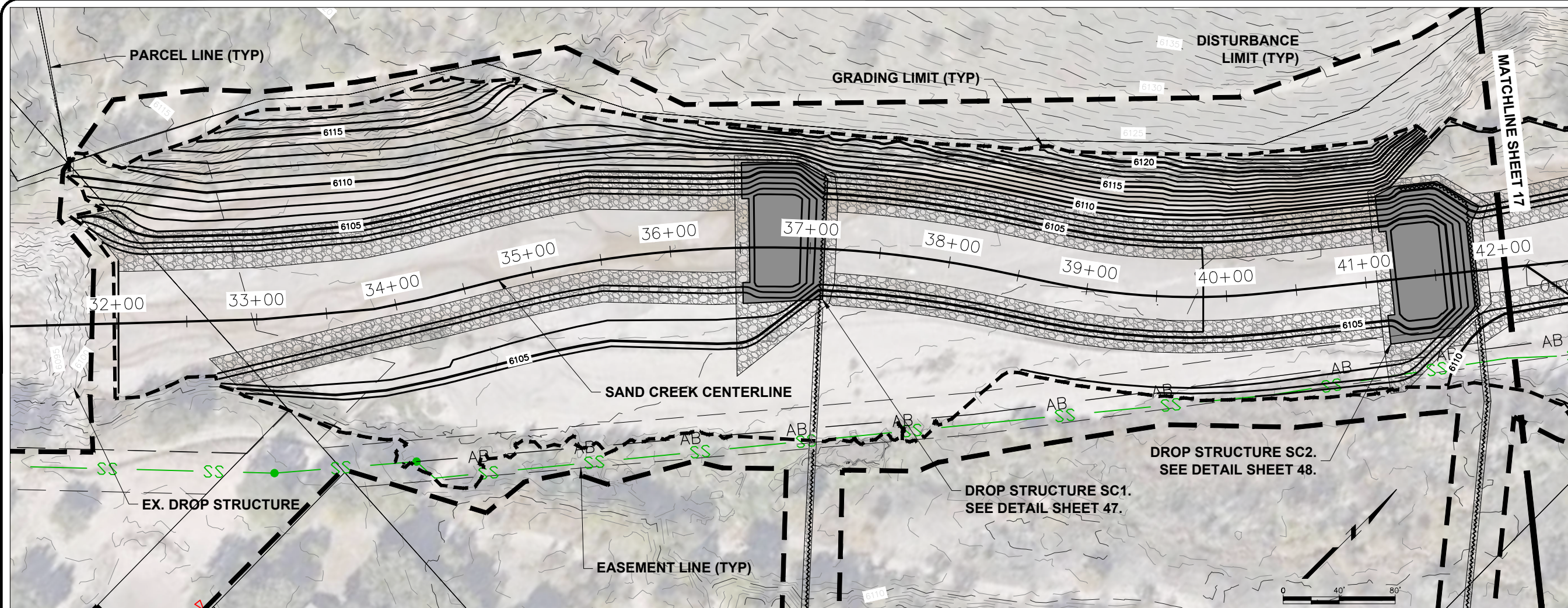
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Know what's below.
Call before you dig.

PROPOSED
CONDITIONS

DATE: 9.27.2021
SHEET NO: 7 OF 70



(AS BUILT INFORMATION)

DATE STARTED:
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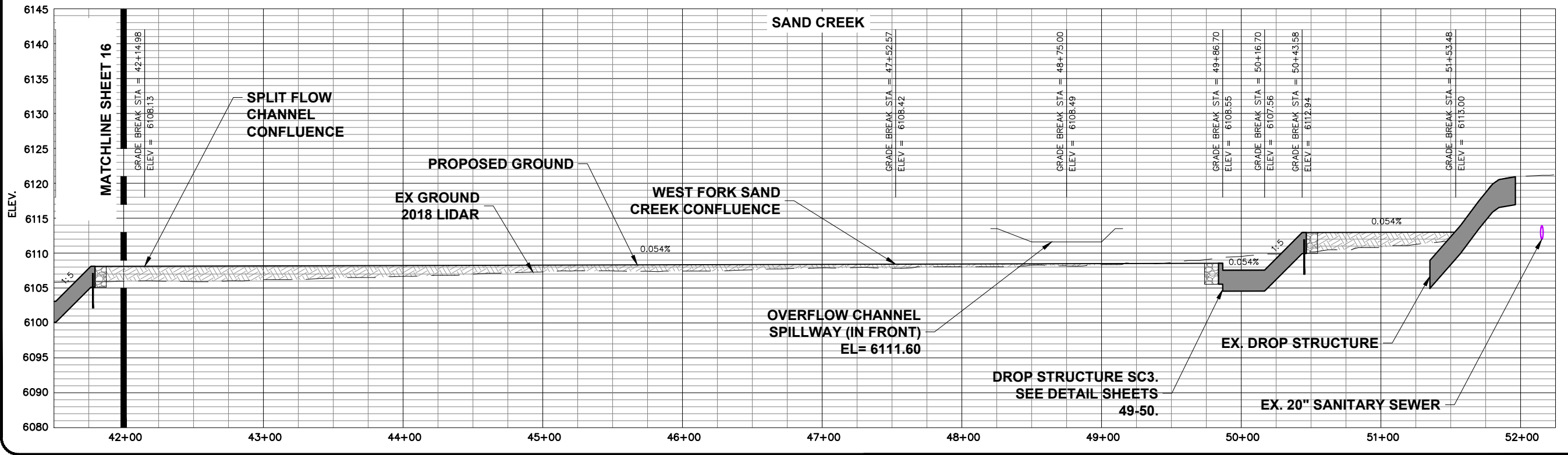
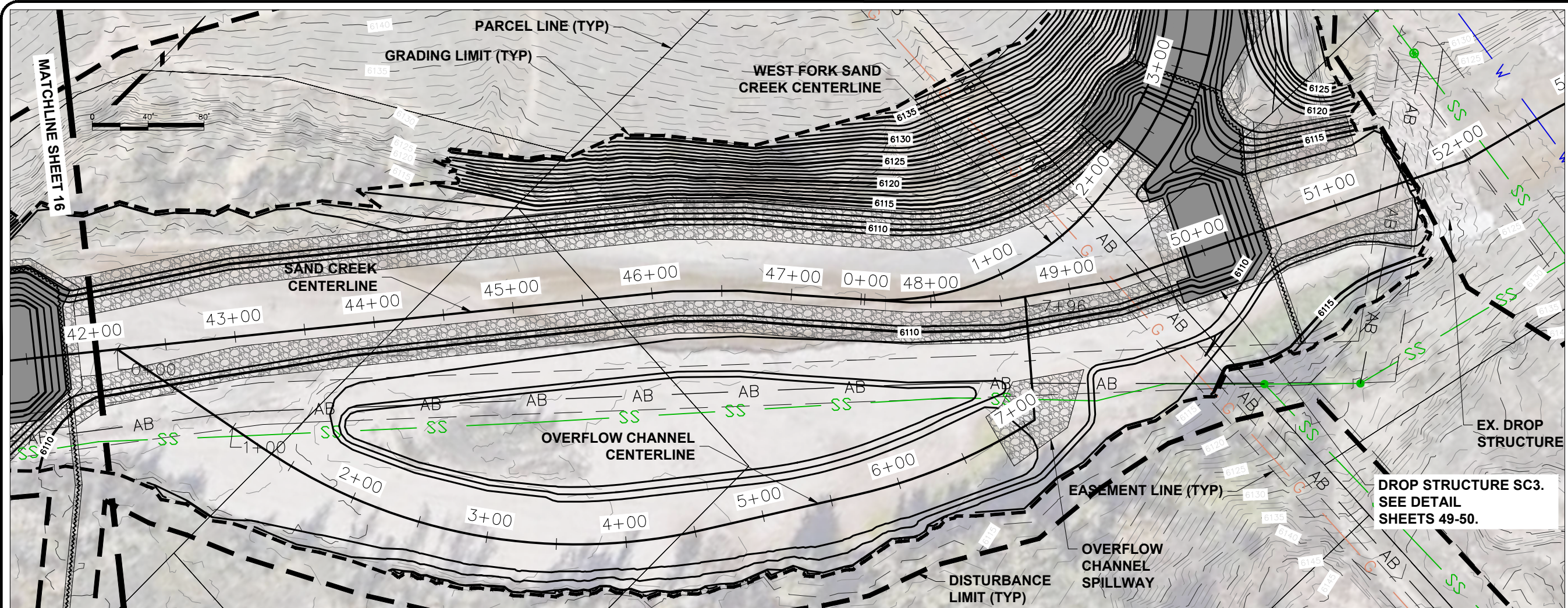
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SAND CREEK
PLAN AND
PROFILE

DATE: 9.27.2021
SHEET NO: 16 OF 70



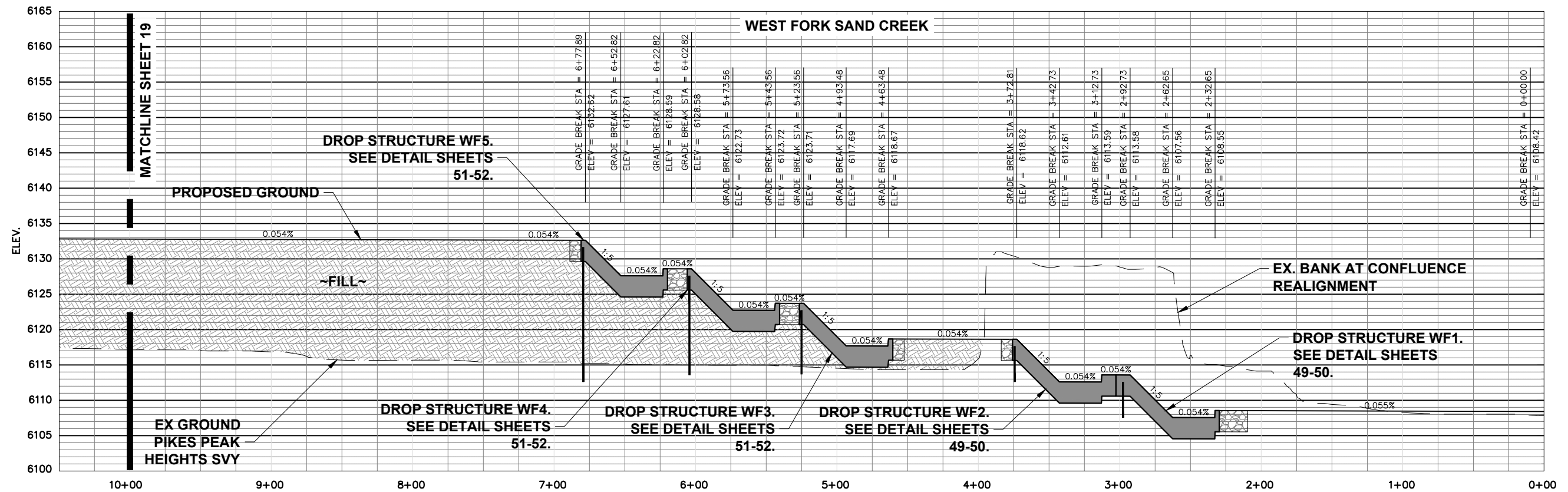
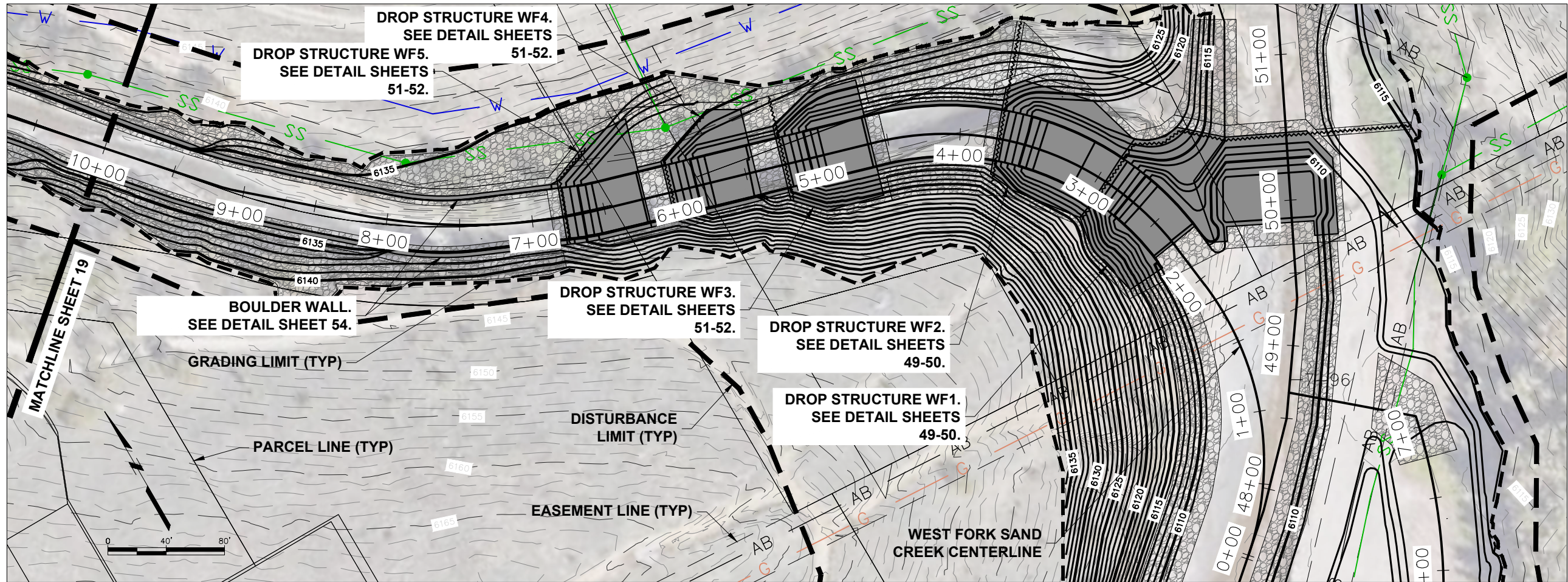
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TO WEST FORK CONFLUENCE AND
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OVERFLOW
CHANNEL
PLAN AND
PROFILE



