

CARSON RIVERBANK STABILIZATION PROJECTS

April 19, 2023

Carson Watershed Forum

CARSON VALLEY



CONSERVATION DISTRICT



CARSON VALLEY



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CAUSES OF RIVERBANK FAILURE

- NATURAL PROCESS
- PRINCIPAL CAUSES
 - CHANNEL CONFINEMENT
 - LOSS OF MEANDERS
 - LOSS OF VEGETATION
 - STREAM POWER > RESISTING FORCE
- PROTECTIVE MEASURES
 - VEGETATIVE PLANTINGS
 - BIOENGINEERING METHODS
 - STRUCTURAL MEASURES

TYPICAL BANKSTABILIZATION MEASURES

- ROUGHENED ROCK TOE
- RIPRAP ON REGRADED BANKS
- STREAM BARBS
- STREAM GROINS
- LOG VEINS/ROOT WADS
- ROCK REFUSAL TRENCHES
- GABION BASKETS
- ROCK CROSS VANES
- LOG CROSS VANES
- WILLOW WATTLES & POLE PLANTINGS

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Legend

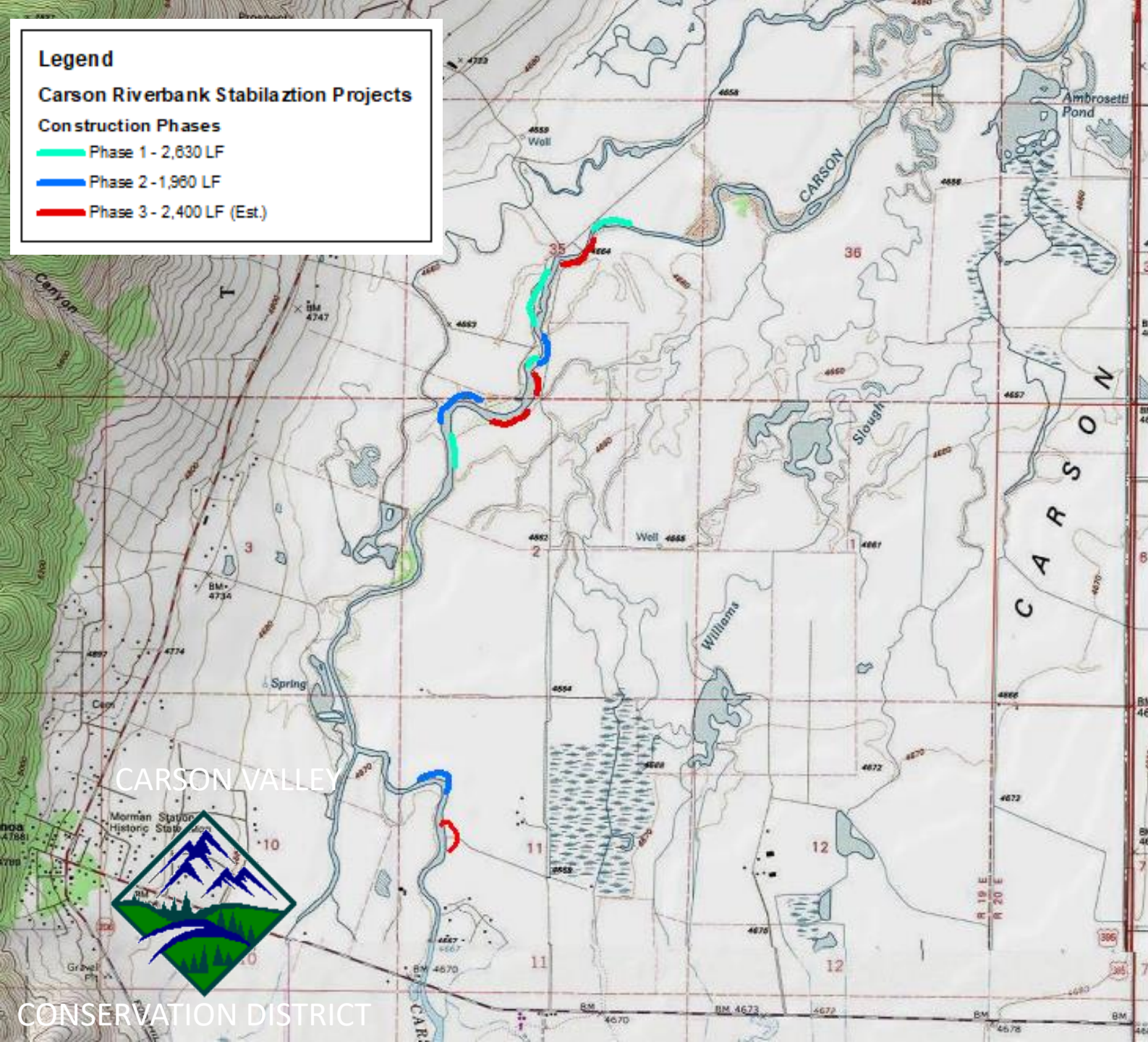
Carson Riverbank Stabilization Projects

Construction Phases

Phase 1 - 2,630 LF

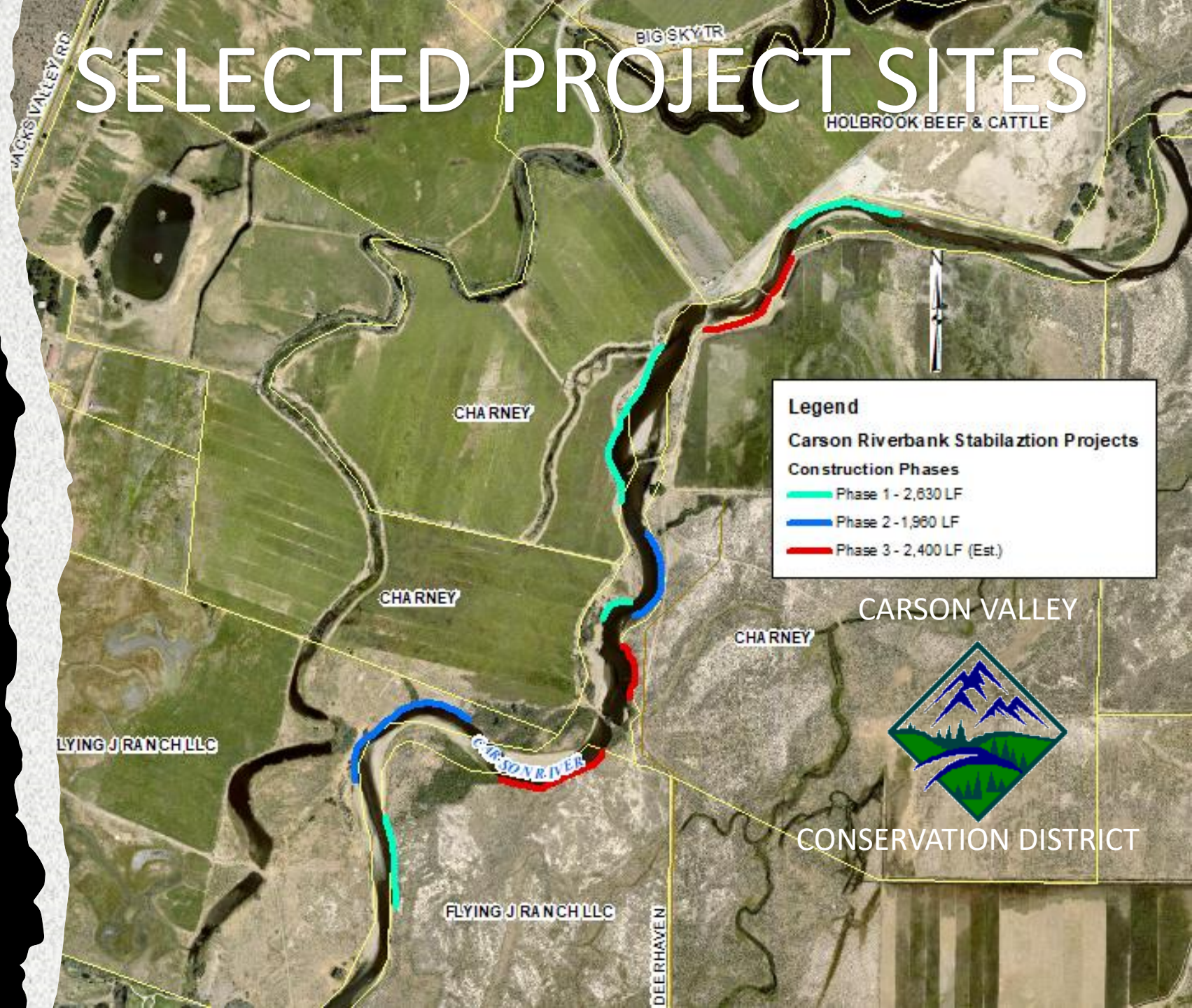
Phase 2 - 1,960 LF

Phase 3 - 2,400 LF (Est.)



PROJECT NEEDS

- Historic channel straightening in the 1950's
- Severe flood damage resulting from past flooding events
- Lack of native or desirable vegetation on the banks.
- Vertical cut banks continue to erode even in normal flow conditions
- Negative Impacts on water quality
- Excessive amounts of sediment deposition
- Poorly functioning project reach and wildlife conditions due to lack of habitat
- Major impacts to local agricultural producers in Carson Valley
- Impacts to irrigation infrastructures
Loss of agriculture production
