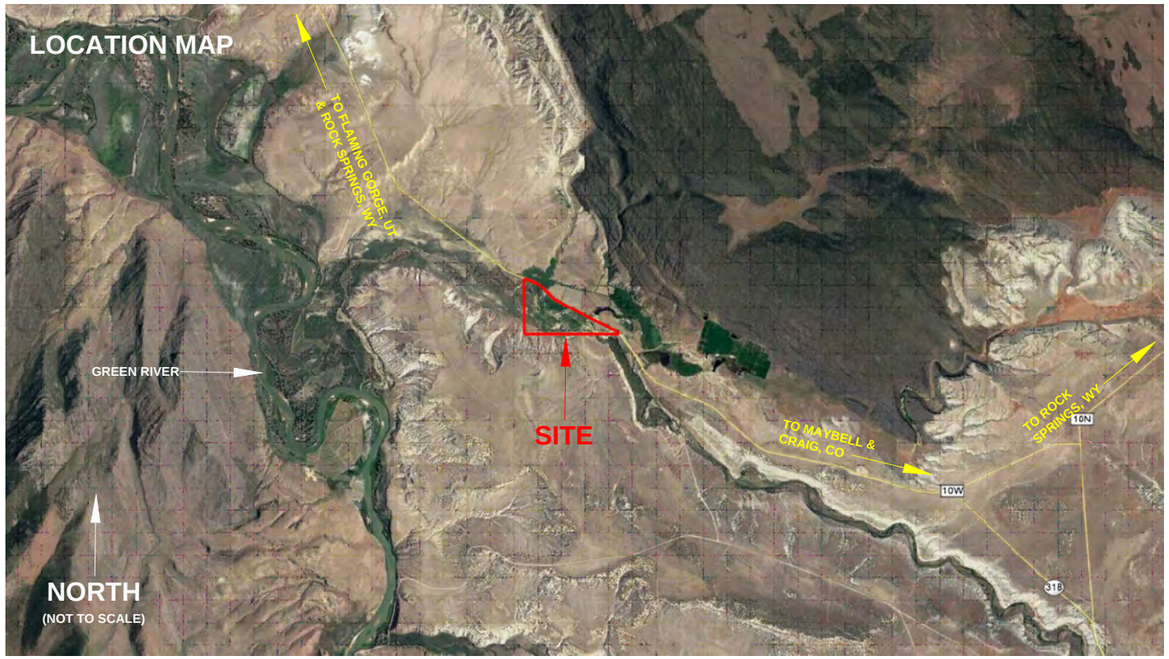

SHEET INDEX

EC = EXISTING CONDITION
PC = PROPOSED CONDITION

CONTACT INFORMATION

CLIENT:
DIAMOND PEAK CATTLE COMPANY, LLC
14761 CO HIGHWAY 318
MAYBELL, CO 81640

PRIMARY CONTACT:
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JOHNRAFTO@GMAIL.COM

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BOULDER, CO 80301

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PRIMARY CONTACT:
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PROFESSIONAL LAND SURVEYOR:
EPP & ASSOCIATES
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PRIMARY CONTACT:
MICHAEL FRAHER, P.L.S.
MIKE@EPPASSOCIATES.COM
970-824-5227

MAPPING NOTES:

GEOREFERENCED AERIAL IMAGERY BACKGROUND SOURCED FROM GOOGLE EARTH, DATED 6/21/2015

EXISTING CONDITION SURVEY PROVIDED BY EPP & ASSOCIATES, DATED 8/19/2020.

SHEET 0

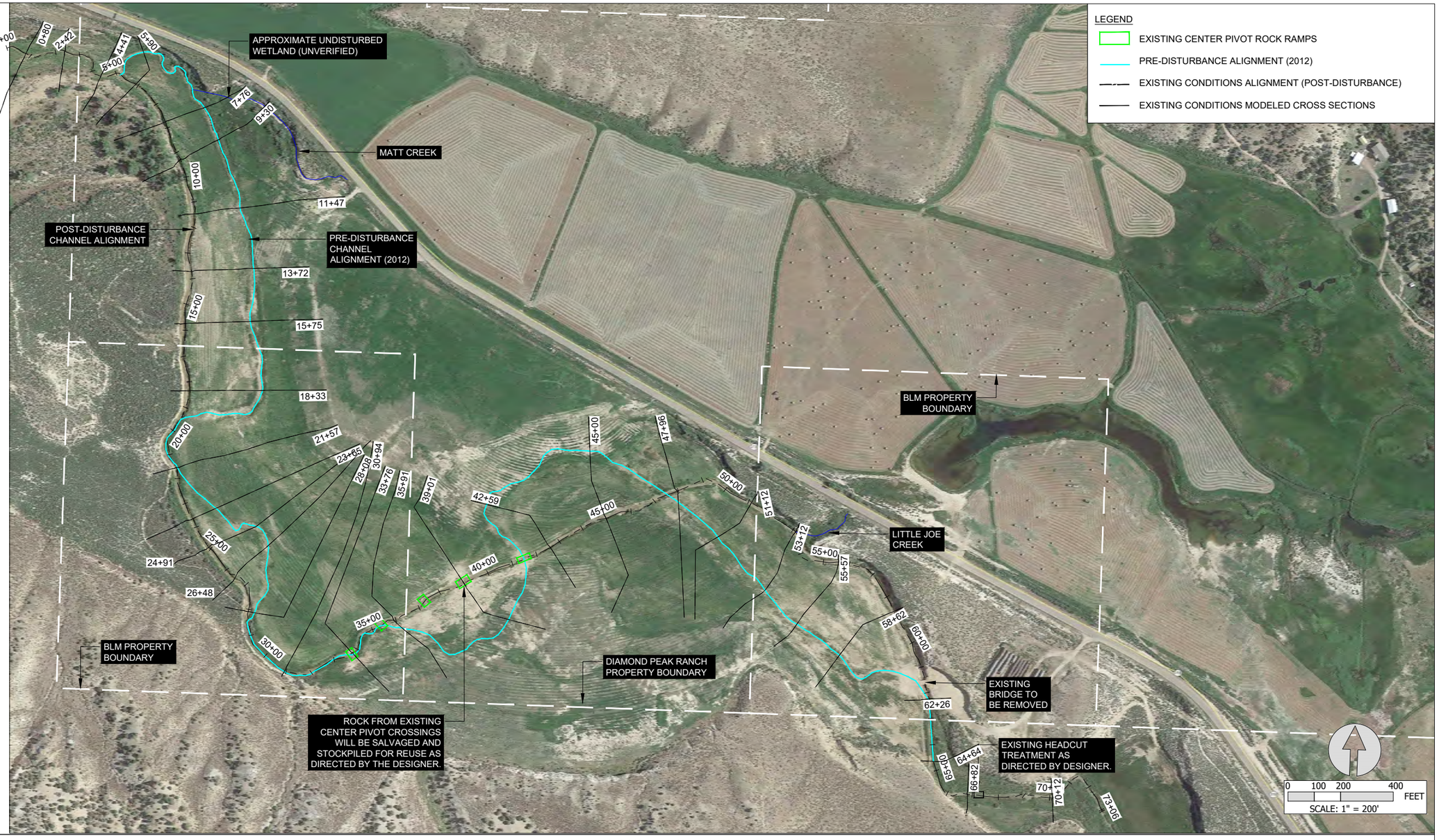
VERMILLION CREEK AT DIAMOND PEAK RANCH
WETLAND RESTORATION PROJECT
COVER SHEET

NO:	REVISIONS:	DATE:
#1	TOTAL PLANSET REISSUED	9/17/21
#2	AGENCY COMMENTS ADDRESSED	4/18/22
#3	SHEET INDEX ADJUSTED	4/18/22
#4	ADD LOW WATER CROSSING	6/14/22

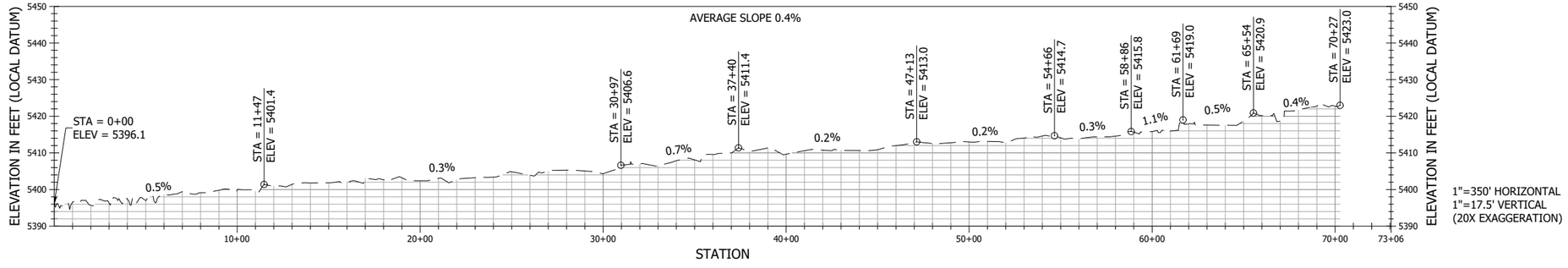
DATE: 7-15-21
PROJECT NO: 2020-7-5

Stillwater Sciences
4845 Pearl East Circle, Ste. 101
Boulder, Colorado 80310
(p): 720-656-2330

ecosystem services
1455 Washburn Street
Erie, Colorado 80516
(p): 970-812-3267



EXISTING PROFILE ON EXISTING ALIGNMENT



VERMILLION CREEK AT DIAMOND PEAK RANCH WETLAND RESTORATION PROJECT

MOFFAT COUNTY, COLORADO

Stillwater Sciences

ecos ecosystem services LLC

PROJECT NUMBER: 880.00
SCALE: AS NOTED
DATE: 6/10/2022

DESIGN: JB/TS/RB
DRAWN: TS/EP/KE
CHECKED: TS/RB
APPROVED:

P&P EC OVERVIEW

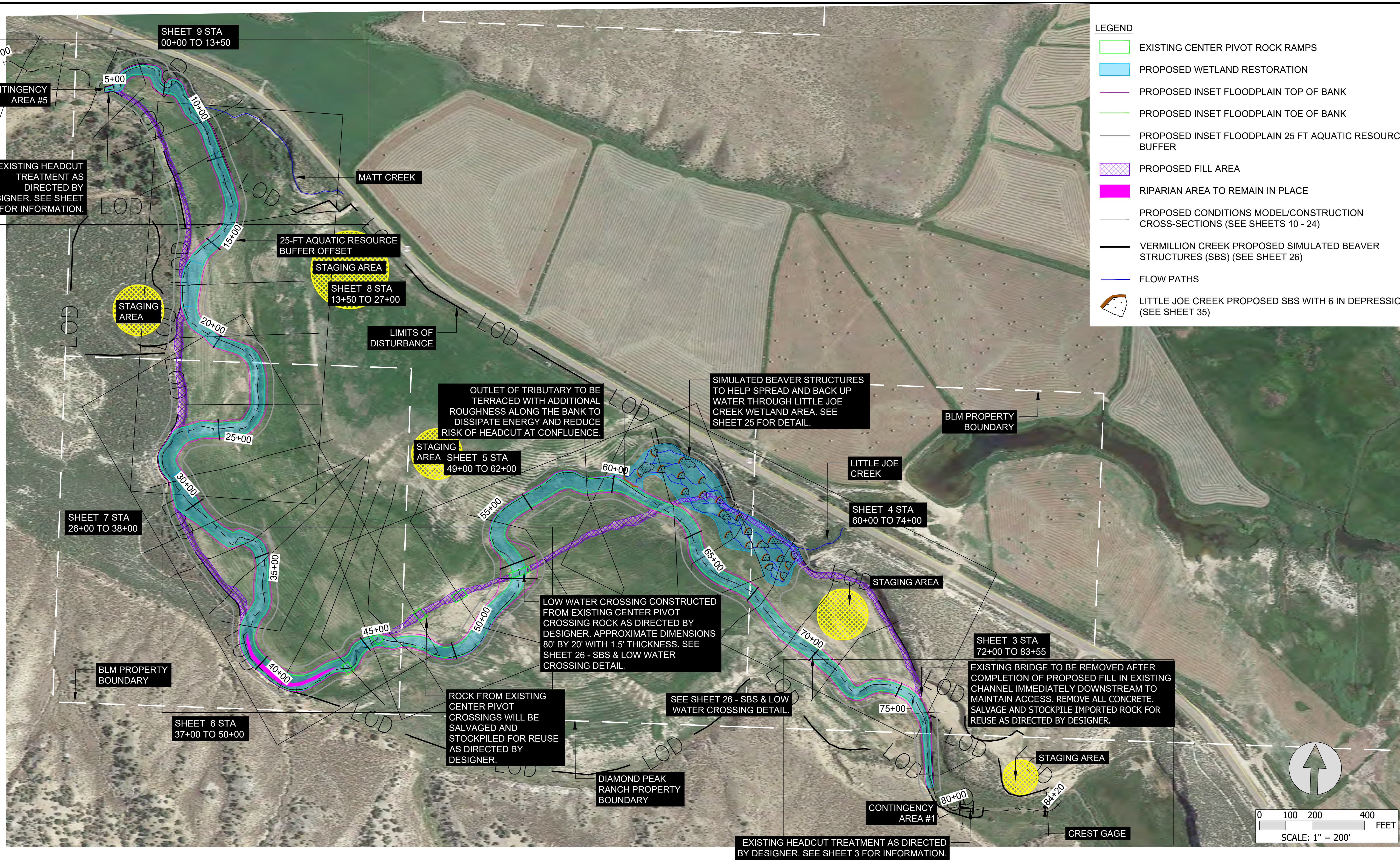
SHEET 1

VERMILLION CREEK AT DIAMOND PEAK RANCH WETLAND RESTORATION PROJECT

MOFFAT COUNTY, COLORADO

Stillwater Sciences

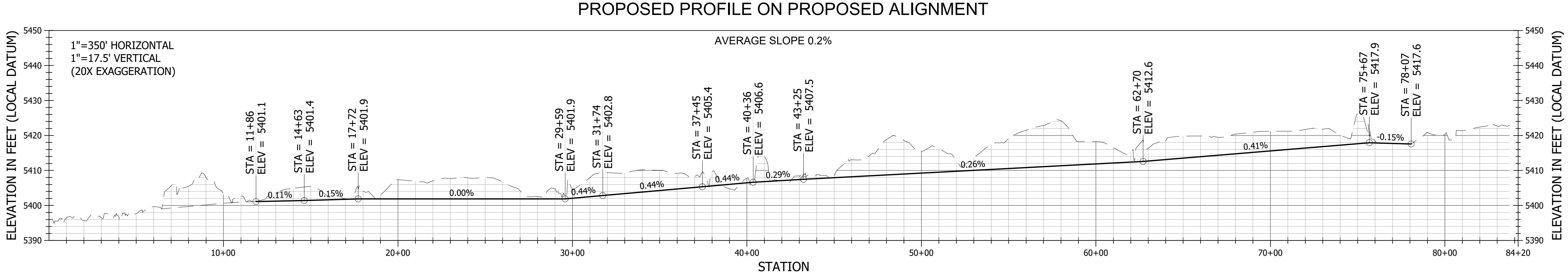
ecos ecosystem services LLC



LEGEND

- EXISTING CENTER PIVOT ROCK RAMPS
- PROPOSED WETLAND RESTORATION
- PROPOSED INSET FLOODPLAIN TOP OF BANK
- PROPOSED INSET FLOODPLAIN TOE OF BANK
- PROPOSED INSET FLOODPLAIN 25 FT AQUATIC RESOURCE BUFFER
- PROPOSED FILL AREA
- RIPARIAN AREA TO REMAIN IN PLACE
- PROPOSED CONDITIONS MODEL/CONSTRUCTION CROSS-SECTIONS (SEE SHEETS 10 - 24)
- VERMILLION CREEK PROPOSED SIMULATED BEAVER STRUCTURES (SBS) (SEE SHEET 26)
- FLOW PATHS
- LITTLE JOE CREEK PROPOSED SBS WITH 6 IN DEPRESSION (SEE SHEET 35)

PROPOSED PROFILE ON PROPOSED ALIGNMENT



PROJECT NUMBER: 880.00
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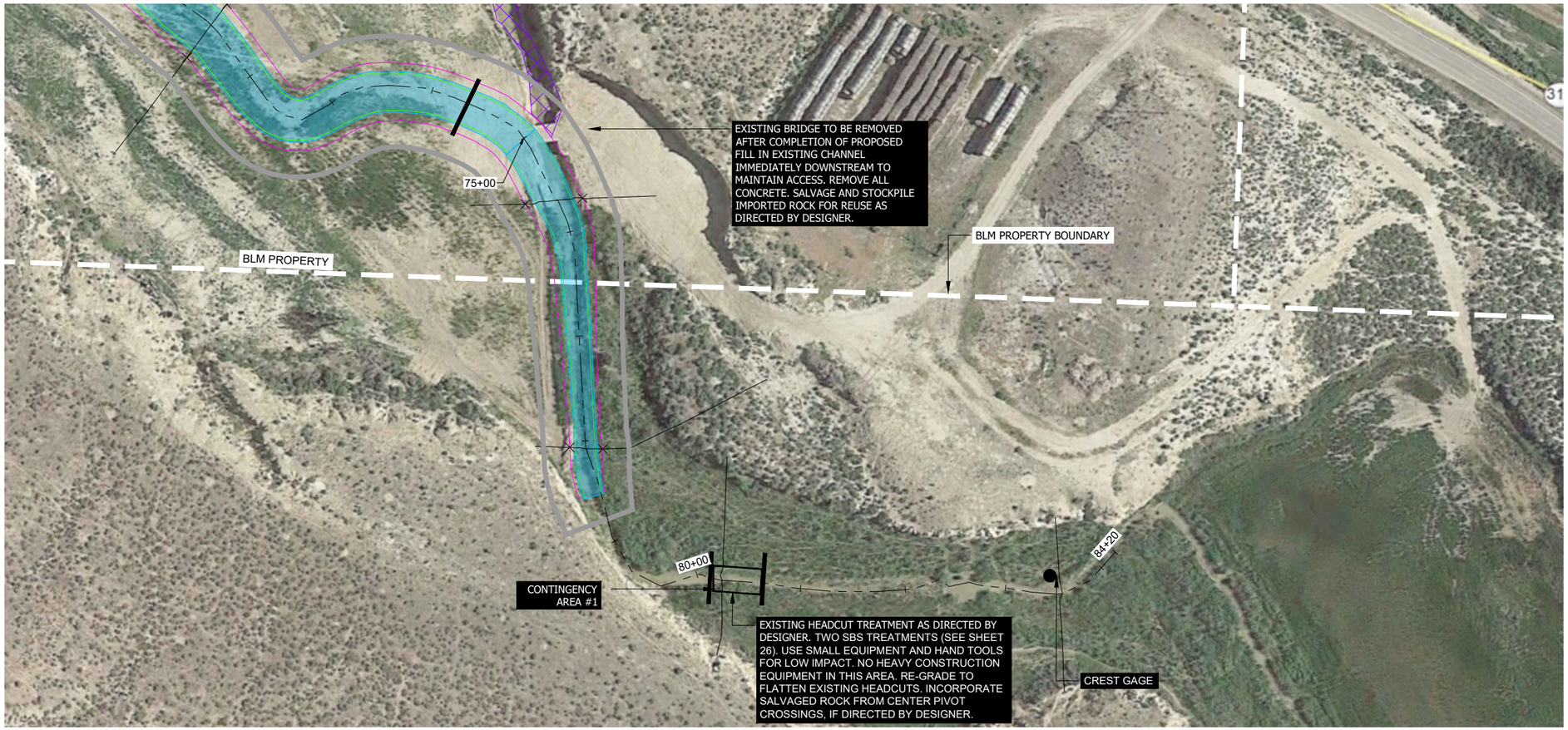
DESIGN: JB/TS/RB
DRAWN: TS/EP/KE
CHECKED: TS/RB
APPROVED:

P&P PC OVERVIEW

SHEET 2



0 30 60 120 FEET
SCALE: 1" = 60'

LEGEND

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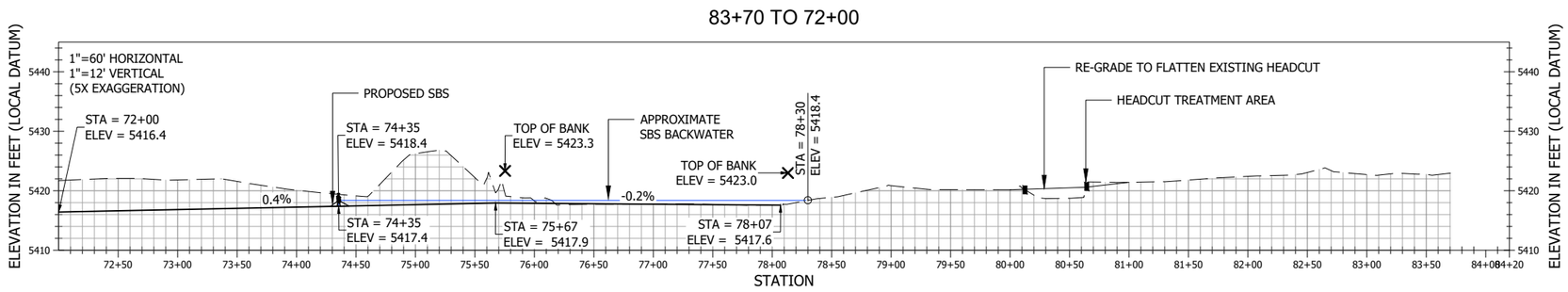

VERMILLION CREEK AT DIAMOND PEAK RANCH WETLAND RESTORATION PROJECT

MOFFAT COUNTY, COLORADO

Stillwater Sciences

ecos ecosystem services LLC

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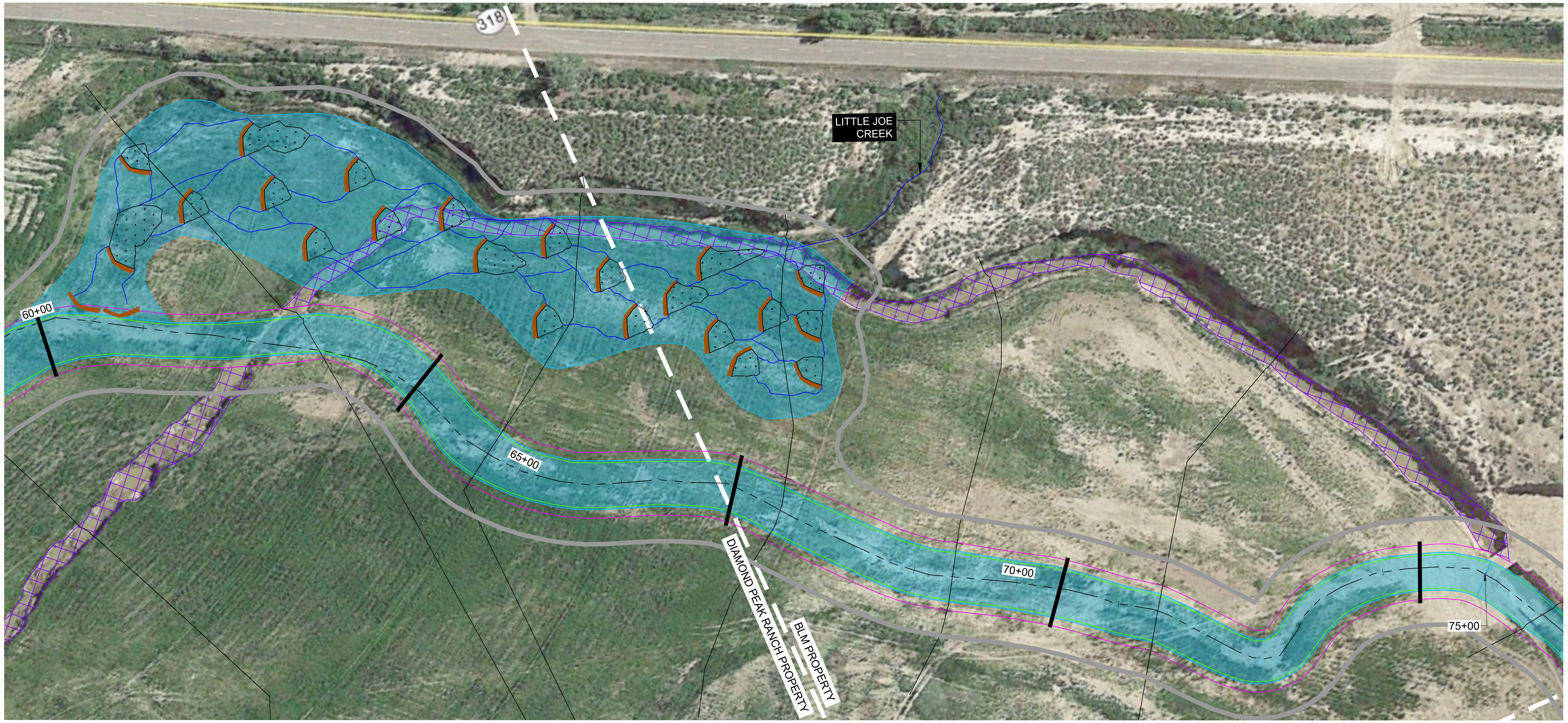
DESIGN: JB/TS/RB
DRAWN: TS/EP/KE
CHECKED: TS/RB
APPROVED:

P&P 83+55 TO 72+00

SHEET 3



0 30 60 120 FEET
SCALE: 1" = 60'

LEGEND

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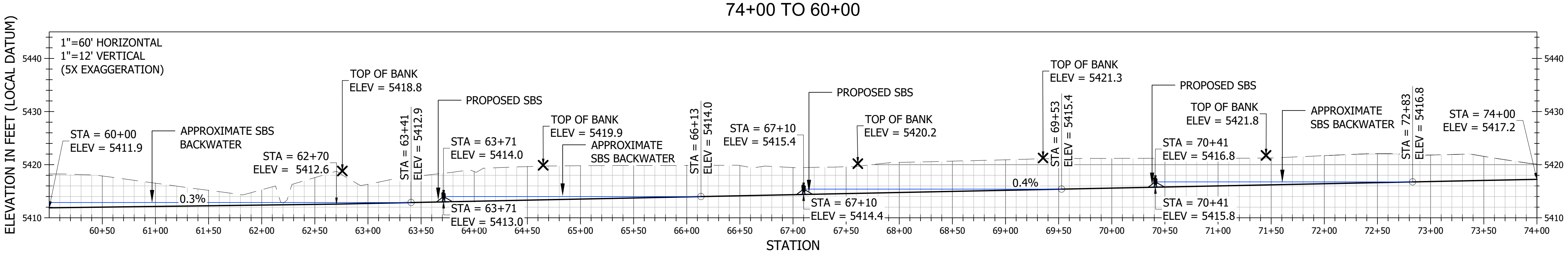
74+00 TO 60+00



VERMILLION CREEK AT DIAMOND PEAK RANCH WETLAND RESTORATION PROJECT

MOFFAT COUNTY, COLORADO

Stillwater Sciences

ecos ecosystem services LLC

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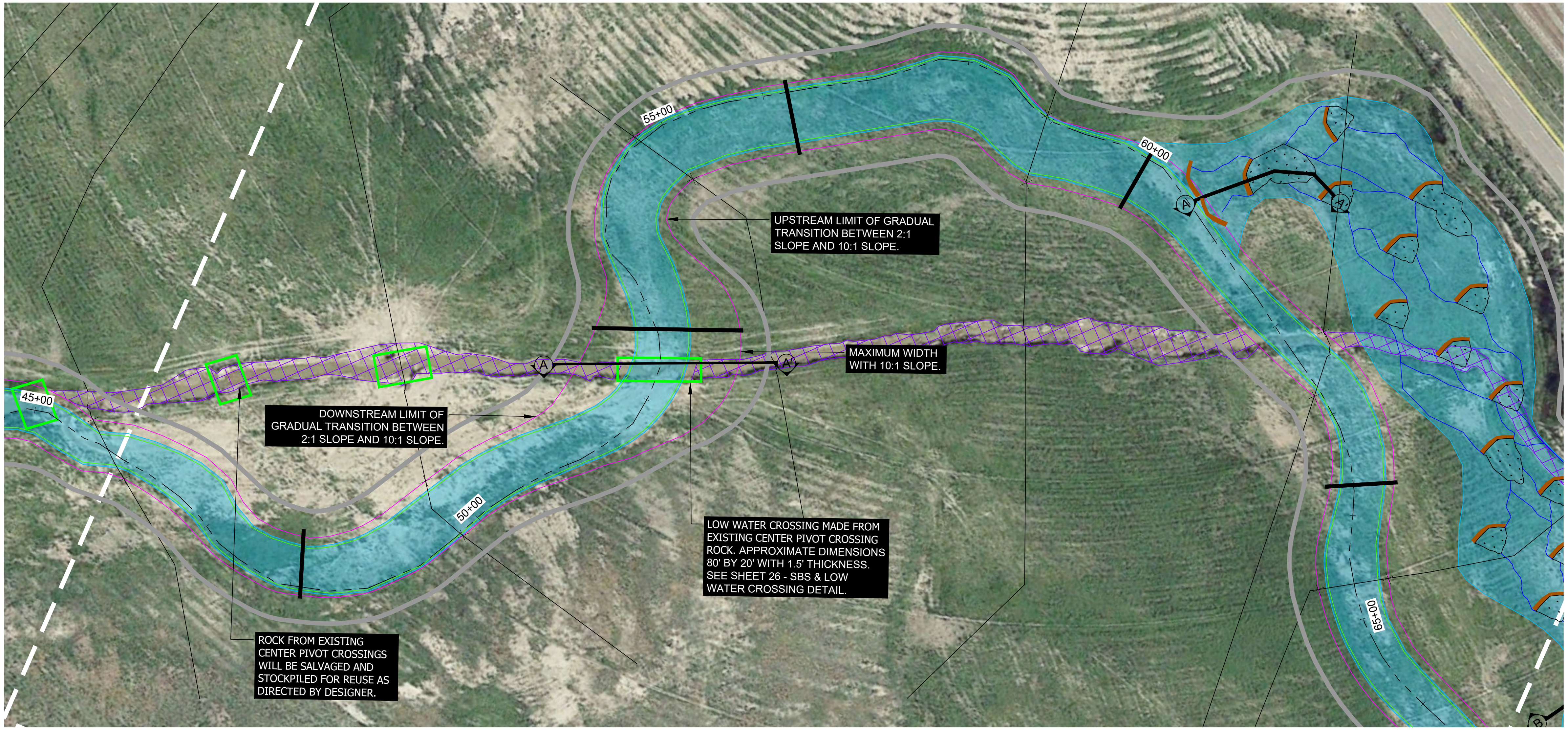
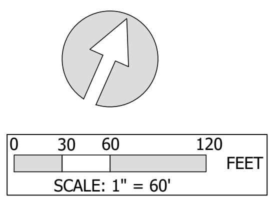
CHECKED: TS/RB
APPROVED:

P&P 74+00 TO 60+00

SHEET 4





LEGEND

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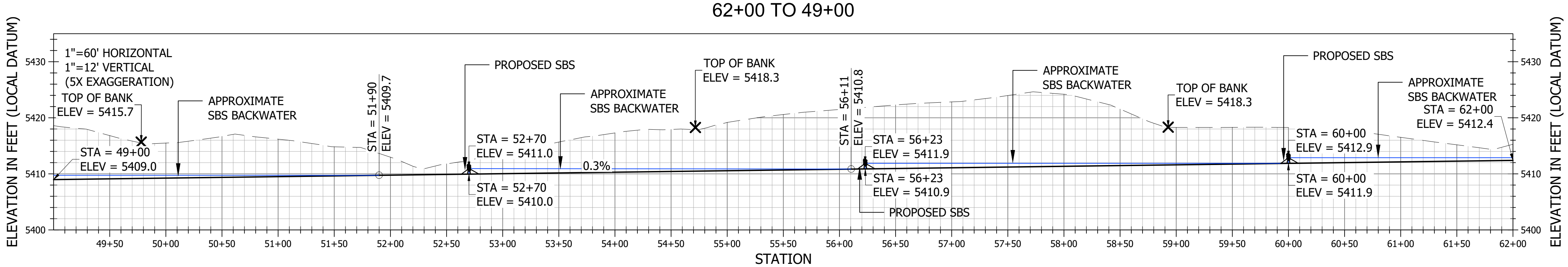
62+00 TO 49+00



VERMILLION CREEK AT DIAMOND PEAK RANCH WETLAND RESTORATION PROJECT

MOFFAT COUNTY, COLORADO

Stillwater Sciences

ecos ecosystem services LLC

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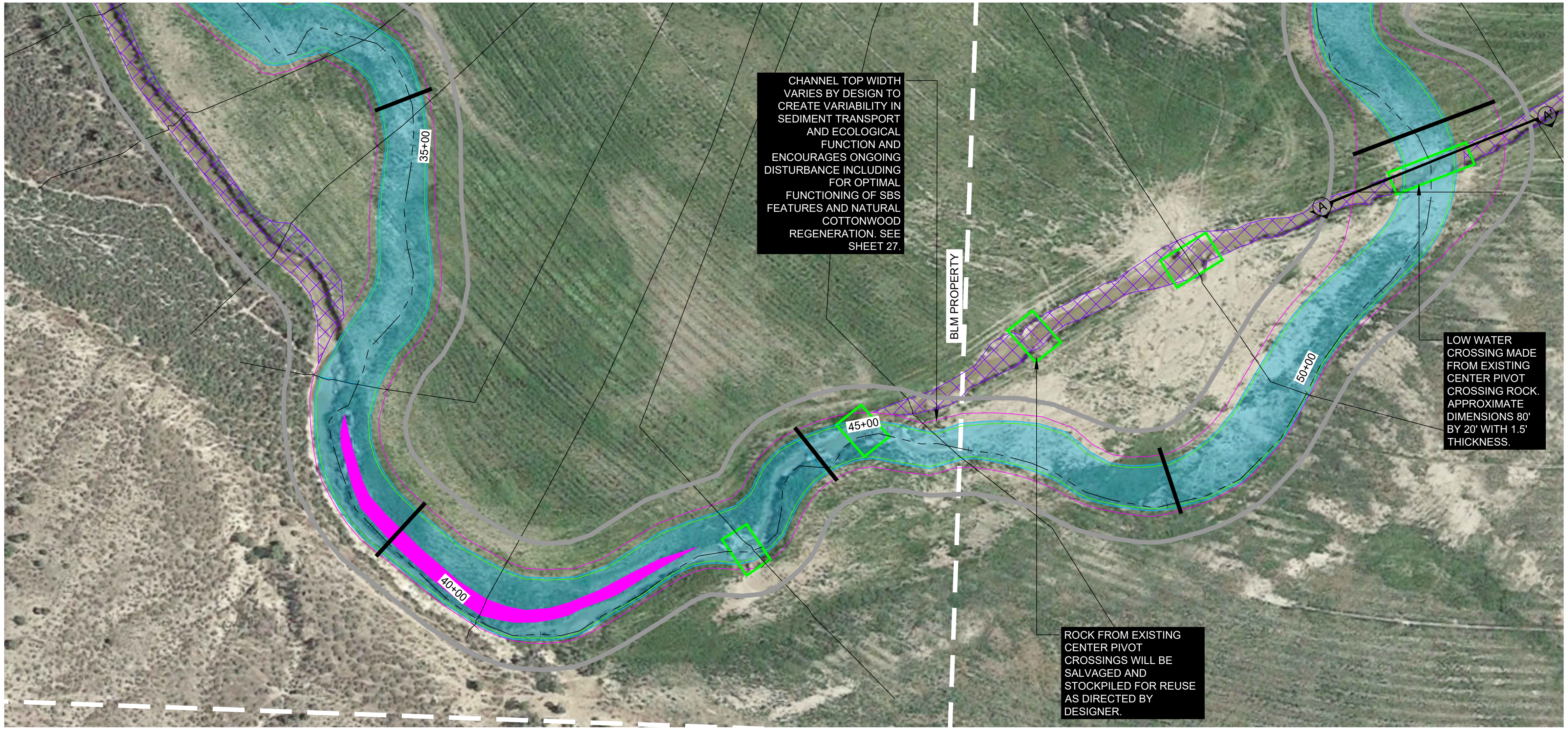
DRAWN: TS/EP/KE
CHECKED: TS/RB
APPROVED:

P&P 62+00 TO 49+00

SHEET 5



0 30 60 120 FEET

SCALE: 1" = 60'

LEGEND

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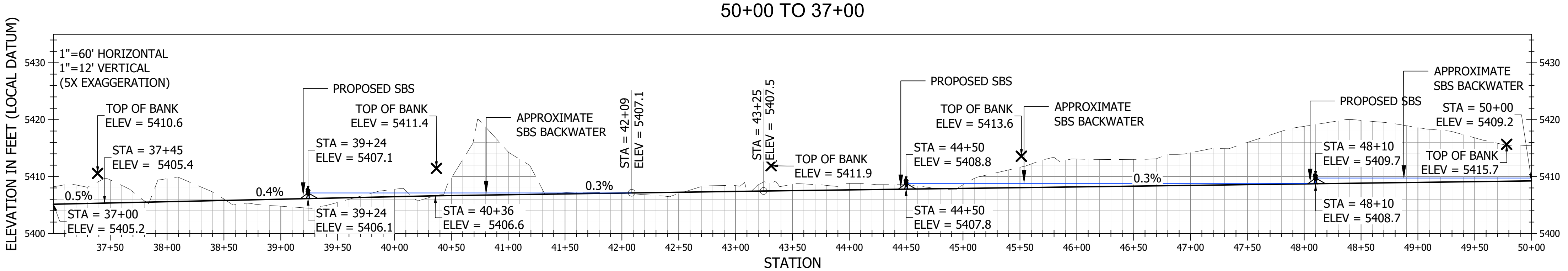
50+00 TO 37+00



VERMILLION CREEK AT DIAMOND PEAK RANCH WETLAND RESTORATION PROJECT

MOFFAT COUNTY, COLORADO

Stillwater Sciences

ecos ecosystem services LLC

PROJECT NUMBER: 880.00

SCALE: AS NOTED

DATE: 6/10/2022

DESIGN: JB/TS/RB

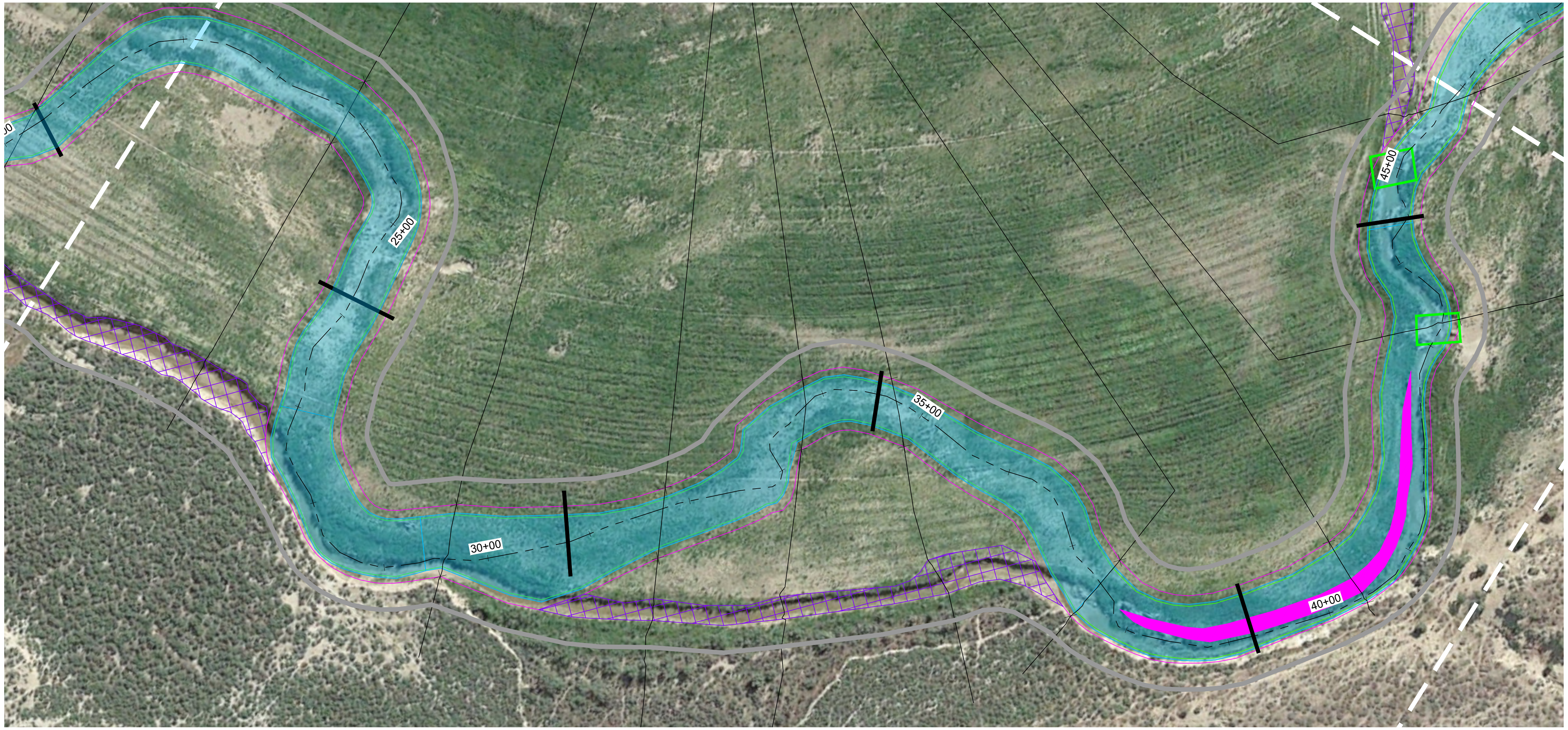
DRAWN: TS/EP/KE

CHECKED: TS/RB

APPROVED:

P&P 50+00 TO 37+00

SHEET 6



0 30 60 120 FEET
SCALE: 1" = 60'

LEGEND

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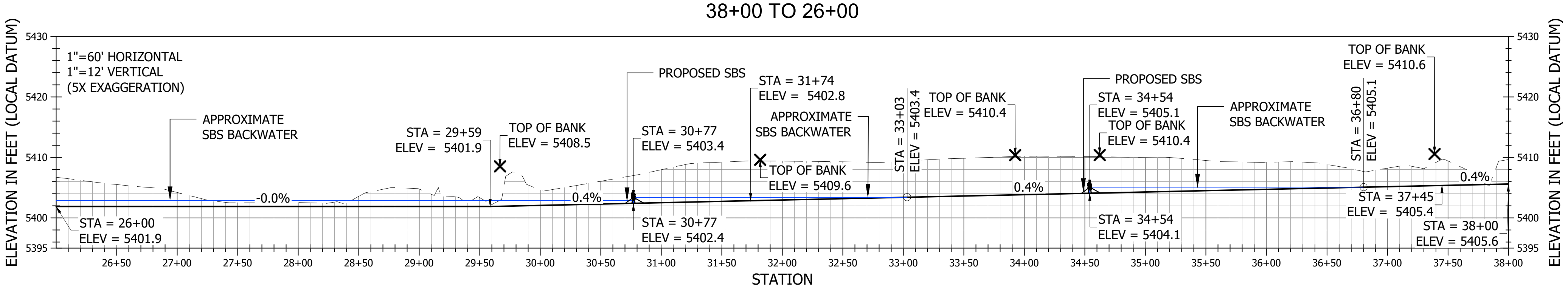
38+00 TO 26+00