(AS BUILT INFORMATION)

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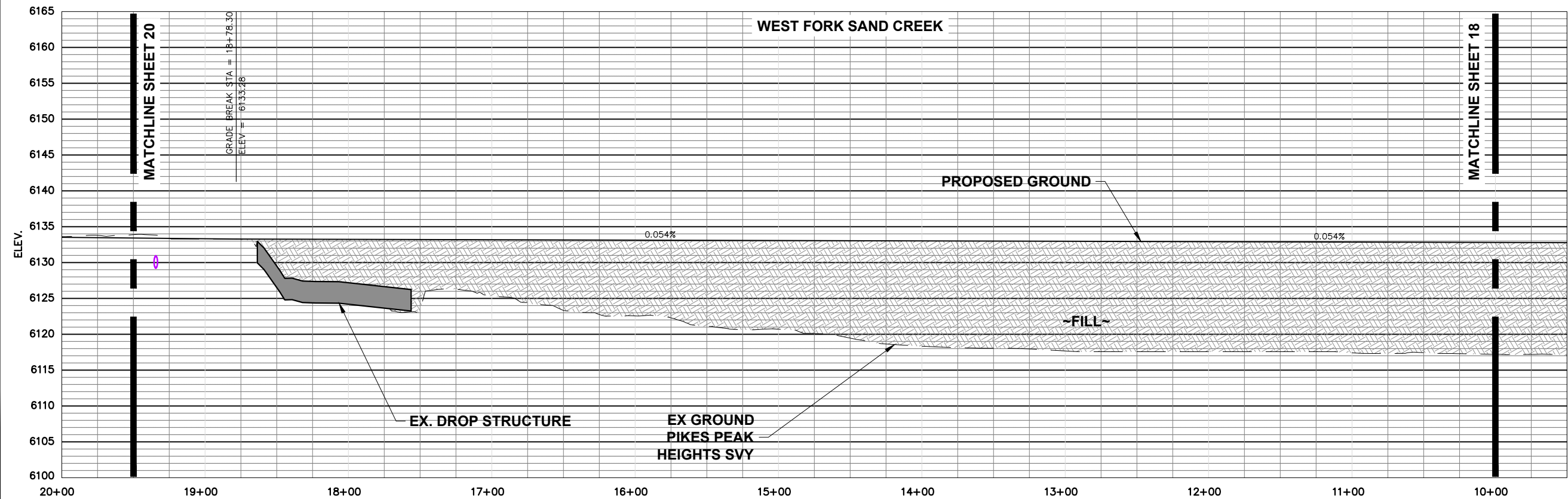
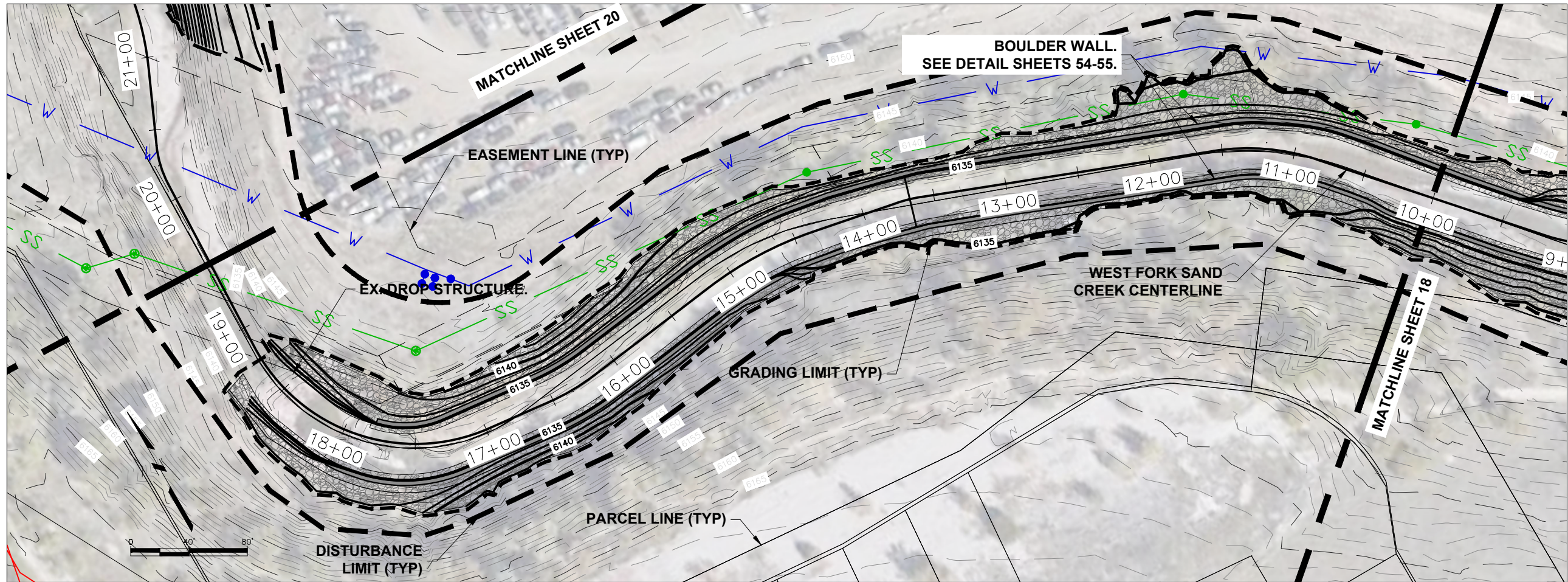
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90% DESIGN



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WEST FORK
SAND CREEK
PLAN AND
PROFILE

DATE: 9.27.2021
SHEET NO: 18 OF 70



(AS BUILT INFORMATION)

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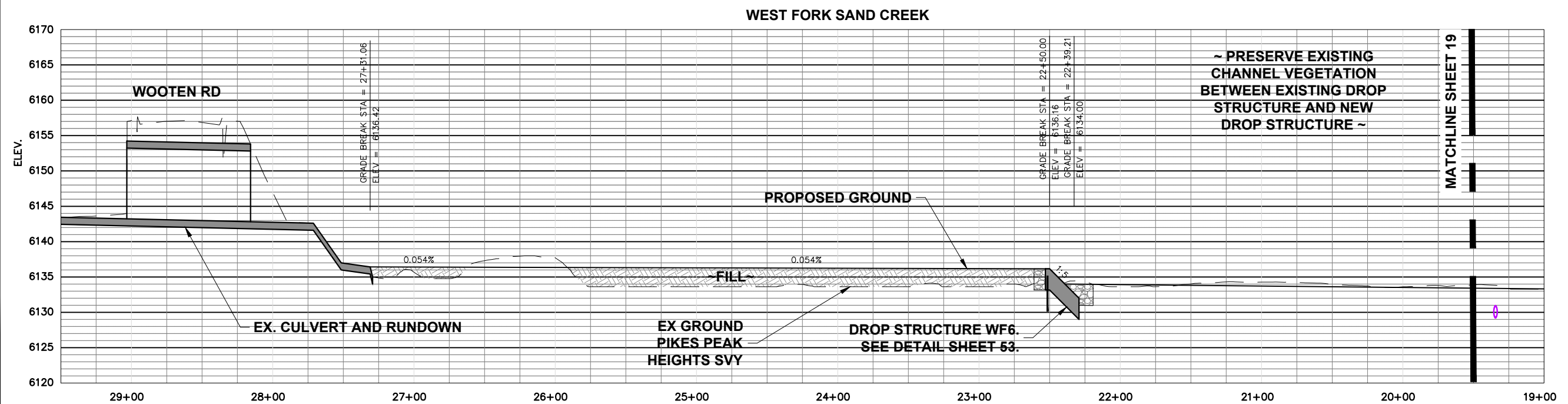
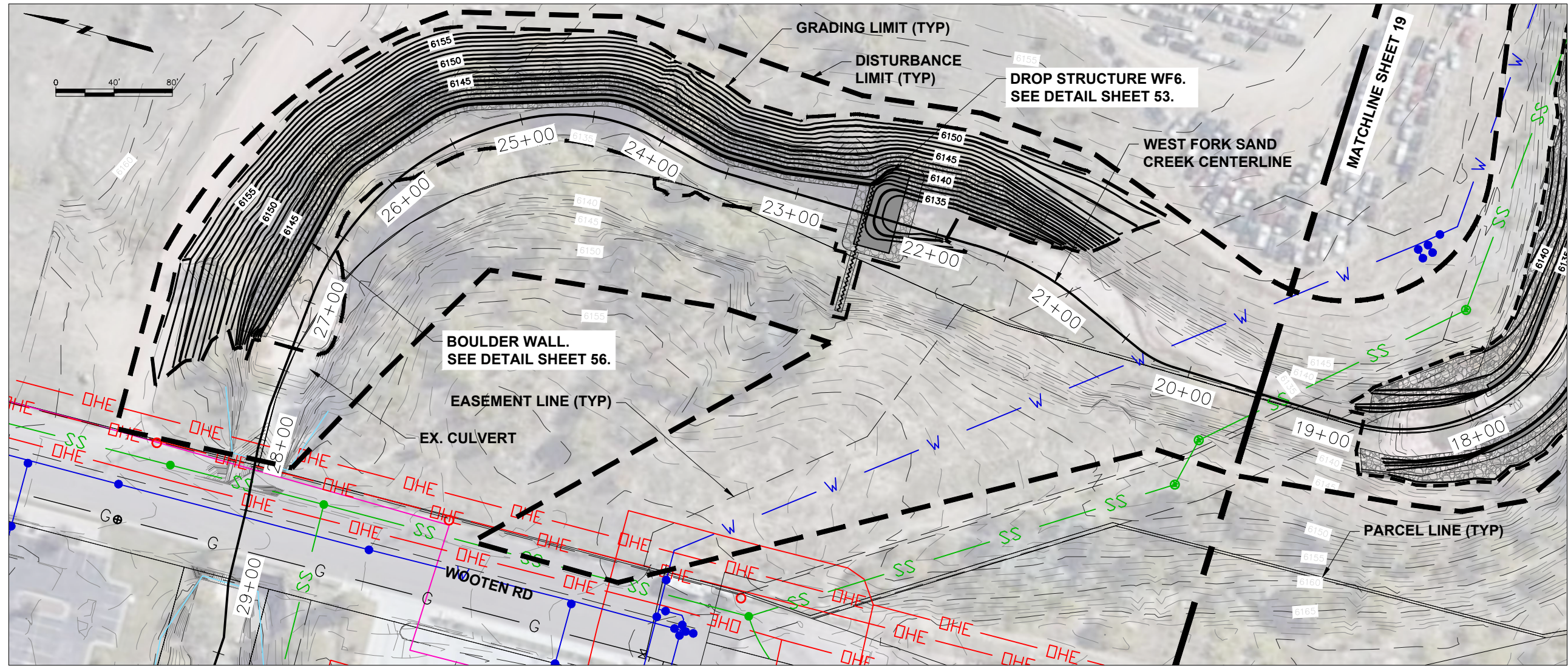
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WEST FORK BELOW WOOTEN ROAD
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WEST FORK
SAND CREEK
PLAN AND
PROFILE

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SHEET NO: 19 OF 70



(AS BUILT INFORMATION)

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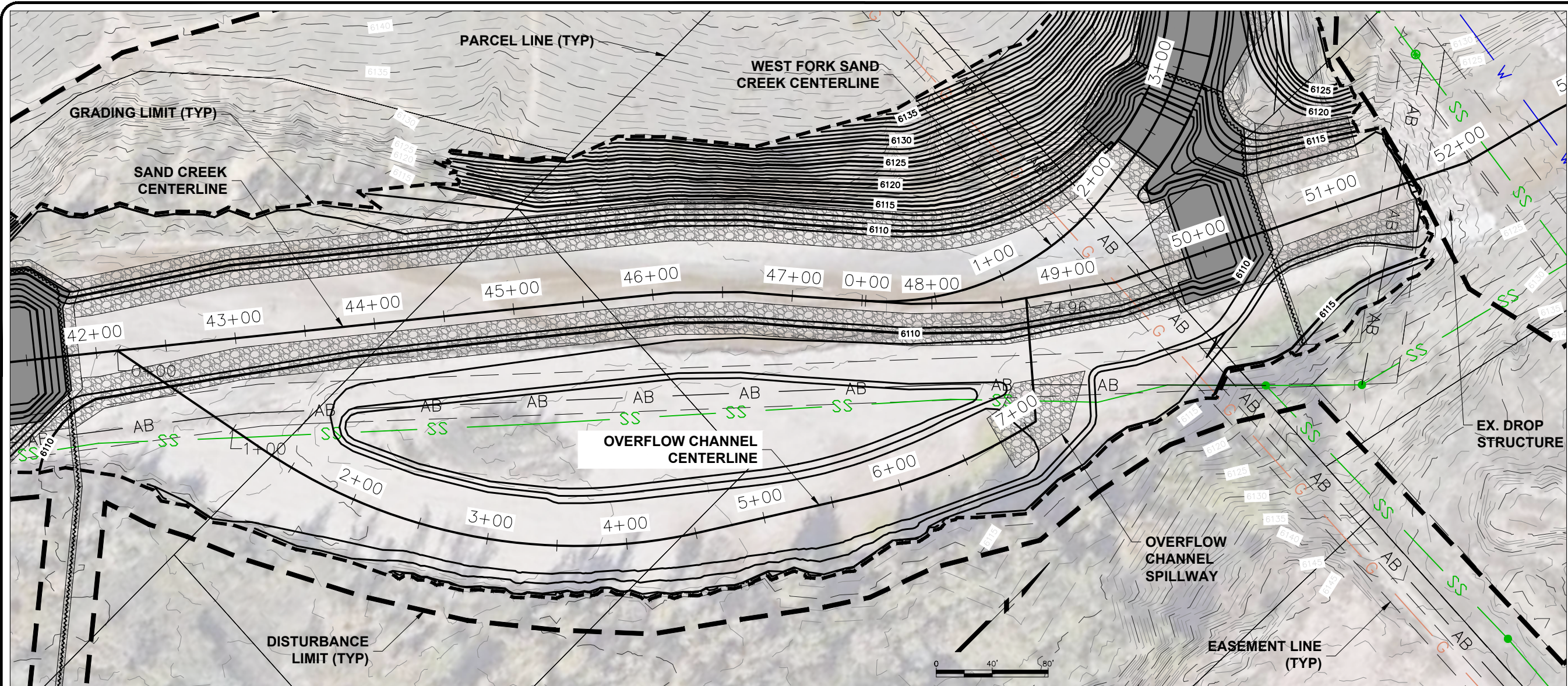
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TO WEST FORK CONFLUENCE AND
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90% DESIGN