- Financial impacts from inability to grow food and fiber



PROJECT PARTNERS



NEVADA DIVISION OF
**ENVIRONMENTAL
PROTECTION**



State of Nevada
Division of Water Resources



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LANDOWNERS

TYPICAL SCOPE OF WORK

- TASK 1. SITE INVESTIGATIONS AND TOPOGRAPHIC SURVEYS – 8 WEEKS
- TASK 2. ENGINEERING DESIGN – 8 WEEKS
- TASK 3. BID DOCUMENTS – 3 WEEKS
- TASK 4. CONSTRUCTION STAKE OUT
- TASK 5. AS-BUILT DRAWINGS

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TOE ZONE:

- SLOPE REVITALIZATION ACTIVITIES TO COMMENCE AT OR BELOW AVERAGE WATER LEVEL
- CONSIST OF WILLOW CUTTINGS WITH NATIVE SOIL TOPDRESSING AND REINFORCED NATIVE RIVER ROCK TOE (TO SCOUR DEPTH)
- STABILIZE BENCH WITH NATIVE SHRUB CUTTINGS (I.E. WILLOW)

MID-BANK ZONE:

- TO COMMENCE ABOVE AVERAGE WATER LEVEL
- BENCH WITH OVERFLOW CHANNEL
- STABILIZE BENCH WITH NATIVE SEED/SHRUB MIX

OVER BANK:

- TO EXISTING GRADE
- STABILIZE BENCH WITH NATIVE TREE/SEED/SHRUB MIX

LEGEND

- CUT
- FILL
- EXISTING GRADE (APPROX)
- PROPOSED GRADE (APPROX)

Diagram Labels:

- NATIVE TREES
- EXPOSED NATIVE BOULDER
- ROCK TOE & SLOPE PROTECTION, PER DETAIL HEREON
- TOE=43.0'
- SEASONAL OVERFLOW SWALE (WIDTH VARIES)
- BRUSH TRENCH
- COCONUT FABRIC (AS NECESSARY)
- FIBERCHAINS
- NATIVE SEED/SHRUB MIX
- RELOCATED STOCK FENCE
- EXISTING GRADE

Dimensions:

- TOE ZONE: 41', 10'
- MID-BANK ZONE: 24'
- OVER BANK ZONE: 75'
- Slopes: 6:1, 5:1, 3:1, 2:1
- Horizontal distances: 53.0', 54.0', 55.0'