VERMILLION CREEK AT DIAMOND PEAK RANCH WETLAND RESTORATION PROJECT

MOFFAT COUNTY, COLORADO

Stillwater Sciences

ecos ecosystem services LLC

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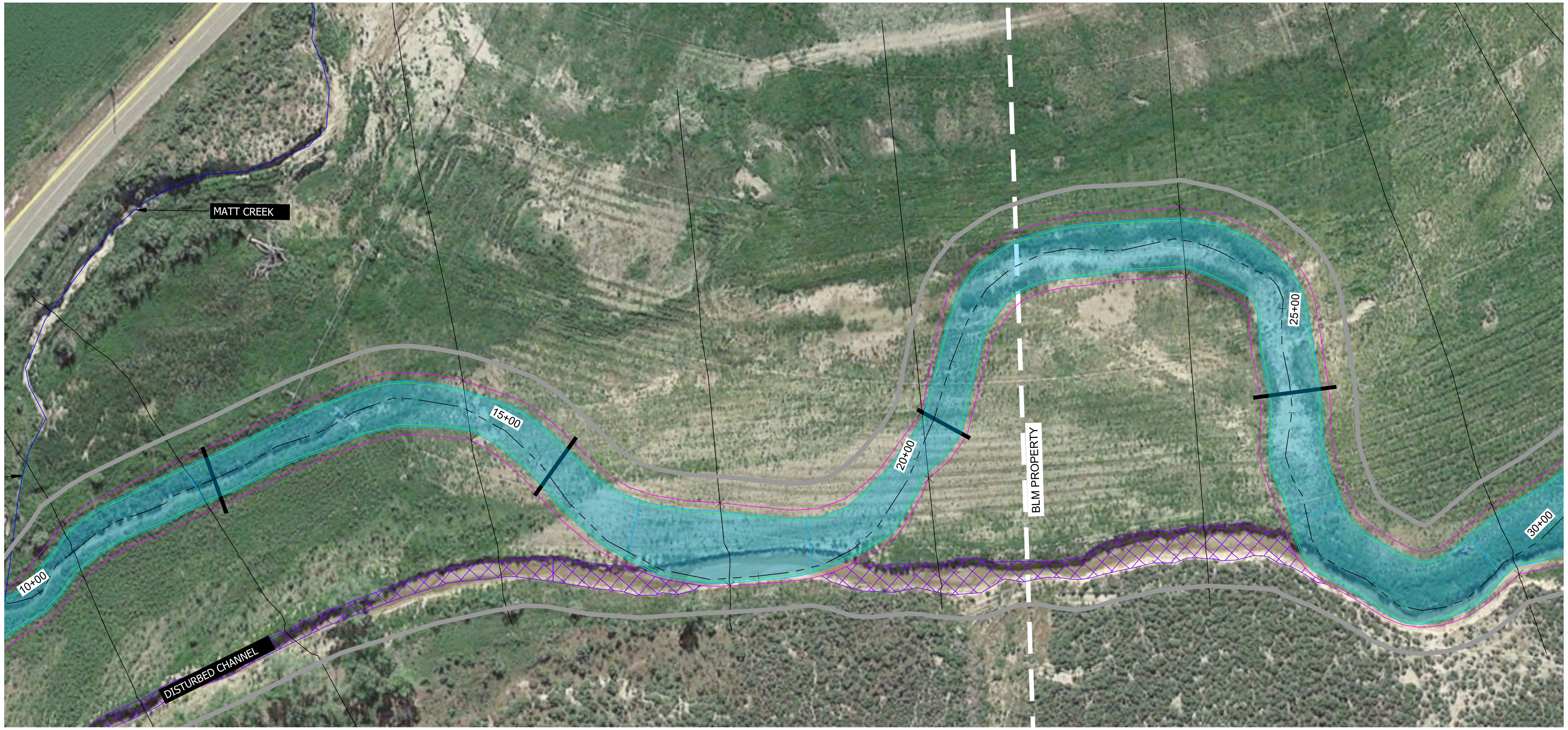
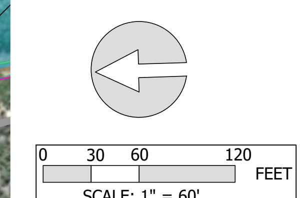
DRAWN: TS/EP/KE
CHECKED: TS/RB
APPROVED:

P&P 38+00 TO 26+00

SHEET 7





LEGEND

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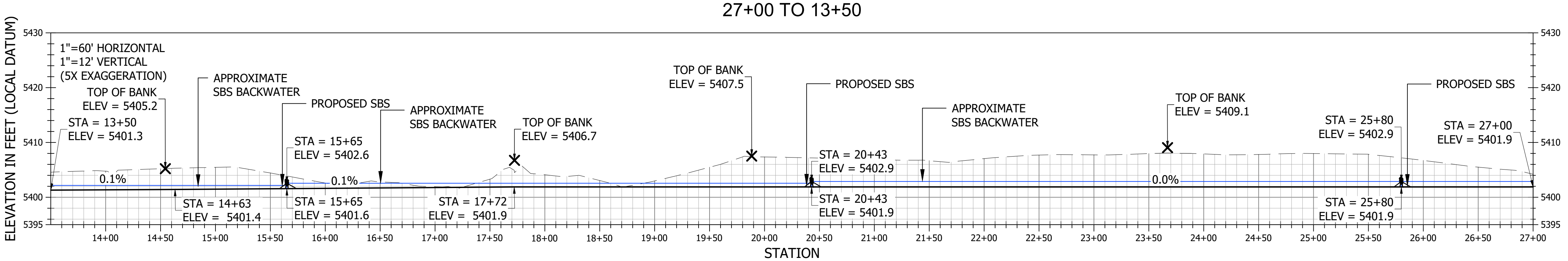
27+00 TO 13+50



VERMILLION CREEK AT DIAMOND PEAK RANCH WETLAND RESTORATION PROJECT

MOFFAT COUNTY, COLORADO

Stillwater Sciences

ecos ecosystem services LLC

PROJECT NUMBER: 880.00

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DESIGN: JB/TS/RB

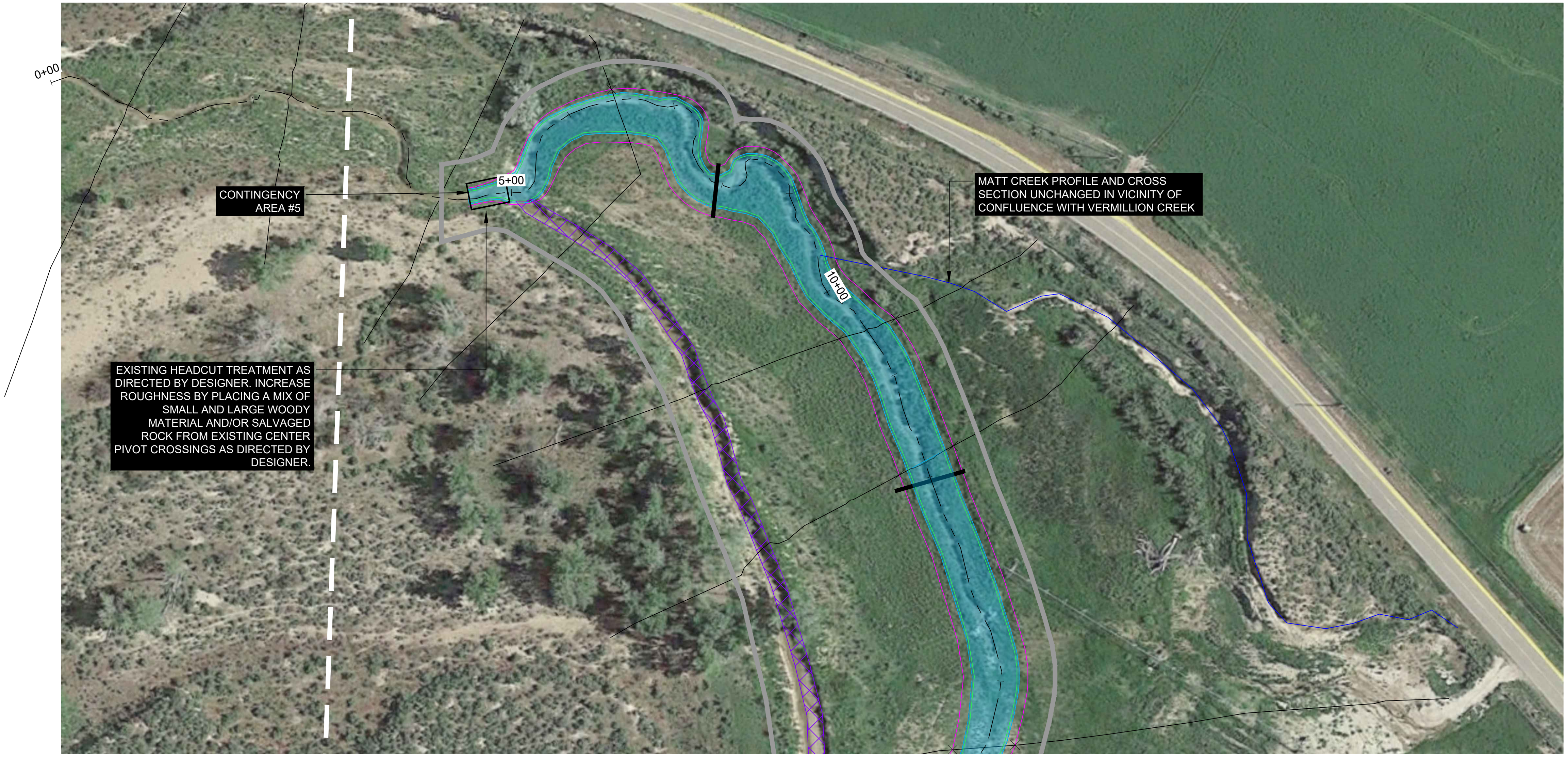
DRAWN: TS/EP/KE

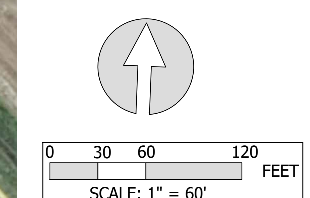
CHECKED: TS/RB

APPROVED:

P&P 27+00 TO 13+50

SHEET 8





LEGEND

- EXISTING CENTER PIVOT ROCK RAMPS
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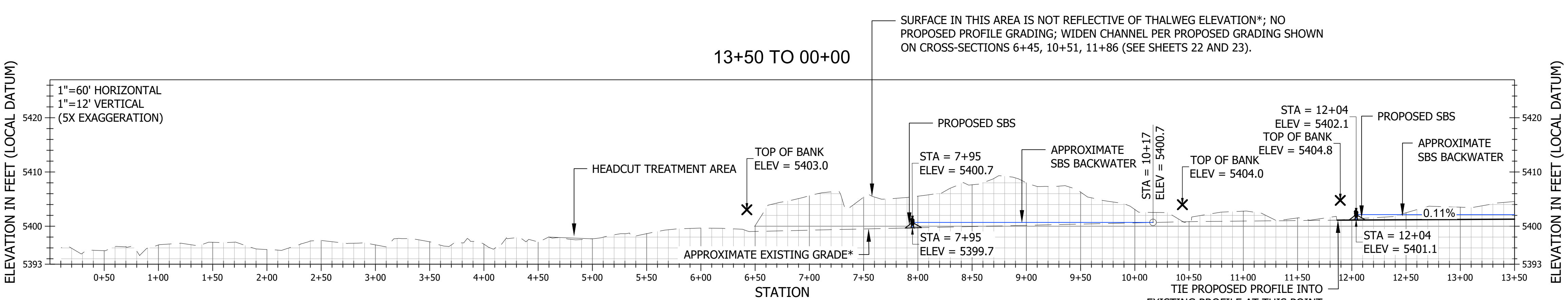
13+50 TO 00+00



* APPROXIMATE EXISTING GRADE LINE, BASED ON SITE OBSERVATION AND SURVEY DATA, IS SHOWN ON PROFILE IN THIS AREA DUE TO INACCURACIES IN THE SURFACE ON THALWEG ELEVATIONS IN THIS LOCALIZED AREA.

VERMILLION CREEK AT DIAMOND PEAK RANCH WETLAND RESTORATION PROJECT

MOFFAT COUNTY, COLORADO

Stillwater Sciences

ecos ecosystem services LLC

PROJECT NUMBER: 880.00
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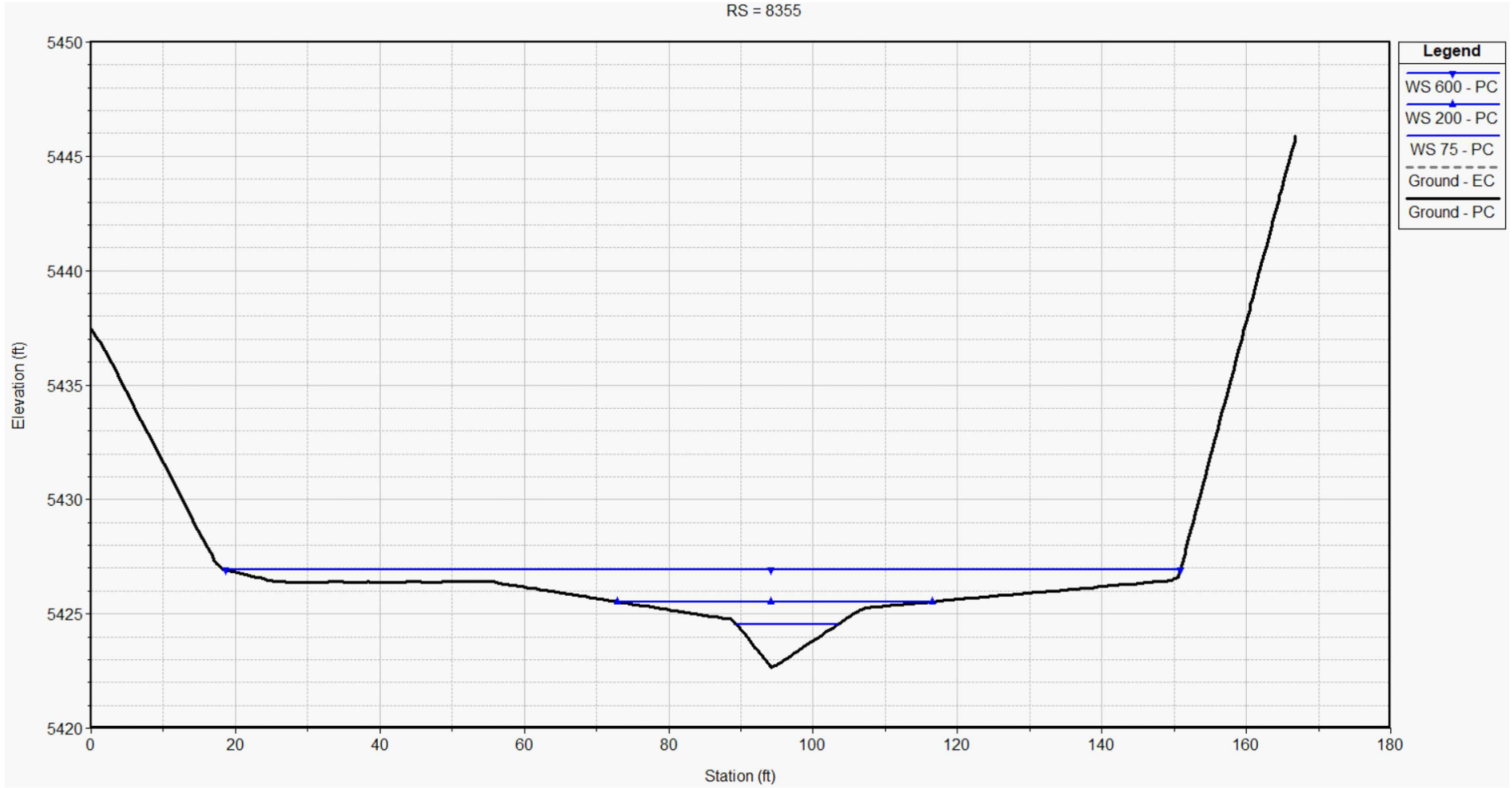
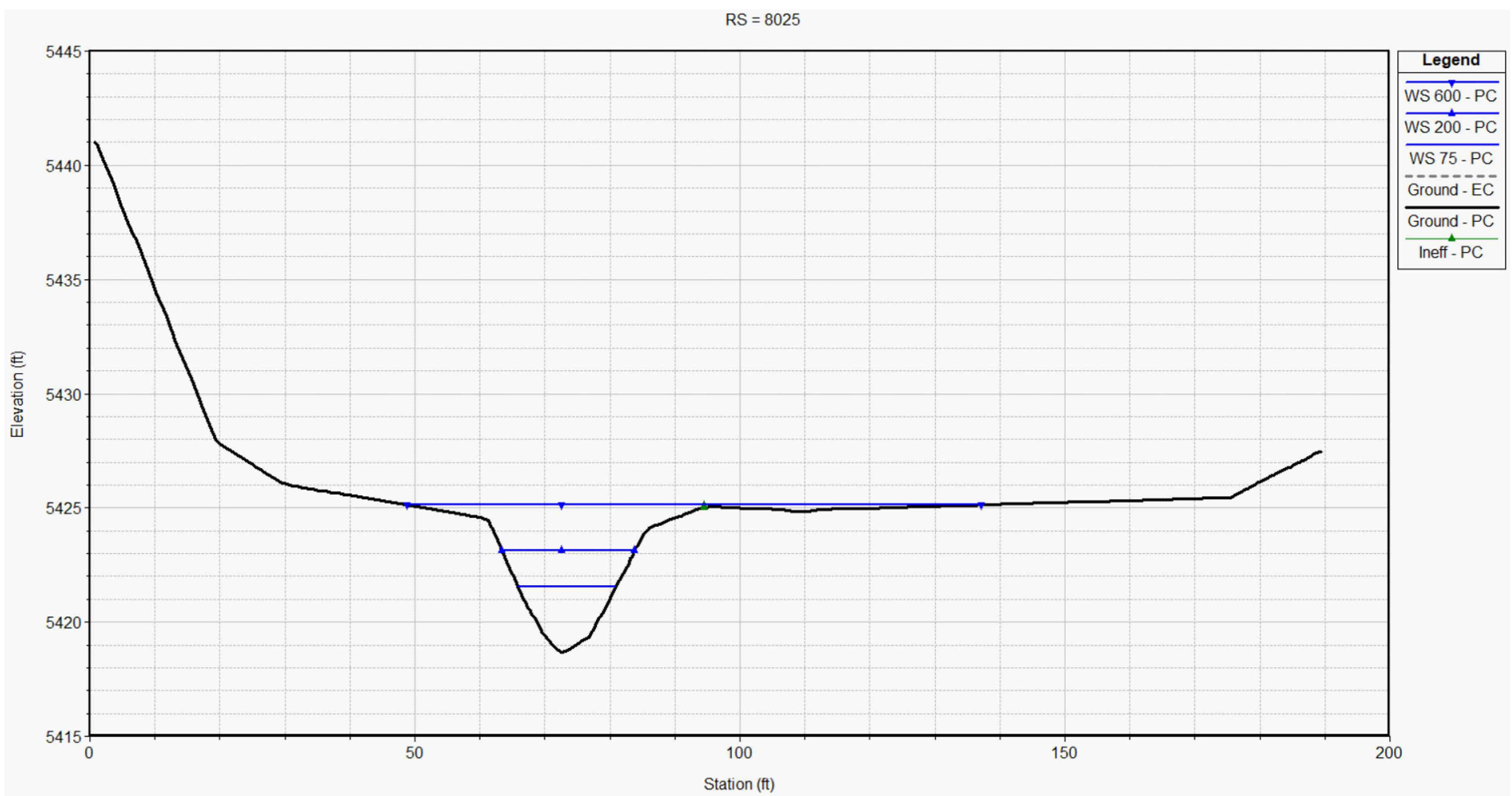
DESIGN: JB/TS/RB
DRAWN: TS/EP/KE
CHECKED: TS/RB
APPROVED:

P&P 13+50 TO 00+00

SHEET 9





75 CFS - WETLAND CREATION FLOW
200 CFS - REPRESENTATIVE INTERMEDIATE FLOW
600 CFS - PEAK OBSERVED FLOW

HORIZONTAL AND VERTICAL SCALES VARY BY CROSS SECTION. SEE AXES INDIVIDUAL AXES FOR SCALE.

VERMILLION CREEK AT DIAMOND PEAK RANCH WETLAND RESTORATION PROJECT

MOFFAT COUNTY, COLORADO

Stillwater Sciences

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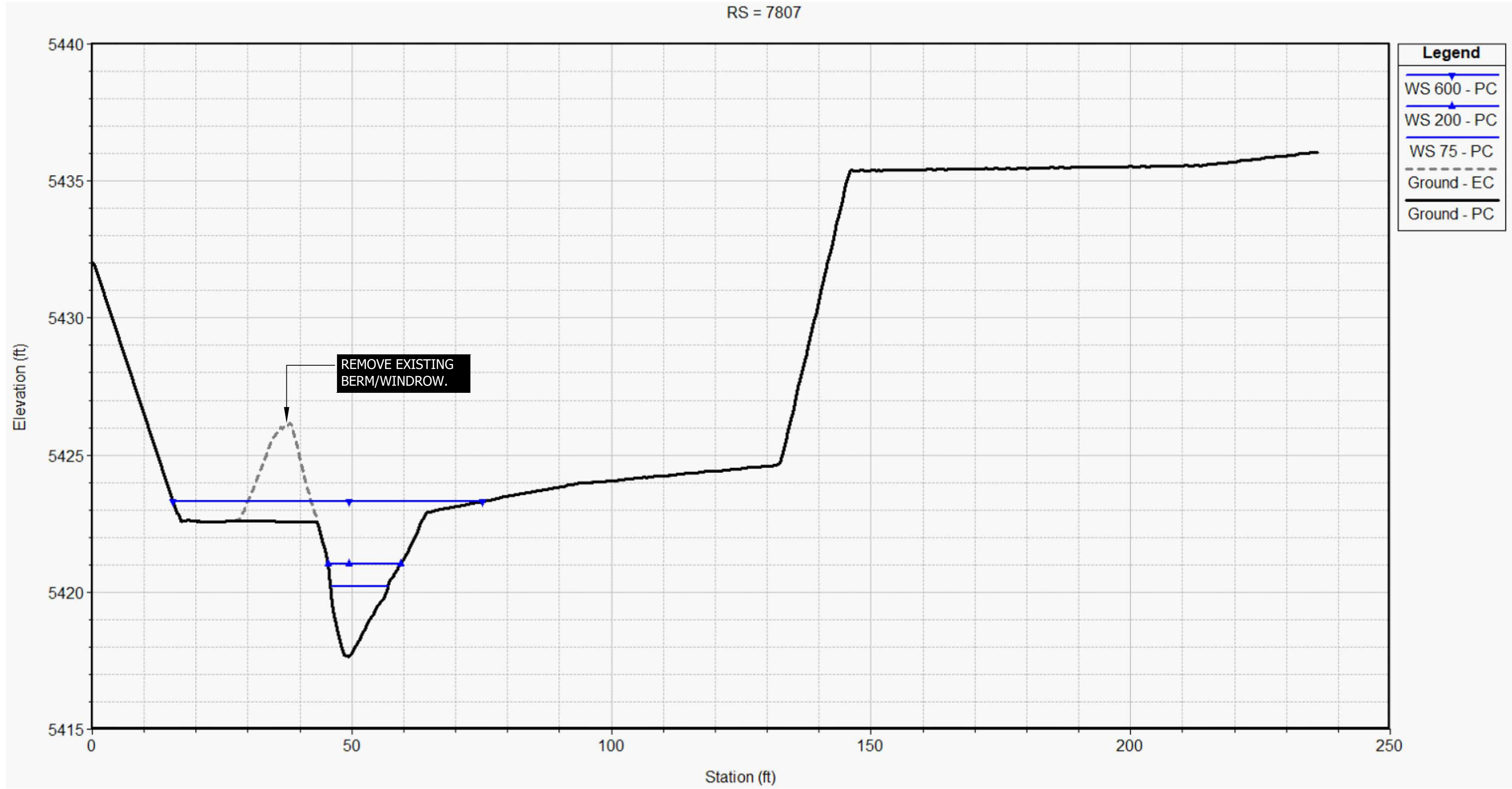
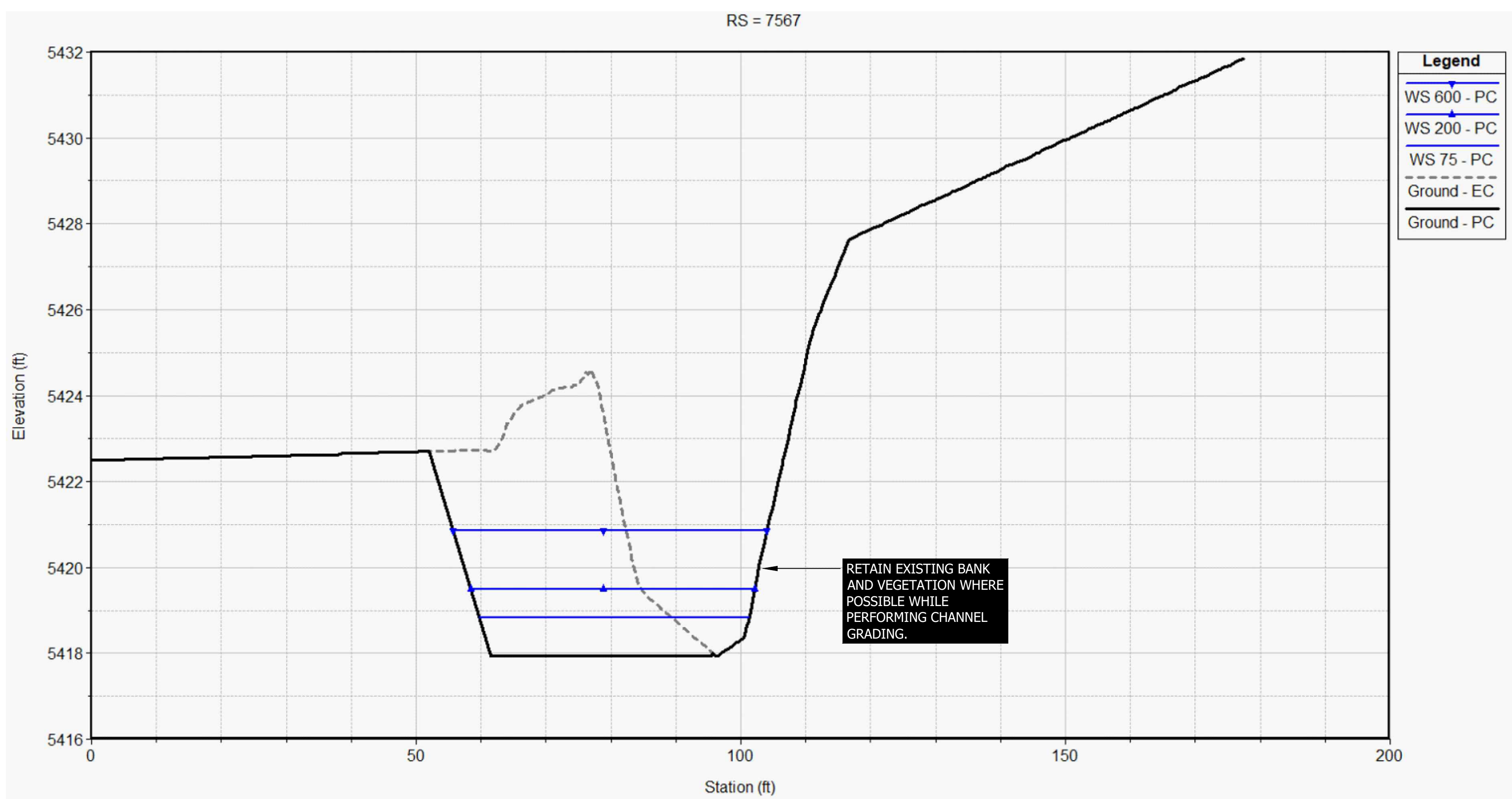
DESIGN: JB/TS/RB
DRAWN: TS/EP/KE
CHECKED: TS/RB
APPROVED:

CROSS SECTIONS 83+55 & 80+25

SHEET 10





75 CFS - WETLAND CREATION FLOW
200 CFS - REPRESENTATIVE INTERMEDIATE FLOW
600 CFS - PEAK OBSERVED FLOW

HORIZONTAL AND VERTICAL SCALES VARY BY CROSS SECTION. SEE AXES INDIVIDUAL AXES FOR SCALE.

VERMILLION CREEK AT DIAMOND PEAK RANCH WETLAND RESTORATION PROJECT

MOFFAT COUNTY, COLORADO

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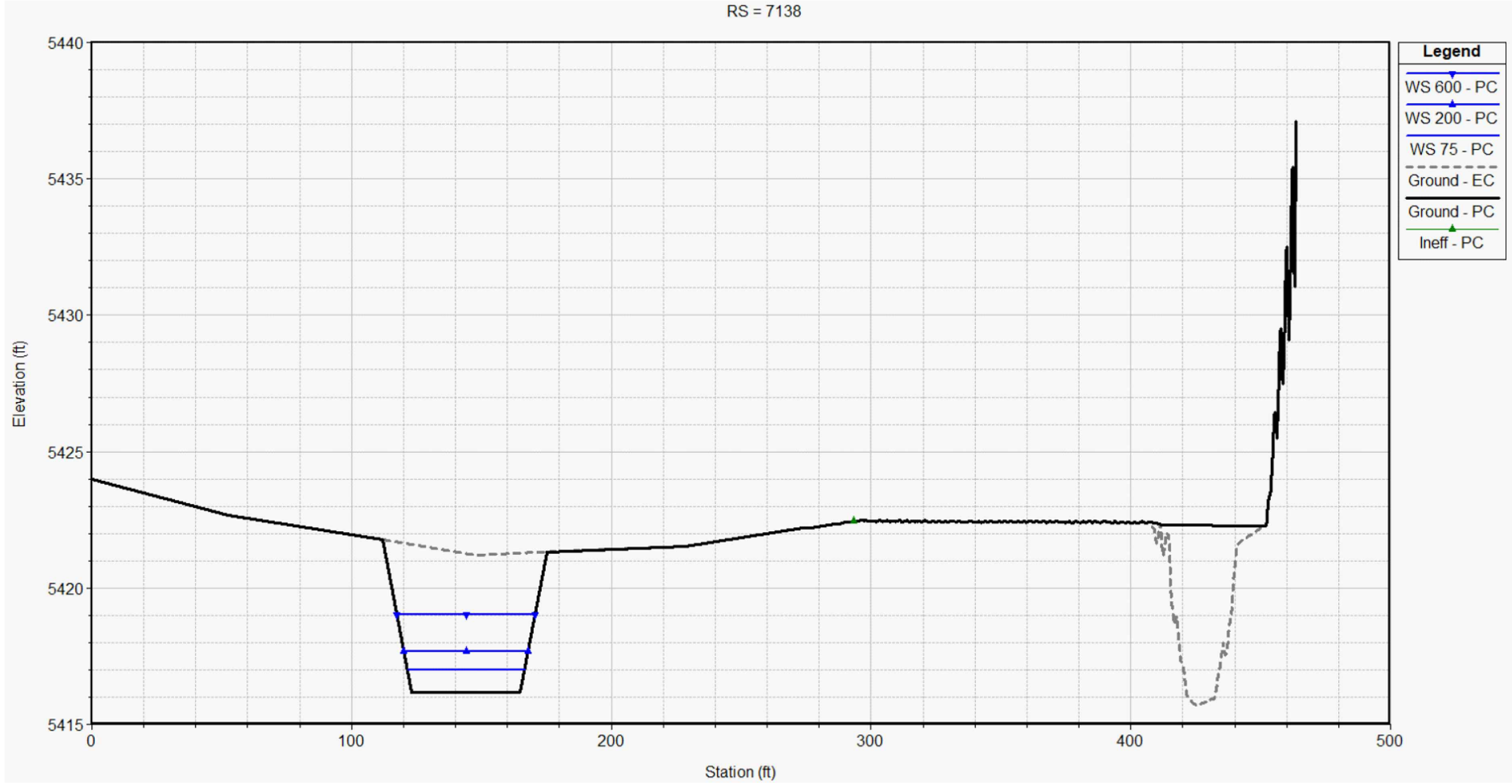
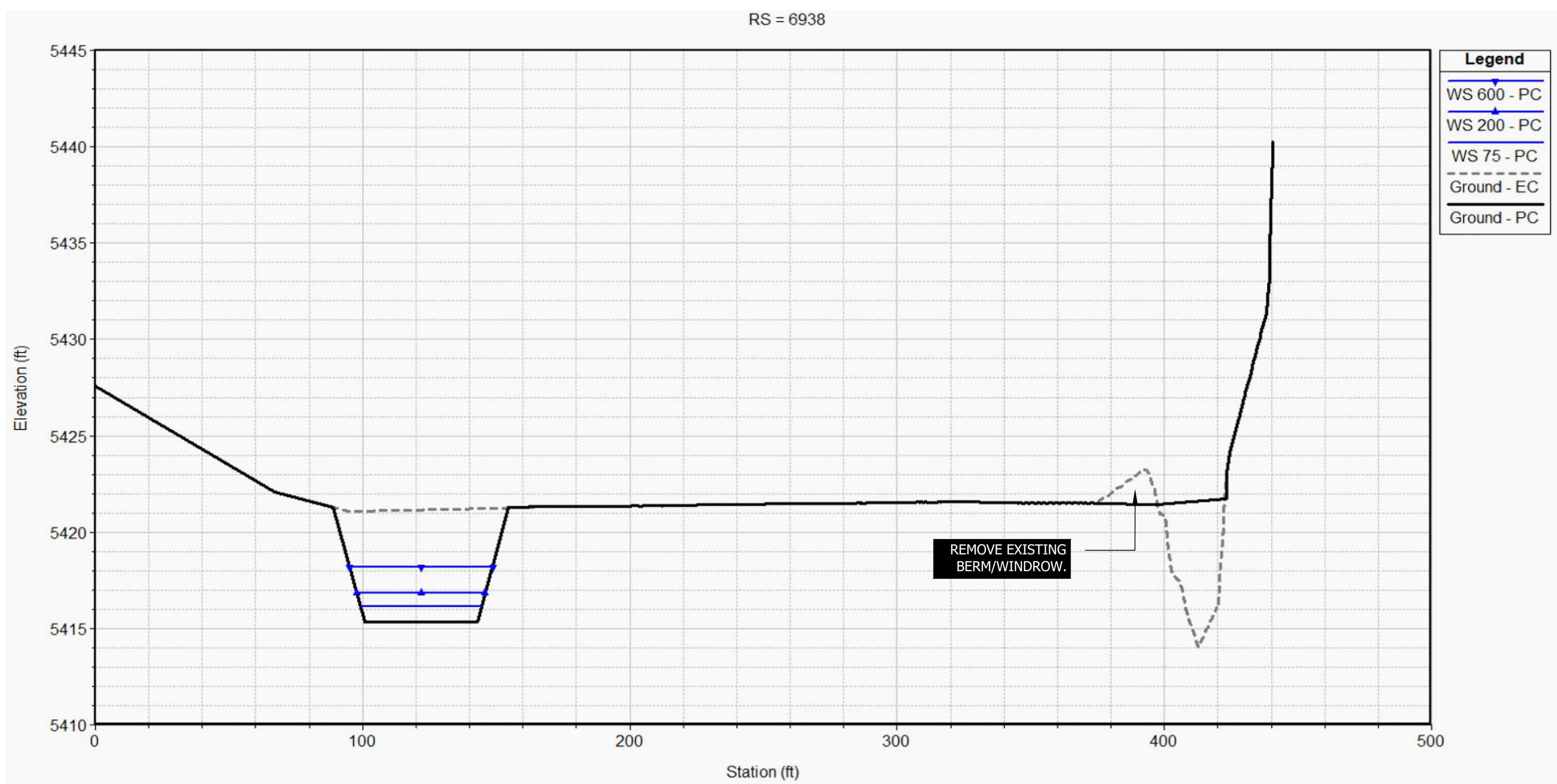
CHECKED: TS/RB
APPROVED:

CROSS SECTIONS 78+07 & 75+67

SHEET 11





75 CFS - WETLAND CREATION FLOW
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HORIZONTAL AND VERTICAL SCALES VARY BY CROSS SECTION. SEE AXES INDIVIDUAL AXES FOR SCALE.

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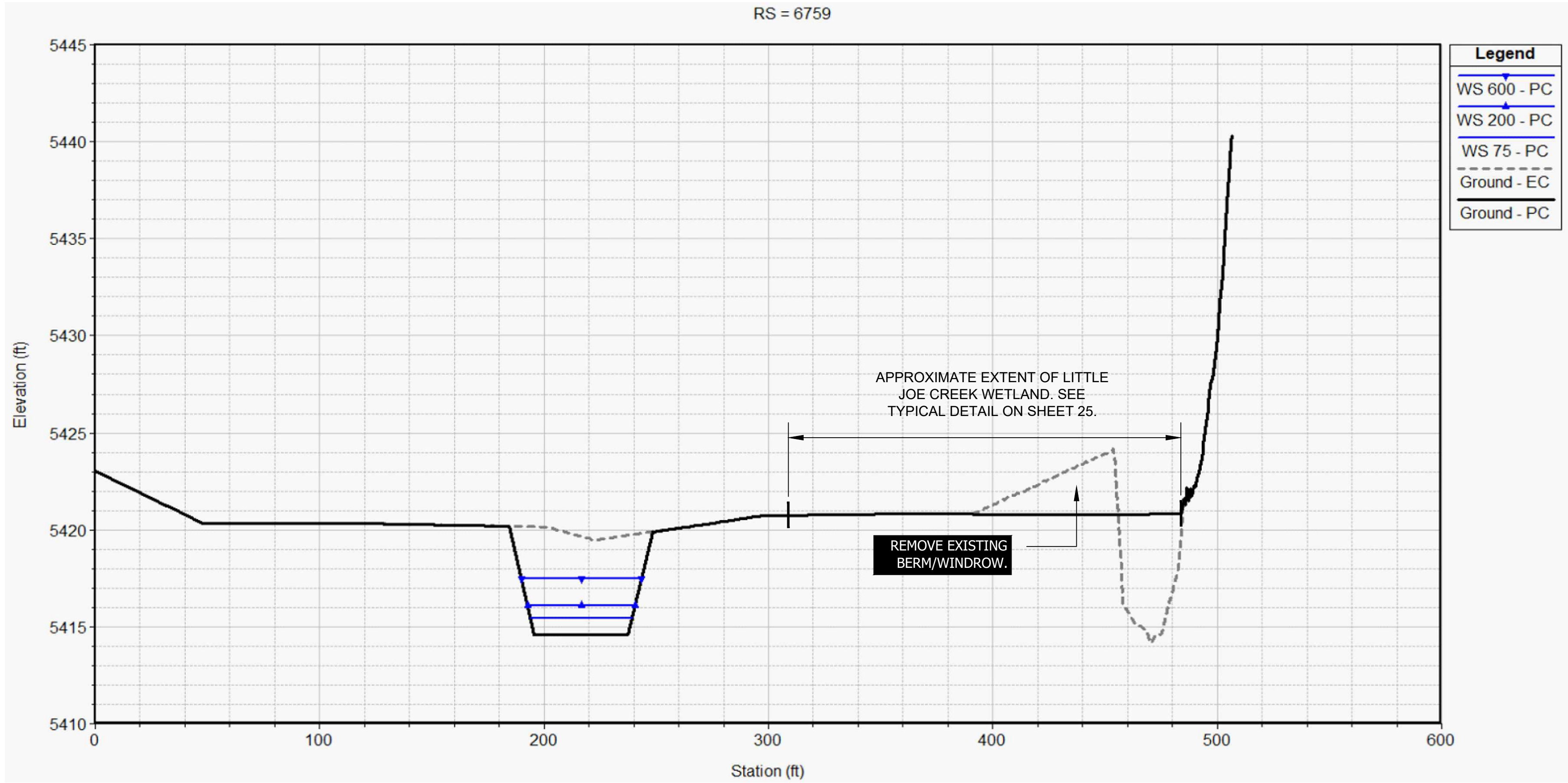
DRAWN: TS/EP/KE

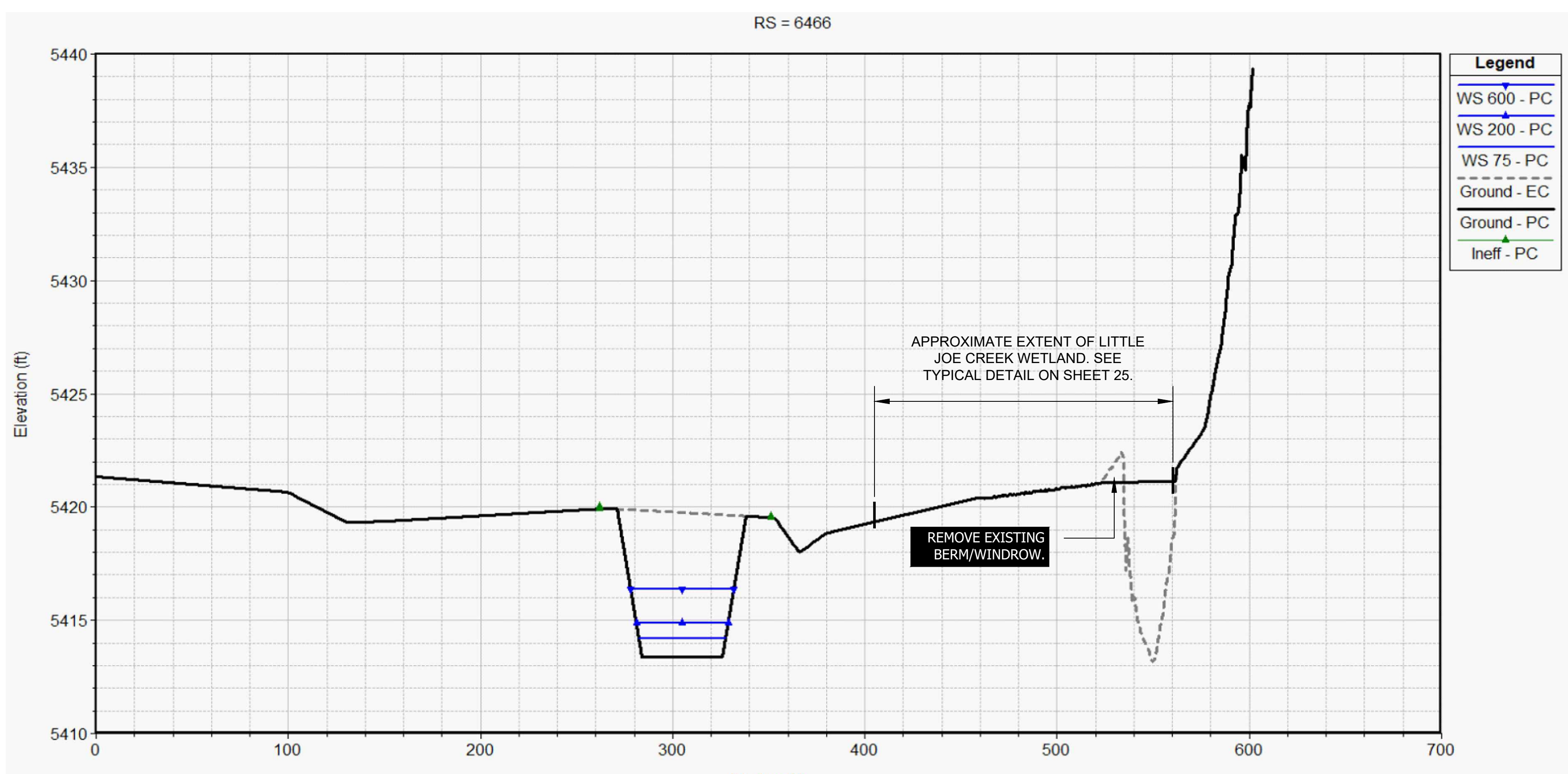
CHECKED: TS/RB

APPROVED:

CROSS SECTIONS 71+38 & 69+38

SHEET 12





75 CFS - WETLAND CREATION FLOW
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HORIZONTAL AND VERTICAL SCALES VARY BY CROSS SECTION. SEE AXES INDIVIDUAL AXES FOR SCALE.