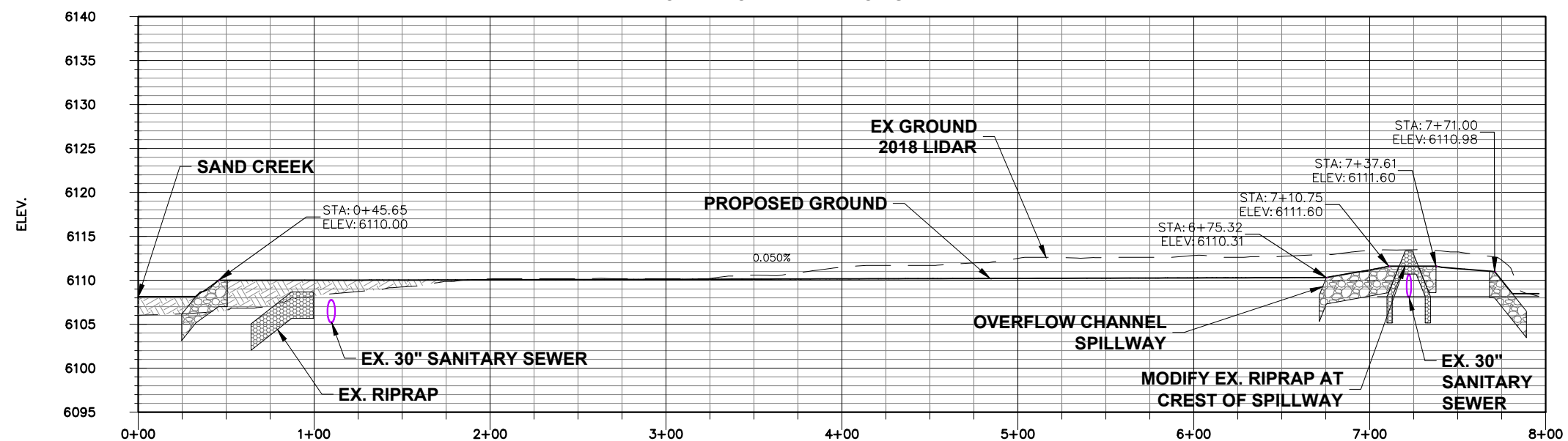
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WEST FORK
SAND CREEK
PLAN AND
PROFILE

DATE: 9.27.2021
SHEET NO: 20 OF 70



OVERFLOW CHANNEL ON SAND CREEK



(AS BUILT INFORMATION)

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INSPECTOR:	
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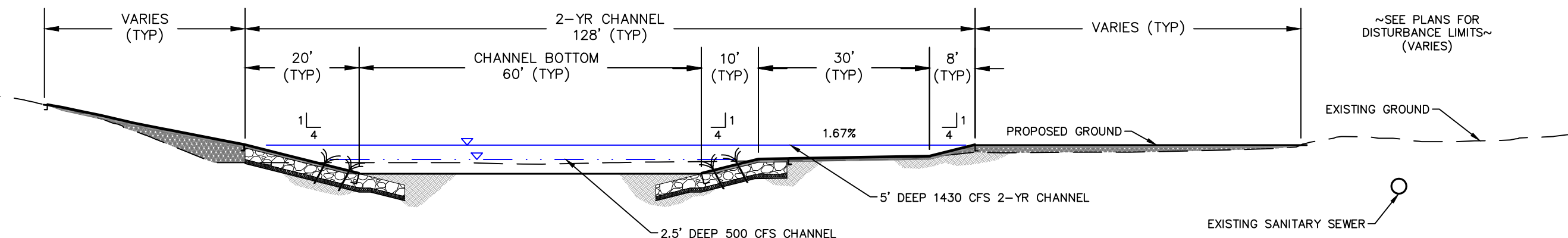
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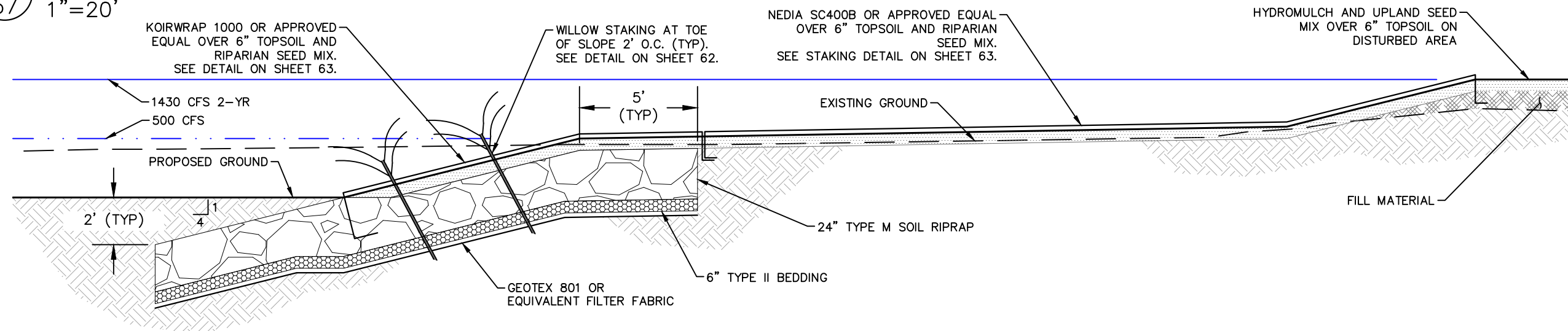
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SAND CREEK
PLAN AND
PROFILE

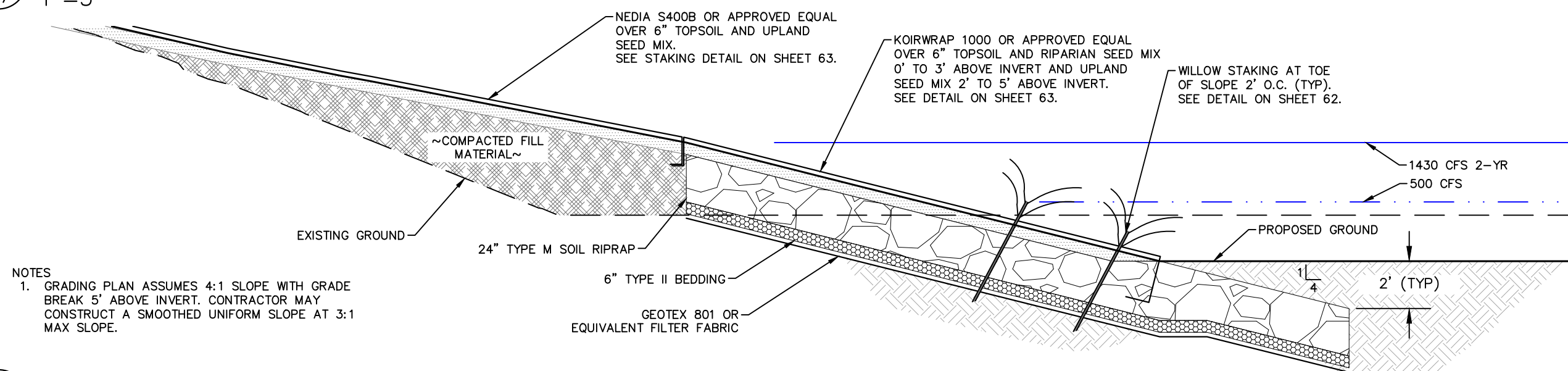
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SHEET NO: 21 OF 70



1
57 TYPICAL CHANNEL SECTION – OVERALL, LOOKING UPSTREAM
1"=20'



2
57 TYPICAL CHANNEL SECTION – EAST BANK, LOOKING UPSTREAM
1"=5'



NOTES
1. GRADING PLAN ASSUMES 4:1 SLOPE WITH GRADE BREAK 5' ABOVE INVERT. CONTRACTOR MAY CONSTRUCT A SMOOTHED UNIFORM SLOPE AT 3:1 MAX SLOPE.

3
57 TYPICAL CHANNEL SECTION – WEST BANK, LOOKING UPSTREAM
1"=5'

(AS BUILT INFORMATION)

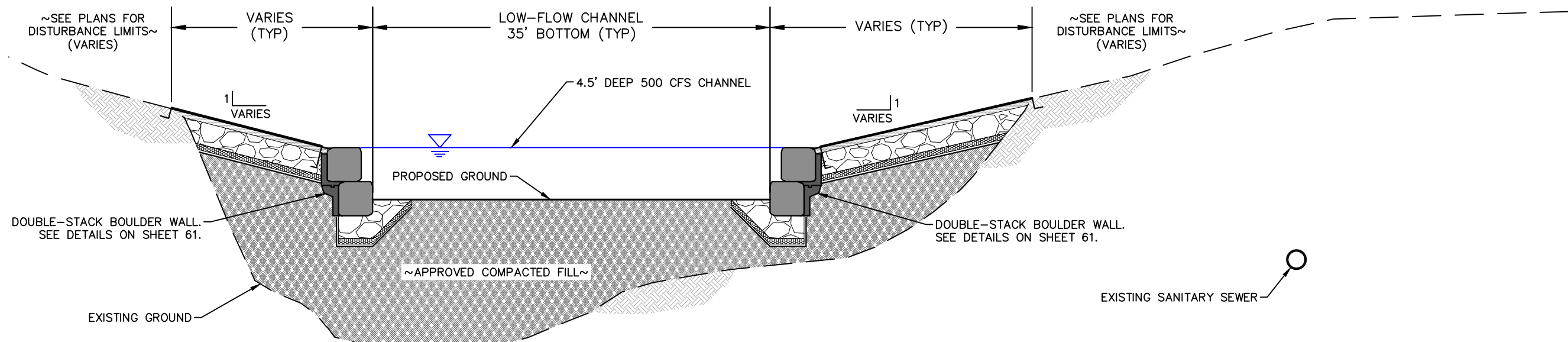
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SAND CREEK KARR ROAD
TO WEST FORK CONFLUENCE AND
WEST FORK BELOW WOOTEN ROAD
90% DESIGN

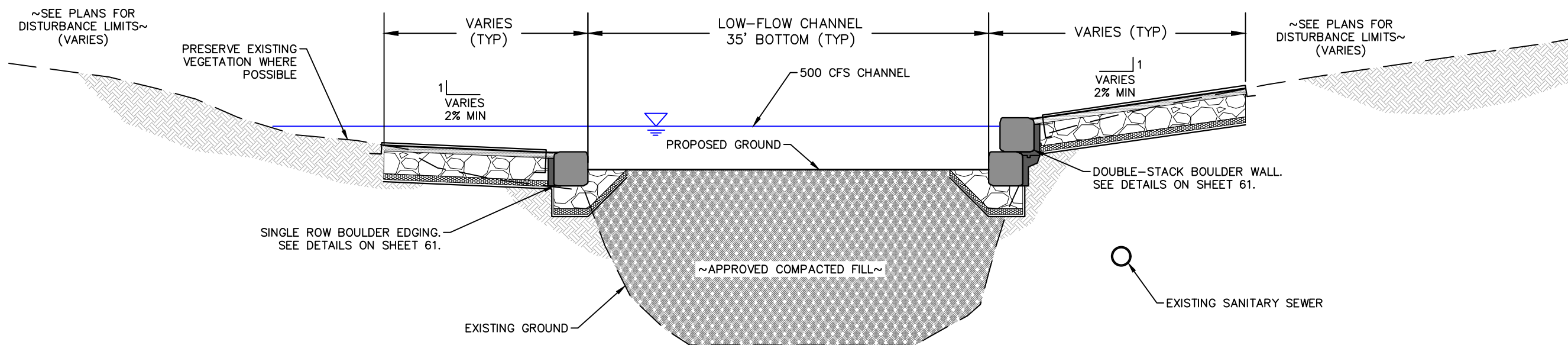
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SAND CREEK
CHANNEL
DETAILS

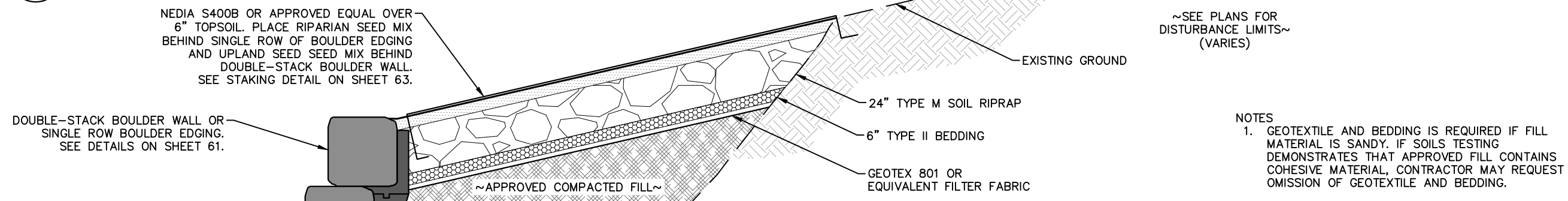
DATE: 9.27.2021
SHEET NO: 57 OF 70



1
58 TYPICAL CHANNEL SECTION - TWO DOUBLE-STACK BOULDER WALLS, LOOKING UPSTREAM
1"=10'



2
58 TYPICAL CHANNEL SECTION - DOUBLE-STACK BOULDER WALLS AND BOULDER EDGING, LOOKING UPSTREAM
1"=10'



3
58 RIPRAP TREATMENT BEHIND BOULDER EDGING OR BOULDER WALL
1"=5'

NOTES
1. GEOTEXTILE AND BEDDING IS REQUIRED IF FILL MATERIAL IS SANDY. IF SOILS TESTING DEMONSTRATES THAT APPROVED FILL CONTAINS COHESIVE MATERIAL, CONTRACTOR MAY REQUEST OMISSION OF GEOTEXTILE AND BEDDING.