CARSON VALLEY

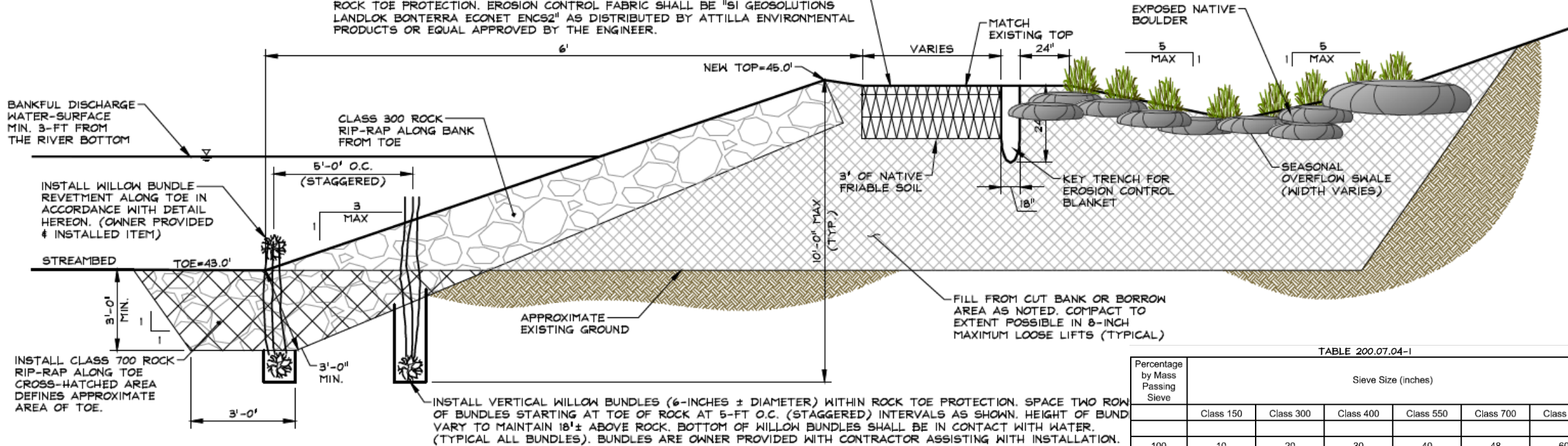
CARSON RIVER (PROPOSED LOCATION)



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ROCK TOE & SLOPE PROTECTION

OWNER TO PROVIDE THE FOLLOWING:
BROADCAST SEED WITH NATIVE SEED MIX. SUBMIT MIX TO ENGINEER FOR APPROVAL. CONTRACTOR TO PROVIDE & INSTALL EROSION CONTROL FABRIC ABOVE ROCK TOE PROTECTION. EROSION CONTROL FABRIC SHALL BE "SI GEOSOLUTIONS LANDLOK BONTERRA ECONET ENCS2" AS DISTRIBUTED BY ATTILLA ENVIRONMENTAL PRODUCTS OR EQUAL APPROVED BY THE ENGINEER.



ROCK TOE & SLOPE PROTECTION

NO SCALE

TABLE 200.07.04-1

Percentage by Mass Passing Sieve	Sieve Size (inches)					
	Class 150	Class 300	Class 400	Class 550	Class 700	Class 900
100	10	20	30	40	48	60
70 - 85	9	18	27	36	45	54
30 - 50	6	12	18	24	30	36
5 - 15	2	5	7	12	18	24
0	1	2	3	6	8	12
D50(1)	6	12	16	22	28	35

1. MEAN STONE SIZE.

TABLE 200.07.04-2

Test	Test Method	Requirements
Resistance to Wear (percent)	ASTM C 535 (1)	45 Maximum
Absorption (percent)	ASTM C 127	4.2 Maximum
Apparent Specific Gravity	ASTM C 97	2.5 Minimum (2)
Durability	ASTM D 3744	52 Minimum

- 500 REVOLUTIONS
- RIP-RAP WITH A SPECIFIC GRAVITY OF LESS THAN 2.5 WILL NOT BE ALLOWED.
- RIP-RAP SHALL BE QUARRIED WITH FRACTURED FACES.
- RIP-RAP SHALL HAVE AN EARTH TONE WHICH BLENDS WITH SURROUNDING ENVIRONMENT.

ROCK RIP-RAP SPECIFICATIONS

NO SCALE

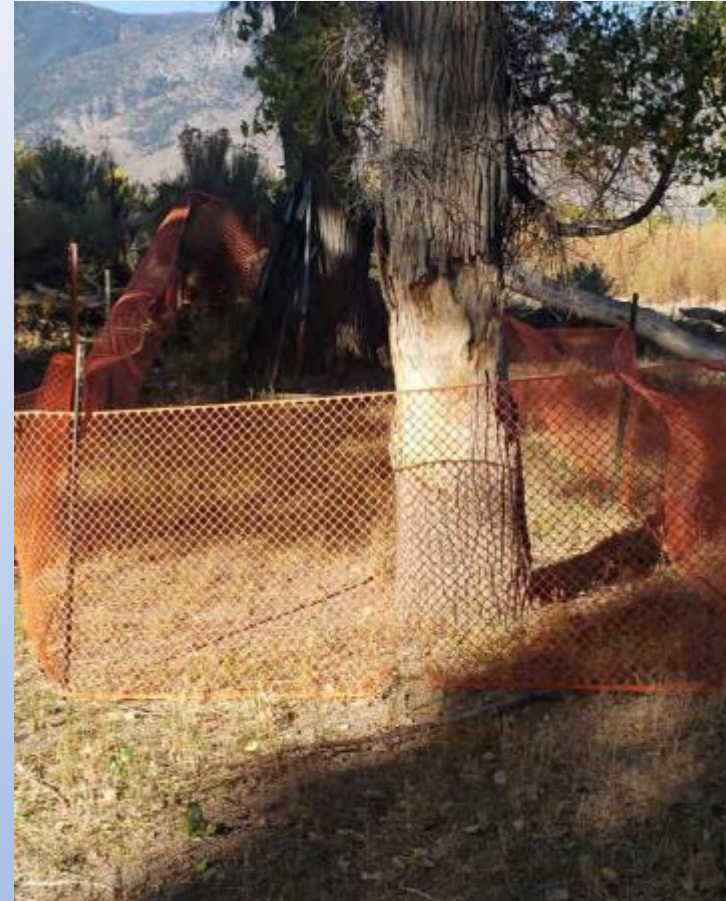
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BEST MANAGEMENT PRACTICES