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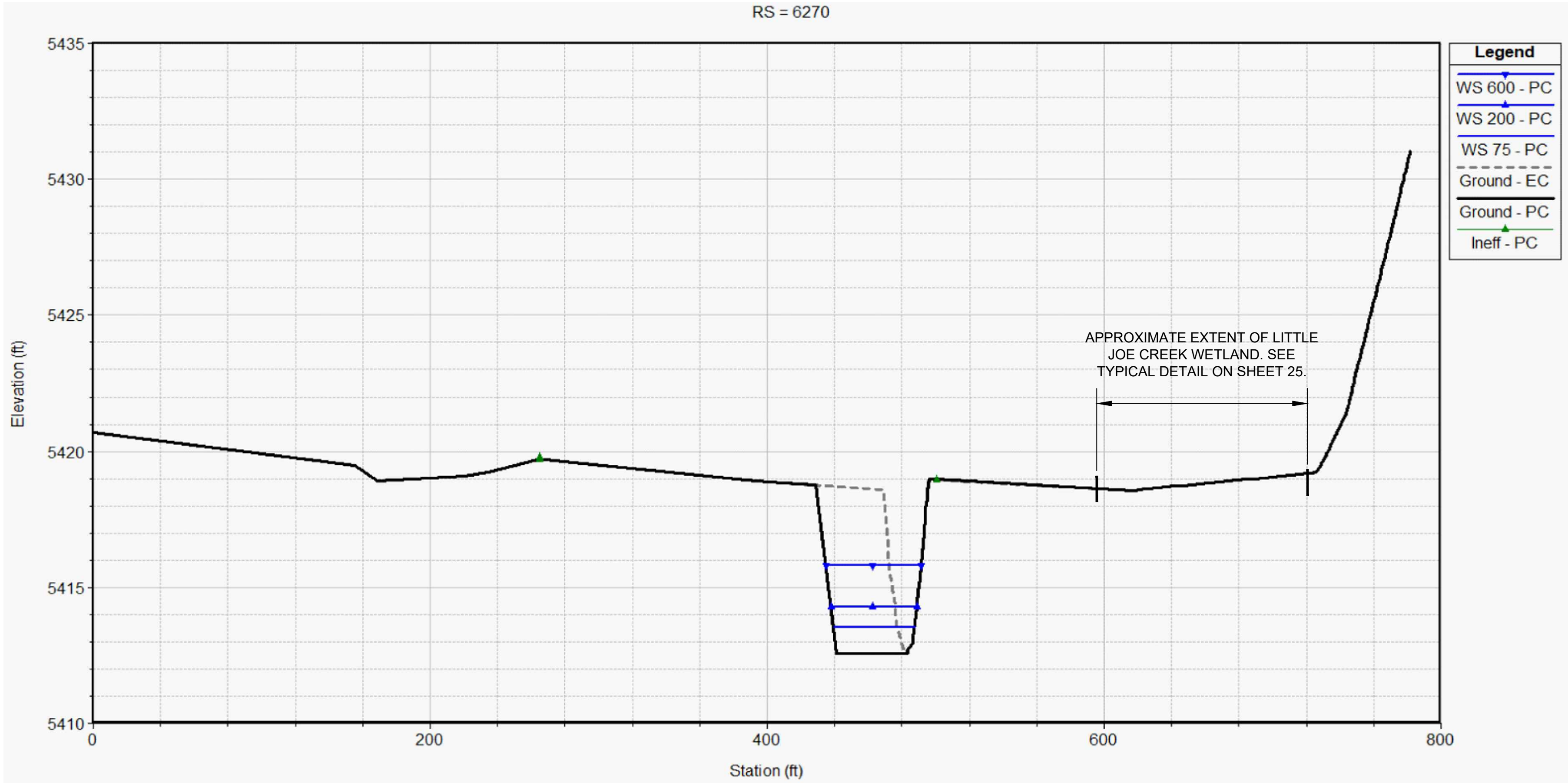
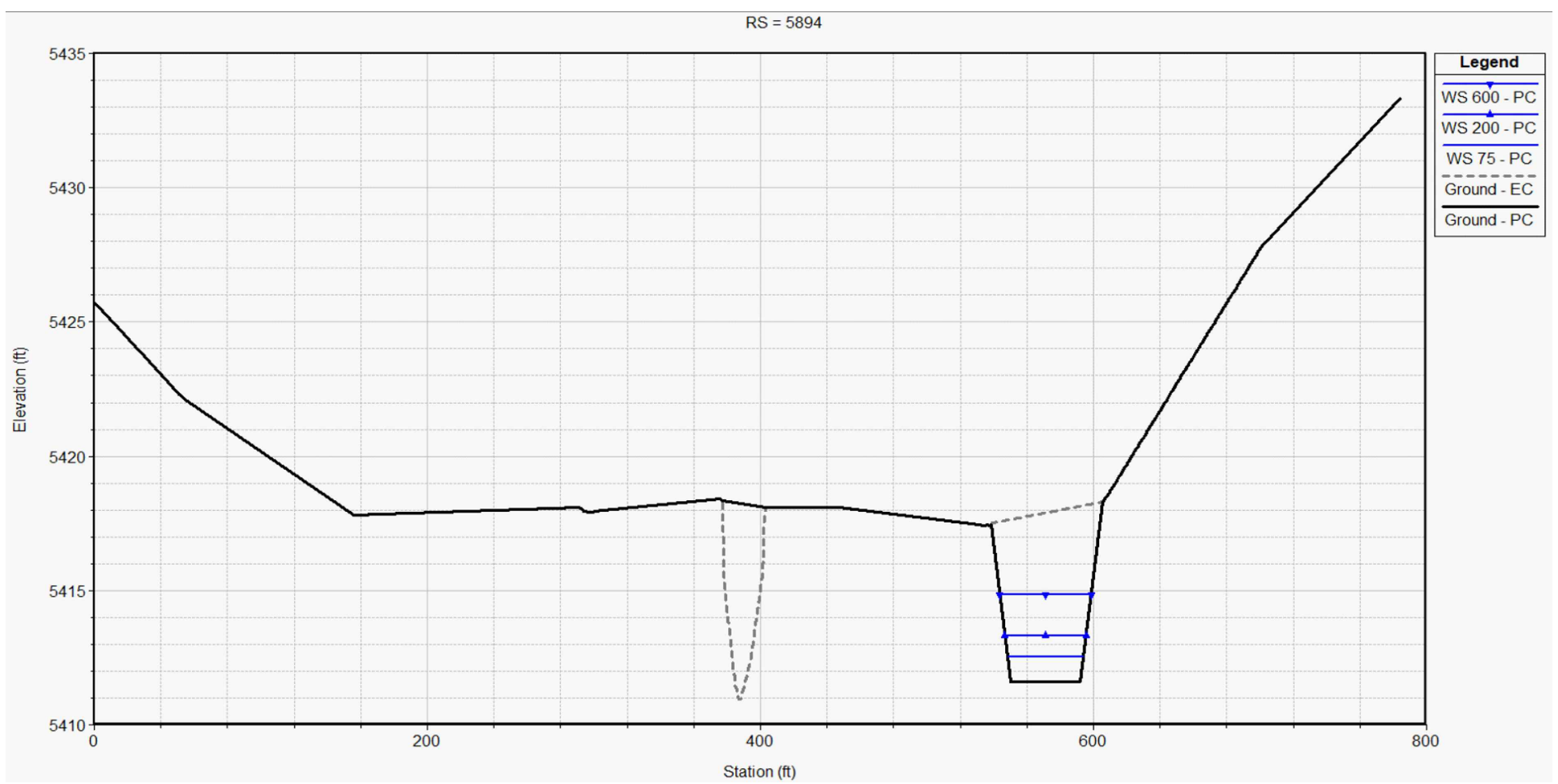
CHECKED: TS/RB
APPROVED:

CROSS SECTIONS 67+59 & 64+66

SHEET 13





75 CFS - WETLAND CREATION FLOW
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HORIZONTAL AND VERTICAL SCALES VARY BY CROSS SECTION. SEE AXES INDIVIDUAL AXES FOR SCALE.

VERMILLION CREEK AT DIAMOND PEAK RANCH WETLAND RESTORATION PROJECT
MOFFAT COUNTY, COLORADO

Stillwater Sciences

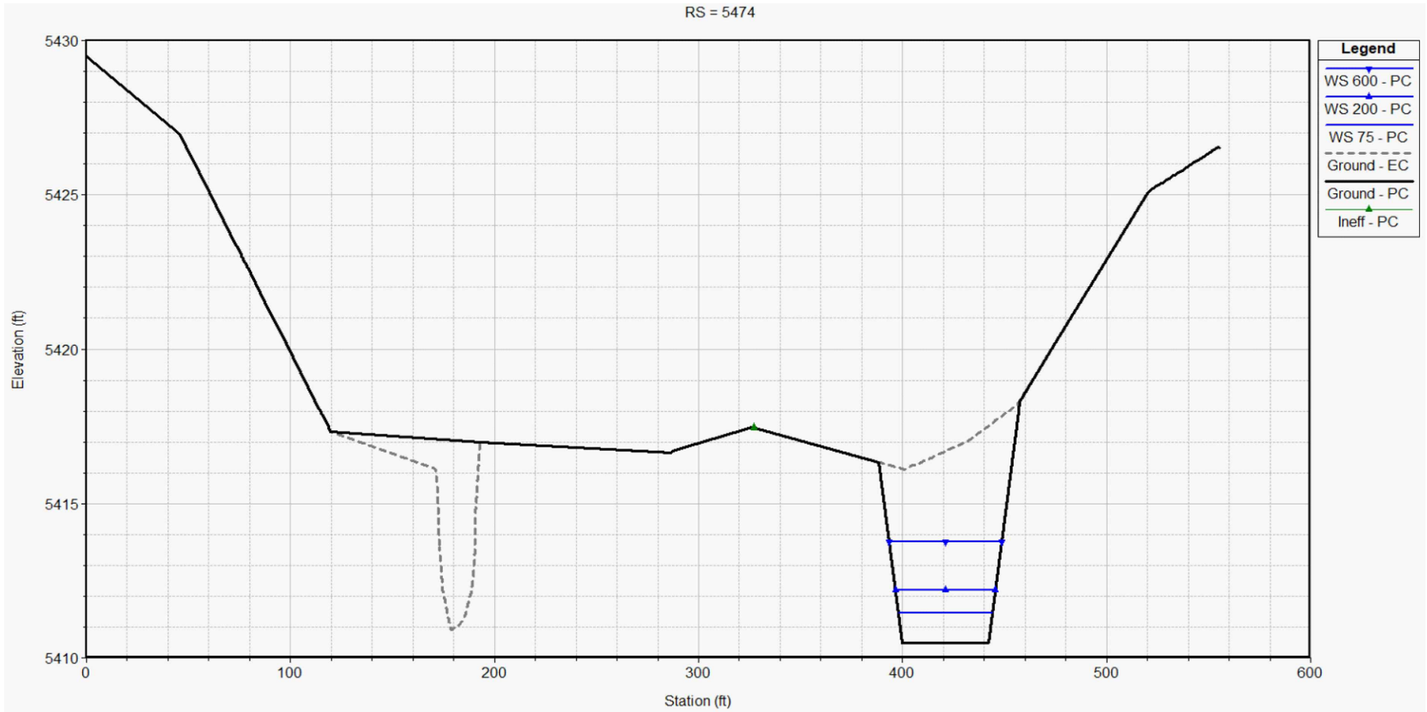
ecos ecosystem services LLC

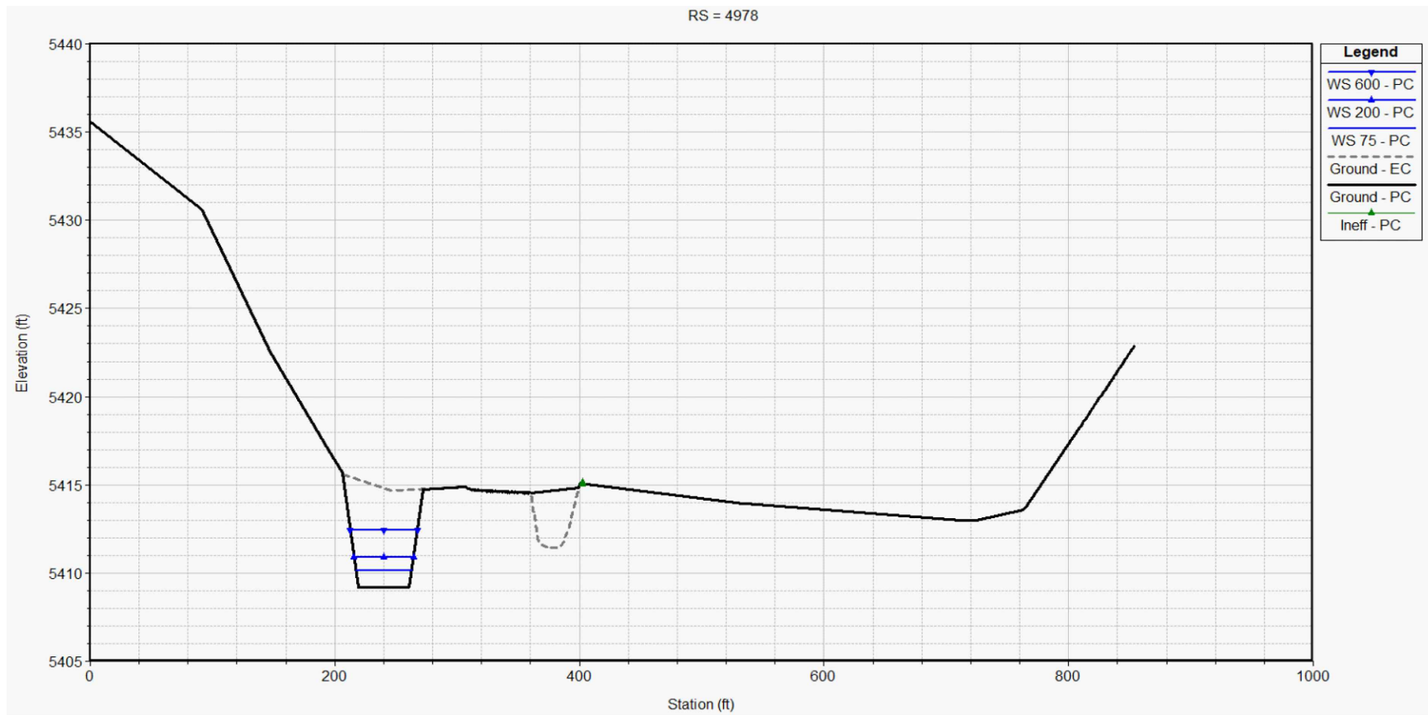
PROJECT NUMBER: 880.00
SCALE: AS NOTED
DATE: 6/10/2022

DESIGN: JB/TS/RB
DRAWN: TS/EP/KE
CHECKED: TS/RB
APPROVED:

CROSS SECTIONS 62+70 & 58+94

SHEET 14





75 CFS - WETLAND CREATION FLOW
200 CFS - REPRESENTATIVE INTERMEDIATE FLOW
600 CFS - PEAK OBSERVED FLOW

HORIZONTAL AND VERTICAL SCALES VARY BY CROSS SECTION. SEE AXES INDIVIDUAL AXES FOR SCALE.

VERMILLION CREEK AT DIAMOND PEAK RANCH WETLAND RESTORATION PROJECT

MOFFAT COUNTY, COLORADO

Stillwater Sciences

ecosystem services LLC

PROJECT NUMBER: 880.00
SCALE: AS NOTED
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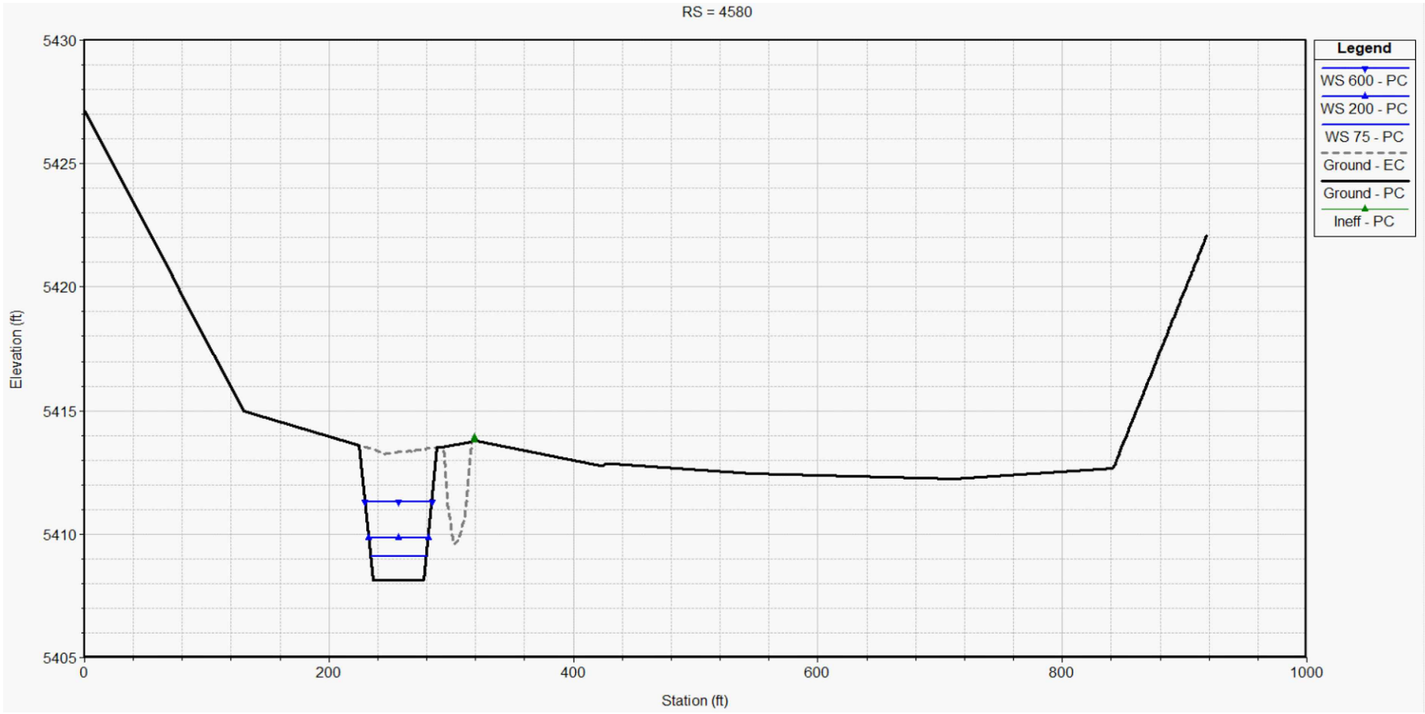
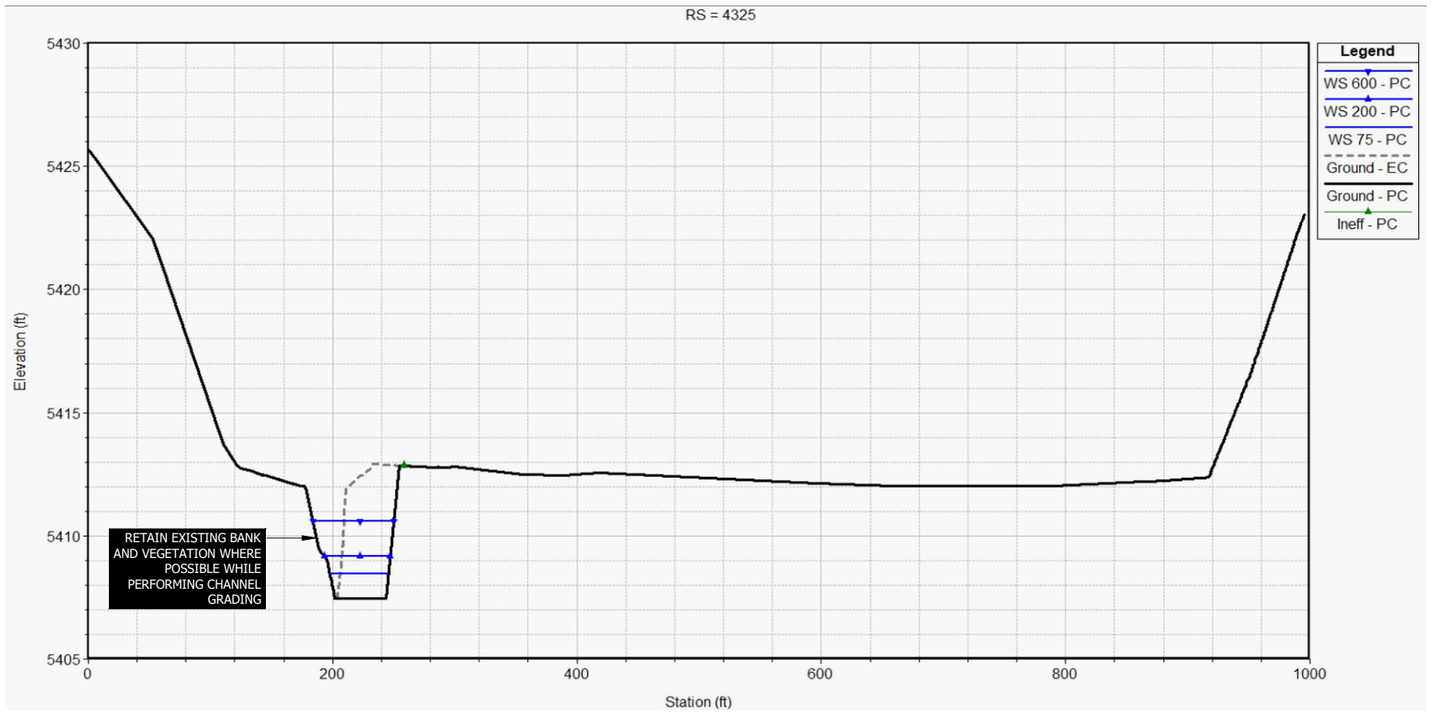
DESIGN: JB/TS/RB
DRAWN: TS/EP/KE
CHECKED: TS/RB
APPROVED:

CROSS SECTIONS 54+74 & 49+78

SHEET 15





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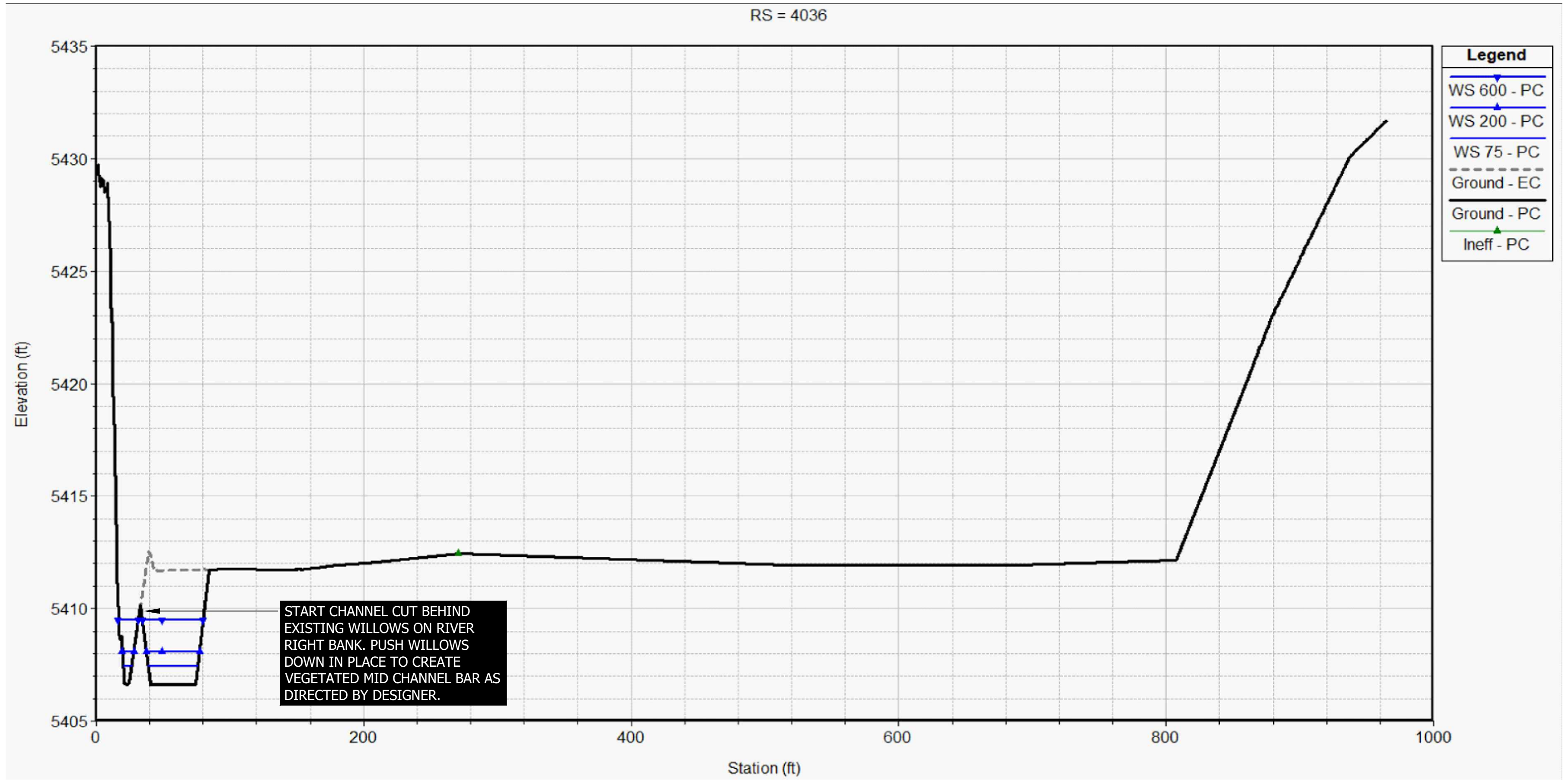
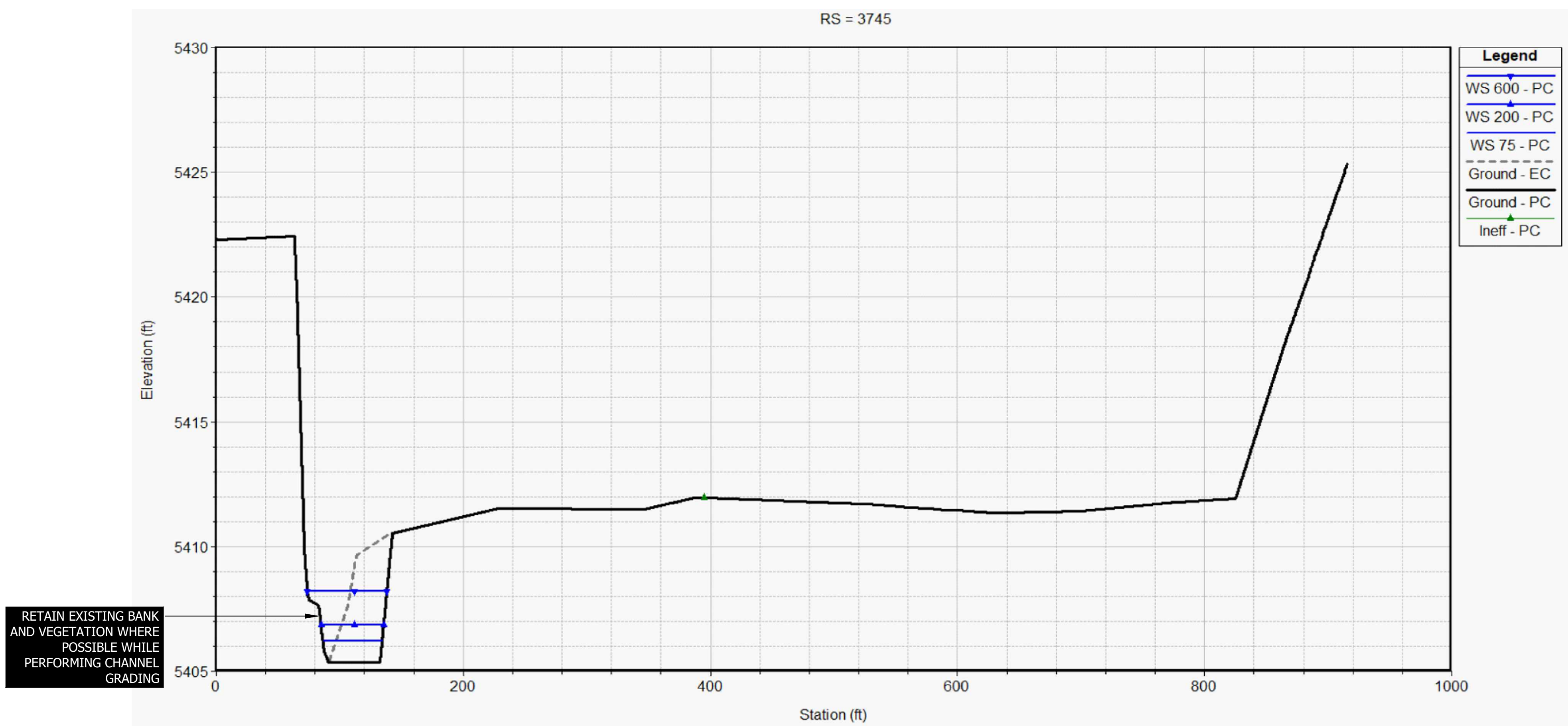
DESIGN: JB/TS/RB
DRAWN: TS/EP/KE
CHECKED: TS/RB
APPROVED:

CROSS SECTIONS 45+80 & 43+25

SHEET 16





75 CFS - WETLAND CREATION FLOW
200 CFS - REPRESENTATIVE INTERMEDIATE FLOW
600 CFS - PEAK OBSERVED FLOW

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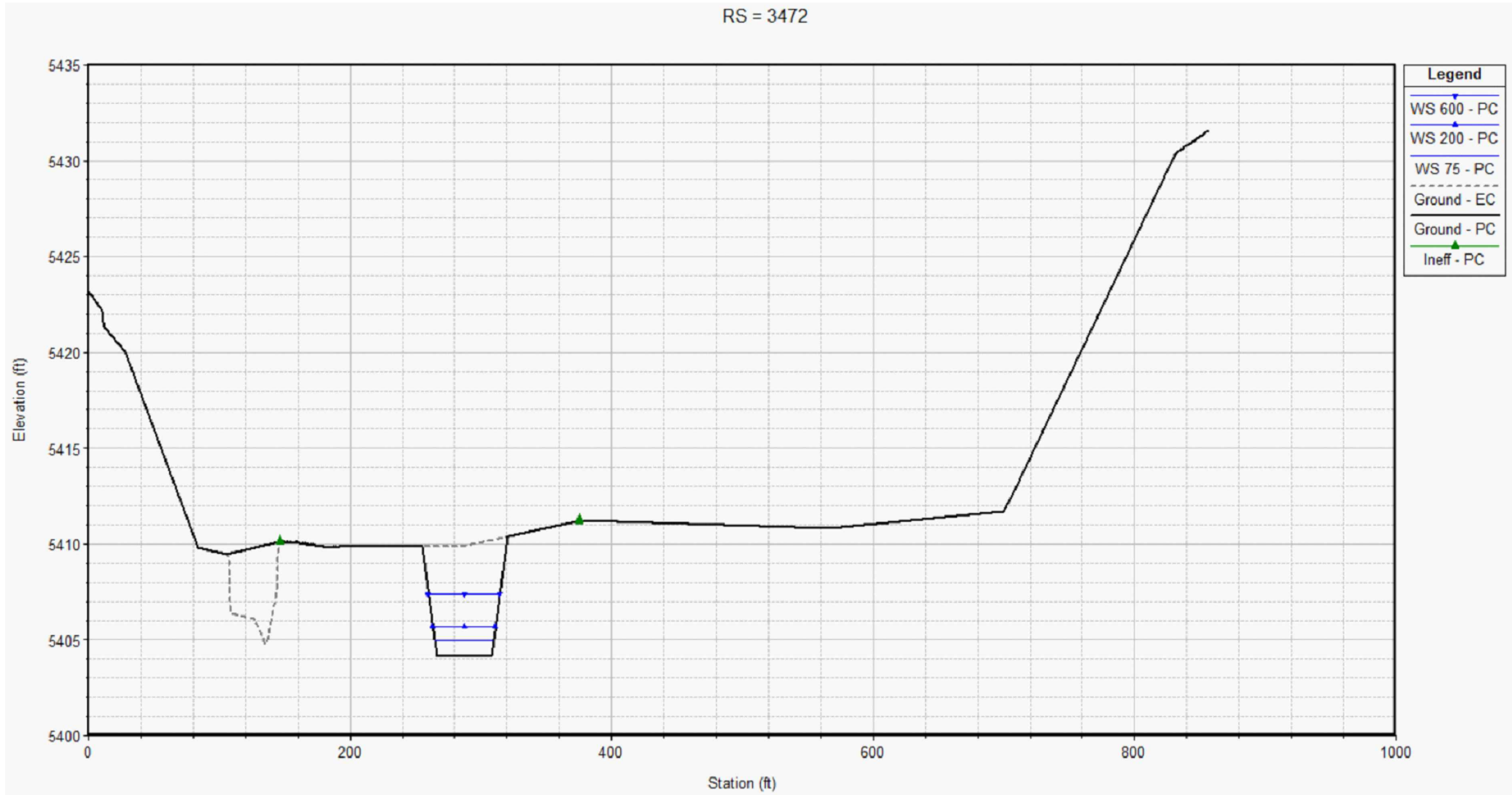
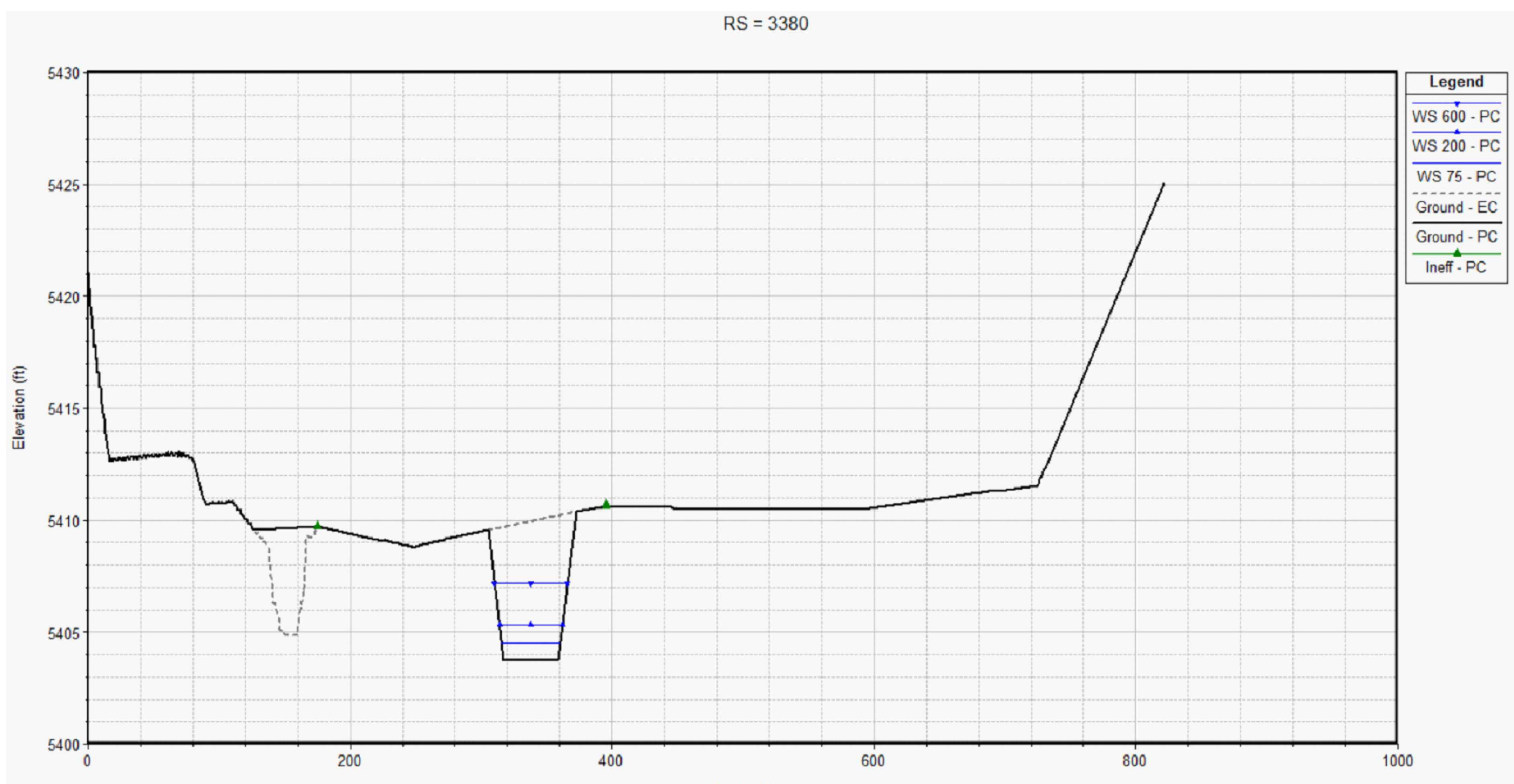
DESIGN: JB/TS/RB
DRAWN: TS/EP/KE
CHECKED: TS/RB
APPROVED:

CROSS SECTIONS 40+36 & 37+45

SHEET 17





75 CFS - WETLAND CREATION FLOW
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600 CFS - PEAK OBSERVED FLOW

HORIZONTAL AND VERTICAL SCALES VARY BY CROSS SECTION. SEE AXES INDIVIDUAL AXES FOR SCALE.

VERMILLION CREEK AT DIAMOND PEAK RANCH WETLAND RESTORATION PROJECT

MOFFAT COUNTY, COLORADO

Stillwater Sciences

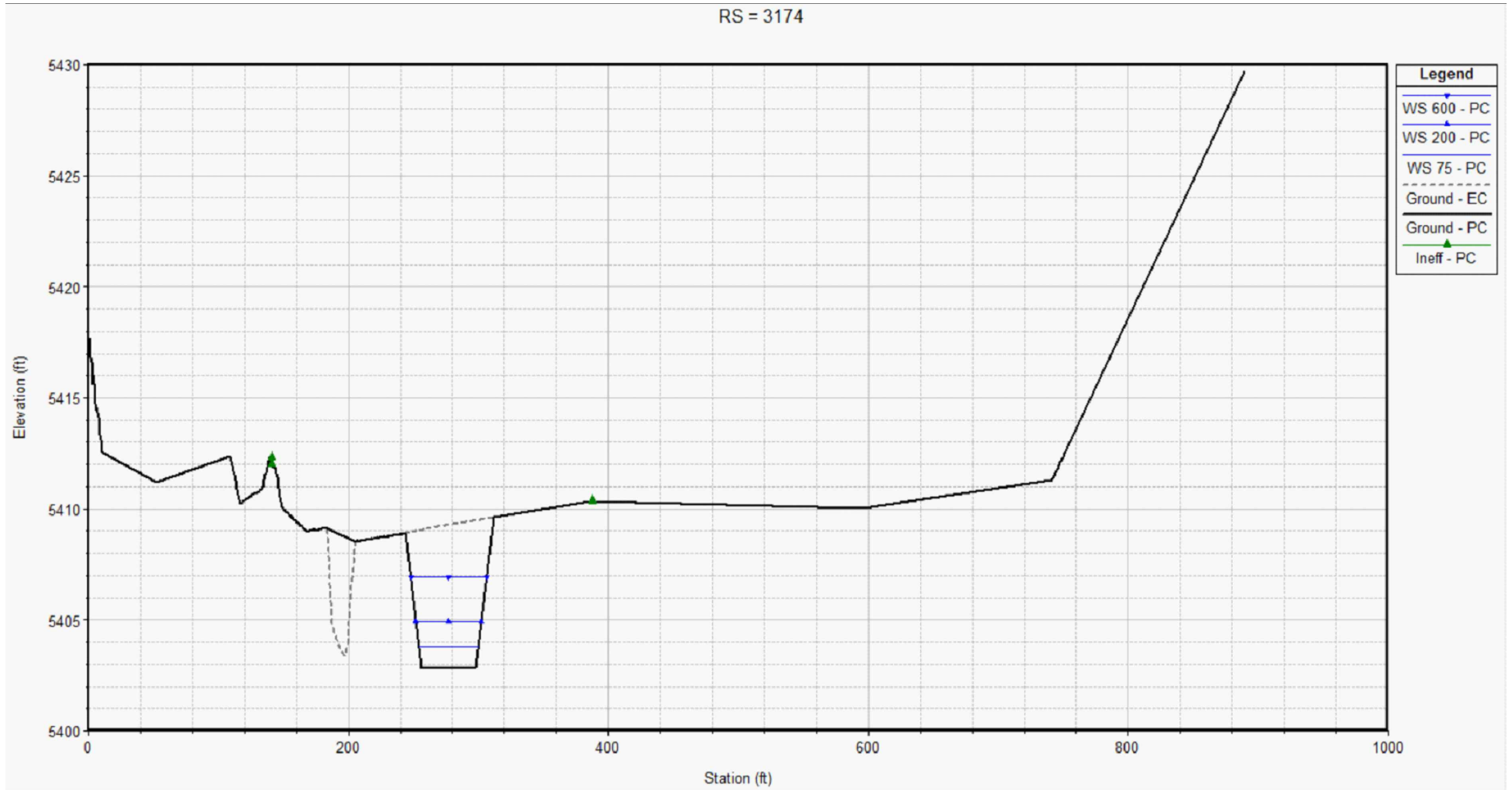
ecos ecosystem services LLC

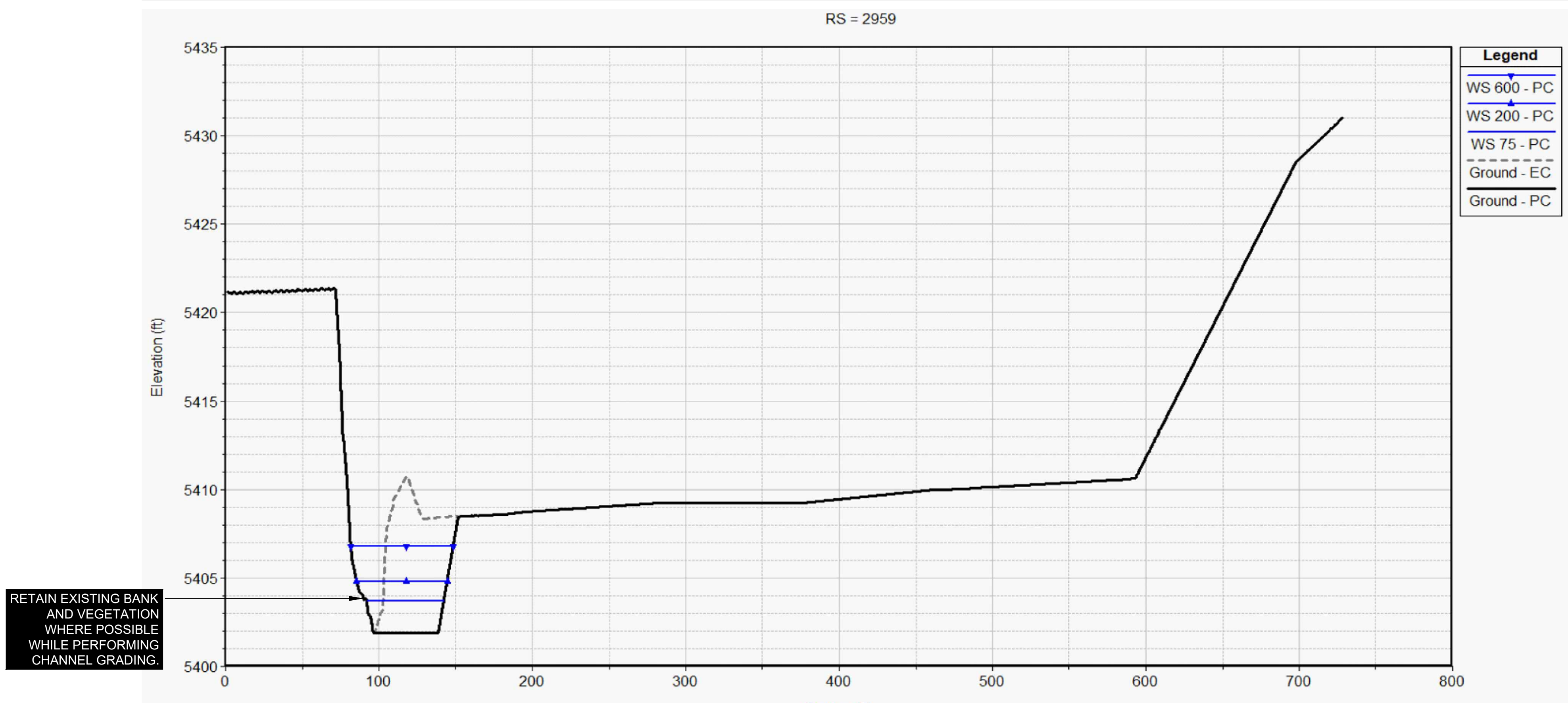
PROJECT NUMBER: 880.00
SCALE: AS NOTED
DATE: 6/10/2022

DESIGN: JB/TS/RB
DRAWN: TS/EP/KE
CHECKED: TS/RB
APPROVED:

CROSS SECTIONS 34+72 & 33+80

SHEET 18





75 CFS - WETLAND CREATION FLOW
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HORIZONTAL AND VERTICAL SCALES VARY BY CROSS SECTION. SEE AXES INDIVIDUAL AXES FOR SCALE.