(AS BUILT INFORMATION)

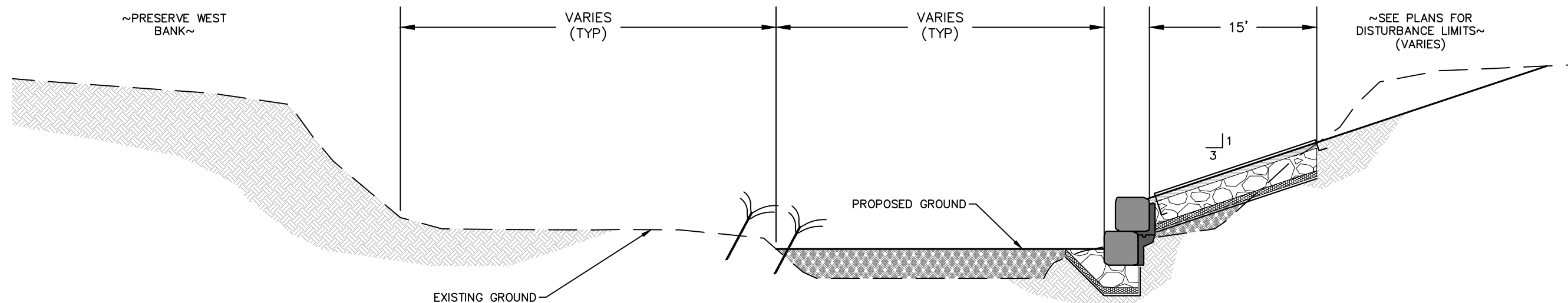
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SAND CREEK KARR ROAD
TO WEST FORK CONFLUENCE AND
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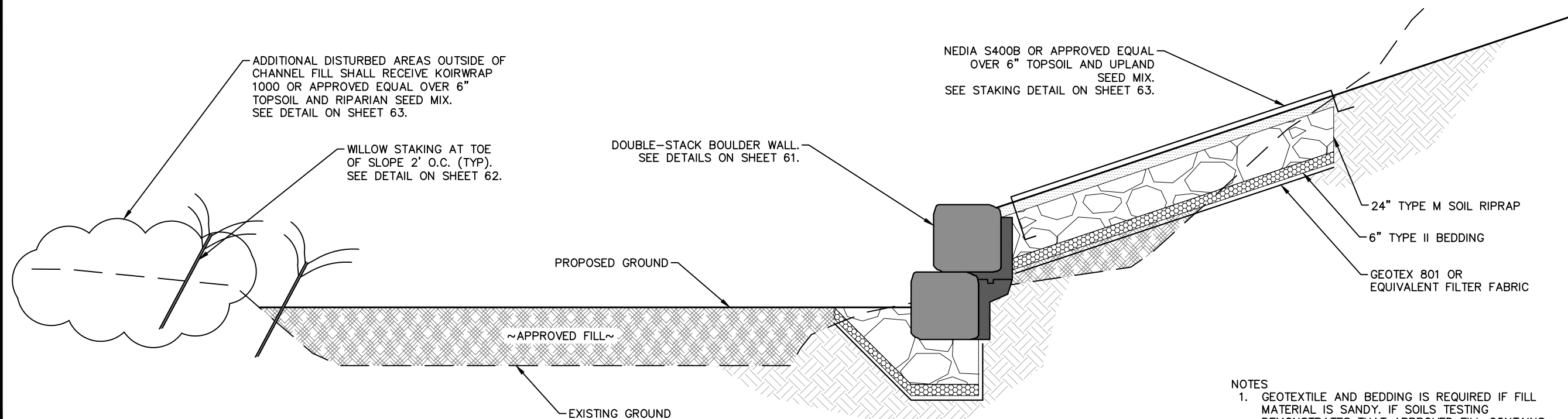
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WEST FORK
SAND CREEK
CHANNEL
DETAILS

DATE: 9.27.2021
SHEET NO: 58 OF 70



1
59 TYPICAL CHANNEL SECTION – UPPER WEST FORK SAND CREEK OVERALL, LOOKING UPSTREAM
1"=10'



NOTES
1. GEOTEXTILE AND BEDDING IS REQUIRED IF FILL MATERIAL IS SANDY. IF SOILS TESTING DEMONSTRATES THAT APPROVED FILL CONTAINS COHESIVE MATERIAL, CONTRACTOR MAY REQUEST OMISSION OF GEOTEXTILE AND BEDDING.

2
59 TYPICAL CHANNEL SECTION – UPPER WEST FORK SAND CREEK, LOOKING UPSTREAM
1"=5'

(AS BUILT INFORMATION)

DATE STARTED:
DATE COMPLETED:
FOREMAN:
INSPECTOR:
CONTRACTOR:

SAND CREEK KARR ROAD
TO WEST FORK CONFLUENCE AND
WEST FORK BELOW WOOTEN ROAD
90% DESIGN



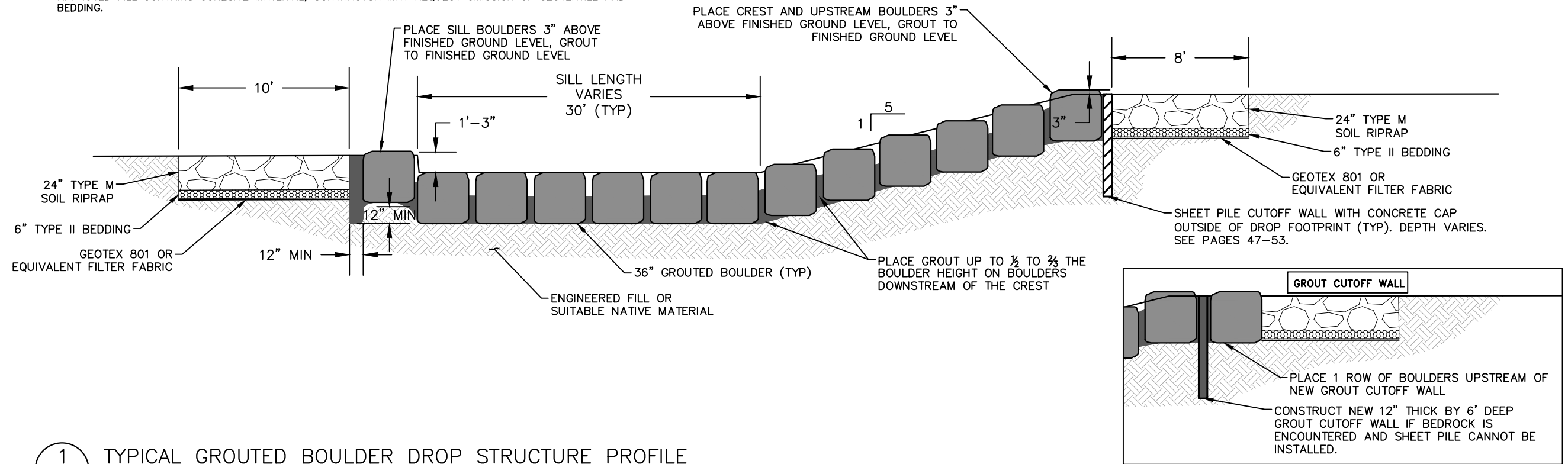
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UPPER WEST
FORK SAND
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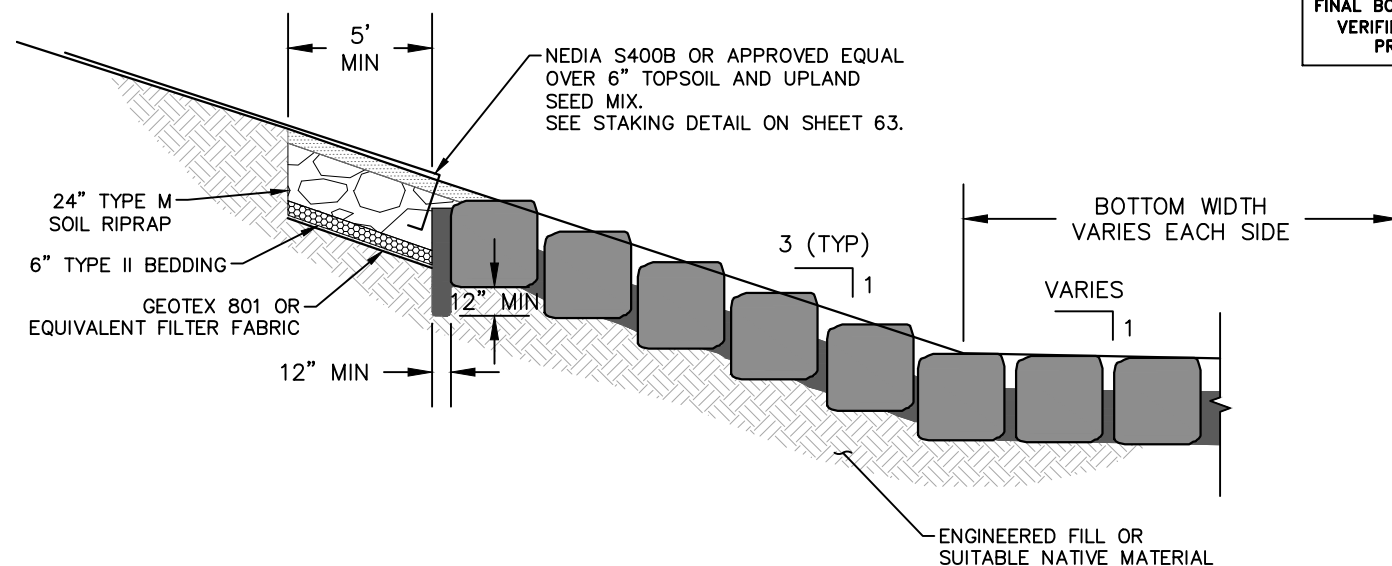
DATE: 9.27.2021
SHEET NO: 59 OF 70

NOTES:

1. SEE DROP DETAIL PAGES 47-53 FOR DIMENSIONS OF EACH DROP STRUCTURE, CUTOFF WALL DEPTHS AND MATERIAL, AND BASIN LENGTHS.
2. DROP STRUCTURE HEIGHT AND WIDTH VARIES.
3. GEOTEXTILE AND BEDDING IS REQUIRED IF FILL MATERIAL IS SANDY. IF SOILS TESTING DEMONSTRATES THAT APPROVED FILL CONTAINS COHESIVE MATERIAL, CONTRACTOR MAY REQUEST OMISSION OF GEOTEXTILE AND BEDDING.



1 TYPICAL GROUTED BOULDER DROP STRUCTURE PROFILE
60 NTS



NOTES:

1. BOULDERS WILL BE TAKEN TO VERTICAL ELEVATION INDICATED ON INDIVIDUAL STRUCTURE SHEETS.
2. GEOTEXTILE AND BEDDING IS REQUIRED IF FILL MATERIAL IS SANDY. IF SOILS TESTING DEMONSTRATES THAT APPROVED FILL CONTAINS COHESIVE MATERIAL, CONTRACTOR MAY REQUEST OMISSION OF GEOTEXTILE AND BEDDING.

2 TYPICAL GROUTED BOULDER DROP STRUCTURE SECTION
60 NTS

(AS BUILT INFORMATION)

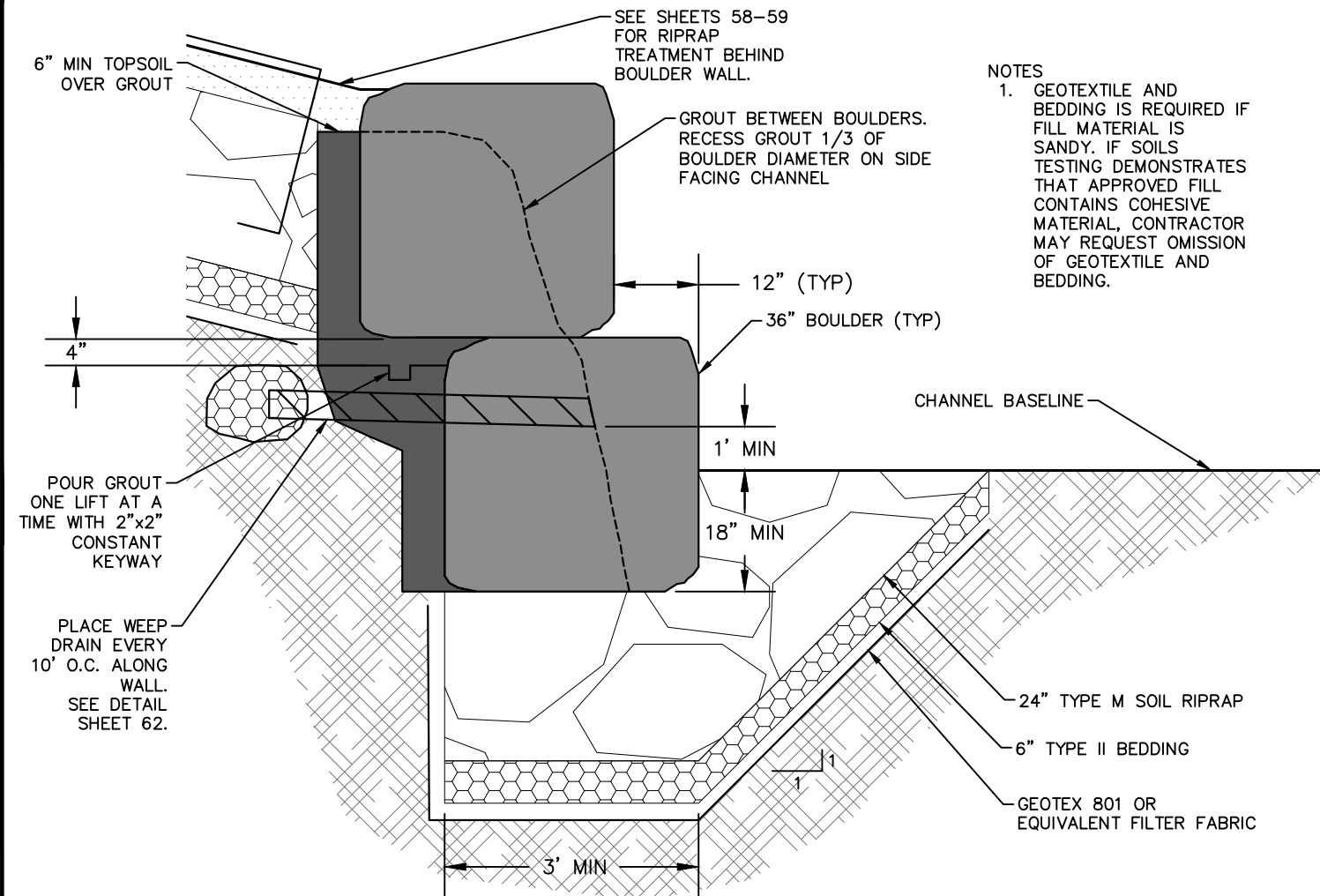
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SAND CREEK KARR ROAD
TO WEST FORK CONFLUENCE AND
WEST FORK BELOW WOOTEN ROAD
90% DESIGN