- DUST CONTROL
- FENCING AROUND SENSITIVE RESOURCES
- WORKING IN THE RIVER DURING THE DRY PERIOD
- DRILL SEEDING DISTURBED AREAS
- COIR FABRIC MATS & LOGS
- SILT FENCING & FILTRATION WADDLES
- DE-WATERING



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DEWATERING, SITE PREP AND GRADING

- CLEAR & GRUB
- CONSTRUCT DEWATERING CHANNEL
- BREACH IRRIGATION CONTROL STRUCTURES
- DIG MIN 3FT DEEP TRENCH ALONG THE NEW TOE
- INSTALL CLASS 700 RIPRAP ALONG THE TOE OF THE RIVERBANK
- SHAPE FAILED BANKS NO STEEPER THAN 2H:1V, PREFERRED 3H:1V



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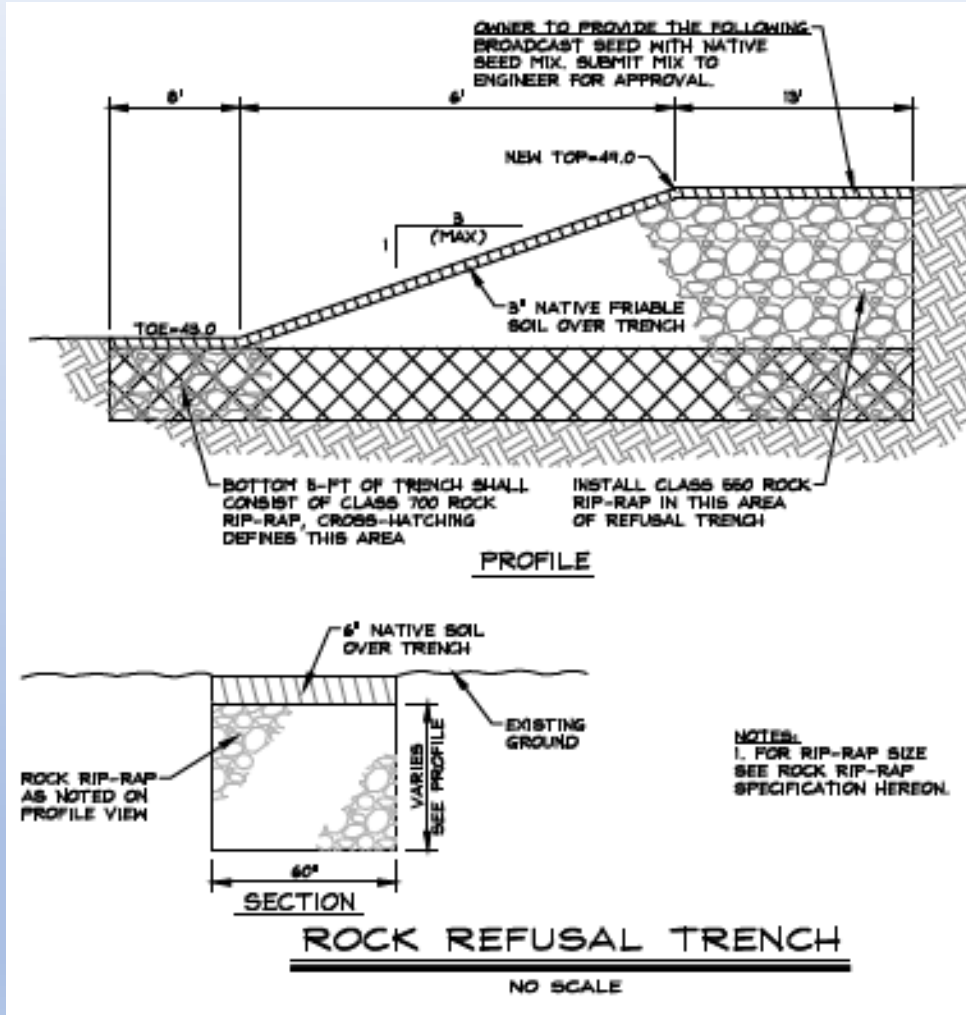
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INSTALL STRUCTURAL MEASURES