VERMILLION CREEK AT DIAMOND PEAK RANCH WETLAND RESTORATION PROJECT

MOFFAT COUNTY, COLORADO

Stillwater Sciences

ecos ecosystem services LLC

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DESIGN: JB/TS/RB
DRAWN: TS/EP/KE
CHECKED: TS/RB
APPROVED:

CROSS SECTIONS 31+74 & 29+59

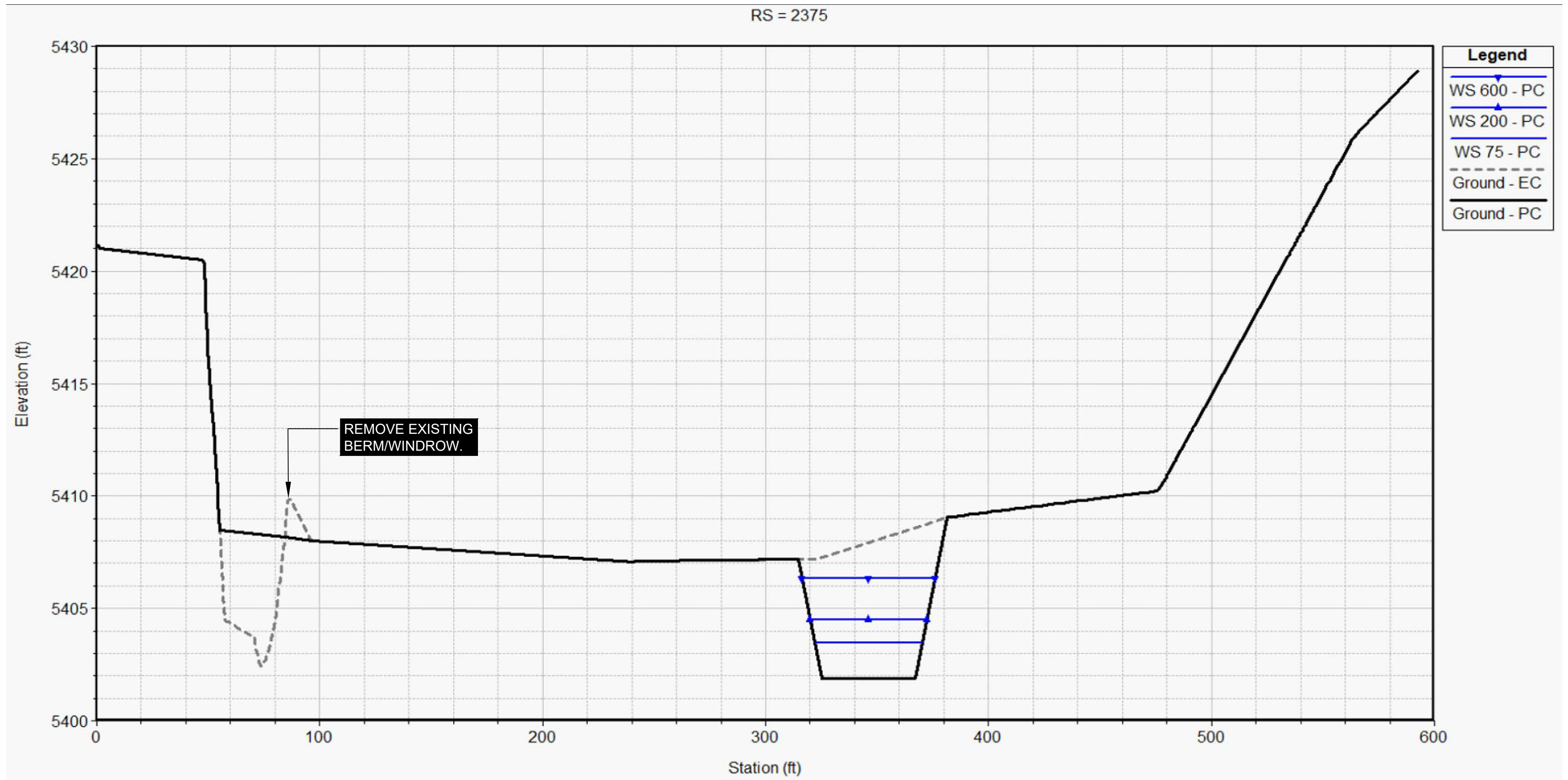
SHEET 19

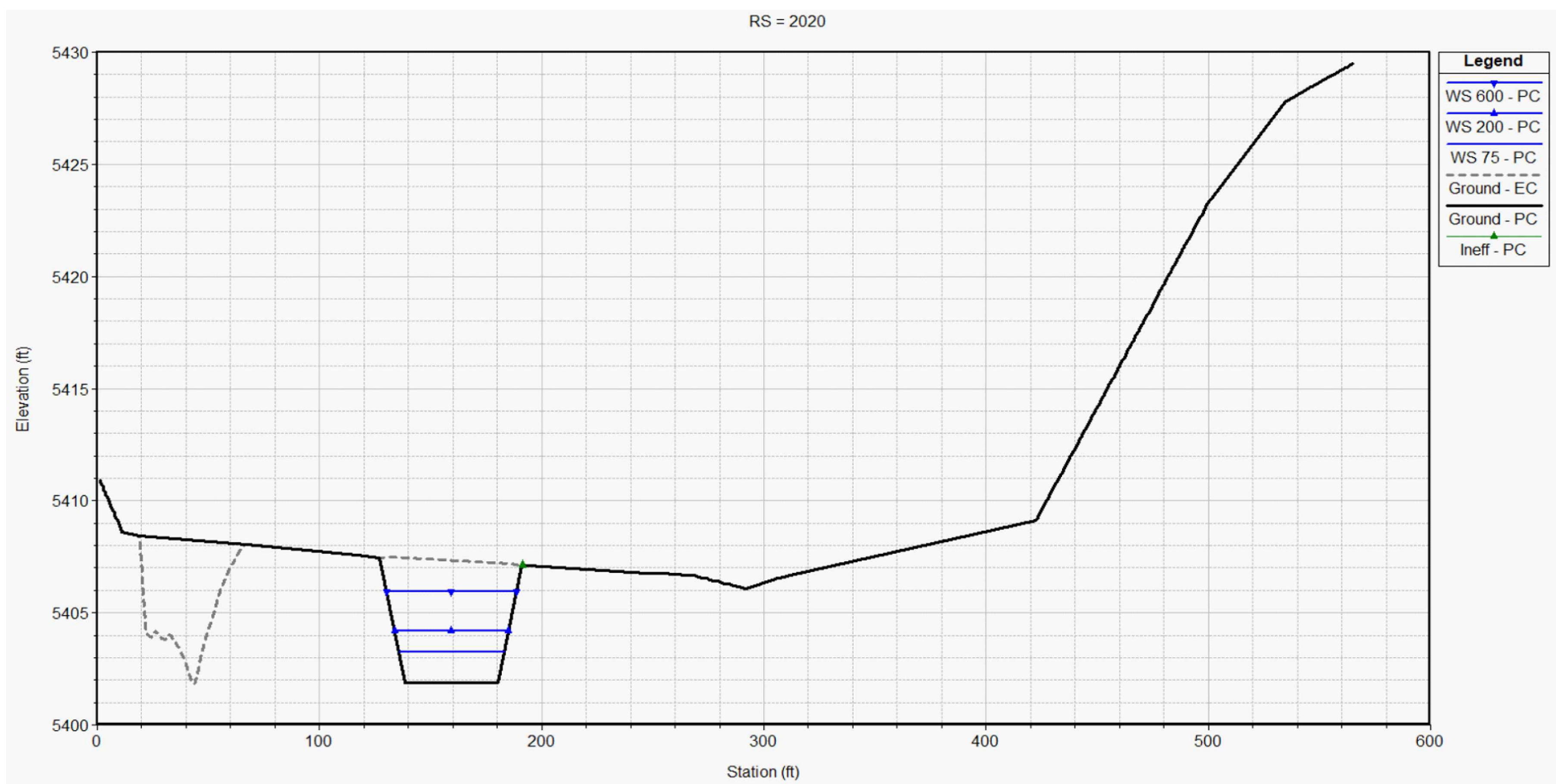
VERMILLION CREEK AT DIAMOND PEAK RANCH WETLAND RESTORATION PROJECT

MOFFAT COUNTY, COLORADO

Stillwater Sciences

ecos ecosystem services LLC





75 CFS - WETLAND CREATION FLOW
200 CFS - REPRESENTATIVE INTERMEDIATE FLOW
600 CFS - PEAK OBSERVED FLOW

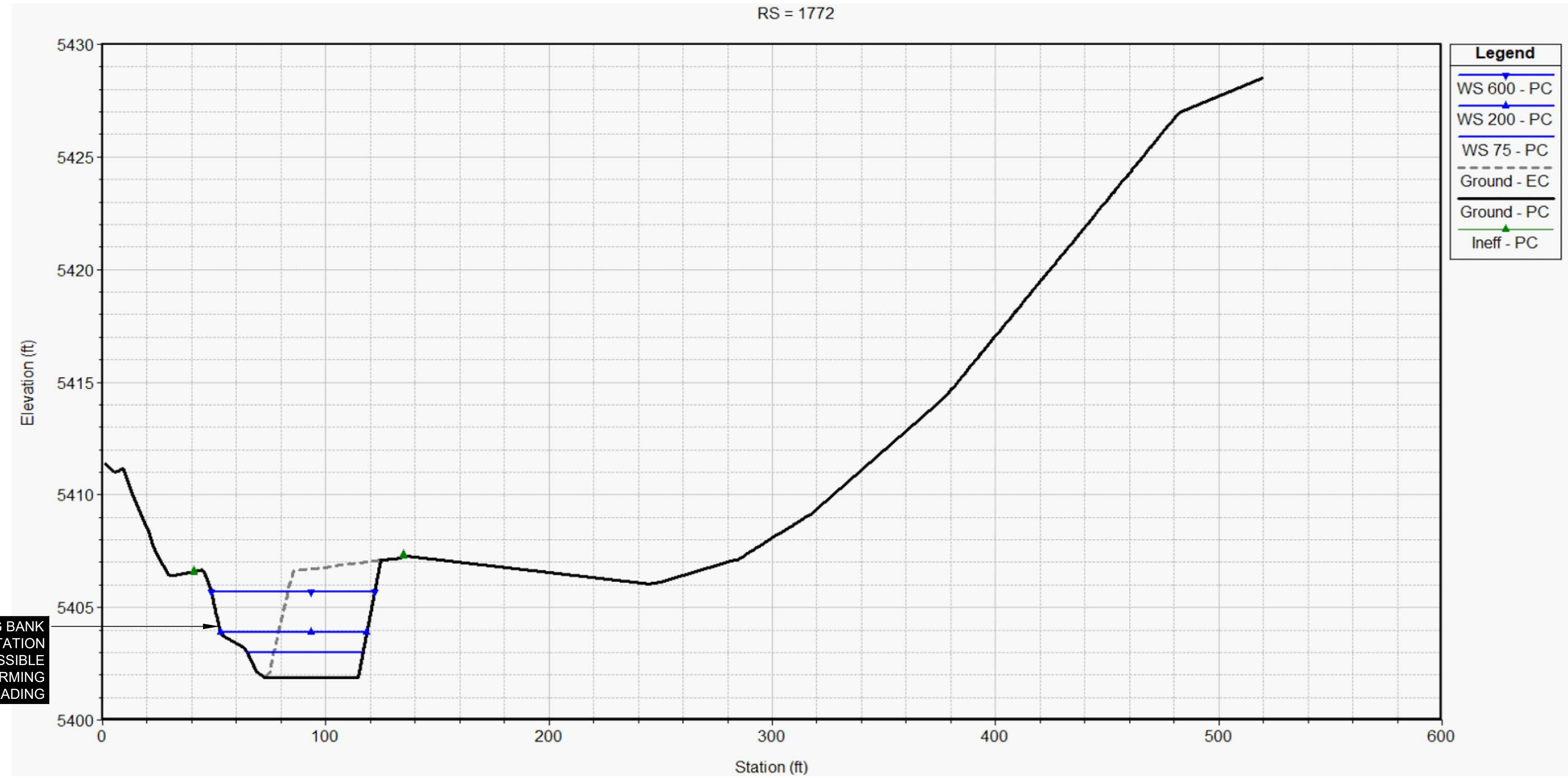
HORIZONTAL AND VERTICAL SCALES VARY BY CROSS SECTION. SEE AXES INDIVIDUAL AXES FOR SCALE.

PROJECT NUMBER: 880.00
SCALE: AS NOTED
DATE: 6/10/2022

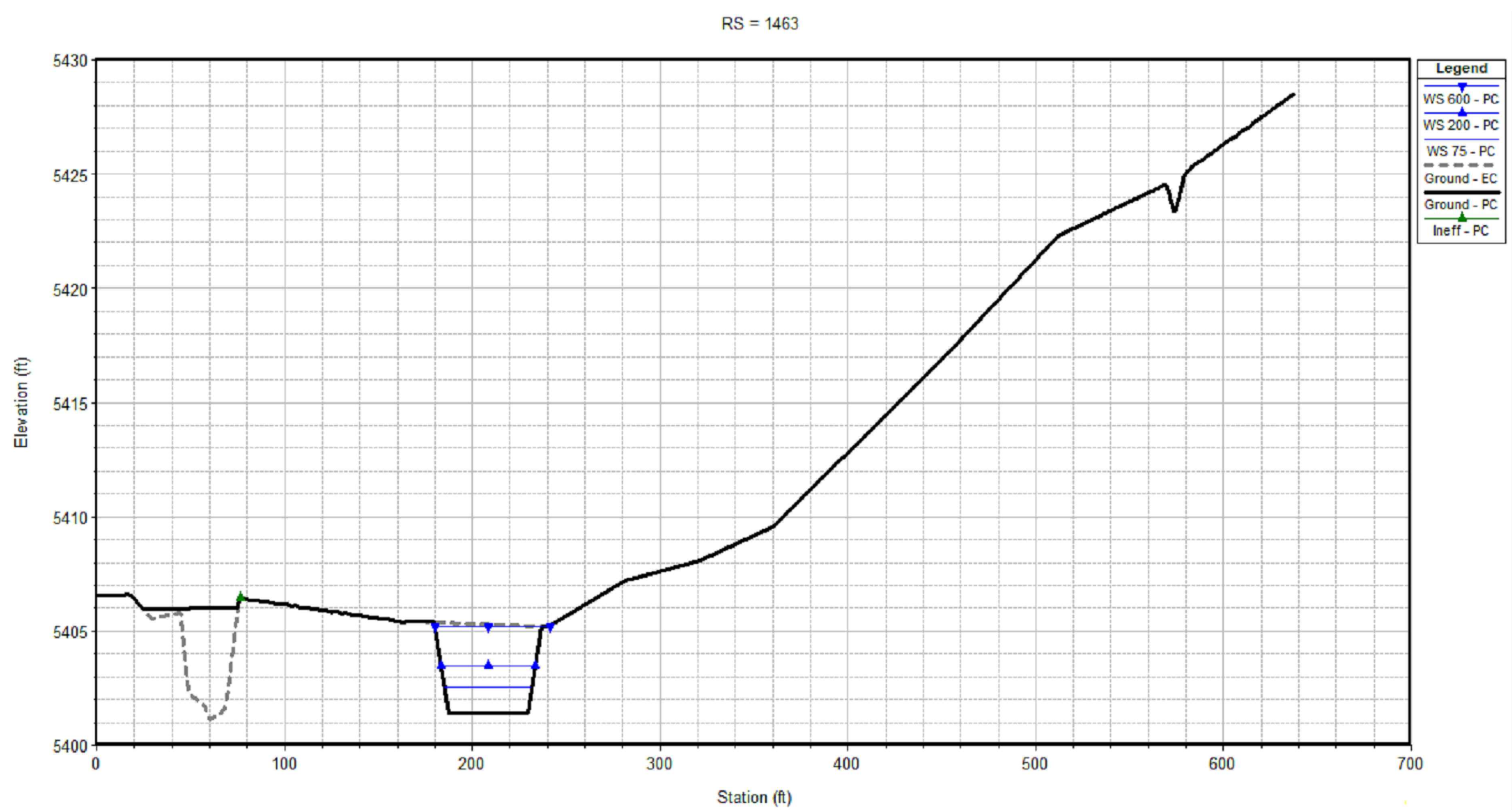
DESIGN: JB/TS/RB
DRAWN: TS/EP/KE
CHECKED: TS/RB
APPROVED:

CROSS SECTIONS 23+75 & 20+20

SHEET 20



RETAIN EXISTING BANK AND VEGETATION WHERE POSSIBLE WHILE PERFORMING CHANNEL GRADING



75 CFS - WETLAND CREATION FLOW
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VERMILLION CREEK AT DIAMOND PEAK RANCH WETLAND RESTORATION PROJECT

MOFFAT COUNTY, COLORADO

Stillwater Sciences

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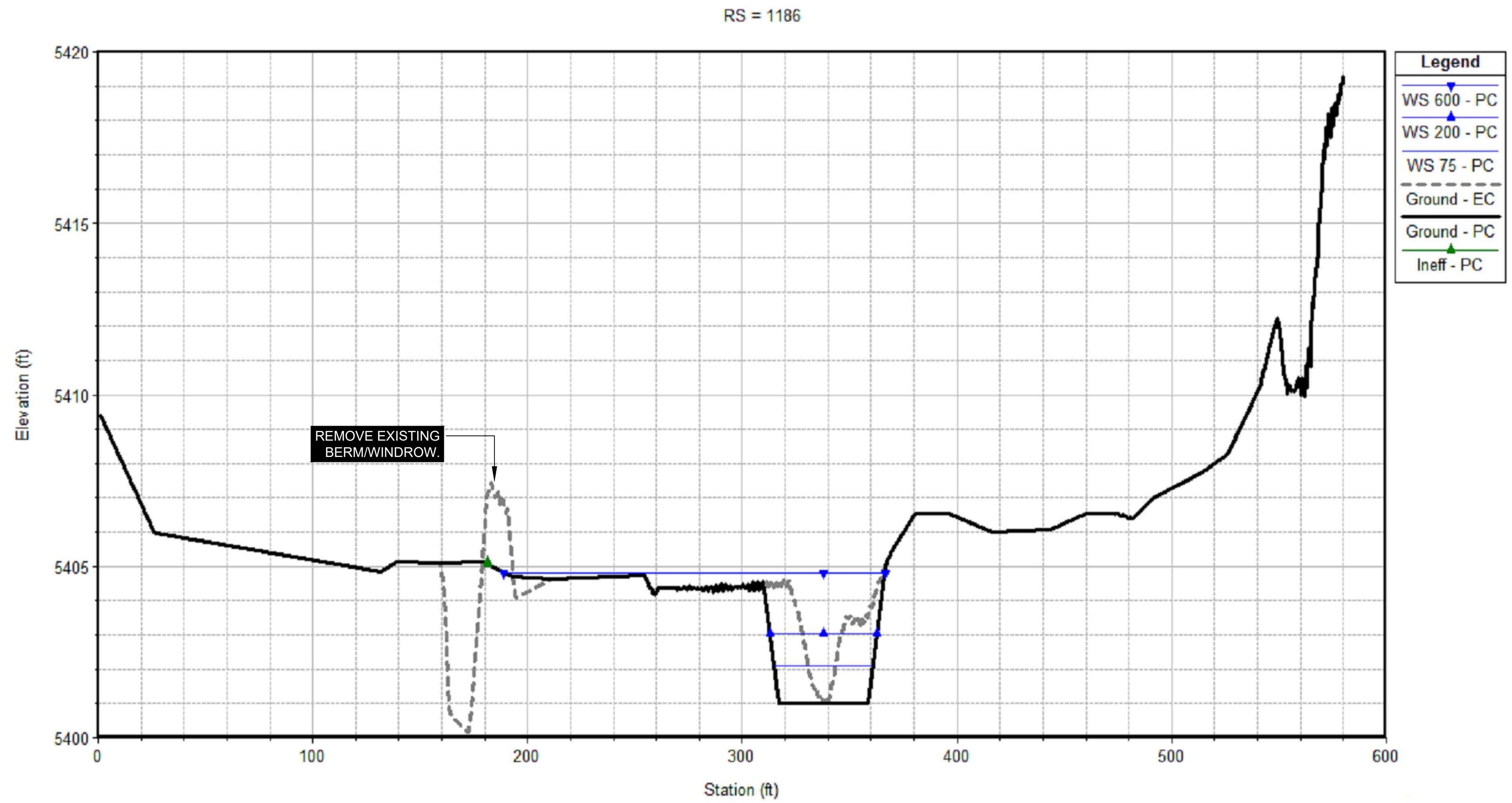
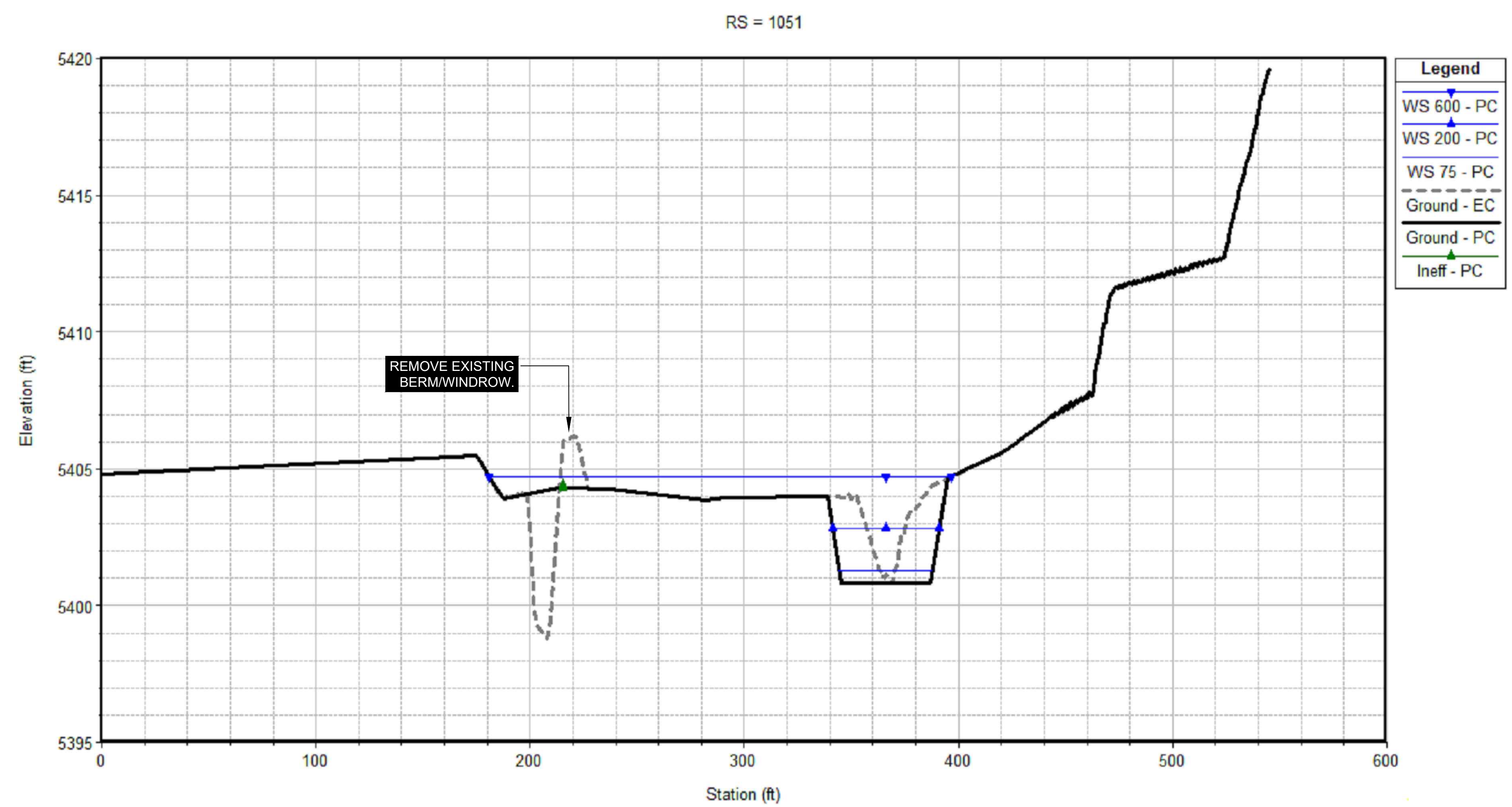
DATE: 6/10/2022

DESIGN: JB/TS/RB
DRAWN: TS/EP/KE
CHECKED: TS/RB
APPROVED:

CROSS SECTIONS 17+72 & 14+63

SHEET 21





75 CFS - WETLAND CREATION FLOW
200 CFS - REPRESENTATIVE INTERMEDIATE FLOW
600 CFS - PEAK OBSERVED FLOW

HORIZONTAL AND VERTICAL SCALES VARY BY CROSS SECTION. SEE AXES INDIVIDUAL AXES FOR SCALE.

VERMILLION CREEK AT DIAMOND PEAK RANCH WETLAND RESTORATION PROJECT

MOFFAT COUNTY, COLORADO

Stillwater Sciences

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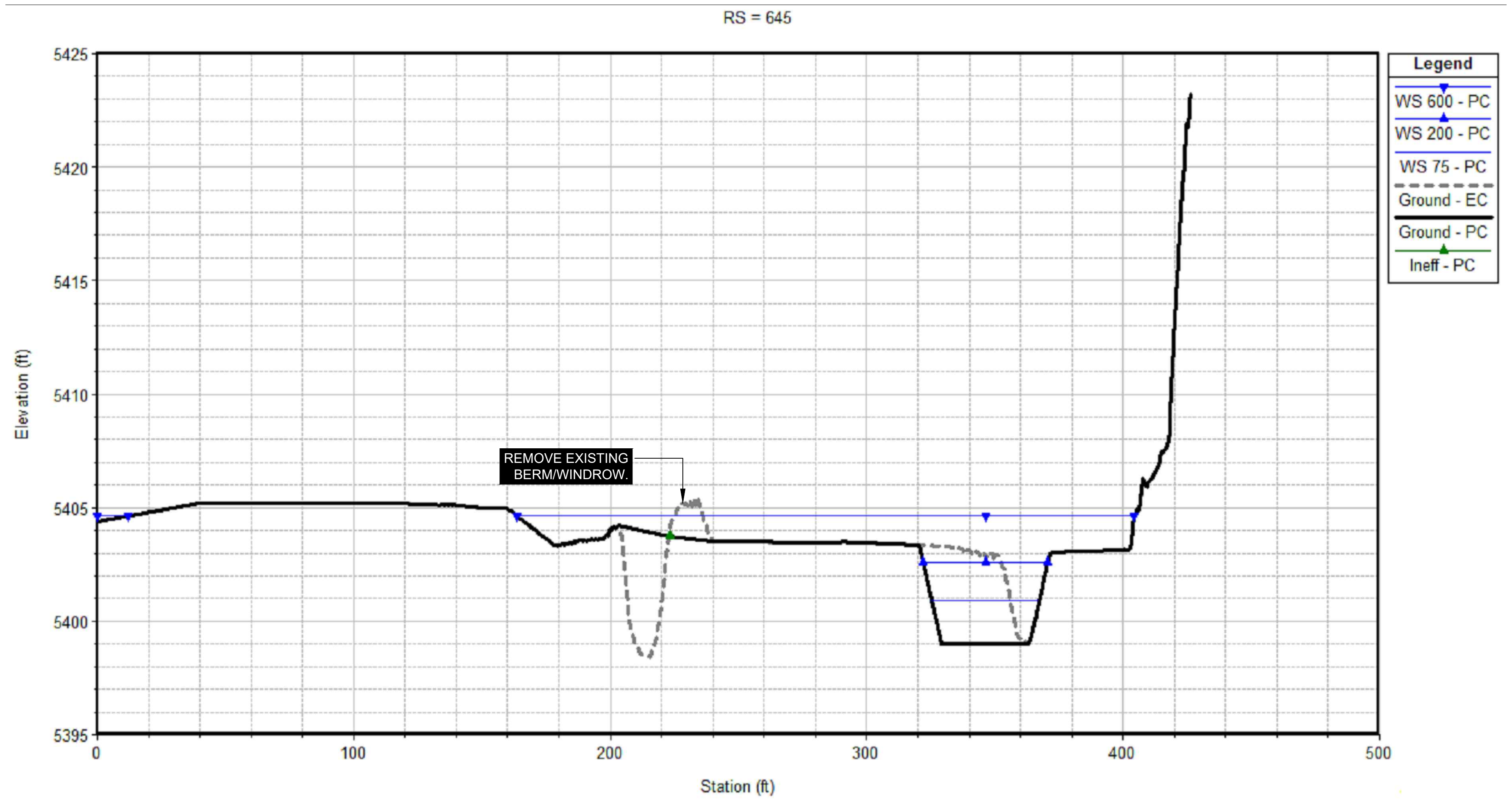
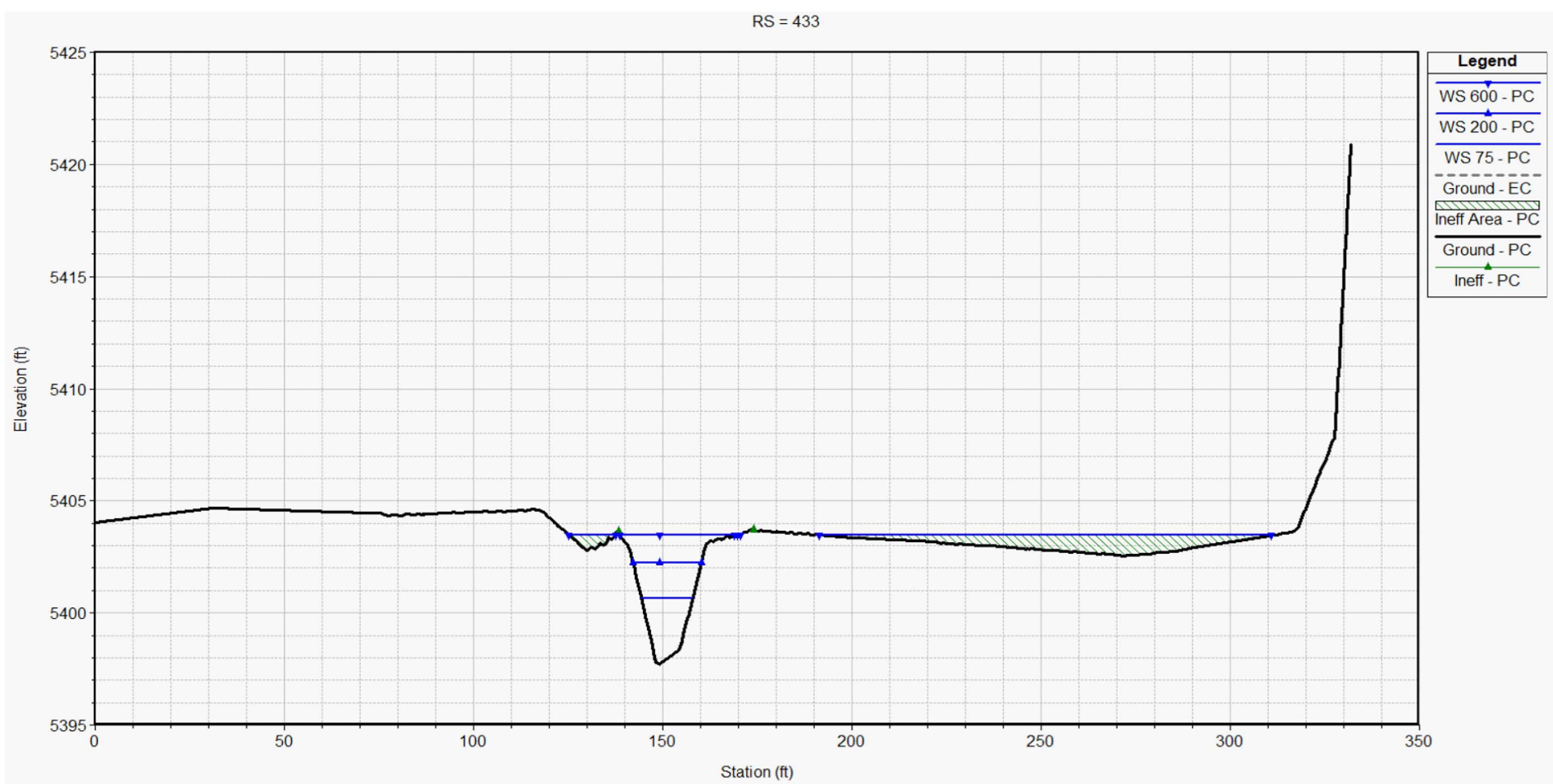
DATE: 6/10/2022

DESIGN: JB/TS/RB
DRAWN: TS/EP/KE
CHECKED: TS/RB
APPROVED:

CROSS SECTIONS 11+86 & 10+51

SHEET 22





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HORIZONTAL AND VERTICAL SCALES VARY BY CROSS SECTION. SEE AXES INDIVIDUAL AXES FOR SCALE.

VERMILLION CREEK AT DIAMOND PEAK RANCH WETLAND RESTORATION PROJECT

MOFFAT COUNTY, COLORADO

Stillwater Sciences

ecos ecosystem services LLC

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SCALE: AS NOTED
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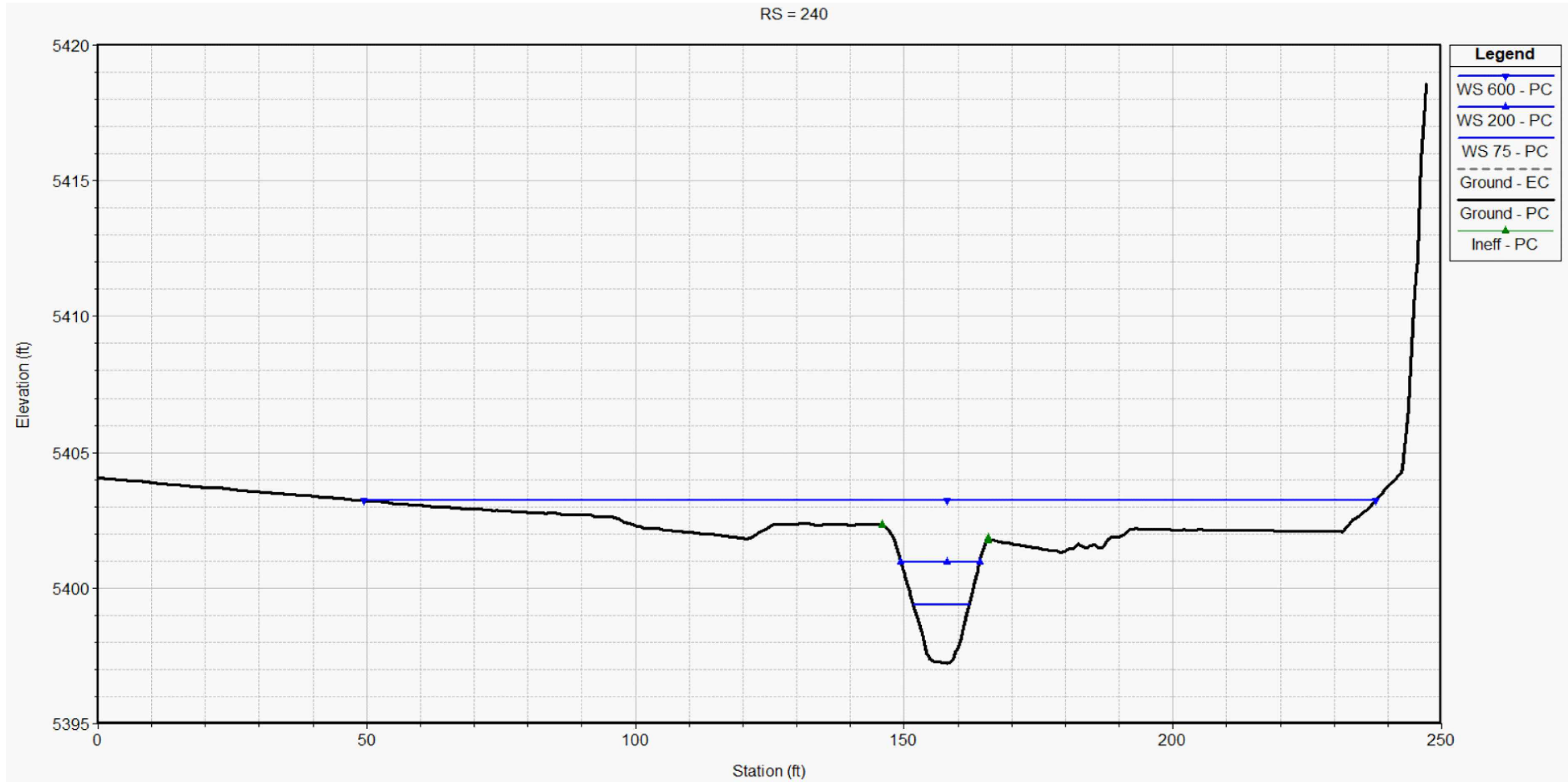
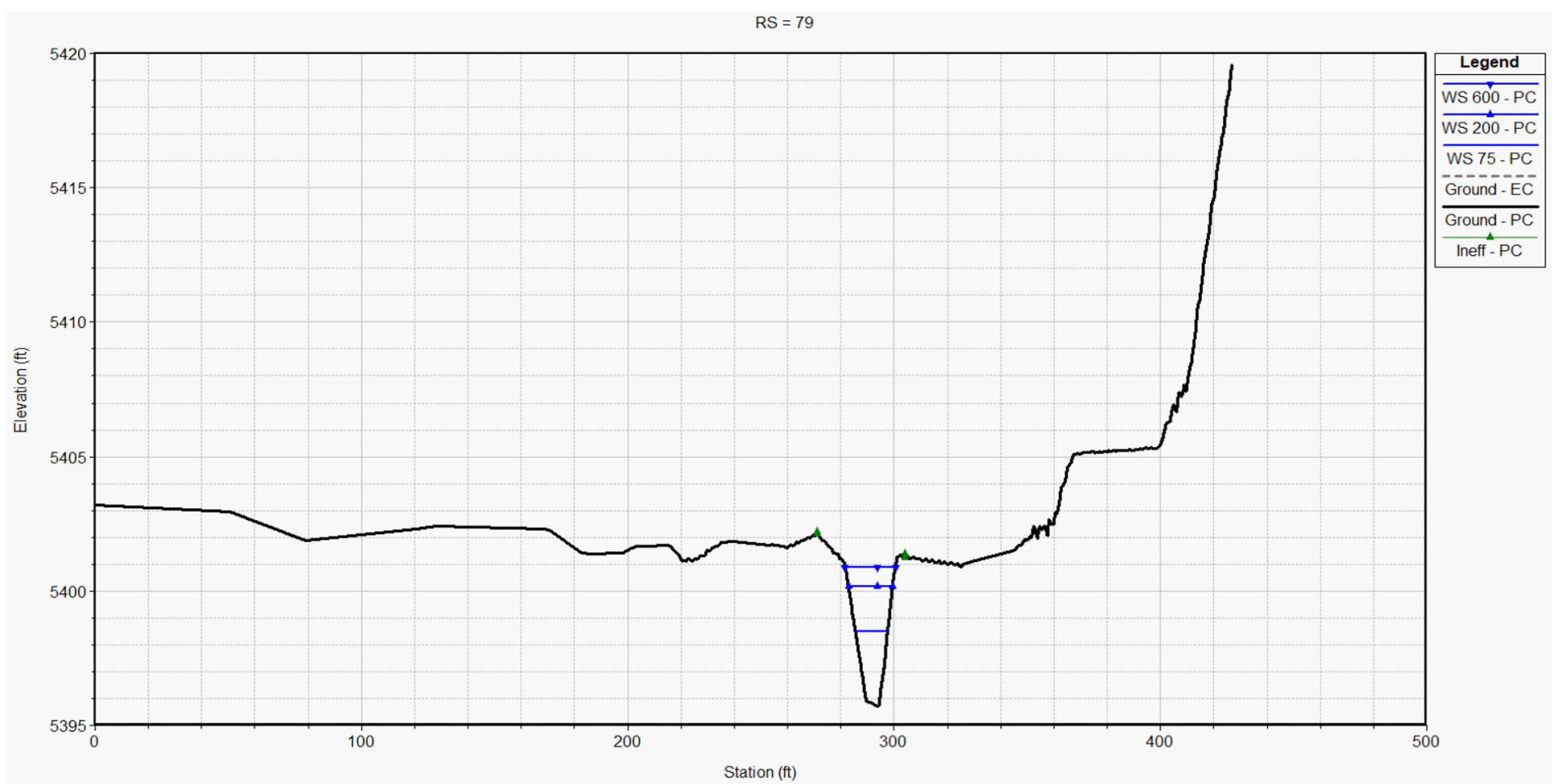
DESIGN: JB/TS/RB
DRAWN: TS/EP/KE
CHECKED: TS/RB
APPROVED:

CROSS SECTIONS 6+45 & 4+33

SHEET 23





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HORIZONTAL AND VERTICAL SCALES VARY BY CROSS SECTION. SEE AXES INDIVIDUAL AXES FOR SCALE.

VERMILLION CREEK AT DIAMOND PEAK RANCH WETLAND RESTORATION PROJECT
MOFFAT COUNTY, COLORADO

Stillwater Sciences

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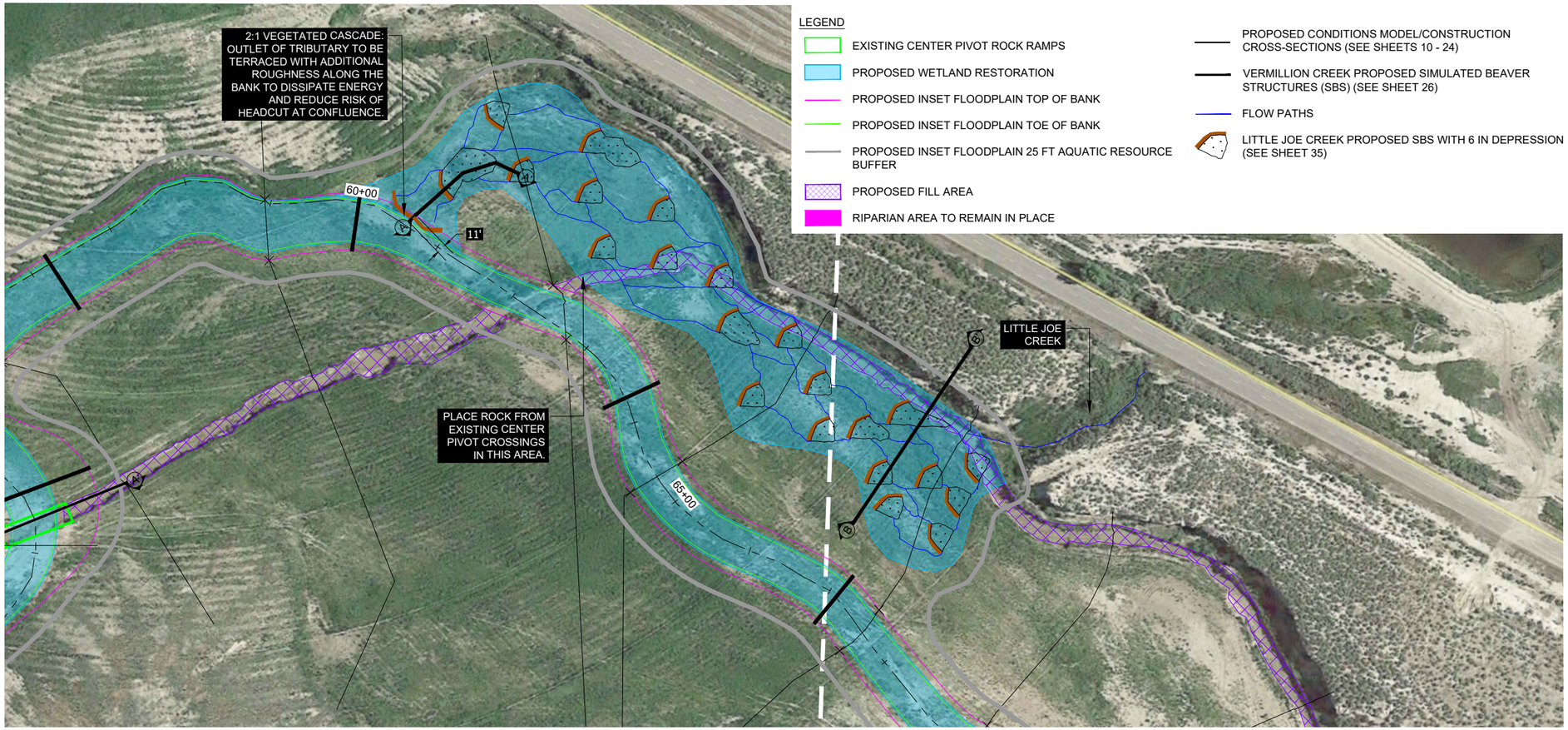
PROJECT NUMBER: 880.00
SCALE: AS NOTED
DATE: 6/10/2022

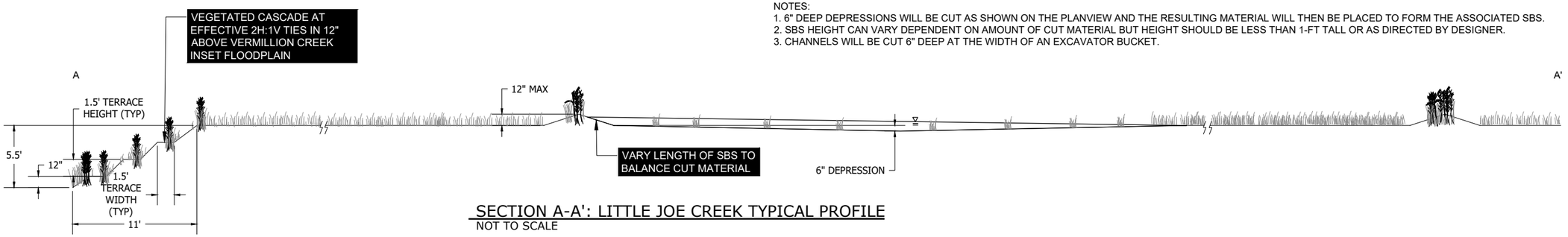
DESIGN: JB/TS/RB
DRAWN: TS/EP/KE
CHECKED: TS/RB
APPROVED:

CROSS SECTIONS 2+40 & 00+79

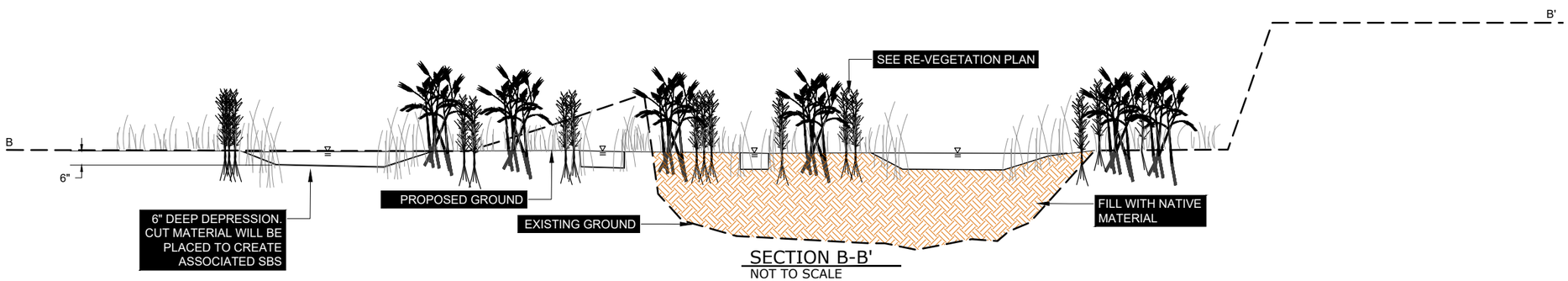
SHEET 24



NOTES:
1. 6" DEEP DEPRESSIONS WILL BE CUT AS SHOWN ON THE PLANVIEW AND THE RESULTING MATERIAL WILL THEN BE PLACED TO FORM THE ASSOCIATED SBS.
2. SBS HEIGHT CAN VARY DEPENDENT ON AMOUNT OF CUT MATERIAL BUT HEIGHT SHOULD BE LESS THAN 1-FT TALL OR AS DIRECTED BY DESIGNER.
3. CHANNELS WILL BE CUT 6" DEEP AT THE WIDTH OF AN EXCAVATOR BUCKET.