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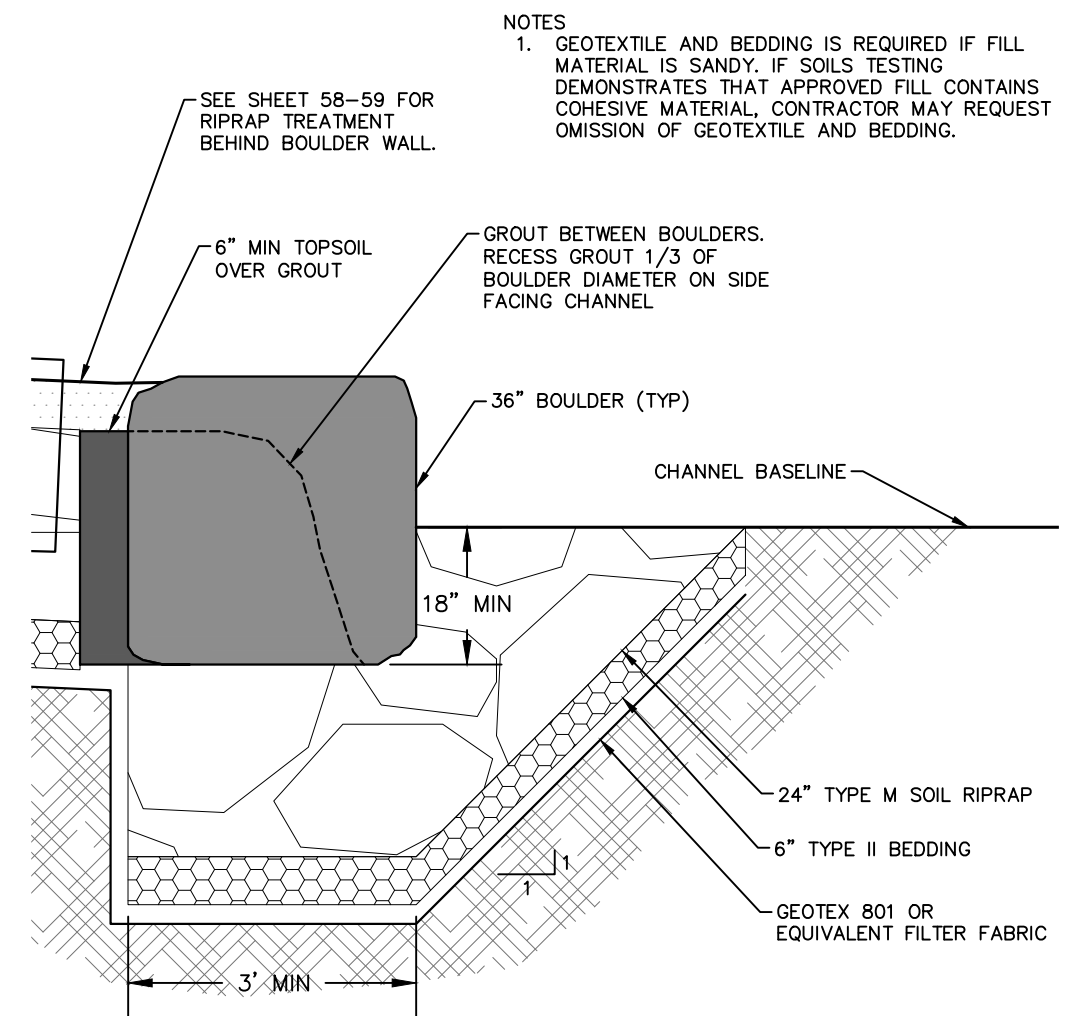
GROUTED
BOULDER
DROP
DETAILS

DATE: 9.27.2021
SHEET NO: 60 OF 70



NOTES
1. GEOTEXTILE AND BEDDING IS REQUIRED IF FILL MATERIAL IS SANDY. IF SOILS TESTING DEMONSTRATES THAT APPROVED FILL CONTAINS COHESIVE MATERIAL, CONTRACTOR MAY REQUEST OMISSION OF GEOTEXTILE AND BEDDING.

1 DOUBLE-STACK GROUTED BOULDER WALL
61 1"=2'



NOTES
1. GEOTEXTILE AND BEDDING IS REQUIRED IF FILL MATERIAL IS SANDY. IF SOILS TESTING DEMONSTRATES THAT APPROVED FILL CONTAINS COHESIVE MATERIAL, CONTRACTOR MAY REQUEST OMISSION OF GEOTEXTILE AND BEDDING.

2 GROUTED BOULDER EDGING
61 1"=2'

(AS BUILT INFORMATION)

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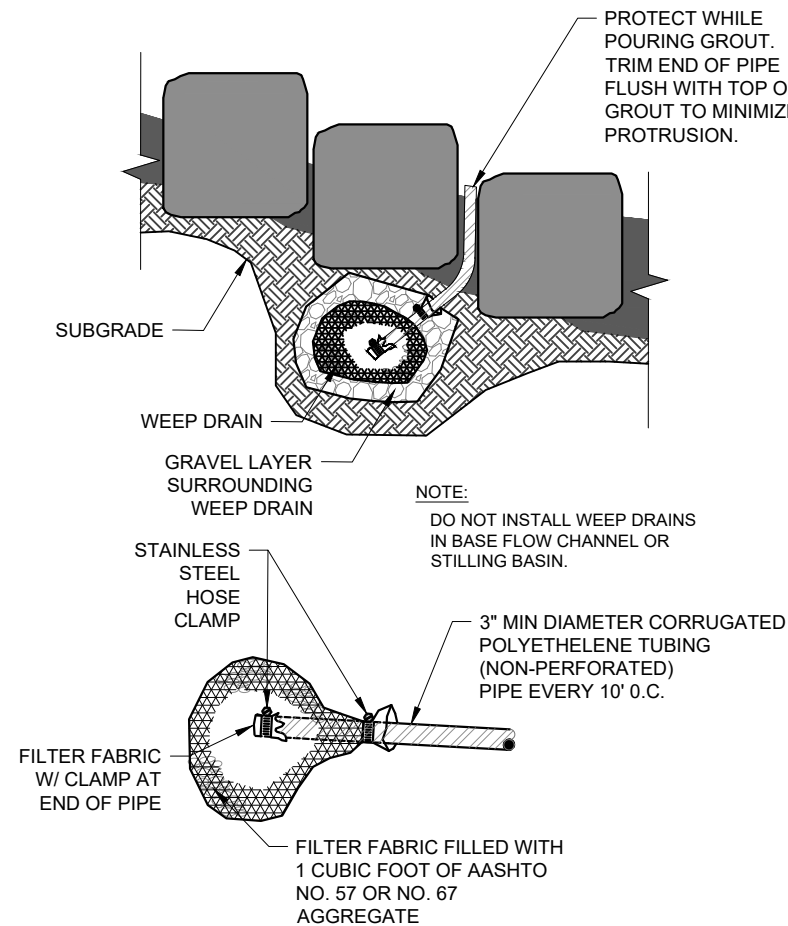
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TO WEST FORK CONFLUENCE AND
WEST FORK BELOW WOOTEN ROAD
90% DESIGN



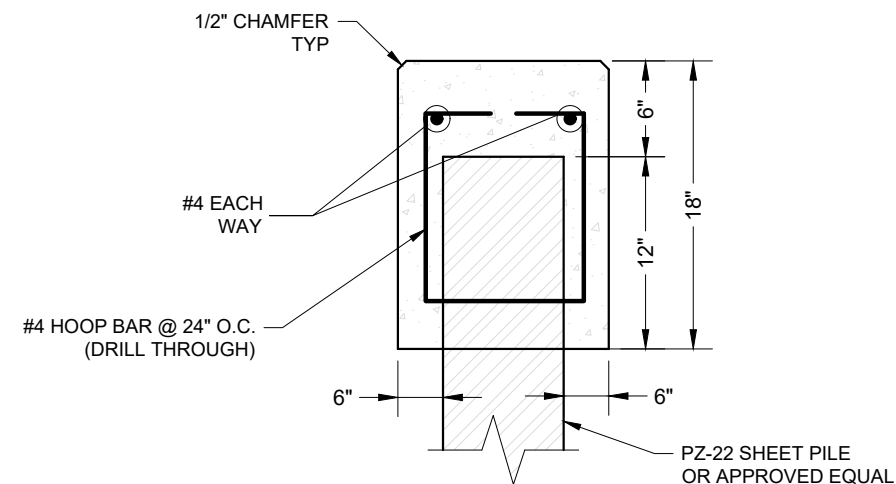
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BOULDER
WALL
AND
BOULDER
EDGING
DETAILS

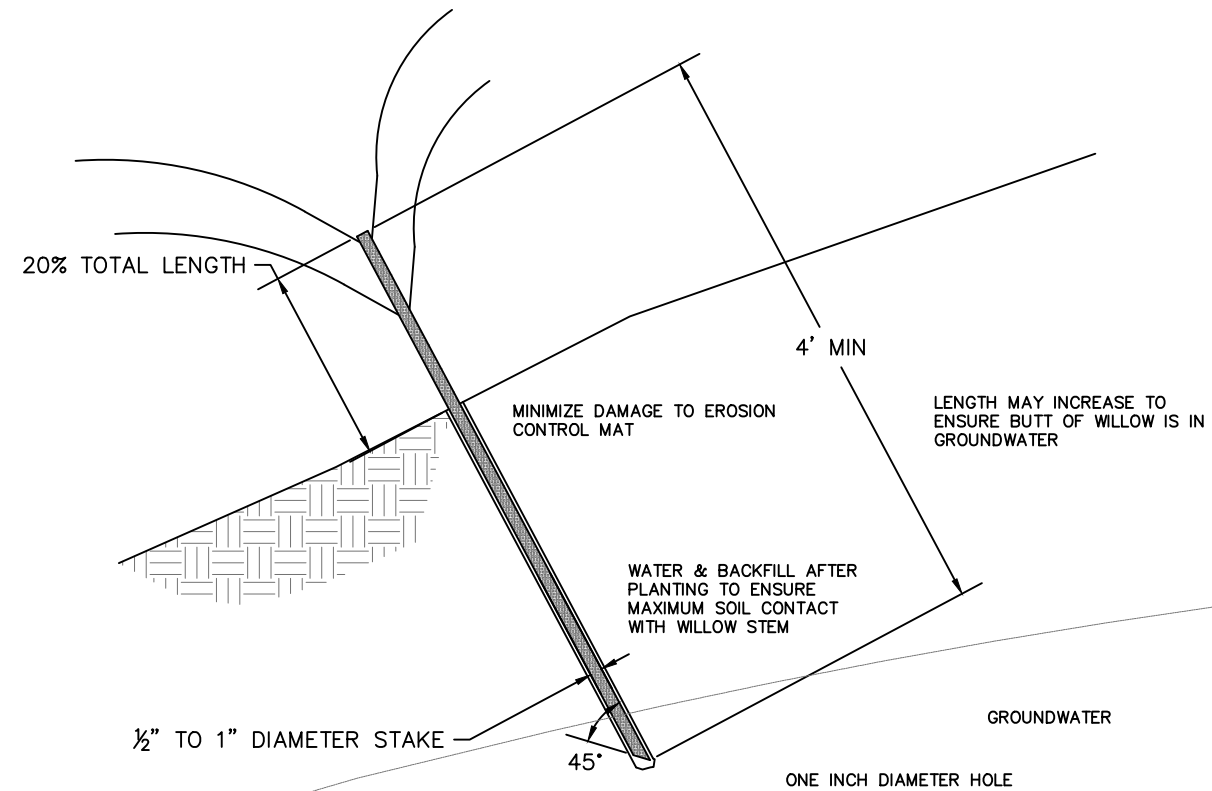
DATE: 9.27.2021
SHEET NO: 61 OF 70



1
62 WEEP DRAIN DETAIL
NTS



2
62 CONCRETE SHEET PILE CAP DETAIL
NTS



NOTES:

1. SOURCE OF LIVE WILLOW STAKES SHALL BE COORDINATED AND APPROVED WITH THE COLORADO SPRINGS UTILITIES PROJECT MANAGER.
2. WILLOWS WILL BE SANDBAR WILLOW (SALIX EXIGUA SPECIES), LIVE AT LEAST TWO (2) YEARS OLD. AVOID SUCKERS AND CURRENT YEAR'S GROWTH. CUTTINGS WILL BE ONE-HALF-INCH (1/2") TO ONE-INCH (1") DIAMETER FOR WILLOWS. CUT THE APICAL BUDS PLUS SEVERAL INCHES OF THE PREVIOUS YEAR'S GROWTH OFF THE CUTTING BEFORE PLANTING IT.
3. LIVE STAKES WILL BE SINGLE STICKS. THESE SHOULD BE MINIMUM TWENTY-FOUR INCHES (48") LONG OR LONGER AS DETERMINED BY THE WATER TABLE/GROUND SURFACE RELATIONSHIP.
4. WILLOWS WILL BE HARVESTED AND PLANTED DURING DORMANT SEASON AS IDENTIFIED BY LACK OF SWELLING BUDS, APPROXIMATELY NOVEMBER 1 TO APRIL 1 (LATE WINTER TO EARLY SPRING).
5. THE BASE CUT WILL BE AT A FORTY-FIVE DEGREE (45°) ANGLE CUT AND ANY TOP CUTS WILL BE BLUNT AND APPROXIMATELY ONE-INCH ABOVE AN AUXILIARY BUD.
6. IMMEDIATELY IMMERSE THE BUTT END OF THE WILLOW IN WATER AFTER HARVESTING. THE BOTTOM (1/3) OF CUTTINGS WILL BE SUBMERGED IN WATER FOR A MINIMUM OF TWENTY-FOUR (24) HOURS PRIOR TO INSTALLATION.
7. WILLOW STAKES WILL BE PLANTED WITHIN SEVEN (7) DAYS OF HARVEST.
8. STAKES SHALL NOT BE PLANTED IN FROZEN GROUND.
9. CUTTINGS WILL NOT BE DROPPED OR OTHERWISE MISHANDLED. MINOR BROKEN AND DAMAGED CUTTINGS WILL BE PRUNED PRIOR TO PLANTING. MAJOR DAMAGE WILL BE CAUSE FOR REJECTION.
10. CUTTINGS WILL BE PROTECTED FROM FREEZING AND DRYING AT ALL TIMES. CUTTINGS SHOULD BE PLANTED IMMEDIATELY AFTER SOAKING AND STORAGE. CUTTINGS WILL BE COVERED WITH TARP OR BURLAP DURING ANY TRANSPORTATION IN VEHICLES.
11. CUTTINGS WILL BE STORED BETWEEN THIRTY-FIVE DEGREES (35°) AND FIFTY DEGREES (50°) FAHRENHEIT FOR NO LONGER THAN ONE (1) WEEK. CUTTINGS WILL BE STORED IN PROTECTED LOCATIONS WHERE THEY ARE SHADED AND SHELTERED FROM SUN AND WIND.
12. PLACE EROSION CONTROL FABRIC PRIOR TO LIVE WILLOW STAKING.
13. PREPARE A PILOT HOLE TO THE GROUNDWATER DEPTH BY HAMMERING A REBAR, DIBBLE BAR, OR STINGER, OR OTHER APPROVED METHOD, INTO THE SOIL. PLACE CUTTING GENTLY INTO THE HOLE, UPRIGHT, ENSURING THAT THE BASE END IS AT OR BELOW THE GROUND WATER LEVEL.
14. HOLES WILL BE BACKFILLED AS NECESSARY SO THAT NO VOIDS REMAIN AROUND THE CUTTING. WATERING SHOULD BE DONE BETWEEN BACKFILL LIFTS TO ENSURE ALL VOIDS ARE FILLED. DO NOT BURY TOP OF CUTTING. TAMP SURFACE AROUND THE CUTTING TO SECURE IT IN PLACE.
15. IF HEAVY EQUIPMENT IS USED TO FACILITATE DIGGING OF PILOT HOLES FOR WILLOW STAKES (SUCH AS WITHIN RIPRAP), ALL DISTURBED SOIL WILL BE RIPPED AND SCARIFIED PRIOR TO FINAL SEEDING.

3
62 LIVE WILLOW STAKING DETAIL
NTS

(AS BUILT INFORMATION)

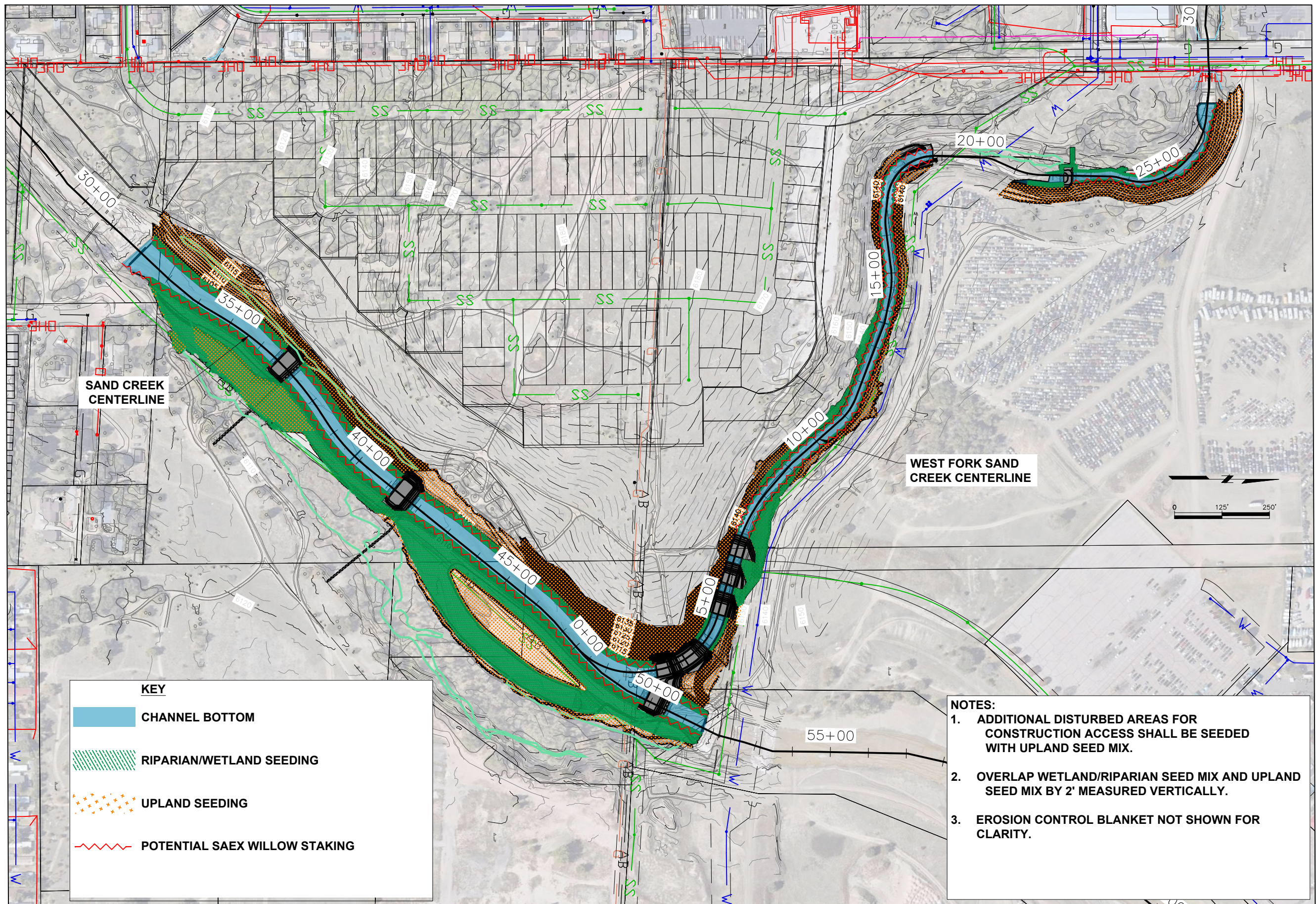
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INSPECTOR:
CONTRACTOR:

SAND CREEK KARR ROAD
TO WEST FORK CONFLUENCE AND
WEST FORK BELOW WOOTEN ROAD
90% DESIGN

811
Know what's below.
Call before you dig.

DETAILS

DATE: 9.27.2021
SHEET NO: 62 OF 70



(AS BUILT INFORMATION)

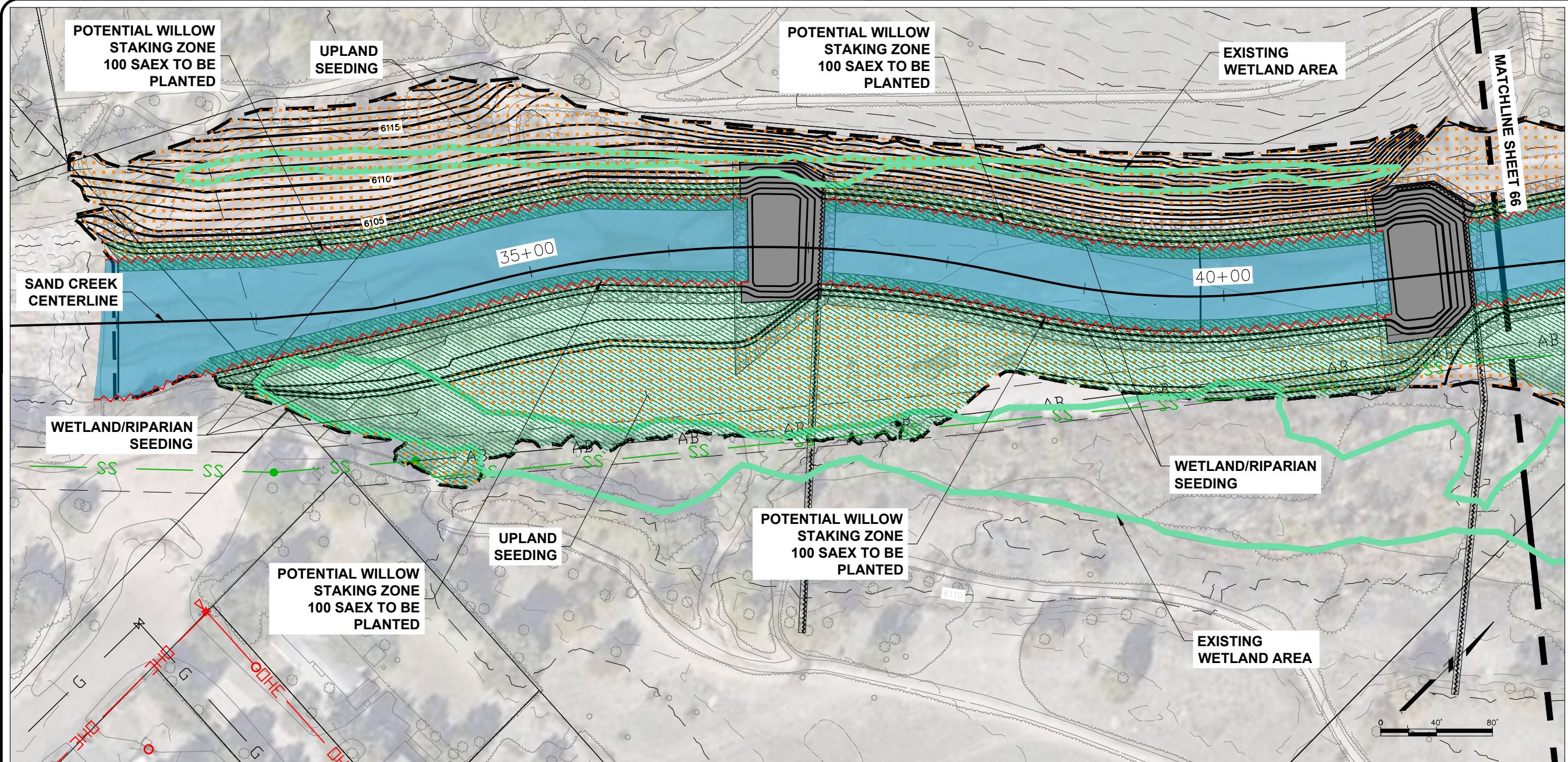
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CONTRACTOR:	

**SAND CREEK KARR ROAD
TO WEST FORK COW WOOTEN ROAD
90% DESIGN**



**REVEGETATION
PLAN
OVERVIEW**

DATE: 9.27.2021
SHEET NO: 64 OF 70



KEY	
	CHANNEL BOTTOM
	RIPARIAN/WETLAND SEEDING
	UPLAND SEEDING
	POTENTIAL SAEX WILLOW STAKING

NOTES:

1. ADDITIONAL DISTURBED AREAS FOR CONSTRUCTION ACCESS SHALL BE SEEDDED WITH UPLAND SEED MIX.
2. OVERLAP WETLAND/RIPARIAN SEED MIX AND UPLAND SEED MIX BY 2' MEASURED VERTICALLY.
3. EROSION CONTROL BLANKET NOT SHOWN FOR CLARITY.