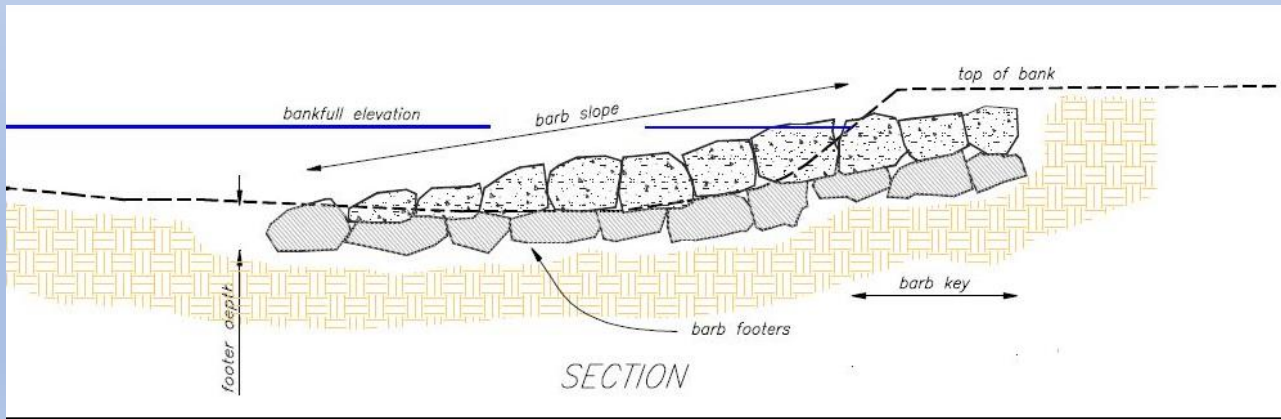
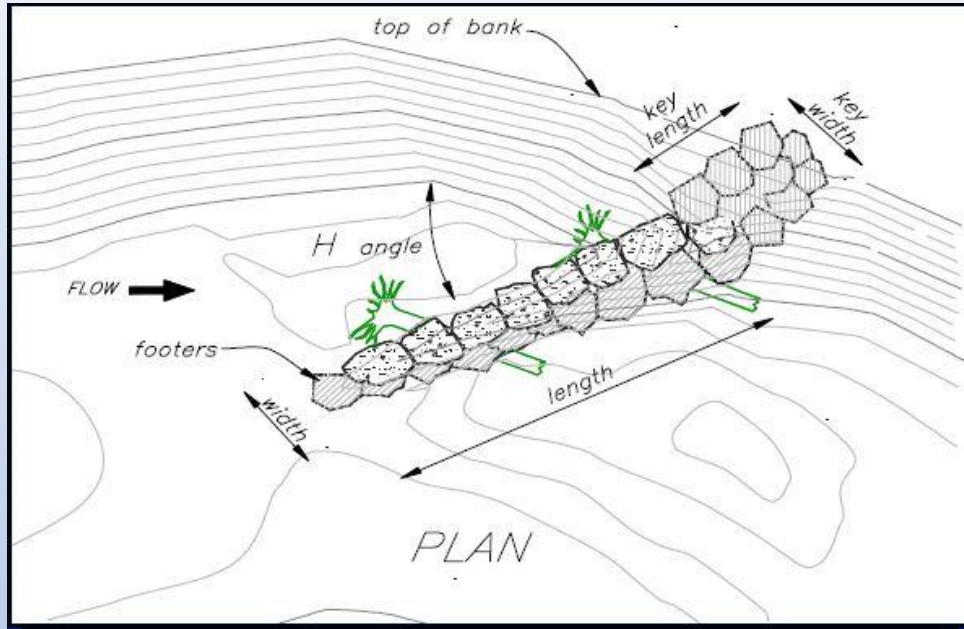
- COMPACT RESHAPED RIVERBANKS
- CONSTRUCT ROCK REFUSAL TRENCH WITH CLASS 700 RIPRAP
- CONSTRUCT STREAM BARBS/LOG VEINS
- COVER BANKS WITH CLASS 500 & 300 RIPRAP



ROCK REFUSAL TRENCH



STREM BARBS

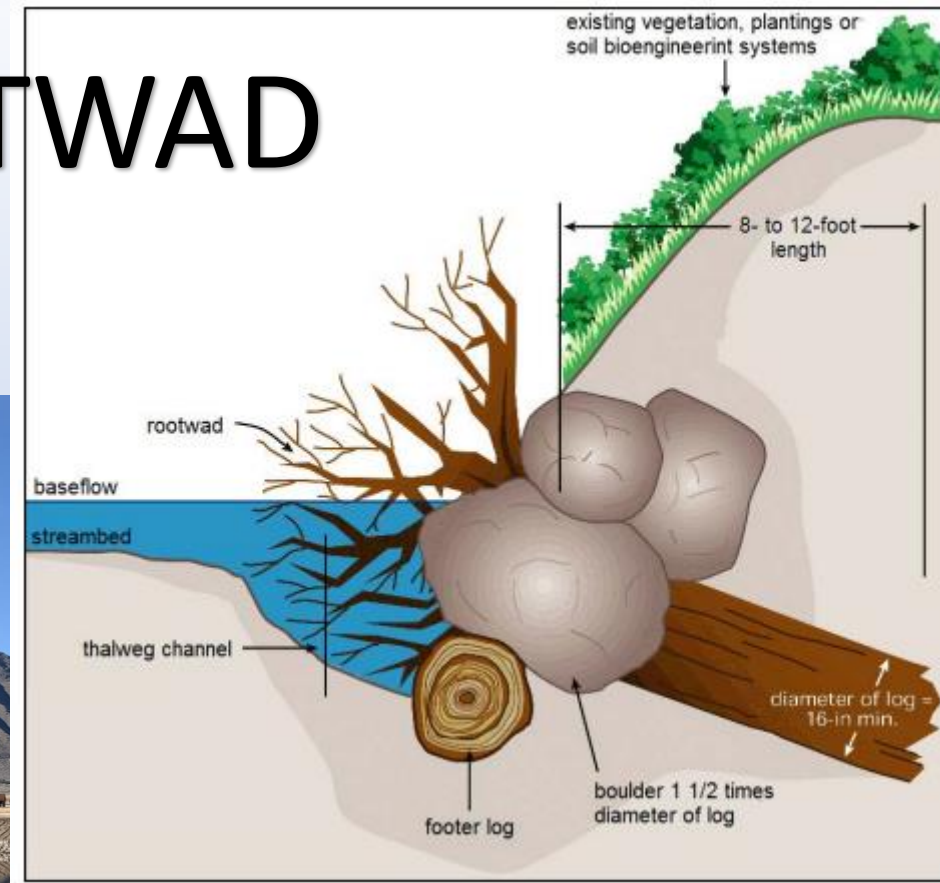
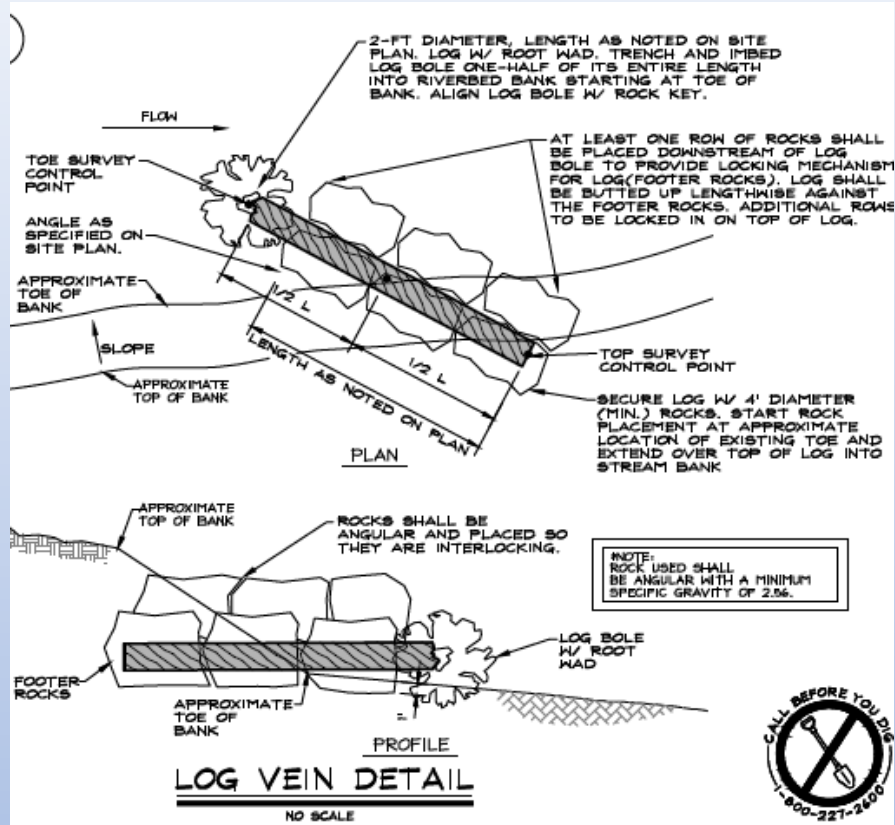