SECTION A-A': LITTLE JOE CREEK TYPICAL PROFILE
NOT TO SCALE



SECTION B-B'
NOT TO SCALE

VERMILLION CREEK AT DIAMOND PEAK RANCH WETLAND RESTORATION PROJECT

MOFFAT COUNTY, COLORADO

Stillwater Sciences

ecos ecosystem services LLC

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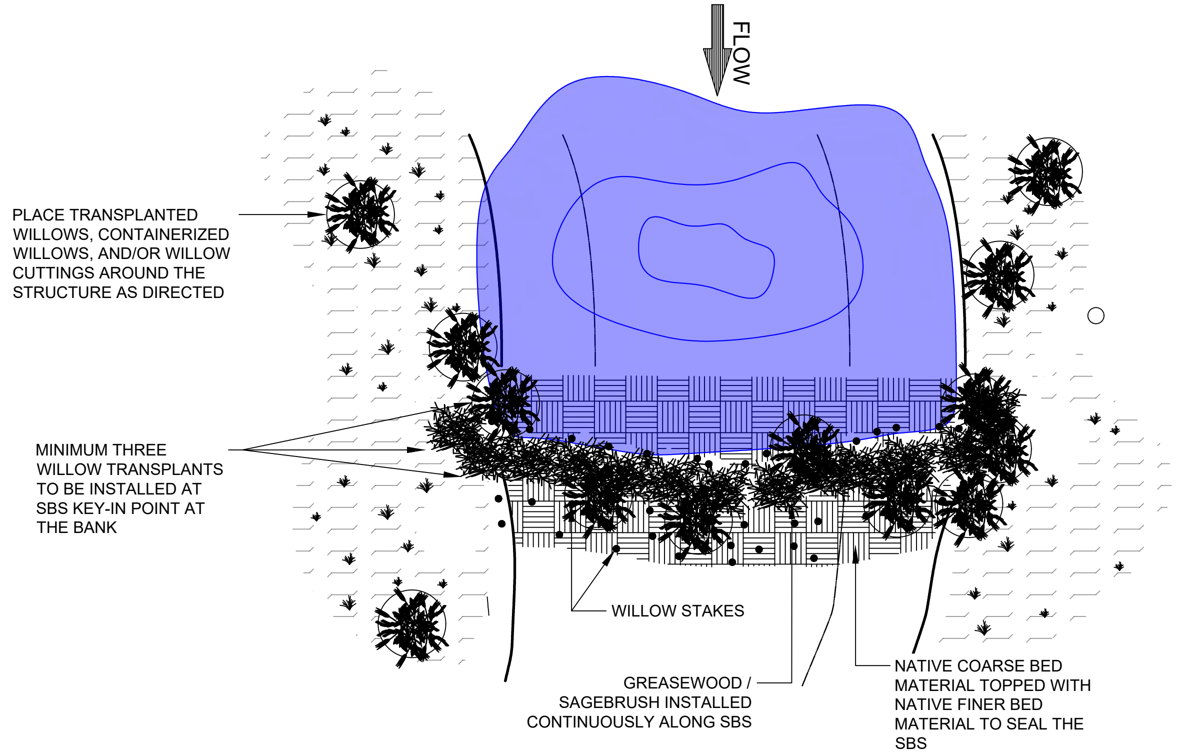
SCALE: AS NOTED
DATE: 6/10/2022

DESIGN: JB/TS/RB
DRAWN: TS/EP/KE
CHECKED: TS/RB
APPROVED:

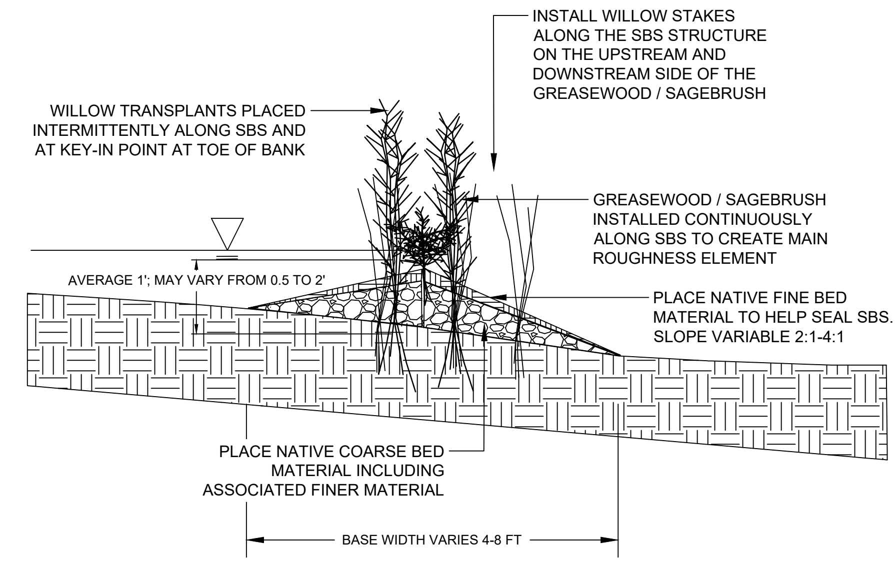
LITTLE JOE CREEK PLAN & TYPICAL CROSS SECTION

SHEET 25



SIMULATED BEAVER STRUCTURE (SBS) PLAN VIEW (TYP.)

NOT TO SCALE



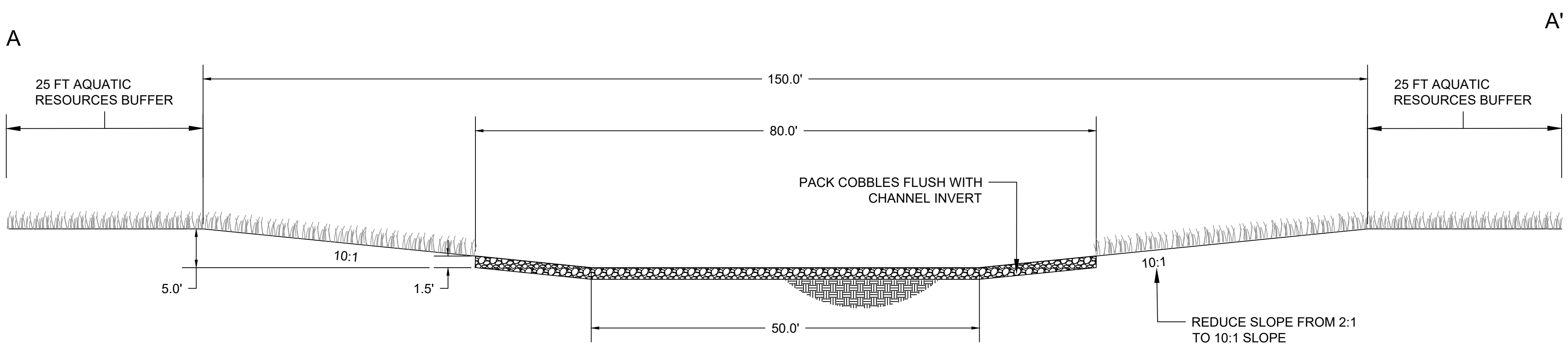
SIMULATED BEAVER STRUCTURE (SBS) PROFILE VIEW (TYP.)

NOT TO SCALE

NOTES:
1. SIMULATED BEAVER STRUCTURES (SBS) TO BE CONSTRUCTED IN THE CHANNEL PER DESIGNER DIRECTION. DESIGNER OR REPRESENTATIVE WILL BE PRESENT DURING INSTALLATION OF SBS.
2. SBS DETAILS THIS SHEET REFER TO SBS IN VERMILLION CREEK ONLY. REFER TO SHEET 25 FOR PROPOSED STRUCTURES IN LITTLE JOE CREEK.
3. PILE UP NATIVE COARSE BED MATERIAL AND THEN DIG A SMALL TRENCH TO INSTALL GREASEWOOD / SAGEBRUSH CONTINUOUSLY ALONG THE SBS. PLACE NATIVE COARSE BED MATERIAL ON DOWNSTREAM SIDE OF STRUCTURE TO PREVENT SCOUR.
4. INSTALL WILLOW TRANSPLANTS AND STAKES AS DIRECTED BY DESIGNER ENSURING A MINIMUM OF THREE WILLOW TRANSPLANT AT ENDS OF SBS ALONG CHANNEL BANK TOE.
5. PLACE NATIVE FINE BED MATERIAL ON TOP OF NATIVE COARSE BED MATERIAL TO HELP SEAL THE SBS

EXAMPLE PHOTO: EXISTING BEAVER STRUCTURE UPSTREAM OF PROJECT REACH

EXAMPLE PHOTO: EXISTING BEAVER STRUCTURE UPSTREAM OF PROJECT REACH



SECTION A-A': LOW WATER CROSSING

NOT TO SCALE SEE SHEET 5

EXAMPLE PHOTO: EXISTING PIVOT CROSSING TO BE REPLACED BY PROPOSED LOW WATER CROSSING. SEE DETAIL FOR PROPOSED LOW WATER CROSSING DIMENSIONS.

VERMILLION CREEK AT DIAMOND PEAK RANCH WETLAND RESTORATION PROJECT

MOFFAT COUNTY, COLORADO

Stillwater Sciences

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DESIGN: JB/TS/RB
DRAWN: TS/EP/KE
CHECKED: TS/RB
APPROVED:

SBS & LOW WATER CROSSING DETAIL

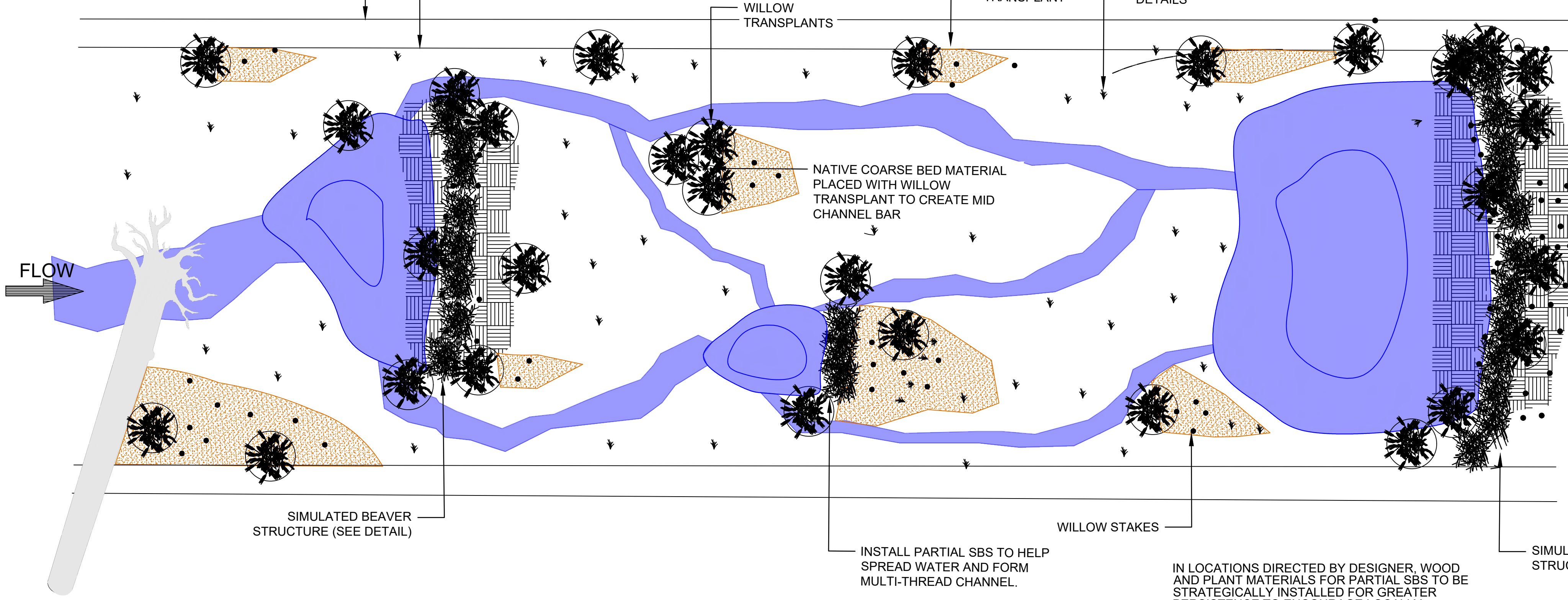
SHEET 26

IF BAR DOES NOT MEASURE 1" DRAWING IS NOT TO SCALE – ADJUST ACCORDINGLY

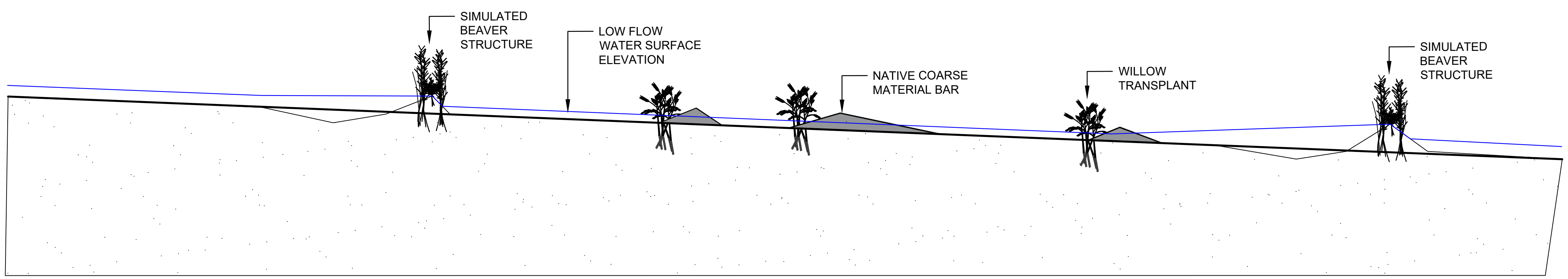
LAST SAVED: 6/8/2022 PLOT DATE: 6/17/2022 PLOT STYLE: STILLWATER-GRAYSCALE-255

C:\STILLWATER SCIENCES\880.00 VERMILLION CREEK – DOCUMENTS\CAD\PLANSET\ECOS_SW_BDA_DETAIL.DWG

TYPICAL CHANNEL PLAN VIEW
NOT TO SCALE



TYPICAL CHANNEL PROFILE VIEW
NOT TO SCALE



TYPICAL CHANNEL CROSS SECTION DIMENSIONS

DIMENSION	PROPOSED RANGE OF DIMENSION
BOTTOM WIDTH (FT.)	30 - 42
TOP WIDTH (FT.)	50 - 80
CUT SIDE SLOPE (H:V)	2:1
DEPTH OF CUT (FT.)	3.2 - 7.5

TYPICAL CHANNEL NOTES:
1. NATIVE COARSE BED MATERIAL WILL BE SALVAGED AND STOCKPILED DURING MASS GRADING OF RESTORED CHANNEL. IT WILL THEN BE PLACED ALONG THE CHANNEL BOTTOM AS DIRECTED BY DESIGNER AFTER MASS GRADING IS COMPLETED.
2. EXISTING LARGE WOOD WILL BE SALVAGED AND REUSED IN THE CHANNEL AT THE DIRECTION OF THE DESIGNER.
3. ROUGHNESS ELEMENTS SUCH AS LARGE WOOD, TRANSPLANTS, SBS, AND NATIVE COARSE BED MATERIAL WILL BE INSTALLED INTO FINISHED CHANNEL AT THE DIRECTION OF THE DESIGNER.

EXAMPLE PHOTO 1: EXISTING CHANNEL WITHIN THE PROJECT REACH THAT SHOWS MULTI-THREAD CHANNEL WITH COARSE BARS AND VEGETATION THOUGHOUT CHANNEL BOTTOM

EXAMPLE PHOTO 2: NATIVE COARSE MATERIAL MID-CHANNEL BAR

VERMILLION CREEK AT DIAMOND PEAK RANCH WETLAND RESTORATION PROJECT
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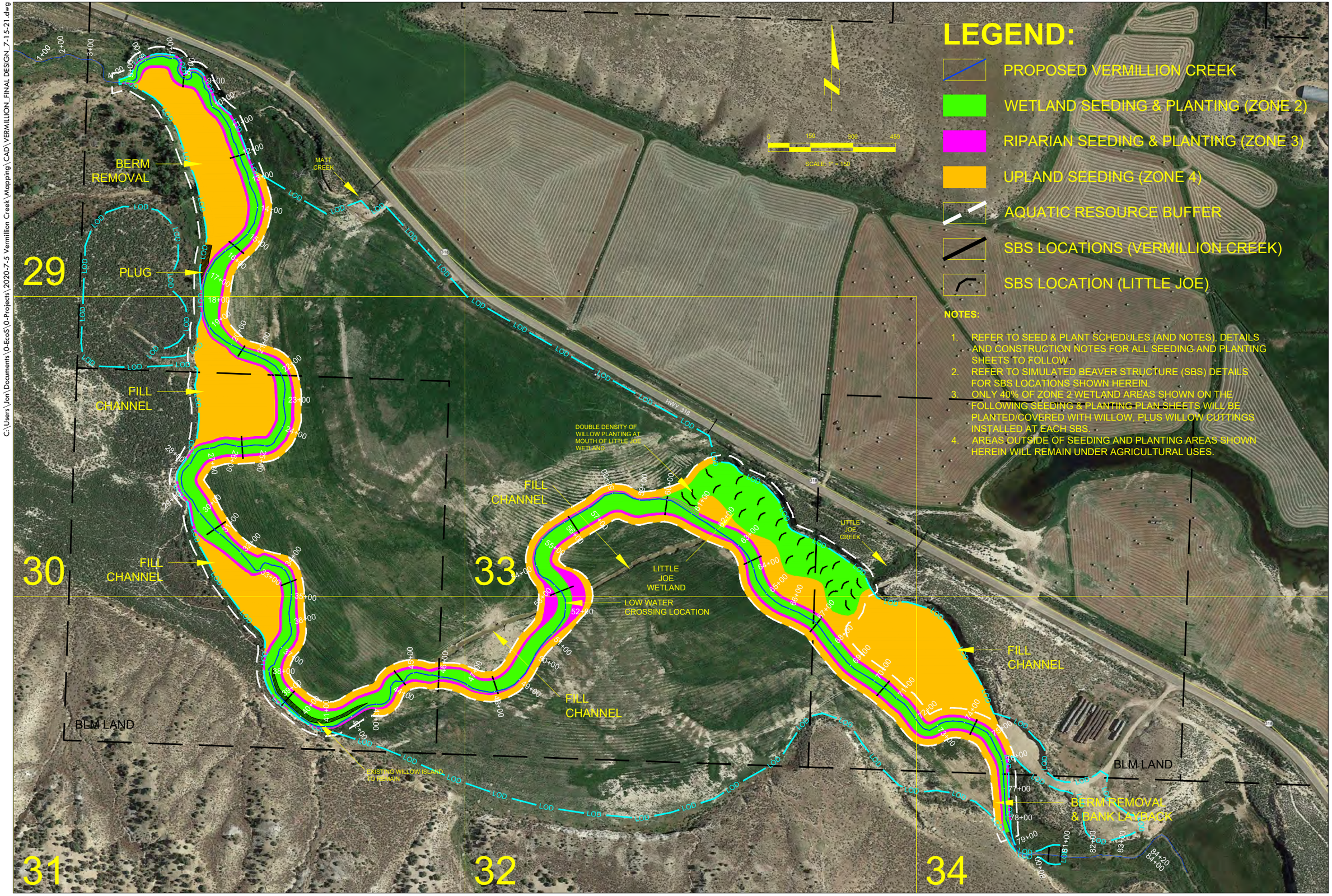
DESIGN: JB/TS/RB
DRAWN: TS/EP/KE
CHECKED: TS/RB
APPROVED:

TYPICAL MAIN CHANNEL DETAIL

SHEET 27

C:\Users\Jon\Documents\0-EcoS\0-Projects\2020-7-5 Vermillion Creek\Mapping\CAD\VERMILLION_FINAL DESIGN_7-15-21.dwg



SHEET 28

VERMILLION CREEK AT DIAMOND PEAK RANCH
WETLAND RESTORATION PROJECT
SEEDING & PLANTING PLAN OVERVIEW

NO:	REVISIONS:	DATE:
#1	REVEG AREA & NOTE REVISIONS	9/17/21
#2	RIPARIAN ZONE LEGEND REVISION	6/6/22
#3		
#4		

DATE: 7-15-21
PROJECT NO: 2020-7-5

Stillwater Sciences
4845 Pearl East Circle, Ste. 101
Boulder, Colorado 80310
(p): 720-656-2330

ecosystem services
1455 Washburn Street
Erie, Colorado 80516
(p): 970-812-3267

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LEGEND:

- **VERMILLION CREEK (AQUATIC ZONE 1)**
- **WETLAND (HYDRIC ZONE 2)**
  WETLAND SEEDING
- **WETLAND (HYDRIC ZONE 2)**
  WILLOW PLANTING
- **RIPARIAN (MESIC ZONE 3)**
  COVER CROP & UPLAND SEEDING &
  COTTONWOOD VOLUNTEER OR TRANSPLANTING
- **UPLAND (ZERIC ZONE 4)**
  UPLAND SEEDING
- **AQUATIC RESOURCE BUFFER**
  25-FOOT BUFFER
- **SBS LOCATION**
  VERMILLION CREEK

0 50 100 150

SCALE: 1" = 50

	29	
30		33
31	32	34

1+00 2+00 3+00 4+00 5+00 6+00 7+00 8+00 9+00 10+00 11+00 12+00 13+00 14+00 15+00 16+00 17+00

LOD

BERM REMOVAL

PLUG

MATT CREEK

318

SHEET 29

VERMILLION CREEK AT DIAMOND PEAK RANCH
WETLAND RESTORATION PROJECT
SEEDING & PLANTING PLAN 1

NO:	REVISIONS:	DATE:
#1	REVEG AREA & NOTE REVISIONS	9/17/21
#2	ADD SEEDING TO DS FILL AREA	5/4/22
#3	RIPARIAN ZONE LEGEND REVISION	6/6/22
#4		

DATE: 7-15-21

PROJECT NO: 2020-7-5

Stillwater Sciences
4845 Pearl East Circle, Ste. 101
Boulder, Colorado 80310
(p): 720-656-2330

ecosystem services LLC
1455 Washburn Street
Erie, Colorado 80516
(p): 970-812-3267

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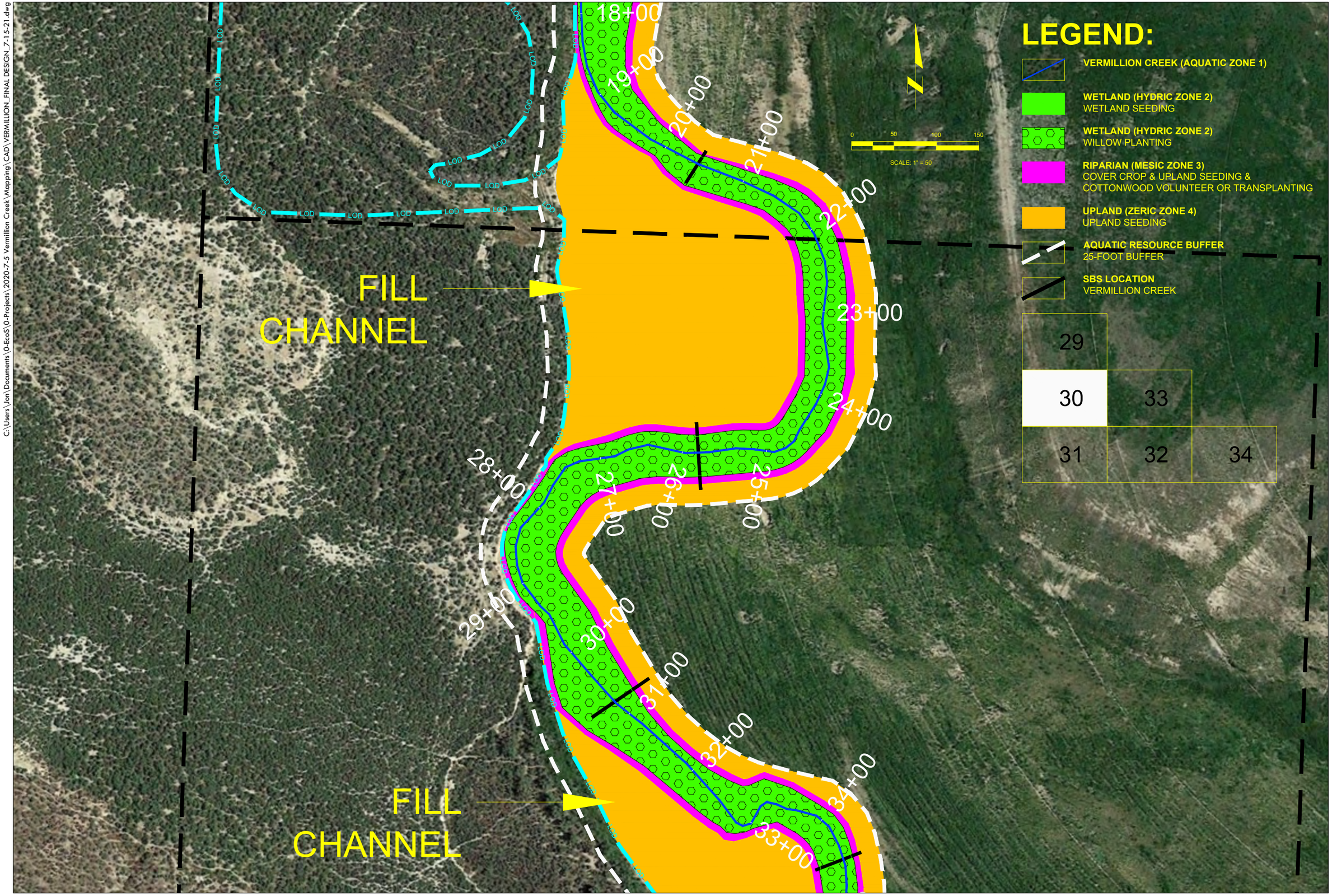

SHEET 30

VERMILLION CREEK AT DIAMOND PEAK RANCH
WETLAND RESTORATION PROJECT

SEEDING & PLANTING PLAN 2

NO:	REVISIONS:	DATE:
#1	REVEG AREA & NOTE REVISIONS	9/17/21
#2	RIPARIAN ZONE LEGEND REVISION	6/6/22
#3		
#4		

DATE: 7-15-21

PROJECT NO: 2020-7-5

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Boulder, Colorado 80310
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ecosystem services
1455 Washburn Street
Erie, Colorado 80516
(p): 970-812-3267

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BLM LAND

EXISTING WILLOW ISLAND TO REMAIN

LEGEND:

- VERMILLION CREEK (AQUATIC ZONE 1)
- WETLAND (HYDRIC ZONE 2) WETLAND SEEDING
- WETLAND (HYDRIC ZONE 2) WILLOW PLANTING
- RIPARIAN (MESIC ZONE 3) COVER CROP & UPLAND SEEDING & COTTONWOOD VOLUNTEER OR TRANSPLANTING
- UPLAND (ZERIC ZONE 4) UPLAND SEEDING
- AQUATIC RESOURCE BUFFER 25-FOOT BUFFER
- SBS LOCATION VERMILLION CREEK

29 | 30 | 33 | 31 | 32 | 34

0 50 100 150

SCALE: 1" = 50'

VERMILLION CREEK AT DIAMOND PEAK RANCH

WETLAND RESTORATION PROJECT

SEEDING & PLANTING PLAN 3

SHEET 31

NO:	REVISIONS:	DATE:
#1	REVEG AREA & NOTE REVISIONS	9/17/21
#2	RIPARIAN ZONE LEGEND REVISION	6/6/22
#3		
#4		

DATE: 7-15-21

PROJECT NO: 2020-7-5

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Boulder, Colorado 80310
(p): 720-656-2330

ecosystem services
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LITTLE JOE WETLAND

LOW WATER CROSSING LOCATION

FILL CHANNEL

CREEK

47+00 48+00 49+00 50+00 51+00 52+00 53+00 54+00 55+00 63+00 64+00 65+00 66+00 67+00 68+00 69+00 70+00

LOD

LEGEND:

- VERMILLION CREEK (AQUATIC ZONE 1)
- WETLAND (HYDRIC ZONE 2) — WETLAND SEEDING
- WETLAND (HYDRIC ZONE 2) — WILLOW PLANTING
- RIPARIAN (MESIC ZONE 3) — COVER CROP & UPLAND SEEDING & COTTONWOOD VOLUNTEER OR TRANSPLANTING
- UPLAND (ZERIC ZONE 4) — UPLAND SEEDING
- AQUATIC RESOURCE BUFFER — 25-FOOT BUFFER
- SBS LOCATION — VERMILLION CREEK
- SBS LOCATION — LITTLE JOE WETLAND

29 30 31 32 33 34

0 50 100 150

SCALE: 1" = 50

VERMILLION CREEK AT DIAMOND PEAK RANCH
WETLAND RESTORATION PROJECT
SEEDING & PLANTING PLAN 5

SHEET 32

NO:	REVISIONS:	DATE:
#1	REVEG AREA & NOTE REVISIONS	9/17/21
#2	RIPARIAN ZONE LEGEND REVISION	6/6/22
#3		
#4		

DATE: 7-15-21

PROJECT NO: 2020-7-5

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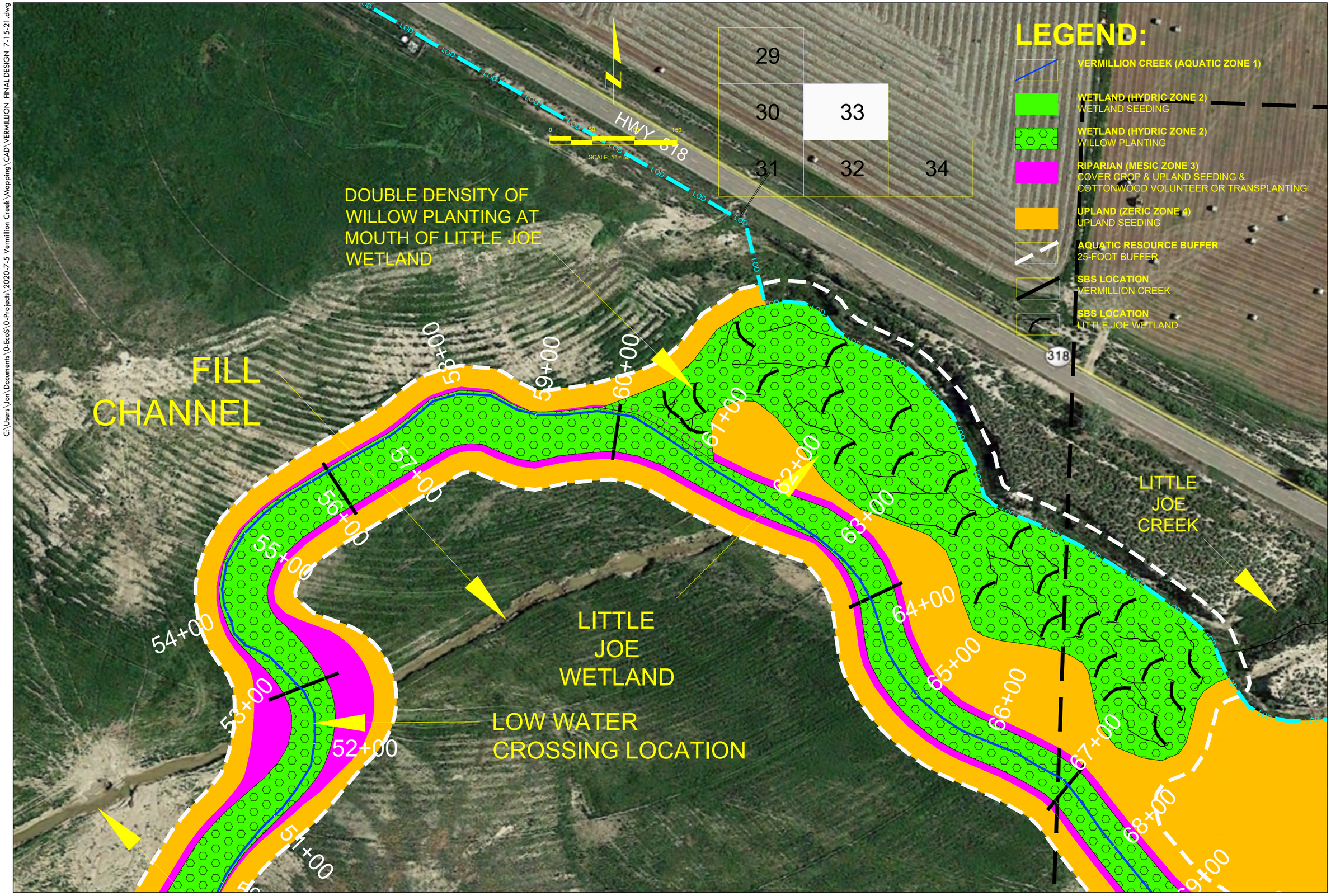

VERMILLION CREEK AT DIAMOND PEAK RANCH
WETLAND RESTORATION PROJECT
SEEDING & PLANTING PLAN 4

SHEET 33

NO:	REVISIONS:	DATE:
#1	REVEG AREA & NOTE REVISIONS	9/17/21
#2	RIPARIAN ZONE LEGEND REVISION	6/6/22
#3		
#4		

DATE: 7-15-21

PROJECT NO: 2020-7-5

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FILL CHANNEL

BERM REMOVAL & BANK LAYBACK

BLM LAND

LOD

72+00
73+00
74+00
75+00
76+00
77+00
78+00
79+00
80+00
81+00
82+00
83+00
84+00
84+20

0 50 100 150
SCALE: 1" = 50

LEGEND:

- VERMILLION CREEK (AQUATIC ZONE 1)
- WETLAND (HYDRIC ZONE 2)
  WETLAND SEEDING
- WETLAND (HYDRIC ZONE 2)
  WILLOW PLANTING
- RIPARIAN (MESIC ZONE 3)
  COVER CROP & UPLAND SEEDING & COTTONWOOD VOLUNTEER OR TRANSPLANTING
- UPLAND (ZERIC ZONE 4)
  UPLAND SEEDING
- AQUATIC RESOURCE BUFFER
  25-FOOT BUFFER
- SBS LOCATIONS

29
318
30
33
31
32
34

SHEET 34

VERMILLION CREEK AT DIAMOND PEAK RANCH
WETLAND RESTORATION PROJECT
SEEDING & PLANTING PLAN 6

NO:	REVISIONS:	DATE:
#1	REVEG AREA & NOTE REVISIONS	9/17/21
#2	RIPARIAN ZONE LEGEND REVISION	6/6/22
#3		
#4		

DATE: 7-15-21
PROJECT NO: 2020-7-5

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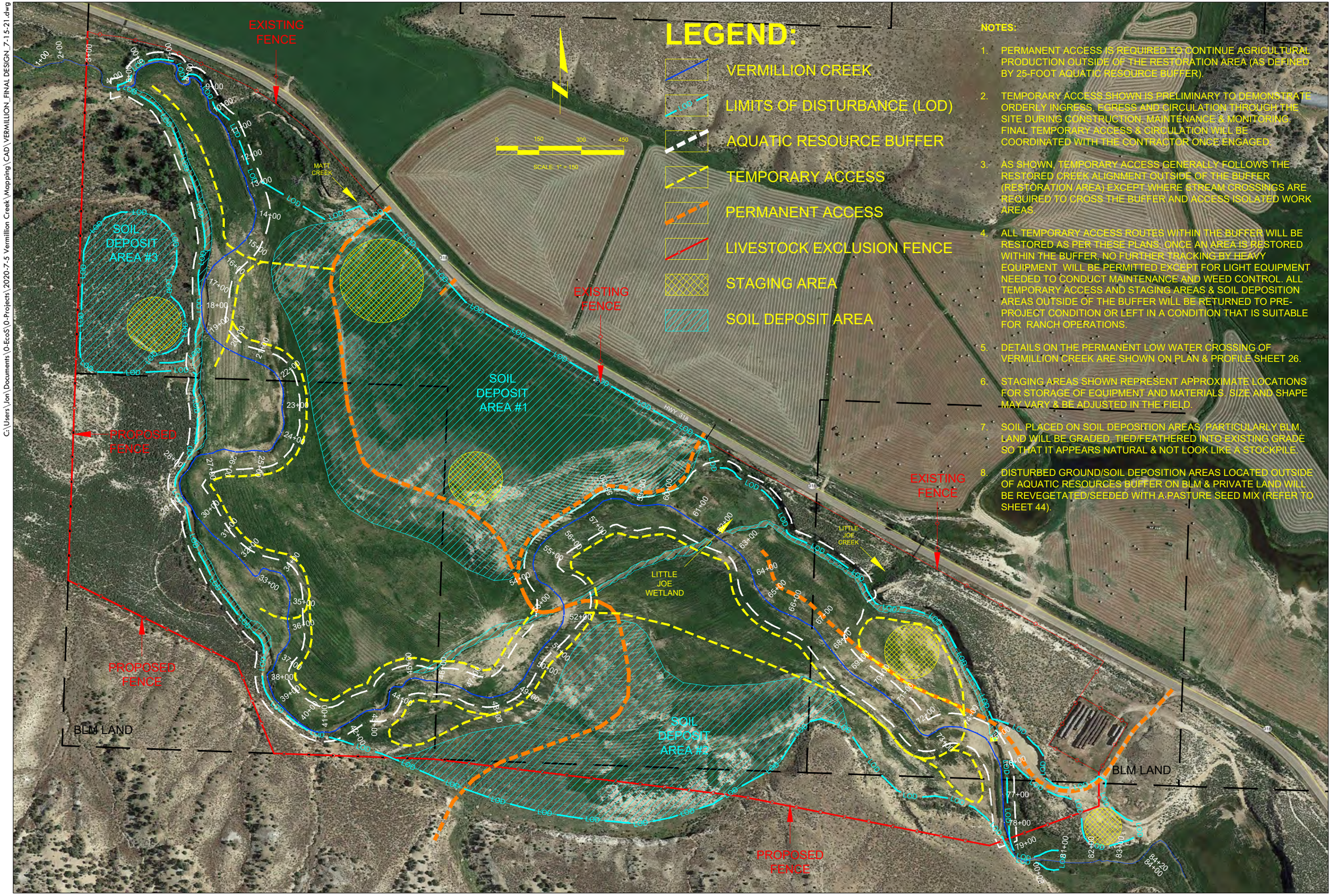

LEGEND:

- VERMILLION CREEK
- LIMITS OF DISTURBANCE (LOD)
- AQUATIC RESOURCE BUFFER
- TEMPORARY ACCESS
- PERMANENT ACCESS
- LIVESTOCK EXCLUSION FENCE
- STAGING AREA
- SOIL DEPOSIT AREA

NOTES:

1. PERMANENT ACCESS IS REQUIRED TO CONTINUE AGRICULTURAL PRODUCTION OUTSIDE OF THE RESTORATION AREA (AS DEFINED BY 25-FOOT AQUATIC RESOURCE BUFFER).
2. TEMPORARY ACCESS SHOWN IS PRELIMINARY TO DEMONSTRATE ORDERLY INGRESS, EGRESS AND CIRCULATION THROUGH THE SITE DURING CONSTRUCTION, MAINTENANCE & MONITORING. FINAL TEMPORARY ACCESS & CIRCULATION WILL BE COORDINATED WITH THE CONTRACTOR ONCE ENGAGED.
3. AS SHOWN, TEMPORARY ACCESS GENERALLY FOLLOWS THE RESTORED CREEK ALIGNMENT OUTSIDE OF THE BUFFER (RESTORATION AREA) EXCEPT WHERE STREAM CROSSINGS ARE REQUIRED TO CROSS THE BUFFER AND ACCESS ISOLATED WORK AREAS.
4. ALL TEMPORARY ACCESS ROUTES WITHIN THE BUFFER WILL BE RESTORED AS PER THESE PLANS. ONCE AN AREA IS RESTORED WITHIN THE BUFFER, NO FURTHER TRACKING BY HEAVY EQUIPMENT WILL BE PERMITTED EXCEPT FOR LIGHT EQUIPMENT NEEDED TO CONDUCT MAINTENANCE AND WEED CONTROL. ALL TEMPORARY ACCESS AND STAGING AREAS & SOIL DEPOSITION AREAS OUTSIDE OF THE BUFFER WILL BE RETURNED TO PRE-PROJECT CONDITION OR LEFT IN A CONDITION THAT IS SUITABLE FOR RANCH OPERATIONS.
5. DETAILS ON THE PERMANENT LOW WATER CROSSING OF VERMILLION CREEK ARE SHOWN ON PLAN & PROFILE SHEET 26.
6. STAGING AREAS SHOWN REPRESENT APPROXIMATE LOCATIONS FOR STORAGE OF EQUIPMENT AND MATERIALS. SIZE AND SHAPE MAY VARY & BE ADJUSTED IN THE FIELD.
7. SOIL PLACED ON SOIL DEPOSITION AREAS, PARTICULARLY BLM, LAND WILL BE GRADED, TIED/FEATHERED INTO EXISTING GRADE SO THAT IT APPEARS NATURAL & NOT LOOK LIKE A STOCKPILE.
8. DISTURBED GROUND/SOIL DEPOSITION AREAS LOCATED OUTSIDE OF AQUATIC RESOURCES BUFFER ON BLM & PRIVATE LAND WILL BE REVEGETATED/SEEDED WITH A PASTURE SEED MIX (REFER TO SHEET 44).