(AS BUILT INFORMATION)

DATE STARTED:
DATE COMPLETED:
FOREMAN:
INSPECTOR:
CONTRACTOR:

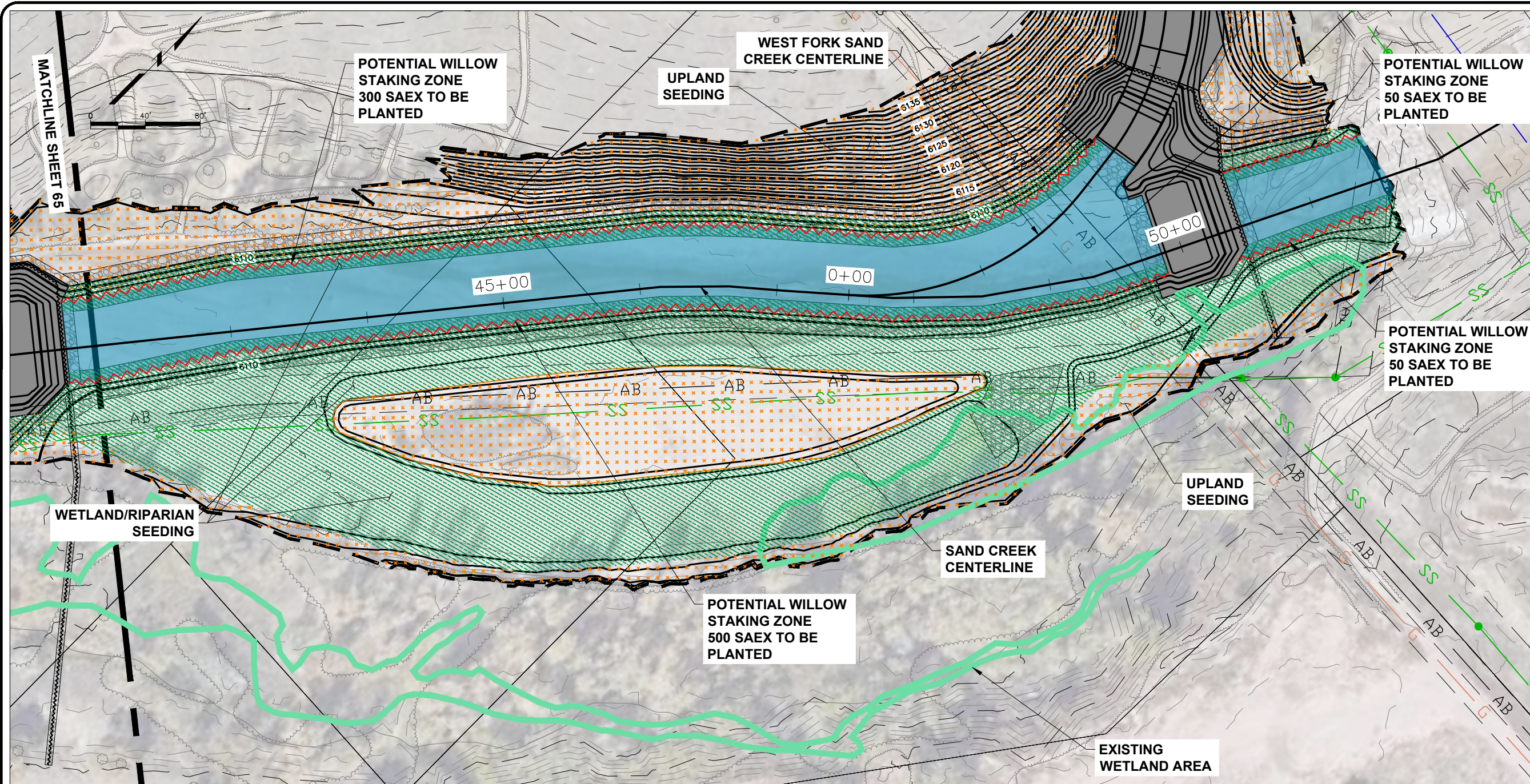
SAND CREEK KARR ROAD
TO WEST FORK CONFLUENCE AND
WEST FORK BELOW WOOTEN ROAD
90% DESIGN



Know what's below.
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REVEGETATION
PLAN

DATE: 9.27.2021
SHEET NO: 65 OF 70



KEY	
	CHANNEL BOTTOM
	RIPARIAN/WETLAND SEEDING
	UPLAND SEEDING
	POTENTIAL SAEX WILLOW STAKING

- NOTES:**
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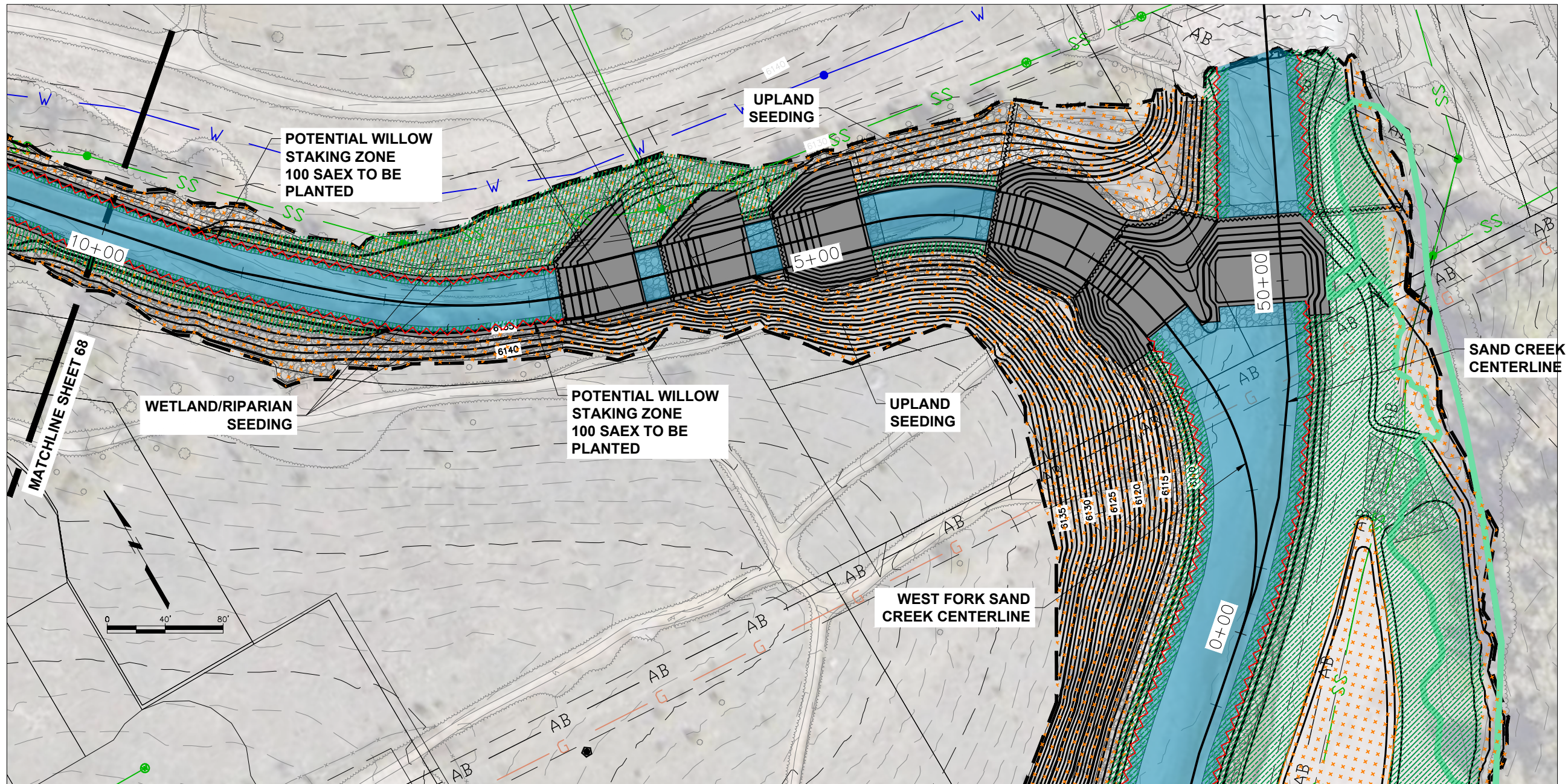
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**REVEGETATION
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DATE: 9.27.2021
SHEET NO: 66 OF 70



KEY	
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	UPLAND SEEDING
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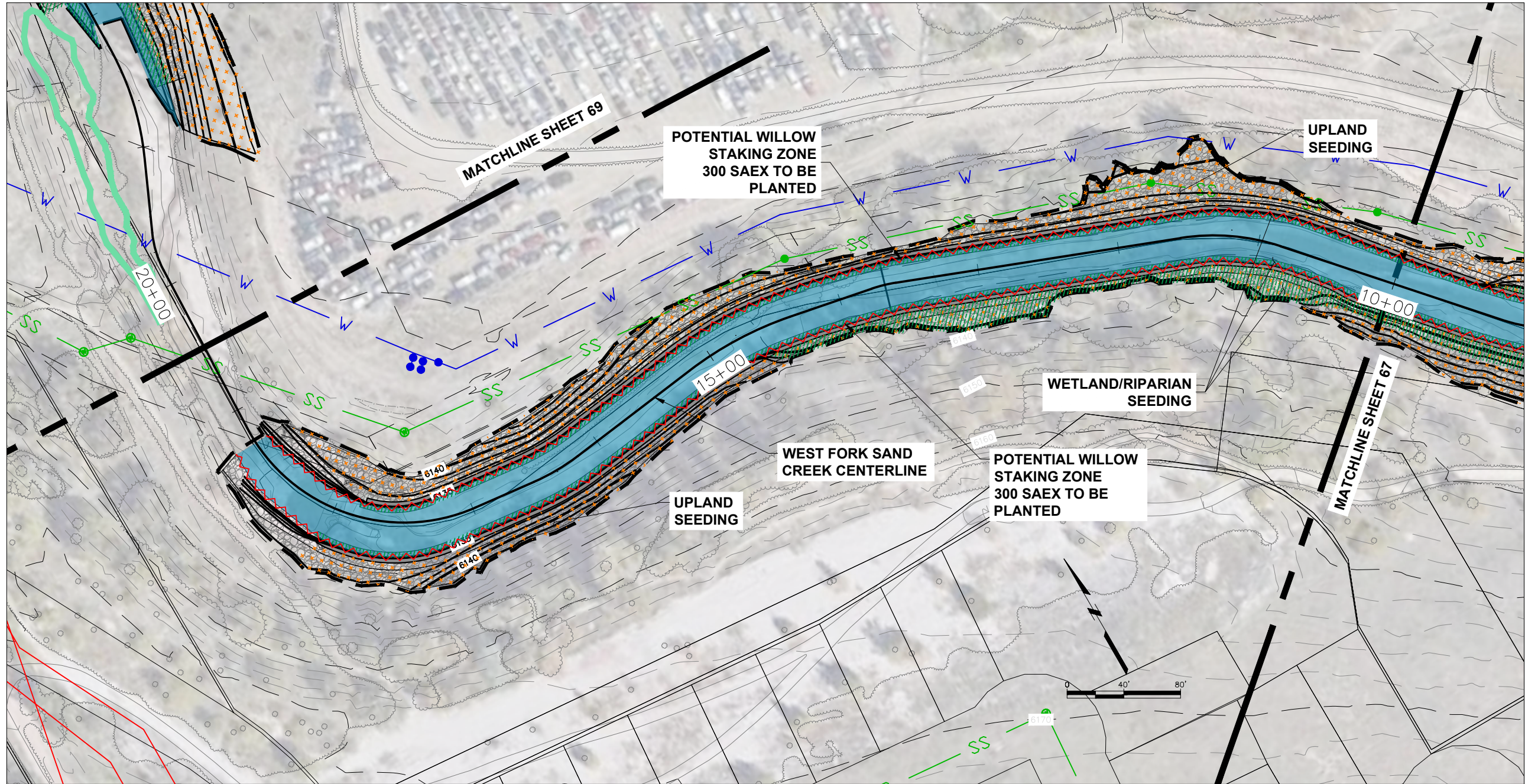
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REVEGETATION
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KEY

 CHANNEL BOTTOM

 RIPARIAN/WETLAND SEEDING

 UPLAND SEEDING

 POTENTIAL SAEX WILLOW STAKING

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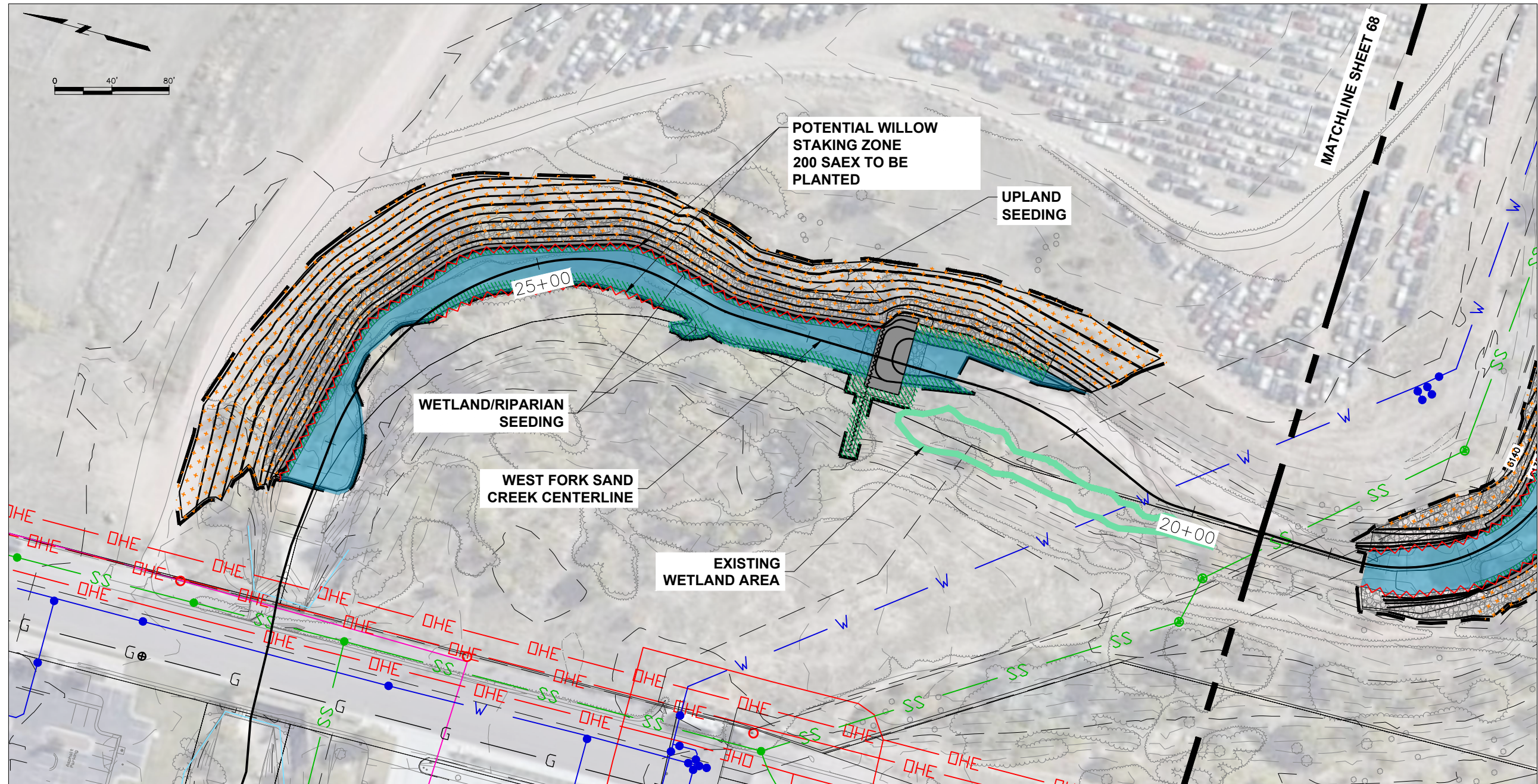
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KEY