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LOG VEIN/ROOTWAD



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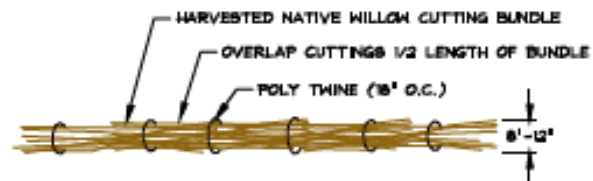
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BIO ENGINEERING METHODS

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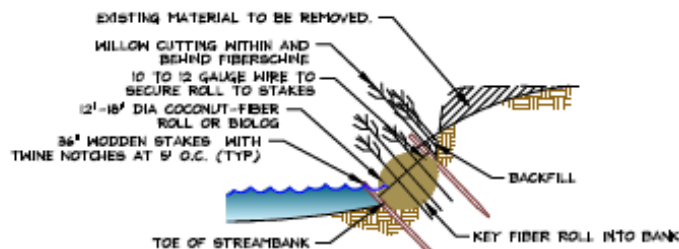


NOTES:

1. WILLOW CUTTINGS TO BE HARVEST FROM LOCAL SOURCE AS AVAILABLE.
2. CLEANLY DETACH WILLOW CUTTING MATERIAL 1\"/>

WILLOW WATTLES DETAIL

NOT TO SCALE



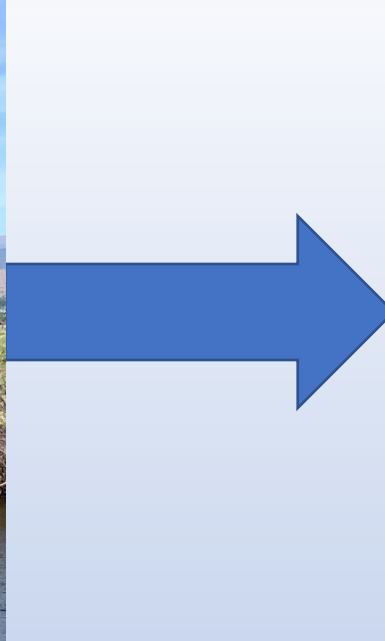
NOTES:

1. EXTEND FIBERSCHINE 5 FEET BEYOND END OF TREATMENT AREA.
2. WILLOW CUTTINGS TO BE HARVEST FROM LOCAL SOURCE AS AVAILABLE.
3. CLEANLY DETACH WILLOW CUTTING MATERIAL 1\"/>