SHEET 35

VERMILLION CREEK AT DIAMOND PEAK RANCH
WETLAND RESTORATION PROJECT
LOD, ACCESS, FENCING & STAGING PLAN

NO:	REVISIONS:	DATE:
#1	ADD BLM APPROVED FENCE ALIGN	9-13-21
#2	ADD LOD, STAGING & SOIL DEPOSIT	9-17-21
#3	ADD FILL TO DS CHANNEL	5/4/22
#4	NOTE REVISIONS/ADDS	6/9/22

DATE: 7-15-21
PROJECT NO: 2020-7-5

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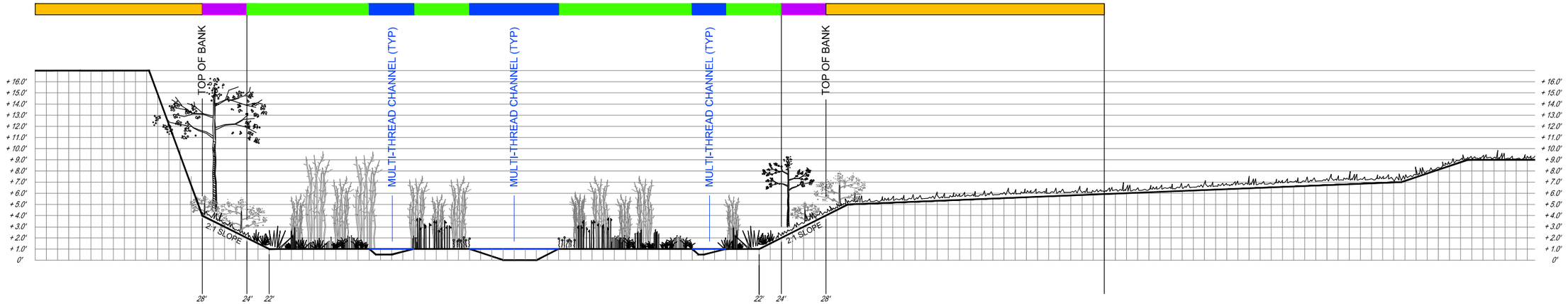
ZONE 4 UPLAND (XERIC)	ZONE 3 RIPARIAN (MESIC)	ZONE 2 WETLAND (HYDRIC)	ZONE 1 AQUATIC BED (LOTIC)	ZONE 2 WETLAND (HYDRIC)	ZONE 3 RIPARIAN (MESIC)	ZONE 4 UPLAND (XERIC)	
(UPL)	UPL - FACW	FACW - OBL	-	FACW - OBL	UPL - FACW	(UPL)	INDICATOR STATUS:
400 CFS +	75 CFS TO ~400 CFS	LOW FLOW TO 75 CFS	LOW FLOW	LOW FLOW TO 75 CFS	75 CFS TO ~400 CFS	400 CFS +	INUNDATION BOUNDARY:
Existing	Forest/Shrub-Scrub (FO/SS)	Palustrine Emergent /Shrub-Scrub (PEM/SS)	Unconsolidated Bottom/Open Water (UB/OW)	Palustrine Emergent /Shrub-Scrub (PEM/SS)	Forest/Shrub-Scrub (FO/SS)	Existing	CLASSIFICATION:
+5.0' and Higher	+5.0' to +3.0'	+1.0 to +3.0'	0 to +1.0	+1.0 to +3.0'	+5.0' to +3.0'	+5.0' and Higher	~ELEVATION RELATIVE TO LOW FLOW WSEL:
	Plant Palette: Cover Crop Upland Seed Riparian Trees (Cottonwood Volunteers or Transplants) Refer to Plant and Seed Schedules			Plant Palette: Wetland Seed Wetland Shrubs Refer to Plant and Seed Schedules		Plant Palette: Upland Seed (Grasses & Shrubs) Refer to Seed Schedules	PLANT PALETTE:



NOTES:

1. RELATIVE ELEVATIONS SHOWN ARE PROVIDED AS GENERAL GUIDELINES.
2. TRANSITION, EXPANSION OR NATURAL MIGRATION OF SPECIES BETWEEN ZONES MAY VARY DEPENDING ON ACTUAL FIELD CONDITIONS, SLOPE, HYDROLOGY, PERTURBATION, MICRO-HABITAT, SOIL TEXTURE & MOISTURE CONDITIONS.
3. WIDTH OF INCISED FLOODPLAIN (FLUVIAL SURFACE) VARIES. REFER TO RESTORATION DESIGN PLANS AND PROFILES.
4. LOW FLOW CHANNEL AND WETLAND CONFIGURATION IS SUBJECT TO MIGRATION AND SHIFTING OVER TIME AS A RESULT OF GEOMORPHIC PROCESSES.
5. MULTI-THREAD CHANNELS SHOWN ABOVE REPRESENT TARGET CONDITIONS FOLLOWING GEOMORPHIC RESPONSE GUIDED BY ADAPTIVE MANAGEMENT. CHANNELS WILL NOT BE GRADED.
6. COTTONWOOD (NATURALLY OCCURNG) MAY BE PRESENT IN ZONE 2.
7. PLANTED OR TRANSPLANTED COTTONWOOD WILL BE PLANTED IN ZONE 3 AT A RELATIVE ELEVATION BETWEEN +3.0 - 4.0 (APPROX. +2.0 - 3.0 FEET ABOVE THE FLUVIAL SURFACE).

WXS

TYPICAL WETLAND-RIPARIAN CROSS-SECTION

CROSS-SECTION 1:1 NTS

SHEET 36

VERMILLION CREEK AT DIAMOND PEAK RANCH
WETLAND RESTORATION PROJECT

TYPICAL WETLAND-RIPARIAN CROSS-SECTION

NO:	REVISIONS:	DATE:	BY:
#1	REV PLANT PALETTE NOTES	6/6/22	
#2	REV SLOPE TO 2:1	6/16/22	
#3			
#4			

DRAWN BY: JBD
CHECKED BY: GEG
DATE: 7-15-21
PROJECT NO: 2020-7-5

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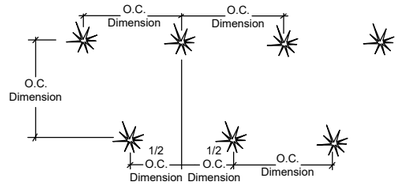
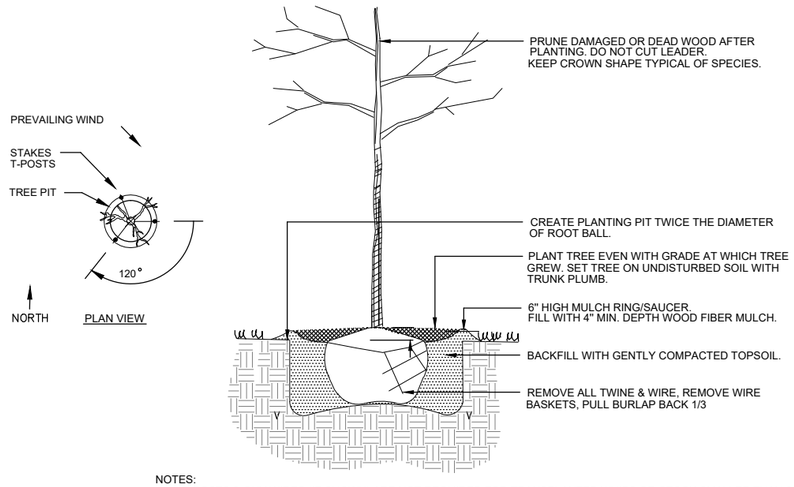


NOTES:
1. REFER TO PLANT SCHEDULES FOR SPACING REQUIREMENTS.

PS

PLANT SPACING DETAIL

PLAN: NTS

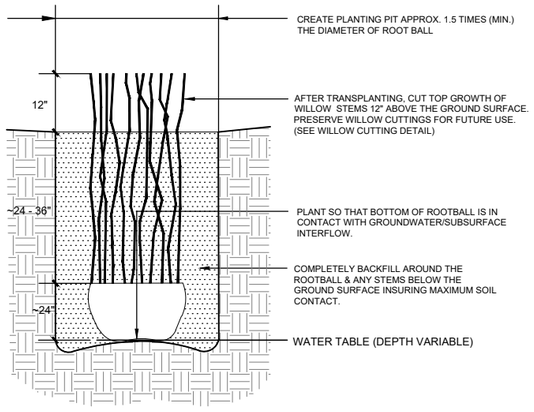


NOTES:
1. T-POSTS & GUY WIRES (IF SHOWN) ARE NOT REQUIRED FOR TRANSPLANTED WHIPS OR STOCK SMALLER THAN 5 GAL.
2. WHERE APPLICABLE, CUT EROSION CONTROL FABRIC IN A "+" PATTERN AND LAY BACK PRIOR TO INSTALLING PLANTS. RETURN/CLOSE FABRIC TO ORIGINAL POSITION AND STAPLE/TAKE TO THE GROUND
3. MAINTAIN AS DIRECTED IN THE CONSTRUCTION NOTES.
4. REFER TO PLANT SCHEDULES.
5. DEEPLY WATER TREE ONCE PLANTED AND MULCHED.

TP

TREE PLANTING DETAIL

CROSS-SECTION NTS



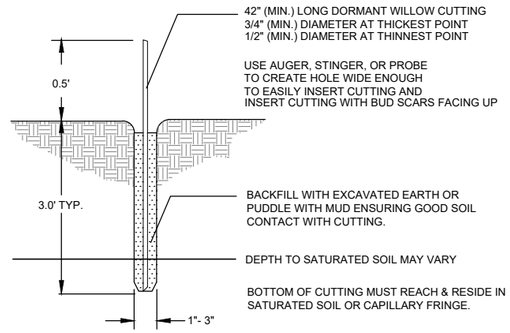
NOTES:

1. MINIMIZE DOUBLE-HANDLING OF TRANSPLANTS. EXCAVATE TRANSPLANT RECEIVING PIT PRIOR TO HARVESTING WILLOW CLUMPS & THEN MOVE & TRANSPLANT DIRECTLY TO FINAL LOCATION.
2. PRESERVE/LIMIT SOIL LOSS AROUND TRANSPLANT ROOTBALL TO THE MAXIMUM EXTENT POSSIBLE DURING EXCAVATION, TRANSPORT & TRANSPLANTING
3. IF STOCKPILING OF WILLOW CLUMPS IS NECESSARY DUE TO TIMING OR LOGISTICAL CONSTRAINTS, PLACE THE TRANSPLANT IN NURSERY CONTAINERS (OR SIMILAR) OF EQUAL SIZE TO THE ROOTBALL OR WRAP AND TIE-UP ROOTBALL WITH BURLAP. WATER AS NECESSARY TO MAINTAIN SOIL MOISTURE OF ROOTBALL.
4. STOCKPILE TRANPLANT ROOTBALLS SIDE BY SIDE IN ROWS, FILLING AND COVERING ALL EXPOSED EDGES OF ROOTBALLS WITH A STRAW-SOIL OR WOODCHIP-SOIL MIXTURE TO PRESERVE SOIL MOISTURE OF ROOTBALL UNTIL TIME OF PLANTING. WATER AS NECESSARY TO MAINTAIN SOIL MOISTURE OF ROOTBALL.
5. AFTER PLANTING, GENTLY WORK AND TAMP SOIL AROUND ROOTBALL AND BETWEEN STEMS, ELIMINATING AIR POCKETS. WATER-IN WILLOW CLUMP THE SAME DAY AS PLANTING. ADD ADDITIONAL SOIL AS NECESSARY TO FILL ANY AIR POCKETS THAT MAY FORM.
6. WILLOW CLUMP TRANSPLANTS CAN BE PLANTED DEEP OR WITH THE ROOTBALL AT OR JUST BELOW THE SOIL SURFACE, DEPENDING ON SITE/SOIL CONDITIONS AND INTEGRITY OF SOIL PIT SIDE-WALLS.
7. TREE TRANSPLANTS (IF AVAILABLE) SHALL BE INSTALLED AS PER TREE DETAIL, NOT DEEP PLANTED.
8. DEEPLY WATER TRANSPLANTED WILLOW CLUMPS ONCE INSTALLED.

WCT

WILLOW CLUMP TRANSPLANT DETAIL

CROSS-SECTION NTS



NOTES:

1. REFER TO PLANT SCHEDULES FOR SPECIES SIZE, QUANTITY AND SPACING.
2. REFER TO PLANTING PLANS FOR LOCATIONS.
3. POINTS OF FAILURE: UNDERSIZED CUTTINGS; LACK OF COMPLETE SOIL CONTACT; LACK OF PENETRATION AND CONTACT WITH PERSISTENTLY SATURATED SOIL; AND LATE PLANTING, LEAF-OUT FOLLOWED BY EARLY ARE MAJOR CAUSES OF CUTTINGS FAILURE.
4. PLANTING NICHE: CUTTINGS MUST BE PLANTED IN CAPILLARY FRINGE, SATURATED SOIL OR INSERTED IN BANK SUCH THAT THE BOTTOM TIP REACHES THE WATER TABLE.
5. HARVESTING: HARVEST DORMANT CUTTINGS IN EARLY SPRING (APPROX. MARCH 1 TO APRIL 15) PRIOR TO LEAFING OUT (PREFERRED TIME), OR LATE FALL (APPROX. OCT. 1 - NOV. 30) AFTER LEAF DROP, PROCESS AND MOVE TO COLD STORAGE FOR LATER PLANTING. CUT STEMS AT THE "ROOT" END OF EACH CUTTINGS AT A 45-DEGREE ANGLE (WHEN FEASIBLE) USING LOPPERS, BRUSH CUTTERS OR PRUNERS. CUTTINGS SHALL BE CUT CLEAN, AVOIDING BARK STRIPPING AND STEM SPLITTING. STRIP ALL SIDE BRANCHES AND DEAD WOOD. CUTS SHALL BE MADE 6 TO 8 INCHES FROM THE GROUND.
6. BINDING: CUTTINGS SHALL BE BOUND TOGETHER SECURELY WITH TWINE AT THE COLLECTION SITE, IN GROUPS OF 10, 25, OR 50 FOR EASE OF HANDLING, COUNTING, AND PROTECTION DURING TRANSPORT AND STORAGE. WRAP CUTTINGS IN SATURATED FABRIC, BURLAP OR SIMILAR MATERIAL DURING TRANSPORT & STORAGE.
7. STORAGE AND TRANSPORTATION: STORE AND MAINTAIN CUTTINGS IN A MOIST, DARK CELLAR, CAVE, LINED & COVERED UNDERGROUND PIT, REFRIGERATED TRUCK OR REFRIGERATOR (COLD STORAGE) BETWEEN 32 AND 40 DEGREES (F) FOR NO LONGER THAN 8 MONTHS UNTIL TIME OF PLANTING. CUTTINGS SHALL BE KEPT HYDRATED & PROTECTED FROM SUN, FREEZING AND DRYING DURING STORAGE AND TRANSPORATION AT ALL TIMES.
8. DELIVERY AND PLANTING: CUTTINGS SHALL BE INSPECTED AND APPROVED UPON DELIVERY, AT THE STORAGE FACILITY, OR THEIR SOURCE. ONLY THE NUMBER OF CUTTINGS THAT CAN BE PLANTED IN 1 DAY (DEPENDING ON CREW SIZE) CAN BE REMOVED FROM COLD STORAGE AND PLANTED. CUTTINGS THAT CAN NOT BE PLANTED ON THE SAME DAY SHALL BE PLACED BACK IN COLD STORAGE UNTIL THEY CAN BE PLANTED. CUTTINGS STAGED ON THE RESTORATION SITE SHALL BE KEPT FROM DRYING OUT.
9. PRE-PLANTING PREPARATION: COMPLETELY SUBMERGE & SOAK CUTTINGS BETWEEN 3 AND 7 DAYS TO FULLY HYDRATE IMMEDIATELY PRIOR TO PLANTING.
10. PLANTING TIME: UNLESS DIRECTED OTHERWISE, DIRECTLY PLANT WILLOW CUTTINGS FROM THEIR HARVEST SOURCE TO THEIR FINAL LOCATION IN EARLY SPRING (AFTER STORAGE AND SOAKING) WHILE STILL DORMANT (APPROX. APRIL 15 - MAY 1); PLANT CUTTINGS THAT HAVE BEEN KEPT DORMANT IN COLD STORAGE AFTER SPRING RUNOFF (APPROX. APRIL 15 - JULY 30); OR DIRECTLY PLANT WILLOW CUTTINGS FROM THEIR HARVEST SOURCE TO THEIR FINAL LOCATION (AFTER STORED SOAKING) SHALL OCCUR IN FALL (AFTER STORAGE AND SOAKING) WHILE STILL DORMANT (APPROX. OCTOBER 15 - DECEMBER 15). PLANTING WINDOWS ARE PROVIDED FOR GENERAL GUIDANCE. ACTUAL HARVESTING AND PLANTING TIMES MAY VARY FROM YEAR TO YEAR, MONTH TO MONTH AND MUST BE MONITORED BY THE PLANTING CONTRACTOR IN CHARGE OF HARVESTING AND PLANTING.
11. PLANTING: CUTTINGS SHALL BE PLANTED IN ROWS ON THE DIAGONAL SPACING SPECIFIED IN THE PLANT SCHEDULE (SEE PLANT SPACING DETAIL AND PLANT SCHEDULES) STARTING APPROX. 0.5 FEET ABOVE THE NORMAL WATER SURFACE ELEVATION (NWSEL) UP TO AN ELEVATION IN WHICH THE BOTTOM OF THE CUTTING WILL REACH THE WATER TABLE (GROUNDWATER OR SUBSURFACE ALLUVIAL INTERFLOW). MECHANICAL OR HAND DRIVEN STINGERS OR HAMMER DRILL SHALL BE USED TO CREATE A HOLE WIDE ENOUGH AND LONG ENOUGH TO EASILY INSERT CUTTINGS TO THE DEPTH INDICATED ON THE DETAIL. IN SOME TYPES OF SOIL, CUTTINGS MAY BE PUSHED INTO THE GROUND.
12. INSERT CUTTINGS SO THAT BUDS ARE POINT SKYWARD. BACK FILL PLANTING HOLE WITH MUD OR IN SOIL LIFTS. WATER BETWEEN EACH LIFT, AND TAMP TO ELIMINATE AIR POCKETS/VOIDS TO ENSURE SOIL IS IN COMPLETE CONTACT WITH CUTTINGS. TAMPING MAY CREATE A SLIGHT SAUCER AROUND EACH CUTTING TO CAPTURE AND HOLD NATURAL PRECIPITATION.
13. CUTTINGS SHALL BE INSERTED SO THAT NO MORE THAN 6 INCHES ARE ABOVE THE GROUND. THIS DOES NOT ELIMINATE THE NEED TO PLANT CUTTINGS TO THEIR SPECIFIED DEPTH AS SHOWN ABOVE. ABOVE GROUND TRIMMING OF CUTTINGS TO FINAL LENGTH SHALL NOT BE DONE TO DECEIVE THE ECOLOGIST THAT THE CUTTING IS PLANTED TO THE SPECIFIED DEPTH.
14. QUALITY ASSURANCE: ECOLOGIST MAY INSPECT COLD STORAGE AND RANDOMLY PULL CUTTINGS OUT OF THE GROUND AFTER INSTALLATION TO CHECK THAT THESE SPECIFICATIONS ARE MET.

WC

WILLOW CUTTING DETAIL

CROSS-SECTION NTS

SHEET 37

VERMILLION CREEK AT DIAMOND PEAK RANCH

WETLAND RESTORATION PROJECT

TYPICAL PLANTING DETAILS

NO:	REVISIONS:	DATE:	BY:
#1	CLARIFIED WILLOW CUTTING NOTES	9-14-21	
#2	ADDED WATERING NOTES	6/6/22	
#3			
#4			

DRAWN BY: JBD
CHECKED BY: GEG
DATE: 7-15-21
PROJECT NO: 2020-7-5

ecos ecosystem services LLC
1455 Washburn Street
Erie, Colorado 80516
(p): 970-812-3267

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GENERAL NOTES:

1. THIS RESTORATION PROJECT (PROJECT) AND ASSOCIATED CONSTRUCTION PLANS (PLANS) ARE TO BE IMPLEMENTED ON THE RESTORATION SITE (SITE) USING A DESIGN-BUILD APPROACH GUIDED BY THESE NOTES AND ON-SITE CONSTRUCTION OBSERVATION. NO OTHER SPECIFICATIONS ARE ATTACHED TO THESE PLANS. APPROVAL BY THE AGENCIES WILL BE NEEDED PRIOR TO IMPLEMENTATION OF THESE PLANS.

2. CONSTRUCTION OBSERVATION IS TO BE PERFORMED BY THE DESIGN CONSULTANT(S) ON BEHALF OF THE DIAMOND PEAK CATTLE COMPANY (CLIENT). HEREAFTER, THE GENERAL CONTRACTOR WILL BE REFERRED TO AS THE CONTRACTOR. THE REVEGETATION CONTRACTOR WILL BE THE CLIENT. TOGETHER, BOTH CONTRACTORS WILL BE REFERRED TO AS CONTRACTORS. THE PROJECT DESIGNER, WHO REPRESENTS THE ENGINEER OF RECORD, REFFERD TO AS PROFESSIONAL ENGINEER (PE), WILL BE REFERRED TO AS THE (DESIGNER). THE PROJECT ECOLOGIST WILL BE REFERRED TO AS THE (ECOLOGIST).

3. IN CLOSE COORDINATION WITH THE PE, DESIGNER WILL GUIDE AND PERIODICALLY INSPECT GRADING, DRAINAGE, EARTHWORK AND ANY ELEMENTS REQUIRING A PE CERTIFICATION. INSPECTIONS BY THE DESIGNER WILL BE PERFORMED FOR THE FOLLOWING MAJOR CONSTRUCTION ELEMENTS:

   - CHANNEL GRADING, EARTHWORK & DRAINAGE
   - GRADE CONTROL OR OTHER ENGINEERED STRUCTURES
   - SIMULATED BEAVER STRUCTURES (SBS)
   - SOIL DECOMPACTION/RIPPING
   - PUNCH LIST, CORRECTION, SUBSTANTIAL COMPLETION & FINAL INSPECTIONS

4. ECOLOGIST WILL GUIDE AND PERIODICALLY INSPECT ALL REVEGETATION WORK WITH THE CLIENT AS NEEDED. INSPECTION BY THE ECOLOGIST WILL BE PERFORMED FOR THE FOLLOWING MAJOR CONSTRUCTION ELEMENTS:

   - SOIL PREPARATION/AMENDMENT
   - SIMULATED BEAVER STRUCTURES (SBS)
   - SEEDING AND MULCHING
   - PLANTING AND/OR TRANSPLANTING
   - PUNCH LIST, CORRECTION, SUBSTANTIAL COMPLETION & FINAL INSPECTIONS
   - IRRIGATION SYSTEM
   - WEED MANAGEMENT AND PLANT MAINTENANCE

   INSPECTIONS WILL BE COORDINATED BETWEEN THE DESIGNER, ECOLOGIST, CONTRACTOR AND CLIENT PRIOR TO & DURING EACH MAJOR CONSTRUCTION ELEMENTS.

5. PROJECT SITE IS TO BE SEEDED AND PLANTED WITH THE SPECIES PROVIDED ON THE PLANT & SEED SCHEDULES. THE ECOLOGIST WILL GUIDE PLANT LAYOUT AND FIELD FIT PLANT MATERIAL PRIOR TO INSTALLATION.

6. SEEDING SHALL OCCUR AS SOON AS FEASIBLE WITHIN THE TIME FRAMES INDICATED IN THE SEEDING NOTES. PLANTING OPERATIONS ARE TO BE PERFORMED IN THE SPRING AS SOON AS PLANT HARVESTING & SOIL CONDITIONS ARE CONDUCIVE FOR PROPER SEEDING AND PLANTING (I.E., NOT FROZEN OR INUNDATED). PLANTING MAY BE CONDUCTED IN SUMMER IF IRRIGATION IS INSTALLED.

7. TO ENSURE AVAILABILITY, SEED AND PLANT MATERIALS MAY BE ACQUIRED FOR THE PROJECT BY THE CLIENT AHEAD OF TIME. THE CLIENT SHALL HAVE THE RIGHT TO INSPECT NURSERY GROWN PLANT MATERIAL AT ITS SOURCE PRIOR TO DELIVERY TO REJECT ANY NON-STANDARD MATERIALS THAT EXHIBIT DEFECTS THAT WOULD PROHIBIT ESTABLISHMENT & GROWTH UNDER NORMAL CONDITIONS. REJECTED NURSERY GROWN PLANT MATERIAL SHALL BE WARRANTED & REPLACED IN KIND BY THE SUPPLIER AT NO COST TO THE CLIENT. THE ECOLOGIST SHALL HAVE THE RIGHT TO INSPECT THE PLANT MATERIAL PRIOR TO OR UPON DELIVERY AND REJECT ANY NON-STANDARD OR DEFECTIVE MATERIAL. THEREAFTER, ALL MATERIALS SHALL BE CONSIDERED ACCEPTED. AFTER ACCEPTANCE IT IS THE CLIENTS RESPONSIBILITY TO ENSURE THAT THE NURSERY OR STORAGE FACILITY MAINTAINS THE PLANTS IN GOOD HEALTH UNTIL TIME OF DELIVERY; AND THAT MATERIAL IS PROPERLY MAINTAINED AND CARED FOR ONCE DELIVERED.

8. CONSTRUCTION SURVEYING, SHALL BE THE RESPONSIBILITY OF THE CONTRACTORS TO ESTABLISH PROJECT LIMITS OF DISTURBANCE, BUFFERS, VERIFY GRADES, LOCATION OF STRUCTURES, AND PLANTING AND SEEDING AREAS, FEATURES OR EXTENTS. AS-BUILT DRAWINGS SHOWING ANY DEVIATIONS OR CHANGES TO THE PLANS THAT WERE MADE IN THE FIELD SHALL BE PROVIDED BY THE CONTRACTORS AT THE END OF THE PROJECT. AS-BULT PLANS, NOTES & PHOTOS SHALL BE PROVIDED IN DIGITAL FORM OR SCANS OF HARD COPIES. FAILURE TO PROVIDE COMPLETE AND ACCURATE AS-BUILT INFORMATION MAY RESULT COMPENSATION EQUAL TO THE AMOUNT NECESSARY FOR THE DESIGNER OR ECOLOGIST TO PRODUCE ACCURATE AS-BUILT DATA.

9. THE PROJECT SITE IS DEFINED AS FOLLOWS:

   - RESTORATION AREA, THE OUTER LIMITS OF RESTORED WETLANDS PLUS A 25-FOOT BUFFER;
   - LIMITS OF DISTURBANCE (LOD): THE RESTORATION AREA (MINUS ANY PORTIONS OF THE BUFFER THAT LIE OUTSIDE OF THE LOD THAT SHALL NOT BE DISTURBED), PLUS ANY AREAS NEEDED FOR ACCESS, STAGING OR DEPOSITION OF SOIL EXCAVATED FROM THE RESTORATION AREA.
   - NOTE: DISTURBED AREAS OUTSIDE OF THE RESTORATION AREA WILL CONTINUE TO BE USED FOR ON-GOING AGRICULTURE ARE CONSIDERED EXEMPT AND RESTORATIVE MEASURES FOR SAID LAND ARE NOT ARE NOT INCLUDED IN THESE PLANS.

10. CONTRACTOR SHALL NOT EXPAND OR WORK OUTSIDE OF THE DESIGNATED LIMITS OF DISTURBANCE (LOD) UNLESS OTHERWISE APPROVED BY THE DESIGNER OR ECOLOGIST. ANY UNAPPROVED IMPACT AREAS BEYOND THE LOD THAT ARE DISTURBED DURING THE COURSE OF WORK SHALL BE RESTORED TO ORIGINAL OR BETTER CONDITION BY THE CONTRACTORS IN ACCORDANCE WITH THESE PLANS & PERFORMANCE CRITERIA AT THE CONTRACTOR'S EXPENSE.

11. THE CLIENT SHALL HAVE OBTAINED THE NECESSARY FEDERAL, STATE & COUNTY PERMITS/APPROVALS FOR THE PROJECT PRIOR TO CONSTRUCTION. THE CONTRACTORS SHALL BE RESPONSIBLE FOR COMPLIANCE WITH SAID PERMITS/APPROVALS, INCLUDING ALL CONDITIONS.

12. SITE WORK SHALL NOT BEGIN UNTIL ALL APPLICABLE LICENSES AND CONSTRUCTION PERMITS (IF REQUIRED) HAVE BEEN OBTAINED BY THE CONTRACTORS. ONCE OBTAINED, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ABIDING BY SAID PERMITS AND ANY REQUIREMENTS THEREIN.

13. THE CONTRACTORS SHALL NOT GO AROUND THE CLIENT, DESIGNER OR ECOLOGIST TO MODIFY PERMITS THAT WERE ALREADY IN PLACE PRIOR TO CONSTRUCTION. IF NECESSARY, THE CONTRACTORS WILL SUBMIT DRAFT CONSTRUCTION RELATED PERMITS TO THE DESIGNER OR ECOLOGIST FOR REVIEW & APPROVAL PRIOR TO SUBMITTING TO ANY AGENCY AND THEN COPY THE DESIGNER AND ECOLOGIST ON ANY FINAL PERMIT APPLICATIONS, RESULTS OR CORRESPONDENCE WITH AGENCIES RELATED TO SAID PERMITS.

14. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SPECIFYING, INSTALLING AND ENSURING ALL APPLICABLE BEST MANAGEMENT PRACTICES (BMPS) ARE INSTALLED AND PROPERLY MAINTAINED.

15. ANY WORK THAT WILL TAKE PLACE IN AND AROUND A WATER BODY MAY BE SUBJECT TO PERIODIC FLOODING. THE CONTRACTORS SHALL BE RESPONSIBLE FOR THE CONTROL OF SURFACE AND SUBSURFACE WATER AND EROSION DURING THE COURSE OF THE WORK. ANY DAMAGE TO THE WORK RESULTING FROM SURFACE FLOWS, BASE FLOWS, OR FLOOD FLOWS, INCLUDING BUOYANCY FORCES, AS A RESULT OF THE CONTRACTOR NOT EFFECTIVELY PROTECTING THE WORK, SHALL BE CORRECTED BY THE CONTRACTORS AT THEIR EXPENSE.

16. THE CONTRACTOR WILL PREPARE A STORMWATER MANAGEMENT PLAN (SWMP) IN CONJUNCTION WITH THE DESIGNER THAT DEFINE REASONABLE AND PRUDENT EROSION CONTROL MEASURES. THEREAFTER, THE SWMP WILL REMAIN IN FORCE DURING CONSTRUCTION ACTIVITIES. THE SWMP WILL BE PROVIDED TO THE AGENCIES FOR REVIEW AND APPROVAL PRIOR TO THE START OF CONSTRUCTION.

17. THE CONTRACTOR SHALL READ & ENSURE ONE COPY OF THE FOLLOWING ARE ON SITE AT ALL TIMES:

    A. CONSTRUCTION PLANS;
    B. STORMWATER MANAGEMENT PLAN (SWMP); AND
    C. ALL OTHER CONSTRUCTION PERMITS REQUIRED FOR THE PROJECT.

18. THE CONTRACTOR & CLIENT ARE RESPONSIBLE FOR SUPPLYING THEIR OWN SUPERVISORS AND FOREMEN WITH THE APPROVED PLANS AND PERMITS AND VERIFYING THAT ALL CONSTRUCTION IS DONE IN ACCORDANCE WITH THE SAID PLANS AND PERMITS (I.E., QUALITY CONTROL). THE CONTRACTORS WILL INFORM THEIR CREWS OF ALL ESSENTIAL REQUIREMENTS AND CONDITIONS OF SAID PLANS AND PERMITS. THE CONTRACTORS WILL CONTACT THE DESIGNER OR ECOLOGIST IN WRITING FOR CLARIFICATION OR DISCREPANCIES ON ANY INFORMATION SHOWN IN THESE PLANS.

19. ANY ESTIMATES OR QUANTITIES PROVIDE IN THESE PLANS OR BID SCHEDULES SHALL BE VERIFIED BY THE CONTRACTORS, WHO SHALL BE RESPONSIBLE FOR INDEPENDENTLY DETERMINING ALL QUANTITIES AND PROVIDING WORK AND MATERIALS AS SHOWN ON THESE PLANS. IT IS THE RESPONSIBILITY OF THE CONTRACTORS TO VERIFY ON-SITE CONDITIONS AND PERFORM AN INDEPENDENT TAKE-OFF OF ALL QUANTITIES, TO NOTIFY THE DESIGNER OR ECOLOGIST OF ANY DISCREPANCIES (INCLUDING UNLISTED ITEMS), AND TO SUBMIT AN ADD-ALTERNATE BID IDENTIFYING THE DISCREPANCIES PRIOR TO FINAL EXECUTION OF A CONSTRUCTION CONTRACT AND/OR WORK WITH THE DESIGNER TO PERFORM VALUE ENGINEERING TO ACCOMMODATE ON-SITE MATERIAL QUANTITIES. AFTER CONTRACT AWARD, THE CONTRACTOR WILL BE RESPONSIBLE FOR IDENTIFYING ANY DISCREPANCIES OR CHANGES THAT MAY BE REQUIRED AND SUBMIT CHANGE ORDERS TO THE DESIGNER OR ECOLOGIST FOR REVIEW AND APPROVAL, WHICH SHALL NOT BE UNREASONABLY DENIED.

20. ALL PROPERTY PINS, INTERSECTION MONUMENTS, SECTION CORNERS DISTURBED BY THE CONTRACTORS DURING CONSTRUCTION MUST BE REFERENCED AND REPLACED UNDER SUPERVISION OF A LICENSED SURVEYOR AT THE CONTRACTOR'S COST.

21. THE CONTRACTORS SHALL REPAIR OR REPLACE ANY FENCE OR GATE THAT IS REMOVED OR DAMAGED DURING CONSTRUCTION.

GRADING, EARTHWORK & DRAINAGE:

1. DESIGN INTENT: THESE DRAWINGS REPRESENT THE GENERAL DESIGN INTENT TO BE IMPLEMENTED. CONTRACTORS SHALL BE RESPONSIBLE FOR ALL ITEMS SHOWN ON THESE PLANS. CONTRACTORS SHALL BE RESPONSIBLE FOR CONTACTING THE DESIGNER FOR ANY CLARIFICATIONS OR FURTHER DETAILS NECESSARY TO ACCOMMODATE ACTUAL SITE CONDITIONS. ANY DEVIATION FROM THESE PLANS WITHOUT DESIGNER APPROVAL ARE AT THE CONTRACTOR'S OWN RISK AND EXPENSE. NOTIFY DESIGNER IMMEDIATELY OF ANY UNEXPECTED AND CHANGED CONDITIONS, SAFETY HAZARDS, AND ENVIRONMENTAL PROBLEMS ENCOUNTERED.

2. JOB SITE CONDITIONS AND CONTRACTOR RESPONSIBILITY: CONTRACTORS SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR SITE CONDITIONS DURING THE COURSE OF THE CONSTRUCTION OF THIS PROJECT, INCLUDING THE SAFETY OF ALL PERSONS AND PROPERTY, AND ALL ENVIRONMENTAL PROTECTION ELEMENTS, WHETHER SHOWN ON THESE DRAWINGS OR NOT. CONTRACTORS SHALL FOLLOW ALL APPLICABLE CONSTRUCTION AND SAFETY REGULATIONS. THESE REQUIREMENTS SHALL APPLY CONTINUOUSLY AND WILL NOT BE LIMITED TO NORMAL WORKING HOURS. THE CONTRACTOR SHALL DEFEND, INDEMNIFY, AND HOLD CLIENT, DESIGNER OR ECOLOGIST HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPT FROM LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF CLIENT, DESIGNER OR ECOLOGIST.

3. DAMAGE. CONTRACTORS SHALL EXERCISE CARE TO AVOID DAMAGE TO EXISTING PUBLIC AND PRIVATE PROPERTY, INCLUDING NATIVE TREES AND SHRUBS, AND OTHER PROPERTY IMPROVEMENTS. IF CONTRACTORS CAUSES DAMAGES TO SUCH ITEMS, CONTRACTORS SHALL BE RESPONSIBLE FOR REPAIR OR REPLACEMENT IN LIKE NUMBER, KIND, CONDITION, AND SIZE.

4. CONTRACTORS SHALL NOT USE ANY DELETERIOUS MATERIALS IN WATER CONTROL STRUCTURES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVAL AND DISPOSING OF ALL WATER CONTROL STRUCTURES AND EQUIPMENT UPON COMPLETION OF WORK.

5. CONTRACTOR SHALL FURNISH, INSTALL, AND OPERATE ALL OTHER NECESSARY MACHINERY, APPLIANCES, AND EQUIPMENT TO DIVERT FLOWING WATER AROUND WORK AREAS, AND TO KEEP EXCAVATIONS AND TRENCHES FREE FROM WATER DURING CONSTRUCTION TO THE EXTENT NECESSARY FOR CONTRACTOR, DESIGNER OR ECOLOGIST TO DETERMINE APPROPRIATE LOCATIONS AND GRADES FOR TREATMENTS, AND TO AVOID INJURY TO PUBLIC OR PRIVATE PROPERTY, A NUISANCE OR A MENACE TO THE PUBLIC, OR TO DEGRADE WATER QUALITY. CONTRACTOR SHALL AT ALL TIMES HAVE ON HAND SUFFICIENT PUMPING EQUIPMENT AND MACHINERY IN GOOD WORKING CONDITION FOR ALL ORDINARY EMERGENCIES AND SHALL HAVE AVAILABLE AT ALL TIMES COMPETENT MECHANICS FOR THE OPERATION OF ALL PUMPING EQUIPMENT. IF CONTRACTOR CHOOSES TO USE A PUMPING SYSTEM FOR ANY PORTION OF THE WATER CONTROL WORK, CONTRACTOR SHALL HAVE ADEQUATE BACK-UP EQUIPMENT TO INSURE THE CONTINUOUS OPERATION OF THE EQUIPMENT.

   THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING A CDPHE DEWATERING PERMIT IF THE SELECTED MEANS AND METHODS FOR DEWATERING REQUIRE A PERMIT. A CDPHE. DEWATERING PERMIT IS NOT EXPECTED TO BE REQUIRED FOR IN-STREAM DEWATERING. CONTRACTOR MAY WORK WITH PROPERTY OWNER TO UTILIZE EXISTING DIVERSION STRUCTURES TO DIVERT WATER FLOW RATES UP TO THE LEGAL WATER RIGHT FOR THAT DIVERSION.

6. ALL HEAVY EQUIPMENT MUST HAVE A SUPPLY OF SORBENT PADS AVAILABLE TO CLEAN-UP GREASE, OIL, OR FUEL THAT DRIPS OR SPILLS INTO THE STREAM CHANNEL. SORBENT BOOMS MUST BE PLACED DOWNSTREAM FROM LOCATIONS WHERE MACHINERY IS EXPECTED TO CROSS THE STREAM CHANNEL. USED PADS AND BOOMS ARE TO BE DISPOSED OF PROPERLY AT CONTRACTOR'S EXPENSE.

7. EARTHWORK QUANTITIES: CONTRACTOR IS RESPONSIBLE FOR ALL EARTHWORK, INCLUDING GRADING, PROVISION AND PLACEMENT OF ROCK AND LOGS MEETING SIZE LIMITS, AS SHOWN ON DRAWINGS, AND ONSITE DISPOSAL OF ALL EXCESS SOIL AND RUBBLE AS DIRECTED BY DESIGNER OR ECOLOGIST. EARTHWORK QUANTITIES, INCLUDING GRADING, PROVIDED BY THE DESIGNER OR ECOLOGIST ARE ESTIMATES ONLY. CONTRACTOR SHALL BRING ANY POTENTIAL DISCREPANCIES BETWEEN EARTHWORK QUANTITY ESTIMATES AND ACTUAL SITE CONDITIONS TO THE ATTENTION OF DESIGNER OR ECOLOGIST FOR RESOLUTION PRIOR TO PROCEEDING WITH WORK. DESIGNER OR ECOLOGIST DO NOT, EXPRESSLY OR OTHERWISE BY IMPLICATION, EXTEND ANY WARRANTY TO EARTHWORK CALCULATIONS.

8. FILL MATERIAL SHALL BE SPREAD IN LIFTS NOT EXCEEDING 12 INCHES IN COMPACTED THICKNESS, MOISTENED OR DRIED AS NECESSARY TO NEAR OPTIMUM MOISTURE CONTENT AND COMPACTED BY AN APPROVED METHOD. ACCEPTABLE MOISTURE CONTENT AND COMPACTION SHALL BE VERIFIED BY DESIGNER OR ECOLGIST BY VISUAL APPROXIMATION.

9. GENERAL GUIDANCE FOR CUT AND FILL ACTIVITIES: CUT SLOPES SHALL NOT EXCEED A GRADE OF 2 HORIZONTAL TO 1 VERTICAL AS SHOWN IN DESIGN CROSS SECTIONS. FILL AND COMBINATION FILL AND CUT SLOPES SHALL NOT EXCEED 2 HORIZONTAL TO 1 VERTICAL AS SHOWN IN DESIGN CROSS SECTIONS. SLOPES OVER THREE FEET IN VERTICAL HEIGHT SHALL BE PLANTED WITH APPROVED PERENNIAL OR TREATED WITH EQUALLY APPROVED EROSION CONTROL MEASURES PRIOR TO FINAL INSPECTION. INFORMATION PROVIDED IN THE PLANTING PLAN AND NOTES TAKE PRECEDENCE OVER THIS GENERAL GUIDANCE INFORMATION. CONTRACTOR SHALL BRING ANY POTENTIAL DISCREPANCIES BETWEEN GENERAL GUIDANCE AND PLANTING PLAN AND NOTES TO THE ATTENTION OF THE ECOLOGIST FOR RESOLUTION PRIOR TO PROCEEDING WITH WORK.

10. BEST MANAGEMENT PRACTICES FOR CONSTRUCTION ACTIVITIES: ERODED SEDIMENTS AND OTHER POLLUTANTS MUST BE RETAINED ONSITE AND MAY NOT BE TRANSPORTED FROM THE SITE VIA SHEET FLOW, SWALES, AREA DRAINS, NATURAL DRAINAGE COURSES, OR WIND. STOCKPILES OF EARTH AND OTHER CONSTRUCTION RELATED MATERIALS MUST BE PROTECTED FROM BEING TRANSPORTED FROM THE SITE BY THE FORCES OF WIND OR WATER. FUELS, OILS, SOLVENTS, AND OTHER TOXIC MATERIALS MUST BE STORED IN ACCORDANCE WITH THEIR LISTING AND ARE NOT TO CONTAMINATE THE SOIL AND SURFACE WATERS. ALL APPROVED STORAGE CONTAINERS ARE TO BE PROTECTED FROM THE WEATHER. SPILLS MAY NOT BE WASHED INTO THE DRAINAGE SYSTEM. EXCESS OR WASTE CONCRETE MAY NOT BE WASHED INTO PUBLIC WAY OR ANY OTHER DRAINAGE SYSTEM. PROVISIONS MUST BE MADE TO RETAIN CONCRETE WASTES ONSITE UNTIL THEY CAN BE DISPOSED AS A SOLID WASTE. TRASH AND CONSTRUCTION RELATED SOLID WASTE MUST BE DEPOSITED INTO A COVERED WASTE RECEPTACLE TO PREVENT CONTAMINATION OF RAINWATER AND DISPERSAL BY WIND. SEDIMENTS AND OTHER MATERIAL MAY NOT BE TRACKED FROM TO THE SITE BY VEHICLE TRAFFIC.

11. NATIVE COARSE BED MATERIAL WILL BE SALVAGED AND STOCKPILED DURING MASS GRADING OF NEW CHANNEL. IT WILL THEN BE PLACED ALONG THE NEW CHANNEL BOTTOM AS DIRECTED BY DESIGNER AFTER MASS GRADING IS COMPLETED TO CREATE VARIABILITY IN BED MATERIAL WHICH WILL SUPPORT THE NATURAL CREATION OF BEDFORM VARIABILITY OVER TIME.

12. EXISTING LARGE WOOD WILL BE SALVAGED AND PLACED OUT OF THE WAY OF CONSTRUCTION ACTIVITIES TO BE REUSED IN THE CHANNEL AT THE DIRECTION OF THE DESIGNER. APPROXIMATELY 5-10 DEAD COTTONWOOD TREES ARE EXPECTED TO BE SALVAGED FOR REUSE AS WOODY MATERIAL IN THE CHANNEL. THE WOODY MATERIAL WILL PROVIDE FLOW ROUGHNESS IN TANDEM WITH SBS STRUCTURES TO CAUSE LOCALIZED EROSION AND DEPOSITION (DISTURBANCE) THAT WILL CREATE FAVORABLE CONDITIONS FOR NEW VEGETATION ESTABLISHMENT.

13. ROUGHNESS ELEMENTS SUCH AS LARGE WOOD, TRANSPLANTS, SIMULATED BEAVER STRUCTURES, AND NATIVE COARSE BED MATERIAL BARS WILL BE INSTALLED INTO FINISHED CHANNEL AT THE DIRECTION OF THE DESIGNER.

PRE-EARTHWORK NOTES:

1. ALL EQUIPMENT TO BE USED MUST BE CLEANED, INSPECTED, AND APPROVED BY THE DESIGNER OR ECOLOGIST PRIOR TO MOBILIZATION TO THE SITE. EQUIPMENT WITH MUD, DIRT, ORGANIC MATTER, REMNANT SEED, OR OTHER MATERIALS PRESENT WILL NOT BE ALLOWED.