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REVEGETATION
PLAN

DATE: 9.27.2021
SHEET NO: 69 OF 70

REVEGETATION NOTES

1. NO CONSTRUCTION ACTIVITIES (EITHER TEMPORARY OR PERMANENT) OTHER THAN THE ACTIVITIES AUTHORIZED IN THE SECTION 404 PERMIT WILL OCCUR IN WETLANDS. ALL ADDITIONAL ACTIVITIES NEED TO BE AUTHORIZED BY THE U.S. ARMY CORPS OF ENGINEERS IN WRITING BEFORE CONSTRUCTION. NO MATERIALS WILL BE STOCKPILED IN THE WETLANDS.
2. NO FERTILIZER SHALL BE ADDED.
3. ALL DISTURBED AREAS SHALL BE SEEDED WITH EITHER THE UPLAND OR RIPARIAN AND WETLAND SEED MIX LISTED AND SHOWN ON THE PLANS. NO SUBSTITUTIONS SHALL BE ALLOWED, INCLUDING ADDITION OF A COVER CROP, WITHOUT WRITTEN PERMISSION OF THE UTILITIES REPRESENTATIVE. THE CONTRACTOR SHALL LIMIT DISTURBANCE TO THE CONSTRUCTION LIMITS SHOWN ON THE PLAN.
4. SEE UPLAND SEED MIX IN ALL AREAS DISTURBED DURING CONSTRUCTION EXCEPT WHERE WETLAND SEED MIX IS APPLIED. OVERLAP WETLAND AND UPLAND SEED MIX 2 FEET (MEASURED VERTICALLY).
5. NATIVE SEED MAY BE DRILLED OR BROADCAST. SEED WHICH IS BROADCAST SHALL BE HAND RAKED IMMEDIATELY FOLLOWING SEEDING TO COVER WITH 1/8" TO 1/2" OF TOPSOIL. SEEDING RATES SHOWN SHOULD BE DOUBLED IF BROADCASTED. BROADCAST WETLAND SEED MIX AS SHOWN ON PLANS.
6. AREAS SHALL BE MULCHED WITH 2000 LBS/ACRE OF CERTIFIED WEED-FREE STRAW MULCH (MULCH SHALL BE CRIMPED).
7. WILLOW STAKES ARE TO BE COLLECTED IN THE FIELD WHILE DORMANT (APPROXIMATELY NOV TO MID-MARCH). IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO OBTAIN THE QUANTITIES OF STAKES AND STORE THEM IN AN APPROPRIATE MANNER UNTIL PLANTING. **LIVE STAKES MUST BE PLACED IN WATER SO THAT THE CUT ENDS ARE COMPLETELY COVERED AND STORED IN A COOL LOCATION.**
8. WHEN HARVESTING WILLOW STAKES MAKE SURE TO CUT TO THE BOTTOM OF THE STAKE OR POLE AT 45 DEGREES AND CUT TOP OF STAKE OR POLE SQUARE. PLANT RIGHT SIDE UP.
9. SPACE WILLOWS 2 FEET ON CENTER.
- 10.TWO TO FIVE BUD SCARS SHOULD BE ABOVE GROUND. EIGHTY PERCENT OF THE STAKE LENGTH SHOULD BE PLANTED BELOW THE GROUND. WOOD TO BE USED FOR WILLOW STAKES SHOULD BE 2 TO 5 YEARS OLD WITH SMOOTH BARK.

COMMON NAME	QUANTITY	TYPE/SIZE	SPACING
SANDBAR WILLOW	2,300	STAKES	2 FT. CENTERS

Riparian and wetland seed mix.

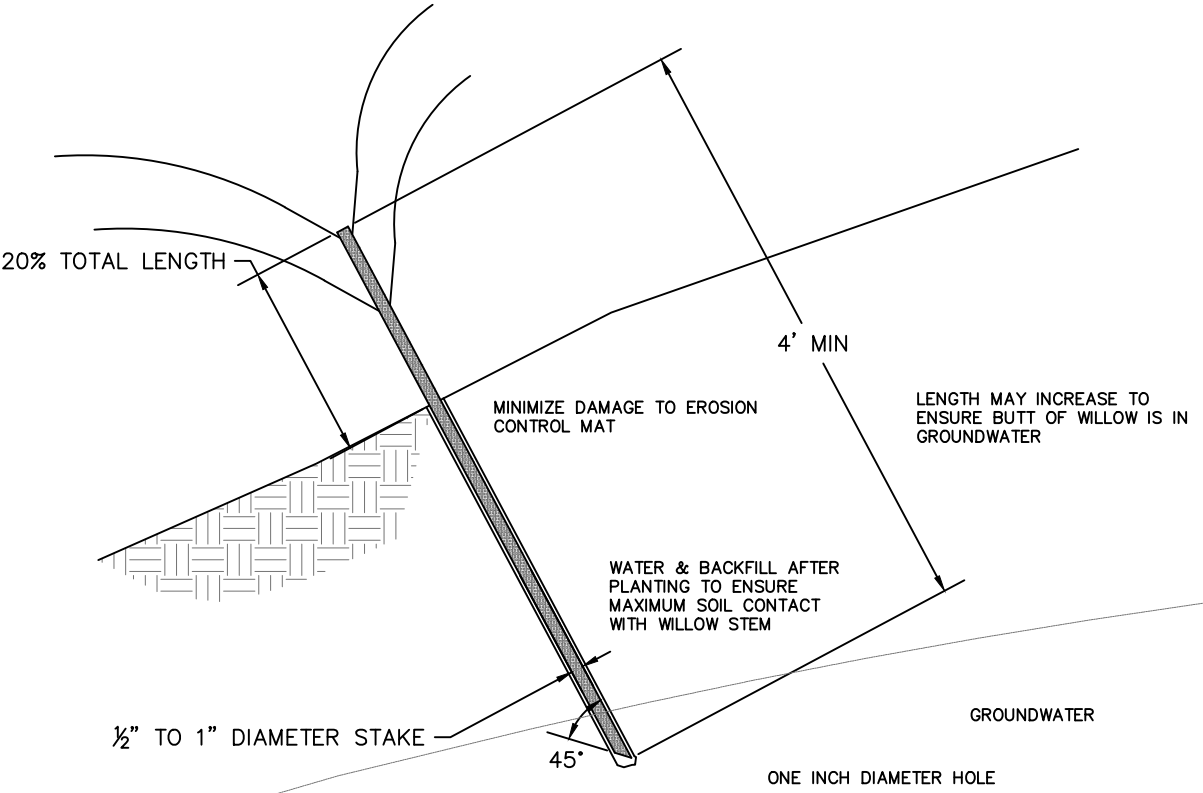
Scientific Name	Common Name	PLS lb. Seed/Acre*
<i>Andropogon ferardii</i>	Big bluestem	1.5
<i>Andropogon hallii</i>	Sand bluestem	1.5
<i>Asclepias speciosa</i>	Showy milkweed	0.3
<i>Carex nebrascensis</i>	Nebraska sedge	4.0
<i>Distichlis spicata</i>	Inland saltgrass	0.5
<i>Elymus canadensis</i>	Canada wildrye	2.1
<i>Elymus trachycaulus</i>	Slender wheatgrass	1.6
<i>Glyceria striata</i>	Fowl mannagrass	2.0
<i>Helianthus nuttallii</i>	Nuttall's sunflower	0.1
<i>Juncus arcticus</i>	Arctic rush	0.6
<i>Panicum virgatum</i>	Switchgrass	1.0
<i>Pascopyrum smithii</i>	Western wheatgrass	1.5
<i>Poa palustris</i>	Fowl bluegrass	0.1
<i>Sorghastrum nutans</i>	Indiangrass	1.2
<i>Spartina pectinata</i>	Prairie cordgrass	0.2
Total		18.2

*Drill seed rates; double rate if broadcasted; PLS lb. = Pure Live Seed pounds.

Upland seed mix.

Scientific Name	Common Name	PLS lb. Seed/Acre*
Grasses		
<i>Acantherum hymenoides</i>	Indian ricegrass	0.9
<i>Andropogon gerardii</i>	Big bluestem	1.0
<i>Bouteloua curtipendula</i>	Sideoats grama, Hachita	1.5
<i>Bouteloua gracilis</i>	Blue grama, Lovington	0.5
<i>Elymus lanceolatus lanceolatus</i>	Thickspike wheatgrass	1.2
<i>Nasella viridula</i>	Green needlegrass	0.8
<i>Pascopyrum smithii</i>	Western wheatgrass	2.0
<i>Schizachyrium scoparium</i>	Little bluestem	1.0
<i>Sporobolus cryptandrus</i>	Sand dropseed	0.1
<i>Vulpia octoflora</i>	Sixweeks fescue	0.2
Total		9.2

*Drill seed rates; double rate if broadcasted; PLS lb. = Pure Live Seed pounds.



NOTES:

1. SOURCE OF LIVE WILLOW STAKES SHALL BE COORDINATED AND APPROVED WITH THE COLORADO SPRINGS UTILITIES PROJECT MANAGER.
2. WILLOWS WILL BE SANDBAR WILLOW (SALIX EXIGUA SPECIES), LIVE AT LEAST TWO (2) YEARS OLD. AVOID SUCKERS AND CURRENT YEAR'S GROWTH. CUTTINGS WILL BE ONE-HALF-INCH (1/2") TO ONE-INCH (1") DIAMETER FOR WILLOWS. CUT THE APICAL BUDS PLUS SEVERAL INCHES OF THE PREVIOUS YEAR'S GROWTH OFF THE CUTTING BEFORE PLANTING IT.
3. LIVE STAKES WILL BE SINGLE STICKS. THESE SHOULD BE MINIMUM TWENTY-FOUR INCHES (48") LONG OR LONGER AS DETERMINED BY THE WATER TABLE/GROUND SURFACE RELATIONSHIP.
4. WILLOWS WILL BE HARVESTED AND PLANTED DURING DORMANT SEASON AS IDENTIFIED BY LACK OF SWELLING BUDS, APPROXIMATELY NOVEMBER 1 TO APRIL 1 (LATE WINTER TO EARLY SPRING).
5. THE BASE CUT WILL BE AT A FORTY-FIVE DEGREE (45°) ANGLE CUT AND ANY TOP CUTS WILL BE BLUNT AND APPROXIMATELY ONE-INCH ABOVE AN AUXILIARY BUD.
6. IMMEDIATELY IMMERSE THE BUTT END OF THE WILLOW IN WATER AFTER HARVESTING. THE BOTTOM (1/3) OF CUTTINGS WILL BE SUBMERGED IN WATER FOR A MINIMUM OF TWENTY-FOUR (24) HOURS PRIOR TO INSTALLATION.
7. WILLOW STAKES WILL BE PLANTED WITHIN SEVEN (7) DAYS OF HARVEST.
8. STAKES SHALL NOT BE PLANTED IN FROZEN GROUND.
9. CUTTINGS WILL NOT BE DROPPED OR OTHERWISE MISHANDLED. MINOR BROKEN AND DAMAGED CUTTINGS WILL BE PRUNED PRIOR TO PLANTING. MAJOR DAMAGE WILL BE CAUSE FOR REJECTION.
10. CUTTINGS WILL BE PROTECTED FROM FREEZING AND DRYING AT ALL TIMES. CUTTINGS SHOULD BE PLANTED IMMEDIATELY AFTER SOAKING AND STORAGE. CUTTINGS WILL BE COVERED WITH TARP OR BURLAP DURING ANY TRANSPORTATION IN VEHICLES.
11. CUTTINGS WILL BE STORED BETWEEN THIRTY-FIVE DEGREES (35°) AND FIFTY DEGREES (50°) FAHRENHEIT FOR NO LONGER THAN ONE (1) WEEK. CUTTINGS WILL BE STORED IN PROTECTED LOCATIONS WHERE THEY ARE SHADED AND SHELTERED FROM SUN AND WIND.
12. PLACE EROSION CONTROL FABRIC PRIOR TO LIVE WILLOW STAKING.
13. PREPARE A PILOT HOLE TO THE GROUNDWATER DEPTH BY HAMMERING A REBAR, DIBBLE BAR, OR STINGER, OR OTHER APPROVED METHOD, INTO THE SOIL. PLACE CUTTING GENTLY INTO THE HOLE, UPRIGHT, ENSURING THAT THE BASE END IS AT OR BELOW THE GROUND WATER LEVEL.
14. HOLES WILL BE BACKFILLED AS NECESSARY SO THAT NO VOIDS REMAIN AROUND THE CUTTING. WATERING SHOULD BE DONE BETWEEN BACKFILL LIFTS TO ENSURE ALL VOIDS ARE FILLED. DO NOT BURY TOP OF CUTTING. TAMP SURFACE AROUND THE CUTTING TO SECURE IT IN PLACE.
15. IF HEAVY EQUIPMENT IS USED TO FACILITATE DIGGING OF PILOT HOLES FOR WILLOW STAKES (SUCH AS WITHIN RIPRAP), ALL DISTURBED SOIL WILL BE RIPPED AND SCARIFIED PRIOR TO FINAL SEEDING.

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