FIBERSCHINES WITH WILLOW CUTTINGS DETAIL

NOT TO SCALE



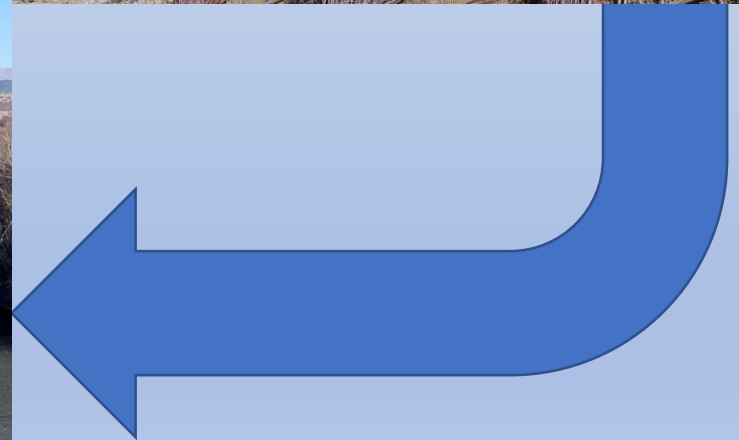


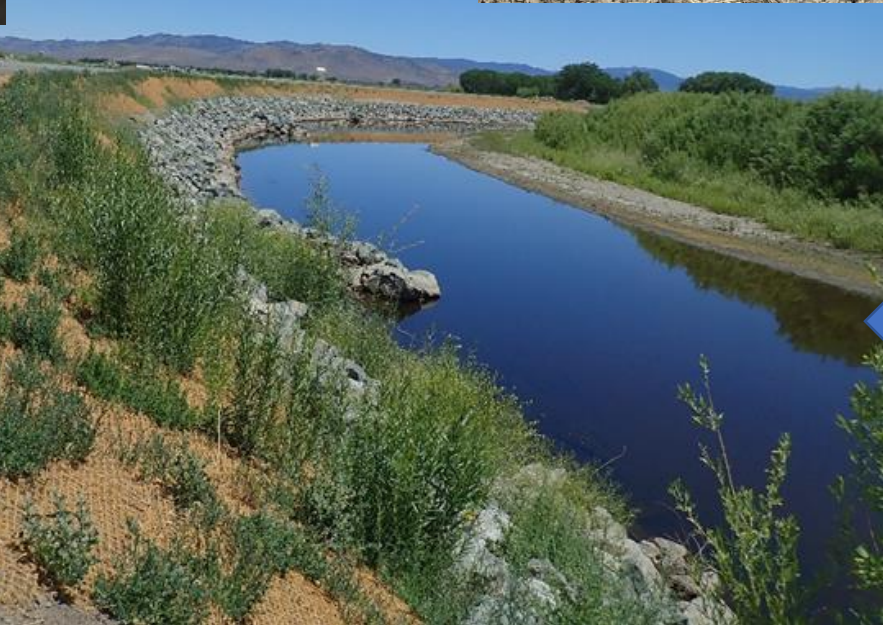
CRADLEBAUGH

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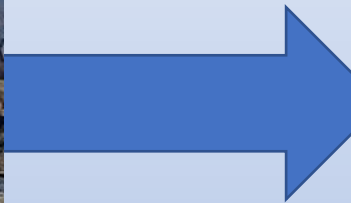
HOLBROOK

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FLYING J – Site 1



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CHARNEY – SITE 2



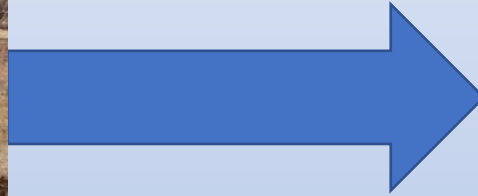
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CHARNEY – SITE 3

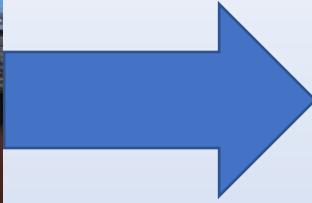


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RUNNING RIVER

CARSON VALLEY



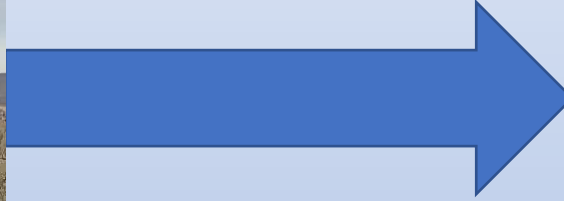
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 **Anderson**