2. IF THE EQUIPMENT WAS PREVIOUSLY USED IN ANOTHER STREAM, RIVER, LAKE, POND, OR WETLAND WITHIN 10 DAYS OF INITIATING WORK, THE FOLLOWING ARE RECOMMENDED METHODS FOR PREVENTING THE SPREAD OF INVASIVE AQUATIC ORGANISMS (E.G., ASIAN CLAM, GRAND VALLEY ASIAN TAPEWORM, GREEN RIVER MUD SNAIL, NEW ZEALAND MUD SNAIL):

   2.1. REMOVE ALL MUD AND DEBRIS FROM EQUIPMENT (TRACKS, TURRETS, BUCKETS, DRAGS, TEETH, ETC.) AND SPRAY/SOAK EQUIPMENT WITH A 1:15 SOLUTION OF DISINFECTION SOLUTION CONTAINING THE FOLLOWING INGREDIENTS: DIALKYL DIMETHYL AMMONIUM CHLORIDE (5-10% BY WEIGHT); ALKYL DIMETHYL BENZYL AMMONIUM CHLORIDE (5-10% BY WEIGHT); NONYL PHENOL ETHOXYLATE (5-10% BY WEIGHT); SODIUM SESQUICARBONATE (1-5%); AND, TETRASODIUM ETHYLENE DIAMINETETRAACETATE (1-15%)

   2.2. THE EQUIPMENT SHOULD BE KEPT MOIST FOR AT LEAST 10 MINUTES, AND RINSATE SHOULD BE MANAGED AS A SOLID WASTE IN ACCORDANCE WITH LOCAL, COUNTY, STATE, OR FEDERAL REGULATIONS. ALTERNATELY, EQUIPMENT, HAND TOOLS, BOOTS AND ANY OTHER EQUIPMENT THAT WAS PREVIOUSLY USED IN A RIVER, STREAM, LAKE, POND, OR WETLAND PRIOR TO MOVING THE EQUIPMENT TO ANOTHER WATER BODY MAY BE DISINFECTED USING THE FOLLOWING METHODS:

   - SPRAY/SOAK EQUIPMENT WITH WATER GREATER THAN 140 DEGREES FAHRENHEIT FOR AT LEAST 10 MINUTES.
   - SANITIZE WATER SUCTION HOSES AND WATER TRANSPORTATION TANKS (USING METHODS DESCRIBED ABOVE) AND DISCARD RINSE WATER AT AN APPROPRIATELY PERMITTED DISPOSAL FACILITY.

3. UNNECESSARY IMPACTS TO EXISTING VEGETATION TO REMAIN WILL BE AVOIDED BY MARKING THE LIMITS OF DISTURBANCE (LOD). THERE WILL BE NO VEHICLE ACCESS IN AREAS OUTSIDE THESE LIMITS, EXCEPT WHERE ON-GOING, LAND DISTURBING AGRICULTURAL LAND USE PRACTICES REMAIN IN EFFECT.

4. CONSTRUCTION ACCESS ROADS WILL BE IN UPLAND AREAS WHEREVER POSSIBLE, EXCEPT WHERE NECESSARY TO CROSS AND REACH ISOLATED AREAS. IF ACCESS ROAD CROSS OR OVERLAP EXISTING CREEK OR WETLAND AREAS TO REMAIN, WOODEN MATS WILL BE USED TO AVOID GROUND DISTURBANCE AND COMPACTION.

5. ALL STAGING AREAS WILL BE IN UPLANDS.

TOPSOIL:

1. SOIL FOUND IN UPLAND OR WETLAND AREAS TO BE DISTURBED THAT IS OBVIOUSLY DARKER DUE TO HIGHER ORGANIC CONTENT WILL BE HARVESTED AND REPLACED IN UPLANDS (ZONES 4 AND 3) TO FACILITATE THE MATURATION OF MESIC AND/OR XERIC PLANT COMMUNITIES. FOUND TOPSOIL WILL NOT BE REPLACED IN WETLANDS TO AVOID BEING WASHED DOWNSTREAM DURING RUNOFF EVENTS.

2. NO ADDITIONAL SOIL TESTING BEYOND WHAT HAS ALREADY BEEN TESTED SHALL BE PERFORMED TO MAKE ORGANIC CONTENT DETERMINATIONS BEYOND VISUAL OBSERVATION.

3. EXISTING TOPSOIL OR THE FINAL SOIL SURFACE (IF NO TRUE TOPSOIL IS PRESENT) SHALL BE REPLACED TO A MINIMUM DEPTH OF 6" AND THEN AMENDED WITH THE SOIL AMENDMENTS OUTLINED IN THESE SPECIFICATIONS.

SHEET 38

VERMILLION CREEK AT DIAMOND PEAK RANCH
WETLAND RESTORATION PROJECT
CONSTRUCTION NOTES 1

NO:	REVISIONS:	DATE:
#1	MODS AS PER AGENCY COMMENTS	9/17/21
#2	MODS AS PER ECOS/SWS	9/17/21
#3	MODS AS PER AGENCY COMMENTS	4/18/22
#4	MODS AS PER AGENCY COMMENTS	6/6/22

DATE: 7-15-21

PROJECT NO: 2020-7-5

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Boulder, Colorado 80310
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ecos ecosystem services
1455 Washburn Street
Erie, Colorado 80516
(p): 970-812-3267

EXISTING HABITAT PROTECTION:

1. CONSTRUCTION FENCE (OR VISUAL MARKERS) SHALL BE INSTALLED AT THE LOD WHERE EXISTING HABITAT MUST BE PRESERVED.

2. AFTER CONSTRUCTION, A PERMANENT FENCE SHALL BE INSTALLED BY THE CLIENT TO PROTECT THE SITE.

3. ANY TREES & SHRUBS TO REMAIN THAT MAY BE AFFECTED BY GRADING OR ACCESS SHALL BE PROTECTED TO AVOID EXCAVATION, COMPACTION OR DISTURBANCE WITHIN THEIR DRIP LINE. IF ANY EXCAVATION IS REQUIRED WITHIN THE DRIP LINE OF TREES AND SHRUBS TO REMAIN, IT WILL BE DONE IN A MANNER, WHICH WILL CAUSE MINIMUM DAMAGE TO THE ROOT SYSTEMS. INJURED ROOTS WILL BE PRUNED CLEANLY AND BACKFILLED AS SOON AS POSSIBLE.

4. STOCKPILES OF EARTH, SOIL AMENDMENT, OR OTHER CONSTRUCTION MATERIALS IN FLOOD PRONE AREAS SHALL BE PLACED IN UPLANDS AS SOON AS PRACTICABLE.

SUBMITTALS:

THE CONTRACTOR WILL PROVIDE THE DESIGNER AND ECOLOGIST WITH COPIES OF THE FOLLOWING SUBMITTALS A MINIMUM OF 10 WORKING DAYS PRIOR TO DELIVERY UNLESS NOTED OTHERWISE BELOW:

1. **LIST OF EQUIPMENT** TO BE USED FOR ALL OPERATIONS, INCLUDING PLANTING AND SEEDING.

2. **LIST OF ALL KEY EMPLOYEES** (PROJECT MANAGERS, SUPERVISORS, FOREMEN, EQUIPMENT OPERATORS) WHO WILL BE WORKING ON THE PROJECT, INCLUDING THEIR POSITIONS, ROLES AND RESPONSIBILITIES. THE CONTRACTOR SHALL PROVIDE THE KEY EMPLOYEES LISTED AND SHALL NOT MAKE SUBSTITUTIONS WITHOUT PRIOR APPROVAL (WRITTEN OR VERBAL) OF THE ENGINEER OR ECOLOGIST. THE DESIGNER OR ECOLOGIST RESERVE THE RIGHT TO WAIVE THIS REQUIREMENT.

3. **PRE- AND POST-CONSTRUCTION DIGITAL PHOTOS** OF ANY FENCE, STRUCTURE, OR WORK AREA THAT IS TO BE REMOVED, DISTURBED, RESTORED OR REPLACED DURING THE COURSE OF THE PROJECT.

THE CLIENT WILL PROVIDE THE DESIGNER AND ECOLOGIST WITH COPIES OF THE FOLLOWING SUBMITTALS:

1. **LIST OF EQUIPMENT** TO BE USED FOR ALL OPERATIONS, INCLUDING PLANTING AND SEEDING.

2. **LIST OF ALL KEY EMPLOYEES** (PROJECT MANAGERS, SUPERVISORS, FOREMEN, EQUIPMENT OPERATORS) WHO WILL BE WORKING ON THE PROJECT, INCLUDING THEIR POSITIONS, ROLES AND RESPONSIBILITIES. THE CLIENT SHALL PROVIDE THE KEY EMPLOYEES LISTED AND SHALL NOT MAKE SUBSTITUTIONS WITHOUT PRIOR APPROVAL (WRITTEN OR VERBAL) OF THE DESIGNER AND ECOLOGST. THE DESIGNER AND ECOLOGIST RESERVES THE RIGHT TO WAIVE THIS REQUIREMENT.

3. **AGRONOMIC SOIL TESTS** WERE CONDUCTED DURING THE DESIGN DEVELOPMENT. HOWEVER, IF UNUSUAL SOILS ARE DISCOVERED DURING THE CONSTRUCTION, MONITORING OR MAINTENANCE PERIODS, ADDITIONAL SOIL TESTS MAY BE REQUIRED. WHEN REQUIRED, THE ANALYSIS SHALL INDICATE THE SOIL CHARACTERISTICS (E.G., SANDY CLAY LOAM), ANY NUTRIENT DEFICIENCIES OR EXCESSES, AND RECOMMENDED AMENDMENTS AND RATES, INCLUDING MACRO- AND MICRO-NUTRIENTS FOR NATIVE SEEDING (NOT RESIDENTIAL TURF GRASS).

4. **SOIL AMENDMENT MATERIAL LITERATURE** ON THE TYPE, COMPOSITION AND RECOMMENDED APPLICATION RATES OF ANY SOIL AMENDMENT MATERIALS PROPOSED.

5. **SEED CERTIFICATES & SEED TAGS** THAT INCLUDE SUPPLIER, SOURCE, ORIGIN OF STOCK, BOTANICAL NAME, COMMON NAME, POUNDS AND PERCENTAGE OF PURE LIVE SEED FOR EACH SPECIES SPECIFIED. SEED TAGS SHALL BE PROVIDED AFTER SEED DELIVERY ATTESTING THAT SEED WAS DELIVERED ACCORDING TO THE ORIGINAL CERTIFICATES.

6. HYDROMULCH AND TACKIFIER SPECIFICATION SHEETS.

7. **BRUSH DELIVERY SCHEDULE** INCLUDING THE QUANTITY OF BRUSH COLLECTED TO USE IN SIMULATED BEAVER STRUCTURES (SBS)

9. **WILLOW DELIVERY SCHEDULE** INCLUDING THE QUANTITY OF WILLOW CUTTINGS COLLECTED TO BE DELIVERED.

10. **WILLOW COLD STORAGE IDENTIFICATION** INCLUDING THE LOCATION AND CAPABILITIES TO KEEP WILLOWS STORED COLD AND WET.

11. **IRRIGATION PLAN** INCLUDING BUT NOT LIMITED TO LAYOUT, PIPE SIZE, HEAD SPACING, TYPE OF HEADS, TAP LOCATION AND SIZE, VALVE & CONTROLLER LOCATIONS, WATER PRESSURE, SPRAY DISTANCE AND OTHER RELEVANT INFORMATION DEEMED NECESSARY BY THE ECOLOGIST.

12. **WEED MANAGEMENT LOG** INCLUDING MEANS, METHODS, MATERIALS, DATES AND LOCATIONS WHERE MANAGEMENT WAS APPLIED.

13. **GROUND WATER MEASUREMENT LOG** SHOWING DATA COLLECTED AS SPECIFIED IN THE MONITORING & ADAPTIVE MANAGEMENT PLAN (MAM PLAN).

14. **PLANT MAINTENANCE LOG** FOLLOWING EACH MAINTENANCE SITE VISIT THAT DOCUMENTS ANY WILDLIFE DEPREDATION OF PROTECTED TREES AND ANY REMEDIAL ACTIVITIES IMPLEMENTED TO PROTECT SAID TREES.

CLARIFICATION NOTE FOR CONTRACTOR: EROSION CONTROL FABRIC AND/OR BLANKET, NURSERY GROWN PLANTS AND WOOD MULCH ARE NOT SPECIFIED FOR THIS PROJECT.

SUBSTITUTIONS:

1. EROSION CONTROL FABRIC, BLANKET, ASSOCIATED HARDWARE OR FASTENERS (IF SPECIFIED) SHALL BE EQUIVALENT OR BETTER THAN THOSE SPECIFIED. ANY SUBSTITUTIONS SHALL BE APPROVED BY THE DESIGNER OR ECOLOGIST PRIOR TO ORDERING AND DELIVERY TO THE SITE.

2. THE CLIENT SHALL CONTACT A MINIMUM OF THREE (3) SEED OR PLANT SUPPLIERS AND MAKE EVERY EFFORT TO OBTAIN THE SPECIFIED SPECIES AND QUANTITIES BEFORE CONCLUDING A SPECIES IS UNAVAILABLE. THEREAFTER, ANY SUBSTITUTIONS WILL BE BROUGHT TO THE ATTENTION OF THE ECOLOGIST FOR APPROVAL PRIOR TO ACQUISITION. PLANT SUPPLIERS SHALL BE ESTABLISHED, QUALIFIED COMMERCIAL SEED SUPPLIERS OR NURSERIES.

3. CONTRACTORS SHALL SUBMIT REQUESTS FOR SUBSTITUTIONS SUFFICIENTLY IN ADVANCE TO AVOID DELAY OF ANY WORK.

4. IN MAKING A REQUEST FOR SUBSTITUTIONS, OR IN USING AN APPROVED SUBSTITUTE ITEM, THE CONTRACTORS REPRESENT THAT THEY:

   A. HAVE PERSONALLY INVESTIGATED THE PROPOSED PRODUCT OR METHOD, AND HAVE DETERMINED THAT IT IS EQUAL OR SUPERIOR IN ALL RESPECTS TO THAT SPECIFIED AND THAT IT WILL PERFORM THE FUNCTION FOR WHICH IT IS INTENDED.

   B. WILL PROVIDE THE SAME GUARANTEE FOR THE SUBSTITUTE ITEM AS FOR THE PRODUCT OR METHOD SPECIFIED.

   C. WILL COORDINATE INSTALLATION OF THE APPROVED SUBSTITUTION INTO THE WORK.

   D. WAIVE ALL CLAIMS FOR ADDITIONAL REIMBURSEMENT RELATED TO ANY EQUIVALENT SUBSTITUTIONS OR QUANTITIES, UNLESS OTHERWISE WAIVED BY THE CLIENT.

   E. WILL REIMBURSE THE CLIENT IF SMALLER OR FEWER PLANTS ARE PROVIDED THAT DIFFER FROM THOSE SPECIFIED IN THE PLANT SCHEDULES.

SOIL PREPARATION:

1. THE FINAL SOIL SURFACE ~~OR SUBSTRATE~~ (IF OVERLY COMPACTED) SHALL BE COMPLETELY RIPPED IN 2 DIRECTIONS TO A MINIMUM DEPTH OF 12" PRIOR TO SEEDING.

2. ANY LARGE CLODS, COBBLE, ROCK, BRANCHES OR OTHER MATERIAL THAT WOULD PREVENT FLUSH INSTALLATION OF EROSION CONTROL BLANKET/FABRIC (IF SPECIFIED) OR EFFECTIVE USE OF A DRILL SEEDER OR MOWERS SHALL BE REMOVED FROM THE AREA OR REDUCED IN SIZE TO LESS THAN 2" PRIOR TO SEEDING AND/OR FABRIC INSTALLATION. FAILURE TO PROPERLY PREPARE THE GROUND COULD RESULT IN COMPLETE REINSTALLATION OF SEED AND/OR EROSION CONTROL FABRIC (IF SPECIFIED).

SEEDING:

1. SEEDING SHALL BE PERFORMED BY THE CLIENT ACCORDING TO THESE SPECIFICATIONS.

2. SEEDING AREAS SHALL BE AMENDED WITH MACRO- OR MICRO-NUTRIENTS AND OTHER SOIL AMENDMENTS AS FOLLOWS:

   A. ENDO MYCHORRIZAL INOCULUM SHALL BE APPLIED TO ALL SEEDING AREAS AT A MINIMUM RATE OF TWENTY (20) POUNDS PER ACRE OR AS A LIQUID AT AN EQUIVALENT RATE. MYCHORRIZAL INOCULUM SHALL CONTAIN THREE SPECIES OF ENDOMYCORRIZE, SHALL BE CERTIFIED WITH A MINIMUM COUNT OF 100,000 PROPAGULES PER POUND.

   B. HUMATE SHALL BE APPLIED AT A RATE OF MINIMUM 500 POUNDS PER ACRE (DRY GRANULES) OR APPLIED AS A LIQUID AT AN EQUIVALENT RATE. HUMATES SHALL BE APPLIED TOPICALLY AND THEN TURNED IN TO THE TOPSOIL DURING DRILL SEEDING. **LIQUID HUMATE SHALL BE QUANTUM ORGANIC VSC SOIL ACTIVATOR APPLIED AT A RATE OF 4 GALLONS/ACRE.**

   C. ORGANIC MATTER/COMPOST (AGED MANURE) IS NOT REQUIRED. ~~**SOURCED FROM THE CLIENT'S RANCH WILL BE DISCED INTO THE TOP 6 INCHES OF THE SOIL SURFACE AT A RATE OF 130 CUBIC YARDS PER ACRE AS AN ADAPTIVE MANAGEMENT MEASURE IN UPLAND BUFFER AREAS THAT MAY BE TOO ALKALINE TO ESTABLISH VEGETATION WITHOUT ADDITIONAL REMEDIATION.** COMPOST WILL NOT BE APPLIED TO THE ENTIRE UPLAND BUFFER, WETLANDS OR AREAS PRONE TO FREQUENT FLOODING OR INUNDATION TO AVOID WATER QUALITY ISSUES.~~

3. **CERTIFIED WEED FREE STRAW SHALL BE APPLIED TO ALL SEEDING AREAS AT A MINIMUM RATE OF 4000 POUNDS PER ACRE (2 TONS/AC).** STRAW SHALL BE APPLIED EVENLY TO THE SEEDING SURFACE. NO MOUNDS OF CLUMPS OF HAY THAT MAY PREVENT SEED GERMINATION WILL BE PERMITTED.

4. ALL SEED SHALL CONFORM TO CURRENT STATE AND FEDERAL REGULATIONS AND SHALL BE SUBJECT TO THE TESTING PROVISIONS OF THE ASSOCIATION OF OFFICIAL SEED ANALYSIS.

5. SEED WILL BE DELIVERED UNMIXED, IN INDIVIDUAL BAGS IN THE QUANTITIES SHOWN ON THE SEED SCHEDULES. THE SEED WILL BE MIXED ON SITE AND PLACED IN THE APPROPRIATE DRILL SEEDER HOPPERS OR BROADCASTER BY CLIENT OR A QUALIFIED SEEDING CONTRACTOR PURSUANT TO THE SEED SCHEDULES.

6. DRILL SEEDING IS THE PREFERRED METHOD OF APPLICATION, FOLLOWED BY HYDRO-SEEDING, FOLLOWED BY HAND BROADCAST SEEDING AS FEASIBLE DEPENDING ON TERRAIN AND WHERE NECESSARY.

7. THE DRILL SEEDER SHALL BE EQUIPPED WITH: DISCS TO CUT FURROWS FOR THE SEED; DEPTH BANDS SET AT 1/2"; ROWS OR FURROWS A MAXIMUM OF 6" APART; TWO DIFFERENT TYPES OF SEED BOXES TO HANDLE SMALL AND LARGE SEED, WITH INDEPENDENT ADJUSTMENTS FOR EACH TYPE OF BOX; AGITATORS IN THE SEED BOXES TO MIX SEEDS; ABILITY TO METER SEED FLOW WITH PRECISION; AND REAR PACKER WHEELS TO COMPACT SOIL OVER PLANTED SEED. PRIOR TO COMMENCEMENT OF SEEDING, CALIBRATION TESTS SHALL BE CONDUCTED ON THE EQUIPMENT TO DETERMINE THAT THE SPECIFIED SEEDING RATE WILL BE MET.

8. SEED SHALL BE DRILLED 1/4 TO 1/2 INCH INTO THE SOIL SURFACE USING A NO-TILL DRILL ON SLOPES WHERE MACHINERY CAN SAFELY OPERATE USING THE SEED RATES INDICATED ON THE SEED SCHEDULES. AREAS INACCESSIBLE BY DRILL SHALL BE HYDRO-SEEDED OR HAND SEEDED, DOUBLING THE DRILL SEEDING RATES INDICATED ON THE SEED SCHEDULES. HAND SEEDED AREAS SHALL BE COMBINED WITH SAND OR VERMICULITE FOR EASE OF SPREADING AND SEEDED IN TWO PERPENDICULAR PASSES TO ENSURE FULL COVERAGE. EVERY SQUARE FOOT OF SOIL, INCLUDING SOIL EXCAVATION FROM FABRIC KEY TRENCHES, IF SPECIFIED.

9. ALL SMALL/FINE SEED SHALL BE DRILLED AND BROADCAST SIMULTANEOUSLY VIA THE DRILL SEEDER. FILLERS (E.G., FINE SAND, VERMICULITE) SHALL BE USED FOR ALL SMALL/FINE SEED TO ENSURE ADEQUATE AND EVEN DISTRIBUTION.

10. THE DRILL SEEDER SHALL MAKE TWO PASSES; THE SECOND IN A DIRECTION THAT IS PERPENDICULAR TO THE FIRST, AS TOPOGRAPHY ALLOWS.

11. SHORTAGES OF SEED AND FAILURE TO COVER THE DESIGNATED AREA DUE TO INADEQUATE CALIBRATION WILL BE CORRECTED AND COMPENSATED AT THE CLIENT'S EXPENSE.

12. ALL SEED SOWN BY HYDRO-SEEDING OR HAND BROADCASTING SHALL BE RAKED IN AND/OR HARROWED 1/4 TO 1/2 INCH INTO THE SOIL SURFACE, AND COMPACTED GENTLY TO ENSURE GOOD SEED-TO-SOIL CONTACT.

13. BROADCAST SEEDING SHALL BE ACCOMPLISHED USING HAND-OPERATED "CYCLONE"-TYPE SEEDERS CONTAINING AGITATORS AND PICKER WHEELS TO DISTRIBUTE FLUFFY SEED. THE LARGER SEED SPECIES SHALL BE COMBINED AND SEEDED FIRST. SMALLER SEED SPECIES SHALL BE MIXED WITH A FILLER AND THEN APPLIED OVER THE LARGER SEED. SEED SHALL BE FREQUENTLY MIXED WITHIN THE HOPPER TO ENSURE EVEN DISTRIBUTION OF SPECIES.

14. SEED SHALL BE INSTALLED PRIOR TO CONSISTENT GROUND FREEZE FROM APPROX. SEPT. 1 TO NOV. 31 FOR DORMANT SEEDING OR AFTER SPRING THAW FROM APPROX. APRIL 1 TO MAY 31 FOR ACTIVE SEEDING, UNLESS OTHERWISE APPROVED BY THE DESIGNER OR ECOLOGIST, SEEDING SHALL BE PERFORMED ONLY DURING SPECIFIED PERIODS OR WHEN SITE AND WEATHER CONDITIONS WILL PRODUCE BENEFICIAL RESULTS. IF THE CLIENT PERFORMS SEEDING OUTSIDE OF THE SPECIFIED SEASONS OR WHEN UNSATISFACTORY SITE CONDITIONS SUCH AS EXCESSIVE MOISTURE, HIGH WIND VELOCITIES, OR WHEN THE SOIL IS IN A FROZEN OR CRUSTED STATE PREVENTING PROPER DISTRIBUTION AND IMPREGNATION OF SEED, THEN THE CLIENT WILL INSURE ADEQUATE GERMINATION AND GROWTH CONDITIONS, RESEED, REMULCH, AND REPAIR ANY AREAS THAT FAIL TO PRODUCE AT THE THEIR OWN EXPENSE.

15. ANY STRAW MULCH USED SHALL CONSIST OF CERTIFIED WEED-FREE FIELD STRAW FROM OATS, BARLEY, WHEAT, RYE, OR TRITICALE CERTIFIED UNDER THE COLORADO DEPT. OF AGRICULTURE WEED FREE FORAGE CERTIFICATION PROGRAM. STRAW IN AN ADVANCED STAGE OF DECOMPOSITION OR STRAW THAT BREAKS IN THE CRIMPING PROCESS WILL NOT BE ACCEPTED.

16. CERTIFIED WEED FREE STRAW MULCH SHALL BE UNIFORMLY APPLIED AND ANCHORED INTO THE SOIL WITH EQUIPMENT HAVING FLAT, SERRATED DISKS WITH DULL EDGES AND DISKS SPACED NO MORE THAN 6 INCHES APART. MULCH SHALL BE ANCHORED TO A DEPTH OF AT LEAST 4 INCHES AND SHALL NOT BE COVERED WITH AN EXCESSIVE AMOUNT OF SOIL. ANCHORING OPERATIONS SHALL BE ACROSS THE SLOPES WHERE PRACTICAL WITH NO MORE THAN TWO PASSES OF THE ANCHORING EQUIPMENT. CRIMPING BY HAND SHOVEL OR OTHER MECHANICAL MEANS SHALL BE PERFORMED ON AREAS INACCESSIBLE TO LARGE CRIMPING EQUIPMENT. **MULCH SHALL BE TACKIFIED TO THE GROUND SURFACE AT A RATE OF 200# PER ACRE**. SEEDED AREAS SHALL BE MULCHED ON THE SAME DAY AS THEY ARE SEEDED.

17. SPRAY-ON OR **HYDROMULCH SHALL CONSIST OF A WOOD CELLULOSE HYDRAULICALLY MATRIX APPLIED AT A RATE OF 3000 LBS/ACRE WITH AN ORGANIC TACKIFIER APPLIED AT A RATE OF 150 LBS/ACRE.** HYDROMULCHING SHALL BE A SECOND, SEPARATE OPERATION PERFORMED AFTER SEEDING AND RAKING/HARROWING.

18. IF NEEDED, EROSION CONTROL FABRIC (ECF) AND/OR BLANKET (ECB) OR APPROVED EQUIVALENTS, SHALL BE PROVIDED & INSTALLED AS DIRECTED BY DESIGNER OR ECOLOGIST.

PLANTING:

DELIVERY:

1. ALL SPECIFIED NURSERY GROWN (IF SPECIFIED IN THE PLANT SCHEDULES) SHALL BE DELIVERED TO THE SITE PRIOR TO INSTALLATION TO ALLOW FOR INSPECTION AND ADVANCE STAGING .

2. NURSERY GROWN PLANT MATERIAL (IF SPECIFIED IN THE PLANT SCHEDULES) WILL BE DELIVERED TO THE SITE IN THE SPECIES, SIZE/FORM, AND QUANTITIES SPECIFIED. WILL BE ACCOMPANIED BY A SHIPPING CERTIFICATE ATTESTING TO THE SAME. THE CLIENT AND/OR ECOLOGIST SHALL COUNT AND CONFIRM THE DELIVERY IS ACCURATE AND INSPECT PLANT MATERIAL TO ENSURE THE PLANT MATERIAL IS IN GOOD CONDITION AND HEALTH.

3. NURSERY GROWN PLANT MATERIAL (IF SPECIFIED IN THE PLANT SCHEDULES) SHALL BE STAGED AND WELL ORGANIZED BY SPECIES IN SEPARATE AND IDENTIFIABLE GROUPS DURING UNLOADING.

4. NURSERY GROWN PLANTS (IF SPECIFIED IN THE PLANT SCHEDULES) SHALL BE IDENTIFIED WITH AN ATTACHED, DURABLE, WATERPROOF LABEL AND WEATHER RESISTANT INK, STATING THE CORRECT SCIENTIFIC AND COMMON NAME.

5. NURSERY GROWN PLANT MATERIAL (IF SPECIFIED IN THE PLANT SCHEDULES) SHALL BE PROTECTED DURING DELIVERY TO PREVENT DESICCATION AND DAMAGE TO THE BRANCHES, TRUNK, ROOT SYSTEMS, OR EARTH/ROOTBALL. BRANCHES SHALL BE PROTECTED BY TYING-IN. EXPOSED BRANCHES SHALL BE COVERED DURING TRANSPORT.

6. ALL PLANT MATERIAL, NURSERY GROWN OR HARVESTED FOR TRANSPLANT SHALL BE KEPT WATERED AND MAINTAINED IN GOOD HEALTH DURING TRANSPORT AND THEREAFTER UNTIL THE PROJECT IS APPROVED.

PLANT QUALITY:

1. 1. ALL NURSERY GROWN PLANTS (IF SPECIFIED IN THE PLANT SCHEDULES) WILL BE CHECKED AND APPROVED BY THE ECOLOGIST & CLIENT PRIOR TO PLANTING TO ENSURE CONFORMITY OF SPECIES, QUALITY AND QUANTITY. PLANT MATERIAL SHALL:

   A. BE NATIVE TO COLORADO (NO HYBRIDS OR CULTIVARS);

   B. BE WELL SHAPED, VIGOROUS AND HEALTHY WITH A WELL BRANCHED ROOT SYSTEM, FREE FROM DISEASE, HARMFUL INSECTS AND INSECT EGGS, SUN-SCALD INJURY, DISFIGUREMENT OR ABRASION;

   C. CHECKED FOR UNAUTHORIZED SUBSTITUTION AND EXHIBIT TYPICAL FORM OF BRANCH TO HEIGHT RATIO;

   D. MEET THE CONTAINER, CALIPER, SIZE, FORM OR HEIGHT MEASUREMENTS SPECIFIED;

   E. SHOW NEW FIBROUS ROOTS AND MAINTAIN ITS SHAPE WHEN REMOVED FROM THE CONTAINER AND NOT HAVE BROKEN OR CRACKED ROOTBALLS, OR BROKEN CONTAINERS;

   F. CONFORM TO THE AMERICAN ASSOCIATION OF NURSERYMEN'S STANDARDS FOR NURSERY STOCK.

2. IF WITHIN 24 HOURS OF DELIVERY THE ECOLOGIST DETERMINES THAT IF ANY NURSERY GROWN PLANT MATERIAL DOES NOT MEET THESE SPECIFICATIONS, THE UNACCEPTABLE MATERIAL SHALL BE REJECTED, REMOVED, AND REPLACED AT NO EXPENSE TO THE CLIENT.

3. IF OVER THE COURSE OF THE PROJECT THE ECOLOGIST DISCOVERS THE CLIENT OR CONTRACTOR HAS FAILED TO PROPERLY STORE, INSTALL & MAINTAIN ANY PREVIOUSLY ACCEPTED PLANT MATERIAL, SAID MATERIAL WILL BE REMOVED AND REPLACED WITH ACCEPTABLE MATERIAL.

STORAGE:

1. PLANT MATERIALS SHALL BE STORED AND PROTECTED IN DESIGNATED TEMPORARY ON-SITE NURSERY AREA. PLANT MATERIAL SHALL BE PROTECTED FROM DIRECT EXPOSURE TO WIND AND SUN, KEPT SHADED AND MOIST BY WATERING, EITHER BY HAND OR A TEMPORARY IRRIGATION SYSTEM UNTIL INSTALLED.

2. ONLY THE NUMBER OF WILLOW CUTTINGS THAT CAN BE PLANTED IN ONE DAY WILL BE REMOVED FROM COLD STORAGE AND DELIVERED TO THE PLANTING SITE. IMMEDIATELY AFTER HARVESTING, WILLOW CUTTINGS SHALL BE STORED IN A COLD/COOL, DARK OR SHADED LOCATION UNTIL PLANTED. CUTTINGS SHALL BE KEPT MOIST DURING STORAGE & THEN SOAKED, FULLY SUBMERGED BETWEEN 3 AND 7 DAYS PRIOR TO PLANTING. FAILURE TO PROPERLY STORE AND HYDRATE WILLOW CUTTINGS OR IF CUTTINGS LINGER ON SITE EXPOSED TO SUN AND DESICCATION FOR MORE THAN 2 DAYS BEFORE PLANTING THEY WILL BE NEED TO BE REPLACED.

HANDLING:

1. PLANT MATERIAL SHALL NOT BE INJURED DURING HANDLING OR PLANTING. TRANSPLANTS OR CUTTINGS SHALL NOT BE ALLOWED TO BECOME DRY.

WOOD FIBER MULCH (FOR PLANT SAUCERS):

1. ORGANIC WOOD FIBER (NOT SPECIFIED FOR THIS PROJECT) SHALL BE USED TO HELP RETAIN SOIL MOISTURE IN PLANTING SAUCERS AND CONSIST OF SHREDDED WOOD FIBER (A.K.A., GORRILA HAIR) OR APPROVED EQUIVALENT TO A DEPTH OF 4". MULCH SHALL BE FREE FROM WEEDS, MOLD, AND OTHER DELETERIOUS MATERIALS.

PLANT INSTALLATION:

1. IF DIRECTED BY THE ECOLOGIST, PLANTS CAPABLE OF DEEP BURIAL WILL BE DEEP PLANTED SO THAT THEIR ROOT BALL IS IN CONTACT WITH OR JUST ABOVE THE CAPILLARY FRINGE (I.E., LOW GROUNDWATER LEVEL). PLANTS NOT DESIGNATED FOR DEEP PLANTING (REFER TO PLANT SCHEDULES) SHALL BE DUG TO A DEPTH EQUAL TO THE HEIGHT OF THE ROOT BALL AS MEASURED FROM THE BASE OF THE BALL TO THE BASE OF THE PLANT TRUNK SO THAT THE TOP OF THE ROOT BALL IS LEVEL WITH THE FINAL GRADE. ALL PLANT PITS SHALL BE DUG A MINIMUM 2 TIMES THE WIDTH OF THE ROOT BALL TO ALLOW FOR ROOT EXPANSION. THE PIT SHALL BE EXCAVATED WITH ROUGHENED SIDES, SLOPING TOWARDS THE BASE AS A CONE. CYLINDRICAL PITS WITH VERTICAL SIDES, ESPECIALLY IN CLAY, SHALL NOT BE USED. **(REFER TO PLANTING DETAILS AND PLANT SCHEDULES FOR THOSE PLANTS THAT CAN BE DEEP PLANTED).**

2. PLANT MATERIAL SHALL BE INSERTED INTO THE CENTER OF THE PIT, SET PLUMB, AND HELD IN POSITION UNTIL SUFFICIENT NATIVE SOIL HAS BEEN FIRMLY PLACED AROUND THE ROOT SYSTEM.

3. ROOT BOUND PLANTS WILL BE SCORED OR RIPPED 1/4 TO 1/2 INCH DEEP AT 3 TO 4 LOCATIONSAROUND THE EDGES OF THE ROOT BALL.

4. BACKFILL SOIL SHALL BE COMPOSED OF NATIVE SOIL. IF NATIVE SOIL IS GREATER THAN 50 PERCENT ROCK THEN ONLY AMENDED TOPSOIL WITH HUMATE SHALL BE USED.

5. PRIOR TO BACKFILLING, ALL BURLAP & WIRE BASKETS (IF PRESENT) SHALL BE REMOVED FROM THE BALL OR ROOT SYSTEM AVOIDING DAMAGE TO THE ROOT SYSTEM.

6. BACKFILL SOIL SHALL BE CAREFULLY WORKED AROUND AND OVER THE PLANT ROOTS AND THOROUGHLY AND PROPERLY SETTLED BY FIRMING, HAND TAMPING, AND "WATERING IN". NO AIR POCKETS AROUND THE ROOTBALL SHALL BE PRESENT.

7. A 4-6" MINIMUM HIGH COMPACTED EARTH BERM OR SAUCER, CONSISTING OF BACKFILL EXCAVATED FROM THE PIT, SHALL BE FORMED AROUND THE EDGE OF PLANT PITS (NURSERY GROWN OR TRANSPLANTS) TO AID IN WATER RETENTION AND TO PROVIDE SOIL SETTLING ADJUSTMENTS. PLANTS SMALLER THAN 1 GAL. DO NOT REQUIRE A SAUCER.

VERMILLION CREEK AT DIAMOND PEAK RANCH
WETLAND RESTORATION PROJECT 2

NO:	REVISIONS:	DATE:
#1	MODS AS PER AGENCY COMMENTS	9/17/21
#2	MODS AS PER ECOS/SWS	9/17/21
#3	MODS AS PER AGENCY COMMENTS	4/18/22
#4	MODS AS PER AGENCY COMMENTS	6/6/22

DATE: 7-15-21

PROJECT NO: 2020-7-5

Stillwater Sciences
4845 Pearl East Circle, Ste. 101
Boulder, Colorado 80310
(p): 720-656-2330

ecos ecosystem services
1455 Washburn Street
Erie, Colorado 80516
(p): 970-812-3267

PLANTING (CONT'D):

8. SOIL EXCAVATED FROM THE PLANT PIT WILL BE HANDLED DELIBERATELY TO FORM THE PLANT SAUCER AND WILL NOT BE CARELESSLY SPREAD OUT OR COVER EXISTING VEGETATION OR AREAS THAT HAVE BEEN SEEDED. WHEN INTER-PLANTING IN EXISTING, MATURE GRASSLAND OR WETLAND, EXCAVATED SOIL WILL BE PLACED ON A TARP OR SIMILAR TO AVOID INDISCRIMINATE SPOILS FROM BURYING SAID EXISTING VEGETATION. EXCESS SOIL EXCAVATED FROM THE PLANT PIT THAT IS NOT USED TO FORM THE SAUCER OR USED FOR ONSITE FILL WILL BE HAULED AWAY FROM THE PROJECT SITE AND DISPOSED OF PROPERLY. THE PLANT SAUCER AND BASIN WILL BE SEEDED.

9. ALL PLANT MATERIAL SHALL BE WATERED IMMEDIATELY AFTER BACKFILLING UNTIL COMPLETELY SATURATED. **SEE WATERING PARAMETERS.**

10. WOOD MULCH WITHIN SAUCERS (IF SPECIFIED) SHALL BE PLACED THE SAME DAY AS PLANTING.

11. PRUNING, IF NECESSARY, SHALL BE ACCOMPLISHED BY THE PLANTING CONTRACTOR ~~CLIENT~~. ONLY DEAD OR BROKEN MATERIAL SHALL BE PRUNED FROM INSTALLED PLANTS. THE TYPICAL GROWTH HABIT OF INDIVIDUAL PLANT MATERIAL SHALL BE RETAINED.

TRANSPLANTS:

1. PLANTS HARVESTED/SALVAGED FROM DESIGNATED ON-SITE SOURCES, INCLUDING WILLOW CLUMPS, CUTTINGS OR COTTONWOOD, SHALL BE CAREFULLY REMOVED AND TRANSPLANTED PRIOR TO ANY CLEARING, GRUBBING OR MASS GRADING ACTIVITIES.

2. THE ROOTBALL OF HARVESTED PLANTS (EXCEPT WILLOW CUTTINGS) SHALL BE CAREFULLY EXCAVATED FROM THE GROUND AND THEN PRESERVED EITHER BY BALL & BURLAP (B&B), PLACEMENT IN APPROPRIATELY SIZED CONTAINERS, OR VIA DIRECT TRANSPLANT TO A FINAL LOCATION. THE TRANSPLANT LOCATION MUST BE EXCAVATED PRIOR TO HARVESTING SO THAT MATERIAL CAN BE TAKEN DIRECTLY FROM THE HARVEST LOCATION TO FINAL LOCATION TO AVOID EXCESIVE BREAK-UP OF THE ROOTBALL. SOME BRANCH AND ROOTBALL BREAKAGE AND BREAK-UP IS EXPECTED.

3. WILLOW TRANSPLANTS (WILLOW CLUMPS) SHALL BE HEALED IN THE GROUND IN THEIR FINAL LOCATIONS WITH NATIVE SOIL AND THEN WATERED IN TO REMOVE AIR POCKETS AROUND THE ROOTS (TO THE EXTENT FEASIBLE). WILLOW CLUMP TRANSPLANTS DO NOT HAVE TO BE SET AT THE SAME GRADE AS THEY WERE AT THEIR ORIGINAL LOCATION, BUT CANNOT BE HIGHER.

4. REFER TO WILLOW CLUMP DETAIL.

MAINTENANCE :

1. ALL PLANTED MATERIAL AND SEEDED AREAS SHALL BE MAINTAINED BY THE CLIENT DURING CONSTRUCTION AND THEREAFTER UNTIL PERFORMANCE STANDARDS ARE MET. FINAL INSPECTION AND FINAL ACCEPTANCE BY THE ECOLOGIST WILL OCCUR AFTER GRADING AND REVEGETATION EFFORTS HAVE BEEN COMPLETED ACCORDING TO THESE PLANS. FINAL ACCEPTANCE WILL MARK THE BEGINNING OF THE MONITORING AND MAINTENANCE PERIOD FOR VEGETATION. REFER TO MAM PLAN FOR THE MONITORING PERIOD AND PERFORMANCE STANDARDS.

2. MAINTENANCE TASKS WILL INCLUDE WEED CONTROL, RESEEDING & MULCHING & WATERING.

WEED CONTROL:

1. THE GOAL OF WEED MANAGEMENT IS TO COMPLY WITH THE COLORADO NOXIOUS WEED MANAGEMENT ACT (CNWA) TO ELIMINATE LIST A & REDUCE LIST B SPECIES TO LESS THAN 10% MEAN FOLIAR COVER TO MEET THIS GOAL, THE OBJECTIVES OF WEED MANAGEMENT IS TO BREAK THE ABOVE AND BELOW GROUND WEED SEED AND ROOT SPREADING CYCLE OF UNDESIREABLE PLANTS (WEEDS) SO THAT THEY DO NOT REGENERATE FROM SEED, PROPAGULES OR ROOTS THAT WILL EMERGE THE FOLLOWING YEAR(S); AND TO STRESS UNDESIRABLE WEEDS TO A POINT WHERE THEY ARE OUTCOMPETED BY DESIRABLE PLANTS.

2. LIST A & B NOXIOUS WEEDS, AS LISTED IN CNWA SHALL BE MONITORED & CONTROLLED BY THE CLIENT USING A QUALIFIED WEED MANAGEMENT SPECIALIST FAMILIAR WITH CONTROL OF SAID WEEDS WHERE THEY PREVENT THE ESTABLISHMENT OF NATIVE OR NATURALIZED STANDS OF VEGETATION.

3. THESE MAINTENANCE NOTES OUTLINE GENERAL WEED CONTROL MEASURES AND TIMING. A WEED MANAGEMENT SPECIALIST SHALL PREPARE A SPECIFIC WEED MANAGEMENT PLAN BASED ON ACTUAL OBSERVED WEEDS THAT EMERGE ON THE SITE. CLIENT/WEED MANAGEMENT SPECIALIST SHALL OBTAIN EPA/BLM APPROVALS PRIOR TO THE APPLICATION OF ANY HERBICIDES/CHEMICAL CONTROLS

4. SPECIFIC PERFORMANCE CRITERIA FOR TOLERABLE COVERAGE OF NOXIOUS WEEDS ARE OUTLINED IN THE MAM PLAN. THE AREA WHERE WEEDS SHALL BE MANAGED INCLUDES:

   - THE ACTIVE FOOTPRINT OF THE PROJECT AS DEFINED BY THE OUTER LIMITS OF RESTORED WETLANDS PLUS A 25-FOOT BUFFER AS SHOWN ON THE PLANS (I.E., THE RESTORATION AREA);

3. NOXIOUS WEEDS (ON CNWA LISTS A & B) SHALL BE MONITORED & CONTROLLED BY THE BLM ON BLM LAND WHERE WEEDS AND WEED VECTORS PREVENT THE ESTABLISHMENT OF NATIVE OR NATURALIZED STANDS OF VEGETATION IN THE RESTORATION AREA.

4. COLORADO STATE NOXIOUS WEEDS ARE DEFINED AS FOLLOWS ACCORDING TO RULES PERTAINING TO THE ADMINISTRATION AND ENFORCEMENT OF THE COLORADO NOXIOUS WEED ACT (8 CCR 1206-2), EFFECTIVE 10/30/2020):

LIST A:

- AFRICAN RUE (PEGANUM HARMALA)
- CAMELTHORN (ALHAGI PSEUDALHAGI)
- COMMON CRUPINA (CRUPINA VULGARIS)
- CYPRESS SPURGE (EUPHORBIA CYPARISSIAS)
- DYER'S WOAD (ISATIS TINCTORIA)
- ELONGATED MUSTARD (BRASSICA ELONGATA)
- FLOWERING RUSH (BUTOMUS UMBELLATUS)
- GIANT REED (ARUNDO DONAX)
- GIANT SALVINIA (SALVINIA MOLESTA)
- HAIRY WILLOW-HERB (EPILOBIUM HIRSUTUM)
- HYDRILLA (HYDRILLA VERTICILLATA)
- JAPANEESE KNOTWEED (FALLOPIA JAPONICA)
- GIANT KNOTWEED (FALLOPIA SACHALINENSE M)
- BOHEMIAN KNOTWEED (FALLOPIA X BOHEMICUM)
- MEADOW KNAPWEED (CENTAUREA X MONCKTONII)
- MEDITERRANEAN SAGE (SALVIA AETHIOPIS)
- MEDUSAHEAD (TAENIATHERUM CAPUT-MEDUSAE)
- MYRTLE SPURGE (EUPHORBIA MYRSINITES)
- ORANGE HAWKWEED (HIERACIUM AURANTIACUM)
- PARROTFEATHER (MYRIOPHYLLUM AQUATICUM)
- PURPLE LOOSESTRIFE (LYTHRUM SALICARIA)
- RUSH SKELETONWEED (CHONDRILLA JUNCEA)
- SQUARROSE KNAPWEED (CENTAUREA VIRGATA)
- TANSY RAGWORT (SENECIO JACOBAEA)
- YELLOW STARTHISTLE (CENTAUREA SOLSTITIALIS)

LIST B:

- ABSINTH WORMWOOD (ARTEMISIA ABSINTHIUM)
- BLACK HENBANE (HYOSCYAMUS NIGER)
- BOUNCINGBET (SAPONARIA OFFICINALIS)
- BULL THISTLE (CIRSIUM VULGARE)
- CANADA THISTLE (CIRSIUM ARVENSE)
- CHINESE CLEMATIS (CLEMATIS ORIENTALIS)
- COMMON TANSY (TANACETUM VULGARE)
- COMMON TEASEL (DIPSACUS FULLONUM)
- CORN CHAMOMILE (ANTHEMIS ARVENSIS)
- CUTLEAF TEASEL (DIPSACUS LACINIATUS)
- DALMATIAN TOADFLAX, BROAD-LEAVED (LINARIA DALMATICA)
- DALMATIAN TOADFLAX, NARROW-LEAVED (LINARIA GENISTIFOLIA)
- DAME'S ROCKET (HESPERIS MATRONALIS)
- DIFFUSE KNAPWEED (CENTAUREA DIFFUSA)
- EURASIAN WATERMILFOIL (MYRIOPHYLLUM SPICATUM)
- HOARY CRESS (LEPIDIUM DRABA)
- HOUNDSTONGUE (CYNOGLOSSUM OFFICINALE)
- JOINTED GOATGRASS (AEGILOPS CYLINDRICA)
- LEAFY SPURGE (EUPHORBIA ESULA)
- MAYWEED CHAMOMILE (ANTHEMIS COTULA)
- MOTH MULLEIN (VERBASCUM BLATTARIA)
- MUSK THISTLE (CARDUUS NUTANS)
- OXEYE DAISY (LEUCANTHEMUM VULGARE)
- PERENNIAL PEPPERWEED (LEPIDIUM LATIFOLIUM)
- PLUMELESS THISTLE (CARDUUS ACANTHOIDES)
- RUSSIAN KNAPWEED (RHAPONTICUM REPENS)
- RUSSIAN-OLIVE (ELAEAGNUS ANGUSTIFOLIA)
- SALT CEDAR (TAMARIX RAMOSISSIMA AND T. CHINESIS)
- SCENTLESS CHAMOMILE (TRIPLEUROSPERMUM INODORUM)
- SCOTCH THISTLE (ONOPORDUM ACANTHIUM)
- SCOTCH THISTLE (ONOPORDUM TAURICUM)
- SPOTTED KNAPWEED (CENTAUREA STOEBE L. SSP. MICRANTHOS)
- SPOTTED X DIFFUSE KNAPWEED HYBRID (CENTAUREA X PSAMMOGENA)
- SULFUR CINQUEFOIL (POTENTILLA RECTA)
- WILD CARAWAY (CARUM CARVI)
- YELLOW NUTSEDGE (CYPERUS ESCULENTUS)
- YELLOW TOADFLAX (LINARIA VULGARIS)

5. POTENTIAL MECHANICAL, CHEMICAL OR BIOLOGICAL CONTROLS SHALL INCLUDE 1 OR A COMBINATION OF:

   A. MECHANICAL MOWING ENTIRE SEEDED AREAS (TO CONTROL ANNUAL WEEDS PRIOR TO FLOWERING & SEED SET);
   B. MOWING LOCALIZED INFESTATIONS WITH A STRING TRIMMER OR SMALL EQUIPMENT;
   C. HAND-PULLING OF THE ROOTS;
   D. CHEMICAL APPLICATION OF WATER SAFE OR OTHER APPROVED HERBICIDES TARGETED TO THE SPECIFIC SUITES OF ANNUAL, BIENNIAL OR PERENNIAL WEEDS PRESENT; OR
   E. CONTROLLED BURN (IF FEASIBLE).

5. TIMING:

   A. MECHANICAL TREATMENT (MOWING OR HAND-PULLING) OF UPRIGHT ANNUAL AND BIENNIAL WEEDS IN THE SPRING & FALL BEFORE FLOWER DEVELOPMENT;
   B. HAND PULLING OR CHEMICAL TREATMENT OF GROUND SPREADING ANNUAL AND BIENNIAL VINE WEEDS IN THE SPRING AND FALL;
   C. MECHANICAL TREATMENT (MOWING OR HAND PULLING) & CHEMICAL TREATMENT OF PERENNIAL WEEDS IN THE SPRING & FALL BEFORE FLOWER DEVELOPMENT;
   D. CHEMICAL TREATMENT OF PERENNIALS, LIKE THISTLE IN THE FALL IS CRITICAL SO THAT THEY PULL THE HERBICIDE INTO THEIR ROOT SYSTEM AS THEY GO DORMANT; AND
   E. CUTTING AND CHEMICAL STUMP TREATMENT OF RUSSIAN OLIVE & TARARISK IN LATE SUMMER WHEN THEY ARE FULLY LEAFED OUT AND ACTIVELY GROWING, BUT BEFORE FLOWERING. BURN OR DISPOSE OF CUT NOXIOUS AND INVASIVE TREES IMMEDIATELY AFTER CUTTING.

SEEDING AREA MAINTENANCE:

1. BARREN AREAS IN THE UPLAND BUFFER GREATER THAN 25 SQUARE FEET THAT FAIL TO PRODUCE A SATISFACTORY STAND OF NATIVE GRASSES OR GRASS-LIKE SPECIES BECAUSE OF SOIL DEFICIENCIES OR EXCESSES THAT CAUSE A FAILURE TO MEET THE PERFORMANCE STANDARDS OUTLINED IN THE MAM PLAN SHALL BE AMENDED, RESEEDED AND MULCHED ACCORDING TO THE SEEDING SPECIFICATIONS HEREIN.

2. GULLY, RILL AND EROSIONAL AREAS WILL BE REPAIRED AS NECESSARY UNTIL PLANTS HAVE ESTABLISHED AND EROSION PROBLEMS CEASE. EROSION CONTROL BLANKET AND/OR FABRIC MAY BE NEEDED IF PERSISTENT EROSION PROBLEMS EXIST.

PLANTING SAUCER MAINTENANCE:

1. ONCE PER YEAR (AFTER SPRING PRECIPITATION & RUN-OFF), ALL PLANTING SAUCERS (IF REQUIRED) SHALL BE INSPECTED AND THE FOLLOWING COMPLETED:

   A. REMOVAL (BY PULLING OR STRING TRIMMER, DEPENDING ON CONDITIONS) OF ANY PLANTS THAT ARE NOT OF THE SPECIES PLANTED;

   B. RE-BUILDING OF SAUCERS AND REPAIR OF BLOW-OUTS, IF NEEDED;

   C. APPLICATION OF ADDITIONAL WOOD MULCH TO ACHIEVE THE 4" DEPTH IF IT HAS BLOWN AWAY OR BEEN DISPLACED;

   D. OBSERVATION AND LOGGING OF THE HEALTH OF TREES FOLLOWED THEREAFTER WITH A REPORT TO THE ECOLOGIST OF ANY EVIDENCE OF DAMAGE OR WILDLIFE DEPREDATION.

WATERING:

1. EVERY EFFORT HAS BEEN MADE IN THE DEVELOPMENT OF THE PLANTING PLANS TO SPECIFY SPECIES & LOCATE PLANTS IN ZONES THAT WILL BE NATURALLY SUSTAINED BY SURFACE &/OR ALLUVIAL SUBSURFACE FLOW. HOWEVER, RUN-OFF AND PRECIPITATION, EITHER IN THE FORM OF RAIN OR SNOW, CAN NOT BE GUARANTEED. THEREFORE, WATERING OF ALL INSTALLED SEED & PLANTS SHALL BE PROVIDED BY THE CLIENT.

2. CLIENT WILL MAKE AVAILABLE AN ON-SITE WATER SOURCE AND DELIVER WATER THAT CAN BE USED TO IRRIGATE AND MAINTAIN SEEDING AREAS AND PLANTED MATERIAL VIA OVERHEAD SPRAY, SURFACE WATER DIVERSIONS OR GROUND WATER RETURN FLOW.

3. ALL WOODY PLANT MATERIAL SPECIFIED, INCLUDING TREES, SHRUBS, TRANSPLANTS, OR CUTTINGS, SHALL BE WATERED BY THE CLIENT BY HAND, HOSE, BUCKET, PORTABLE OR FIXED PUMP, WATER TANK OR TRUCK, TEMPORARY OR PERMANENT IRRIGATION SYSTEM (OVERHEAD SPRAY AND/OR DRIP), OR OTHER EFFECTIVE METHOD OR WATERING DEVICE AS DETERMINED BY THE CLIENT. WATERING OF WILLOW TRANSPLANTS OR CUTTINGS MAY COME IN THE FORM OF SUBSURFACE INTERFLOW FROM GROUNDWATER IRRIGATION RETURN FLOW.

4. THE CLIENT SHALL CONTINUE TO WATER ALL PLANT MATERIALS ACCORDING TO THE FOLLOWING GENERAL PARAMETERS:

   A. TREES & SHRUBS: WATERING WILL NEED TO OCCUR ON THE FOLLOWING SCHEDULE DURING YEARS 1-3 FOLLOWING PLANTING (I.E., THE ESTABLISHMENT PERIOD):

      - NOVEMBER - FEBRUARY: ONCE BEFORE IRRIGATION SYSTEM SHUT-DOWN AND FREEZING
      - MARCH - MAY: ONCE EVERY TWO WEEKS
      - JUNE - AUGUST: ONCE EVERY WEEK
      - SEPTEMBER - OCTOBER: ONCE EVERY TWO WEEKS

      THE CLIENT SHALL DILIGENTLY MONITOR THE PLANTS, SOIL MOISTURE LEVELS AND THE AMOUNT OF NATURAL PRECIPITATION PLANTS ARE RECEIVING. IF TREES & SHRUBS NEED TO BE WATERED MORE OR LESS FREQUENTLY THAN OUTLINED ABOVE, THE CLIENT SHALL MAKE ADJUSTMENTS TO THE SCHEDULE ACCORDINGLY TO ENSURE THAT ALL PLANTS ARE WATERED THOROUGHLY.

   B. WILLOW TRANSPLANTS, CUTTINGS & TUBLINGS (IF SPECIFIED): WILLOWS (IF SOIL IS NOT NATURALLY & PERSISTENTLY SATURATED) SHALL BE WATERED TO COMPLETELY SATURATE THE SOIL AT LEAST ONCE A WEEK OVER THE ESTABLISHMENT PERIOD.

   C. SEEDING AREAS: UPLAND SEEDED AREAS SHALL BE WATERED WITH OVERHEAD SPRAY ACCORDING TO THE FOLLOWING SCHEDULE WHEN THERE IS NO NATURAL PRECIPITATION FOR 1-3 YEARS OR UNTIL FULLY ESTABLISHED AND SELF-SUSTAINING, WHICHEVER COMES FIRST:

      - 2 TIMES PER WEEK UNTIL GERMINATION & SEEDLINGS HAVE REACHED A HEIGHT OF 1-FOOT.
      - 1 TIME PER WEEK THEREAFTER.

      OVERHEAD SPRAY IRRIGATION SHALL BE APPLIED EVENLY OVER THE SEEDED AREA USING A METHOD DETERMINED BY THE CLIENT AT A TIME TIME OF DAY (EARLY MORNING OR LATE EVENING) AND DURATION TO ENSURE THAT SEEDLINGS THRIVE. THE DURATION OF EACH IRRIGATION SESSION SHALL NOT PRODUCE GULLIES, RILLS, ERODE THE SOIL OR CAUSE DAMAGE TO EXISTING OR RECENTLY PLANTED VEGETATION. MORE FREQUENT WATERINGS OF SHORTER DURATION ARE PREFERRED.

WOODY PLANT WATERING PARAMETERS:

1. AT EACH WATERING, NURSERY GROWN WOODY PLANTS (IF SPECIFIED) AND WILLOW TRANSPLANTS SHALL RECEIVE THE FOLLOWING MINIMUM AMOUNTS OF WATER BASED ON CONTAINER AND/OR ROOTBALL SIZE, OR AN AMOUNT SUFFICIENT TO SATURATE THE SOIL TO A DEPTH OF AT LEAST 12 INCHES:

   A. 1 QUART = 1 QUART
   B. 1 GALLON = 1 GALLON,
   C. 5 GALLON = 5 GALLONS
   D. 7 GALLON = 7.5 GALLONS
   E. 10 GALLON = 10 GALLONS
   F. 25 GALLON SIZED CONTAINERS SHALL RECEIVE 25 GALLONS
   F. 2" CAL = 25 GALLONS
   G. 2-3' DIAMETER ROOTBALL (WILLOW TRANSPLANT) = 25 GALLONS

2. WATER SHALL BE DISTRIBUTED EVENLY OVER AND AROUND THE ROOTBALL AND NOT BREACH OR DAMAGE THE SAUCER (IF SPECIFIED).

3. WATERING TUBES SHALL BE INSTALLED ALONG WITH DEEP PLANTED NUSERY STOCK (IF SPECIFIED) TO ALLOW FOR DEEP WATERING OF THE ROOTBALL DURING TIMES OF DROUGHT. DEEP PLANTED MATERIALS SHALL RECEIVE THE SAME AMOUNT OF WATER AS DESIGNATED ABOVE.

SPECIAL NOTES:

PERFORMANCE CRITERIA:

THE CLIENT SHALL BE RESPONSIBLE FOR ACHIEVING THE FOLLOWING PERFORMANCE CRITERIA:

1. ALL NURSERY GROWN VEGETATION INSTALLED (IF SPECIFIED) WILL BE NATIVE TO THE SITE, WATERSHED, COLORADO AND/OR THE ECO-REGION (I.E., ECOTYPIC),.

2. COTTONWOOD (EITHER PLANTED, TRANSPLANTED OR NATURALLY OCCURING) SHALL BE MAINTAINED AND REPLACED UNTIL THE PEFORMANCE STANDARDS (PS) IN THE MAM PLAN ARE MET.

3. WILLOW TRANSPLANTS, CUTTINGS, OR TUBLINGS (IF SPECIFIED) SHALL BE MAINTAINED AND REPLACED UNTIL THE PEFORMANCE STANDARDS (PS) IN THE MAM PLAN ARE MET.

4. REPLACEMENT OF TRANSPLANTED PLANT MATERIAL (IF NECESSARY) REPLACEMENTS CAN BE MADE WITH NURSERY GROWN STOCK. EQUIVALENCY SHALL BE MEASURED BY ROOT MASS (E.G. 1- 5 GALLON TRANSPLANT IS EQUIVALENT TO 5 - 1 GALLON NURSERY GROWN PLANTS).

5. SEEDED AREAS (WETLAND, RIPARIAN OR UPLAND) SHALL MEET THE PS OUTLINED IN THE MAM PLAN.

6. WETLAND SEEDING AREAS (HYDRIC SOIL AREAS AFFECTED BY GREATER MOISTURE LEVELS) SHALL BE COMPRISED OF THE DESIGNED SEED MIX OR OTHER DESIRABLE SPECIES (I.E., NATIVE OR NATURALIZED COLONIZERS).

7. RIPARIAN (MESIC) AND UPLAND (XERIC) SEEDING AREAS SHALL BE COMPRISED OF THE DESIGNED SEED MIX OR OTHER DESIRABLE SPECIES (I.E., NATIVE OR NATURALIZED COLONIZERS).

8. NOXIOUS WEEDS ACROSS THE ENTIRE RESTORATION AREA OR INDIVIDUAL PATCHES SHALL NOT EXCEED THE MEAN FOLIAR COVER PERFORMANCE STANDARDS AS OUTLINED IN THE MAM PLAN (UNDER SEPARATE COVER).

9. PERFORMANCE CRITERIA WILL BE ASSESSED BY THE ECOLOGIST ACCORDING TO MONITORING METHODOLOGIES AND PROTOCOLS OUTLINED IN THE MAM PLAN (UNDER SEPARATE COVER).

EXISTING TREE REMOVAL:

1. NO TREE, WHETHER LIVE OR DEAD, THAT CONTAINS A NEST RETURNED TO ANNUALLY BY A MIGRATORY BIRD OR RAPTOR SPECIES (E.G., OSPREY) SHALL BE REMOVED. NO LIVE TREE OR SHRUBS SHALL BE REMOVED THAT CONTAIN NESTS OR NEST CAVITIES OF BIRDS WHILE THEY ARE FLEDGING OR NESTING. TREES OR ARTIFICIAL NEST SITES THAT ARE ACTIVELY BEING USED BY RAPTORS SHALL NOT BE HARMED UNTIL FLEDGLINGS AND ADULTS HAVE LEFT THE NEST. NO BIRD SHALL BE HARASSED (INTENTIONAL OR UNINTENTIONAL) TO LEAVE OR ABANDON A NEST SITE AS SUCH ACTIONS ARE SUBJECT TO VIOLATION AND POSSIBLE FINES UNDER THE MIGRATORY BIRD TREATY ACT (MBTA) & BALD AND GOLDEN EAGLE PROTECTION ACT (BGEPA).

2. ANY CIVIL, CRIMINAL PENALTIES OR FINES ASSESSED AS A RESULT OF CONTRACTOR OR CLIENT NEGLIGENCE FOR FAILURE TO ABIDE BY THE MBTA OR BGEPA SHALL BE BORN BY THE CONTRACTOR OR CLIENT RESPONSIBLE FOR SAID VIOLATION.

NUISANCE AND INVASIVE SPECIES:

1. ALL PARTIES WHO VISIT OR WORK ON THE SITE, INCLUDING CONSULTANTS, AGENCY PERSONNEL OR CONTRACTORS SHALL PREVENT THE SPREAD OF AQUATIC NUISANCE SPECIES. ALL EQUIPMENT SHALL BE CLEANED PRIOR TO MOBILIZATION TO THE SITE TO REMOVE ALL AQUATIC NUISANCE SPECIES AND WEED SEED IN ACCORDANCE WITH STATE OF COLORADO AQUATIC NUISANCE SPECIES (ANS) REGULATIONS.

2. ALL PARTIES WHO VISIT OR WORK ON THE SITE, INCLUDING CONSULTANTS, AGENCY PERSONNEL OR CONTRACTORS SHALL PREVENT THE SPREAD OF NOXIOUS AND RESTRICTED WEEDS AND AVOID TRANSPORTING WEED SEEDS ON TO THE SITE WHICH MAY ADHERE TO EQUIPMENT, VEHICLES, CLOTHING, OR GEAR. IF WEED SEED IS DISCOVER ON ANY OF THE ABOVE, THE VISITING OR WORKING PARTY SHALL PLACE THE SEEDS IN A PLASTIC BAG OR SIMILAR CONTAINER AND DISPOSE OF PROPERLY.

3. THE CONTRACTOR SHALL AVOID DRIVING IN NOXIOUS WEED INFESTED AREAS PRIOR TO ENTERING THE SITE AND SHALL INSPECT VEHICLES FOR WEED FLOWERS OR SEEDS STUCK IN TIRE TREADS OR MUD ON OR IN THE VEHICLE AND PREVENT THEM FROM BEING CARRIED TO UNAFFECTED AREAS. DON'T CLEAN INFESTED VEHICLES IN A WEED FREE AREA.

4. THE CONTRACTOR SHALL USE HAY, STRAW, OR MULCH THAT HAS BEEN CERTIFIED WEED FREE.

5. THE CONTRACTOR SHALL RESTRICT TRAVEL TO ESTABLISHED ROADS, TRAILS AND ACCESS AREAS WHENEVER POSSIBLE AND NOT DRIVE THROUGH SENSITIVE, SEEDED OR PLANTED AREAS.

6. THE CONTRACTOR SHALL AVOID LEAVING PILES OF EXPOSED SOIL IN CONSTRUCTED PROJECT/RESTORATION AREAS THAT MAY BECOME WEED INFESTED. ALL EXPOSED SOIL WITHIN THE PROJECT AREA WILL BE SEEDED.

SHEET 40

VERMILLION CREEK AT DIAMOND PEAK RANCH
WETLAND RESTORATION PROJECT
CONSTRUCTION NOTES 3

NO:	REVISIONS:	DATE:
#1	MODS AS PER AGENCY COMMENTS	9/17/21
#2	MODS AS PER ECOS/SW'S	9/17/21
#3	MODS AS PER AGENCY COMMENTS	4/18/22
#4	MODS AS PER AGENCY COMMENTS	6/6/22

DATE: 7-15-21

PROJECT NO: 2020-7-5

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4845 Pearl East Circle, Ste. 101
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ecosystem services LLC
1455 Washburn Street
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C:\\LIBRARIES\DOCUMENTS\0-PROJECTS\MAPPING\DWG NAME.DWG

SPECIAL NOTES (CONT'D):

WILDLIFE DEPREDATION & LIVESTOCK DAMAGE:

1. PROACTIVELY OR UPON SIGNS OF DAMAGE OR LOSS BY WILDLIFE (DEPREDATION), THE CLIENT SHALL BE PREPARED TO INSTALL CAGING, FENCING, OR IMPLEMENT OTHER DETERRENTS TO PRESERVE AND PROTECT THE NUMBER OF TREES REQUIRED TO MEET THE PERFORMANCE STANDARDS OUTLINED IN THE MAM PLAN AND OTHER LEGAL DOCUMENTS. THE FOLLOWING DEPREDATION MEASURES ARE RECOMMENDED ACCORDING TO THE TYPES OF WILDLIFE THAT MAY CAUSE DAMAGE:

   A. BEAVER PROTECTION (SMALL TREES LESS THAN 1" DBH): IF REQUIRED, BEAVER CAGING SHALL BE 48" HIGH (MIN.) AND CONSIST OF 4" X 4" WIRE MESH (OR SMALLER) STAKED TO THE GROUND. THE CAGE SHALL BE 12" IN DIAMETER AND FULLY ENCIRCLE THE PLANT. THE CAGE SHALL BE STAKED TO THE GROUND WITH A MINIMUM OF TWO (2) 6-FOOT REBAR STAKES. THE REBAR STAKES WILL BE WOVEN THROUGH THE WIRE LEAVING 3 FEET TO BE DRIVEN INTO THE GROUND. THE STAKES SHALL BE WOVEN THROUGH THE WIRE IN SUCH A MANNER THAT THE CAGE CANNOT BE LIFTED BY A BEAVER. ADDITIONAL STAKING OR STAPLES MAY BE REQUIRED TO PREVENT BEAVERS FROM LIFTING AND GETTING TO THE PLANTS FROM UNDER THE CAGE.

   B. BEAVER PROTECTION (TREES LARGER THAN 1" DBH): SAND PAINT MAY BE USED AS AN ALTERNATIVE TO BEAVER CAGING ON LARGER TREES. MIX 20 OUNCES OF MASON SAND (30-70 MIL) PER 1 GALLON OF LATEX PAINT. CHOOSE PAINT COLOR TO ROUGHLY MATCH THE BARK COLOR. PAINT THE BOTTOM 48 INCHES OF THE TREE OR 24" ABOVE SNOWLINE, WHICHEVER IS GREATER. REAPPLY EVERY 2 YEARS.

   C. ELK OR DEER PROTECTION: EACH PLANT OR SMALL GROUPS OF PLANTS SHALL BE PROTECTED FROM DEER OR ELK BROWSING WITH TEMPORARY WIRE ENCLOSURE FENCING. THE FENCE SHALL BE BUILT IN SUCH A WAY AS TO PREVENT ANIMALS FROM REACHING THE PLANT PARTS EITHER BY OUTSTRETCHED NECK OR JUMPING WITHIN THE ENCLOSURE. THE FENCE SHALL BE CONSTRUCTED WITH 6-FOOT HIGH 4" X 4" WIRE MESH (OR SIMILAR, NOT CHICKEN WIRE) TOPPED WITH 2 STRANDS OF SMOOTH OR BARBED WIRE (A TOTAL HIGHT OF 8 FEET). THE ENCLOSURE SHALL BE ATTACHED TO T-POSTS (OR APPROVED EQUIVALENT) DRIVEN SOLIDLY INTO THE GROUND. OTHER DETERRENTS SUCH AS COYOTE OR PUMA URINE, BITTER SPRAY, RANDOMLY TIMED "SHOTGUN" BLASTS, GUARD DOGS, OR MOTION DETECTION SPRINKLERS, ETC. MAY ALSO BE USED AS DETERRENT PLACED 25 FEET AROUND THE PLANT(S) TO BE PROTECTED.

   D. WATERFOWL PROTECTION: WATERFOWL PROTECTION IS EFFECTIVE ON SMALL WETLAND PLANTING SITES, NOT LARGE LANDSCAPE SCALE RESTORATION PROJECTS AND IS THEREFORE NOT A VIABLE DETTERENT FOR THIS PROJECT.

UTILITY LOCATIONS:

1. NO KNOWN BURIED UTILITES ARE PRESENT IN WITHIN THE PROJECT SITE. HOWEVER, UTILITY LOCATIONS AND MARKING SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR BEFORE DIGGING. COLORADO LAW REQUIRES CONTRACTORS TO NOTIFY THE UTILITY NOTIFICATION CENTER OF COLORADO 2 BUSINESS DAYS PRIOR TO MAKING OR BEGINNING AN EXCAVATION. NOTIFICATION MAY BE MADE BY CALLING:**1-800-922-1987**

2. ANY UTILITIES (IF PRESENT) THAT ARE STRUCK AND DAMAGED BY THE CONTRACTOR AS A RESULT OF FAILING TO GET PROPER LOCATES SHALL BE REPIARED OR REPLACED AT NO EXPENSE TO THE CLIENT.

CLEAN-UP:

1. ANY TRASH, INCLUDING PLANT TAGS OR OTHER DEBRIS PRODUCED BY CONSTRUCTION CREWS SHALL BE CONTAINED, REMOVED FROM THE SITE AND DISPOSED OF PROPERLY AS DISCOVERED, ON A DAILY BASIS, AND UPON COMPLETION OF THE PROJECT. WIND BLOWN TRASH PRODUCED BY THE CONTRACTOR WILL NOT BE TOLERATED.

VERMILLION CREEK AT DIAMOND PEAK RANCH
WETLAND RESTORATION PROJECT
CONSTRUCTION NOTES 4

NO:	REVISIONS:	DATE:
#1	MODS AS PER AGENCY COMMENTS	9/17/21
#2	MODS AS PER ECOS/SWS	9/17/21
#3		
#4		

DATE: 7-15-21

PROJECT NO: 2020-7-5

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VERMILLION CREEK
WETLAND SEED SCHEDULES (ZONE 2)
6/14/2022

Seeds per SF:	**100**
TOTAL ACRES:	**9.82**

WETLAND SEED SCHEDULE (ZONE 2)

Scientific Name	Common Name	Indicator Status	Seasonality	* Percent of Mix	Seeds per SF	Seeds per AC	** Seeds per LB	*** LBS/PLS per AC	Drill Seeding Rate Total LBS	**** Broadcast Seeding Rate Total LBS
Asclepias speciosa	Showy milkweed	FAC	W	2.5%	2.50	108900	72,000	1.51	14.85	25.99
Carex microptera	Popcorn sedge	FAC	C	10.0%	10.00	435600	847,000	0.51	5.05	8.84
Carex nebrascensis	Nebraska sedge	OBL	C	20.0%	20.00	871200	534,100	1.63	16.02	28.03
Distichlis spicata	Inland saltgrass	FAC	W	5.0%	5.00	217800	520,000	0.42	4.11	7.20
Eleocharis palustris	Spikerush	OBL	C	7.5%	7.50	326700	620,000	0.53	5.17	9.06
Glyceria grandis	American mannagrass	OBL	C	10.0%	10.00	435600	1,280,000	0.34	3.34	5.85
Juncus articus spp littoralis	Baltic rush	FACW	C	15.0%	15.00	653400	8,000,000	0.08	0.80	1.40
Muhlenbergia asperifolia	Scratchgrass (alkali muhly)	FACW+	C	15.0%	15.00	653400	1,500,000	0.44	4.28	7.49
Pascopyrum smithii	Western wheatgrass	FAC	C	5.0%	5.00	217800	110,000	1.98	19.44	34.03
Schoenoplectus acutus	Hardstem bulrush	OBL	C	5.0%	5.00	217800	377,600	0.58	5.66	9.91
Schoenoplectus tabernaemontani	Softstem bulrush	OBL	C	5.0%	5.00	217800	550,000	0.40	3.89	6.81
				100.0%	**100.00**			**8.42**	**82.73**	**144.78**

NOTES:
1. * Percent of Mix (abundance) set by ECOS
2. ** Seeds per LB data obtained from Granite Seed Catalog.
3. *** LBS/PLS per AC based on Percent of Mix x Total Seeds per SF x Seeds Per AC x Seeds per LB (based on data obtained from USDA Plants Database and/or Granite Seed Catalog)
4. **** Broadcast/Hydroseeding Rate (if necessary) is 1.75 times the Drill Seeding Rate as per Agency request on 3-16-22.
5. Forbs are intolerant of chemical weed controls and are therefore not included in these seed mixes.
6. Species composition based on Composite Plant List (Site and Reference Inventory) and what is commercially available.
7. Seeds per SF revised from 75 to 100 for drill seeding and 175 for broadcast/hydroseeding as per Agency request.
8. American managrass, Baltic rush and scratchgrass percent of mix increased to reduce expense as per Agency recommendation.
9. Spikerush, hardstem and softstem bulrush percent of mix reduced on 5-4-22 to reduce cost and make up for changes noted in Item 7.

VERMILLION CREEK AT DIAMOND PEAK RANCH
WETLAND RESTORATION PROJECT
WETLAND SEED SCHEDULE

NO:	REVISIONS:	DATE:
#1	ADJUST SEEDS PER SF & ACRES	9/17/21
#2	ADJUST INDICATOR STATUS	9/17/21
#3	REVISED PER AGENCY COMMENTS	5/4/22
#4	CLARIFIED NOTES/ASTERISKS	6/14/22

DATE: 7-15-21
PROJECT NO: 2020-7-5

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VERMILLION CREEK
UPLAND-RIPARIAN SEED SCHEDULES (ZONES 4 & 3)
6/14/2022

Seeds per SF: 100
TOTAL ACRES: 15.87

UPLAND-RIPARIAN SEED SCHEDULE (ZONES 4 & 3)

Scientific Name	Common Name	Indicator Status	Seasonality	* Percent of Mix	Seeds per SF	Seeds per AC	** Seeds per LB	*** LBS/PLS per AC	Drill Seeding Total LBS	**** Broadcast Seeding Total LBS
Achnatherum hymenoides	Indian ricegrass	FACU	C	5.0%	5.00	217800	141,000	1.54	24.51	42.90
Artemisia tridentata spp wyomingensis	**Wyoming Big sagebrush**	**UPL**	**W**	**2.0%**	**2.00**	**87120**	**2,500,000**	**0.03**	**0.55**	**0.97**
Atriplex canescens	**Fourwing saltbush**	**UPL**	**W**	**2.0%**	**2.00**	**87120**	**52,000**	**1.68**	**26.59**	**46.53**
Atriplex gardneri	**Gardner's saltbush**	**UPL**	**W**	**1.0%**	**1.00**	**43560**	**111,500**	**0.39**	**6.20**	**10.85**
Chrysothamnus viscidiflorus	Yellow rabbitbrush	UPL	W				LEFT INTENTIONALLY BLANK			
Distichlis spicata	Inland saltgrass	FAC	W	7.5%	7.50	326700	520,000	0.63	9.97	17.45
Elymus elymoides	Squirreltail	FACU	C	7.5%	7.50	326700	154,000	2.12	33.66	58.91
Elymus lanceolatus	Streambank wheatgrass	UPL	C	5.0%	5.00	217800	154,000	1.41	22.44	39.28
Elymus trachycaulus	Slender wheatgrass	FACU	C	13.0%	13.00	566280	159,000	3.56	56.52	98.90
Ericameria nauseosa	**Rubber rabbitbrush**	**UPL**	**C**	**2.0%**	**2.00**	**87120**	**400,000**	**0.22**	**3.46**	**6.05**
Grayia spinosa	**Spiny hopsage**	**UPL**	**W**	**1.0%**	**1.00**	**43560**	**254,000**	**0.17**	**2.72**	**4.76**
Hesperostipa comata	Needle-and-thread	UPL	C	2.5%	2.50	108900	115,000	0.95	15.03	26.30
Krascheninnikovia lanata	**Winterfat**	**UPL**	**W**	**2.0%**	**2.00**	**87120**	**123,000**	**0.71**	**11.24**	**19.67**
Leymus cinereus	Great basin wildrye	FAC	C	10.0%	10.00	435600	130,000	3.35	53.17	93.05
Pascopyrum smithii	Western wheatgrass	FAC	C	10.0%	10.00	435600	110,000	3.96	62.84	109.97
Poa secunda spp Sandbergii	Sandberg bluegrass	FACU	C	13.0%	13.00	566280	1,047,000	0.54	8.58	15.02
Sarcobatus vermiculatus	**Greasewood**	**FACU**	**C**	**3.5%**	**3.50**	**152460**	**1,047,000**	**0.15**	**2.31**	**4.04**
Shepherdia argentea	Silver buffaloberry	FACU	W				LEFT INTENTIONALLY BLANK			
Sporobolus airoides	Alkali sacaton	FAC	C	13.0%	13.00	566280	1,758,000	0.32	5.11	8.95
				100.0%	**100.00**			**21.73**	**344.91**	**603.59**

NOTES:
1. * Percent of Mix (abundance) set by ECOS
2. ** Seeds per LB data obtained from Granite Seed Catalog.
3. *** LBS/PLS per AC based on Percent of Mix x Total Seeds per SF x Seeds Per AC x Seeds per LB (based on data obtained from USDA Plants Database and/or Granite Seed Catalog)
4. **** Broadcast/Hydroseeding Rate (if necessary) is 1.75 times the Drill Seeding Rate as per Agency request.
5. Forbs are intolerant of chemical weed controls and are therefore not included in these seed mixes.
6. Species composition based on Composite Plant List (Site and Reference Inventory) and what is commercially available.
7. Species in bold type are mycorrhizae dependent shrubs.
8. 2.72 acres of upland seeding is on BLM land outside of the 25-foot buffer, areas that will be isolated/cut-off from the creek with limited or no future access.
9. Seeds per SF revised from 75 to 100 for drill seeding and 175 for broadcast/hydroseeding on 3-16-22 as per Agency request.
10. Yellow rabbitbrush and silver buffaloberry removed for non-availability on 3-16-22 as per Agency recommendation.
11. Needle and thread percent of mix reduced, not eliminated on 3-16-22 to reduce cost as per Agency recommendation.
12. Slender wheatgrass, Sandberg bluegrass and alkali sacaton percent of mix increased to reduce expense on 3-16-22 as per Agency recommendation.
14. Greasewood percent of mix increased on 3-16-22 to make up for changes noted in Items 9-11 and to increase dominance.
15. Added Upland Seed (0.29 AC) for downstream existing channel fill area on 5-4-22.

VERMILLION CREEK AT DIAMOND PEAK RANCH
WETLAND RESTORATION PROJECT
UPLAND -RIPARIAN SEED SCHEDULE

NO:	REVISIONS:	DATE:
#1	ADJUST SEEDS PER SF & ACRES	9/17/21
#2	ADJUST INDICATOR STATUS	9/17/21
#3	REVISED PER AGENCY COMMENTS	5/4/22
#4	CLARIFIED NOTES/ASTERISKS	6/14/22

DATE: 7-15-21
PROJECT NO: 2020-7-5

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VERMILLION CREEK
COVER CROP SEED SCHEDULE (ZONE 3)
6/14/2022

Seeds per SF:	25
TOTAL ACRES:	4.46

COVER CROP SEED SCHEDULE (ZONE 3)

Scientific Name	Common Name	Indicator Status	Seasonality	* Percent of Mix	Seeds per SF	Seeds per AC	** Seeds per LB	*** LBS/PLS per AC	Drill Seeding Total LBS	**** Broadcast Seeding Total LBS
Triticum aestivum x Secale cereale	QuickGuard Sterile Triticale	UPL	C	100.0%	25.00	1089000	13,000	83.8	373.81	373.81
				100.0%	**25.00**			**83.8**	**373.81**	**373.81**

NOTES:
1. * Percent of Mix (abundance) set by ECOS
2. ** Seeds per LB data obtained from Granite Seed Catalog.
3. *** LBS/PLS per AC based on Percent of Mix x Total Seeds per SF x Seeds Per AC x Seeds per LB (based on data obtained from USDA Plants Database and/or Granite Seed Catalog)
4. **** Broadcast/Hydroseeding Rate (if necessary) is equal to the Drill Seeding Rate.
5. Cover crop and hyromulch is to be applied to side slope transitions (Zone 3) between Wetland (Zone 2) and Upland (Zone 4) for temporary erosion control.
6. Maximum seeding rate as recommened by Granite Seed is 60-100 LBS/PLS per acre.

VERMILLION CREEK
PASTURE RECLAMATION SEED SCHEDULE
6/14/2022

***** Seeds per SF:	120
TOTAL ACRES:	1.00

PASTURE SEED MIX

Scientific Name	Common Name	Indicator Status	Seasonality	* Percent of Mix	Seeds per SF	Seeds per AC	** Seeds per LB	*** LBS/PLS per AC	Drill Seeding Total LBS	**** Broadcast Seeding Total LBS
Bouteloua curtipendula	Side-oats grama, Native	UPL	W	15.0%	18.00	784080	191,000	4.11	4.11	5.13
Elymus lanceolatus	Thickspike wheatgrass, Critana	UPL	C	15.0%	18.00	784080	154,000	5.09	5.09	6.36
Lollum perenne ssp. Multiflorum	Annual Ryegrass, VNS	UPL	C	15.0%	18.00	784080	227,000	3.45	3.45	4.32
Nassella viridula	Green needlegrass, Lodorm	UPL	C	5.0%	6.00	261360	181,000	1.44	1.44	1.80
Panicum virgatum	Switchgrass, VNS	FAC	W	15.0%	18.00	784080	389,000	2.02	2.02	2.52
Pascopyrum smithii	Western wheatgrass, Arriba	FAC	C	20.0%	24.00	1045440	110,000	9.50	9.50	11.88
Schizachryrium scoparium	little bluestem, Native	FACU	W	10.0%	12.00	522720	260,000	2.01	2.01	2.51
Sporobolus cryptandrus	Sand dropseed, VNS	FACU	W	5.0%	6.00	261360	5,298,000	0.05	0.05	0.06
				100.0%	**120.00**			**27.67**	**27.67**	**34.59**

NOTES:
1. Reclamation seed mix is based on Buffalo Brand Seed Sandy Soil Pasture Mix, Buffalo Brand Seed, Greeley, Colorado provided to John Raftopoulos on 6/9/22.
2. * Percent of Mix based on Buffalo Brand Seed Sandy Soil Pasture Mix.
3. ** Seeds per LB data obtained from Granite Seed Catalog.
4. *** LBS/PLS per AC based on Percent of Mix x Total Seeds per SF x Seeds Per AC x Seeds per LB (based on Granite Seed Catalog).
5. **** Broadcast/Hydroseeding Rate (if necessary) is 1.25 times the Drill Seeding Rate as per Buffalo Brand Seed.
6. ***** Seeds per SF is based on LBS/PLS per Acre as per Buffalo Brand Seed Sandy Soil Pasture Mix.
7. Pasture Seed Mix is to be used on disturbed ground/soil deposition areas located outside of the Aquaitc Resource Buffer on BLM and private land.
8. Drill and Broadcast seeding rates (25-30 LBS/AC) and (20-35 LBS/AC) fall within the range recommended by Buffalo Brand Seed.
9. This seed schedule provides per acre seeding rates. Actual acres seeded to be established in the field.

SHEET 44

VERMILLION CREEK AT DIAMOND PEAK RANCH
WETLAND RESTORATION PROJECT
COVER CROP & PASTURE RECLAMATION SEED SCHEDULES

NO:	REVISIONS:	DATE:
#1	COVER CROP SCHEDULE ADDED	5/4/22
#2	SEEDS PER SF REV FROM 20 TO 25	6/6/22
#3	ADDED PASTURE MIX	6/9/22
#4	CLARIFIED NOTES/ASTERISKS	6/14/22

DATE: 7-15-21
PROJECT NO: 2020-7-5

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VERMILLION CREEK
PLANT SCHEDULES
4/18/2022

Scientific Name	Common Name	Plant Symbol	Indicator Status	Preferred Size / Form	Plant Spacing	Percent of Mix	Total Quantity
ZONE 3 - RIPARIAN (MESIC) TREES ON BLM LAND				**Cover =**	**41%**		
				Total Acres =	**1.50**		
				Average Spacing =	**22.0**		
Populus deltoides ssp. Wislizeni	Rio Grande cottonwood	POPDEL	NI	Volunteer or Transplant	22.0	100%	54
					TOTAL	**100.0%**	**54**
ZONE 3 - RIPARIAN (MESIC) TREES ON PRIVATE LAND				**Cover =**	**10%**		
				Total Acres =	**2.96**		
				Average Spacing =	**22.0**		
Populus deltoides ssp. Wislizeni	Rio Grande cottonwood	POPDEL	NI	Volunteer or Transplant	22.0	100%	27
					TOTAL	**100.0%**	**27**
ZONE 2 - WETLAND (HYDRIC) SHRUBS				**Cover =**	**40%**		
				Total Acres =	**9.82**		
				Average Spacing =	**4.0**		
*Salix exigua	Coyote willow	SALEXI	FACW	Transplant and/or 42" cutting	4.0	100%	10,695
					TOTAL	**100.0%**	**10,695**
ZONE 2 - WETLAND (HYDRIC) SHRUBS (FOR SBS STRUCTURES)				**Cover =**	**100%**		
				Total Lineal Feet =	**2165**		
				Average Spacing =	**1.0**		
Vermillion Creek SBS							
*Salix exigua	Coyote willow	SALEXI	FACW	42" cutting	1.0	60%	1,300
Little Joe Wetland SBS							
*Salix exigua	Coyote willow	SALEXI	FACW	42" cutting	1.0	40%	865
					TOTAL	**100.0%**	**2,165**

NOTES:
1. ZONE 4 - UPLAND SHRUBS (NOT SHOWN): NO ACTIVE PLANTING IS PLANNED OR REQUIRED. XERIC SHRUBS ARE INCLUDED IN THE UPLAND-RIPARIAN SEED MIX.
2. ZONE 3 - RIPARIAN TREES: FACWET REFERENCE STANDARD FOR COTTONWOOD COVER IS 10%.
3. ZONE 3 - RIPARIAN TREES & SHRUBS ON BLM LAND: 54 COTTONWOOD (41 IN EXCESS OF FACWET REFERENCE STANDARD) WILL BE TRANSPLANTED OR VOLUNTEERS ENCOURAGED.
4. ZONE 3 - RIPARIAN TREES & SHRUBS ON PRIVATE LAND: 27 COTTONWOOD (AS PER THE FACWET REFERENCE STANDARD) WILL BE TRANSPLANTED OR VOLUNTEERS ENCOURAGED.
5. ZONE 2 - WETLAND SHRUBS: COVER AND QUANTITY WILL BE ACHIEVED THROUGH ACTIVE PLANTING OR TRANSPLANTING OF WILLOW CLUMPS OR CUTTINGS.
6. ZONE 2 - WETLAND SHRUBS: WILLOW CLUMPS TO BE HARVESTED AND TRANSPLANTED WILL BE IDENTIFIED, LOCATED & QUANITIFIED IN THE FIELD DURING CONSTRUCTION.
7. ZONE 2 - WETLAND SHRUBS: WILLOW CUTTINGS TO BE INSTALLED WILL BE QUANTIFIED & LOCATED IN THE FIELD AFTER WILLOW TRANSPLANTS ARE INSTALLED AND QUANTIFIED.
8. ZONE 2 - WETLAND SHRUBS: AN ESTIMATED QUANTITY OF 775 WILLOW TRANSPLANTS (OUT OF TOTAL) ARE NEEDED FOR SBS STRUCTURES (AT A RATE OF 18 TRANSPLANTS PER STRUCTURE X 43 TOTAL SBS
9. ESTIMATED QUANTITY OF UPLAND BRUSH FOR SBS (2165 LF / 3' SPREAD OF BRUSH) = 725

* PLANTS CAPABLE OF DEEP BURIAL

VERMILLION CREEK AT DIAMOND PEAK RANCH
WETLAND RESTORATION PROJECT
PLANT SCHEDULE

NO:	REVISIONS:	DATE:
#1	ADJUST INDICATOR STATUS	9/17/21
#2	ADJUST WETLAND ACRES	9/17/21
#3	INCREASE Z2 WILLOW QTY	9/17/21
#4		

DATE: 7-15-21
PROJECT NO: 2020-7-5

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