ineers • Surveyors • Planners

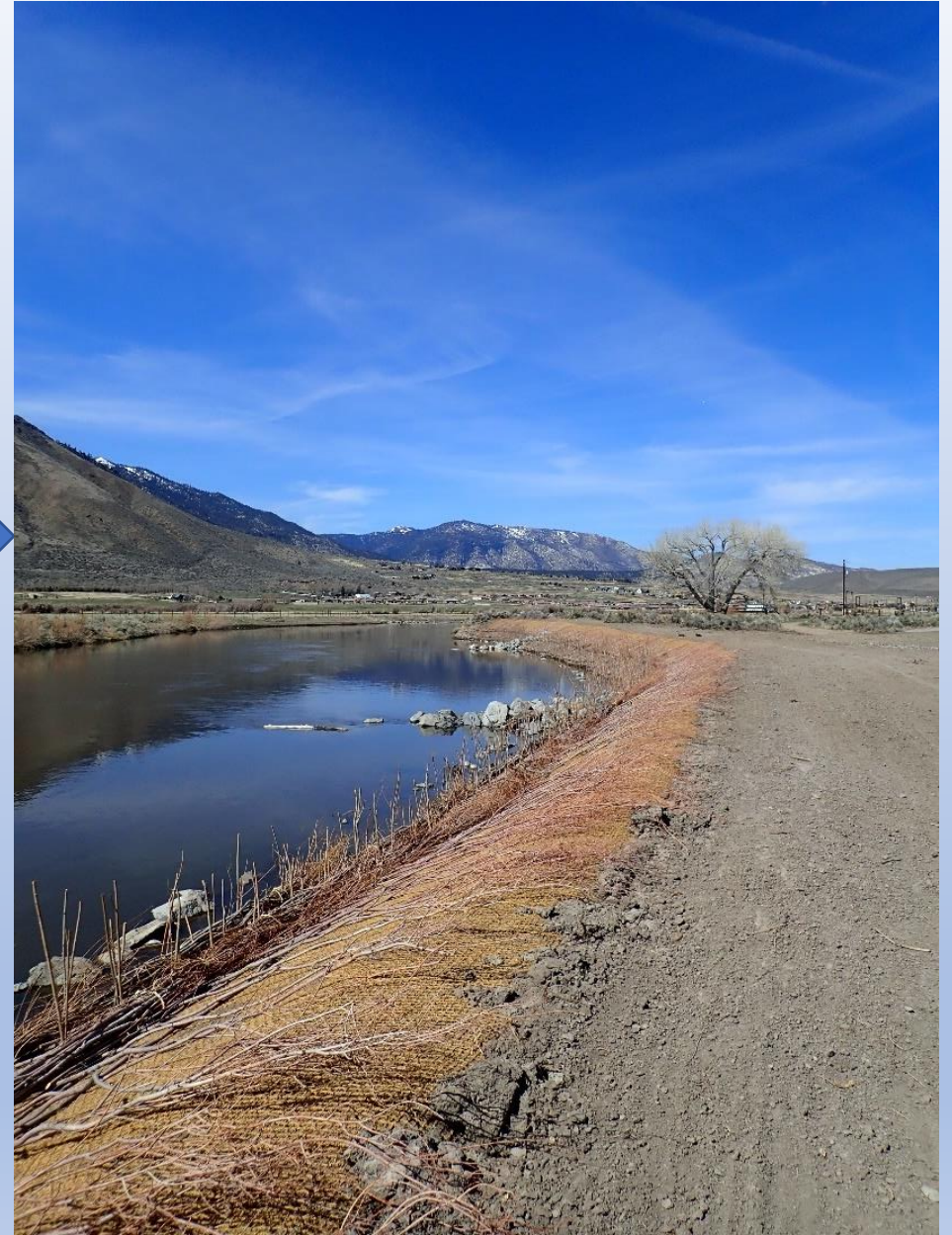
CHARNEY – SITE 1



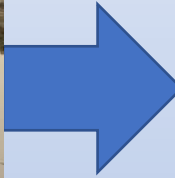
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FLYING J – Site 2



ARSON VA



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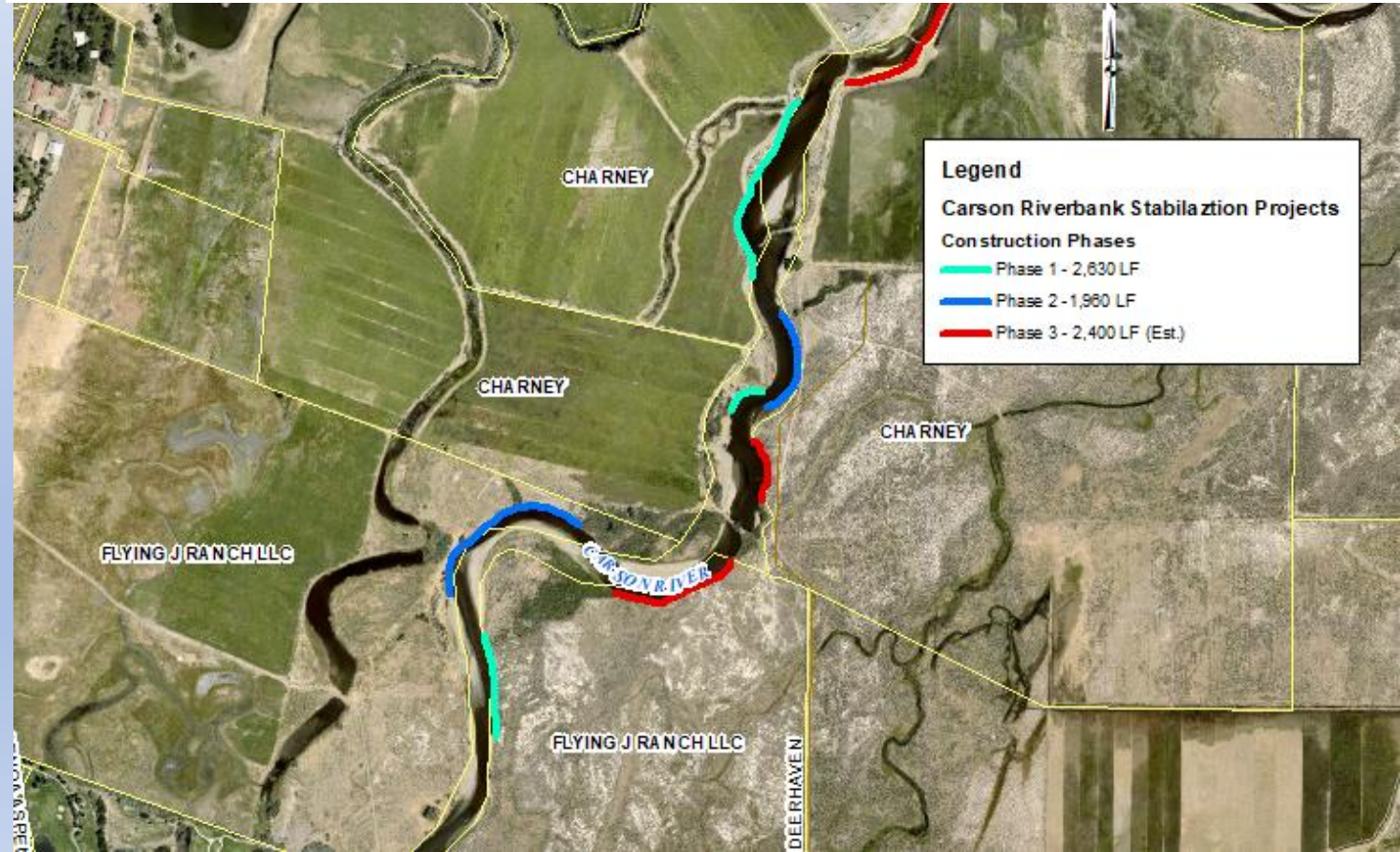


PROJECT BUDGET



PHASE	NO. OF SITES	LF BANK STABILIZATION	ENGR. ESTIMATE	LOWEST BID	CONTRACTOR
1	4	2,630	\$ 402,950.00	\$ 364,820.90	BURDICK
2	3	1,960	\$ 507,650.00	\$ 478,452.00	COONS
3*	4	2,400	\$ 600,000.00	\$ 566,322.00	BURDICK

ESTIMATED



QUESTIONS?

CARSON VALLEY



CONSERVATION DISTRICT

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