



# USDA FOREST SERVICE - LAKE TAHOE BASIN MANAGEMENT UNIT

## ANGORA CREEK MEADOW-CHANNEL RESTORATION PLAN



### 100% SUBMITTAL

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#### PROJECT DESCRIPTION

THESE DRAWINGS PROVIDE DETAILS TO RESTORE GEOMORPHIC FUNCTION ALONG A SECTION OF ANGORA CREEK LOCATED JUST UPSTREAM OF LAKE TAHOE BLVD. THE WORK DESCRIBED HEREIN INCLUDES CLEARING AND GRUBBING OF PROPOSED CHANNEL ALIGNMENT, DIVERSION/DEWATERING, EXCAVATION OF NEW CHANNEL, FILLING OF EXISTING CHANNELS, PLACEMENT OF WOODY DEBRIS, SOD SALVAGE AND REUSE, AND PLANTING OF NATIVE VEGETATION.

#### GRADING SUMMARY

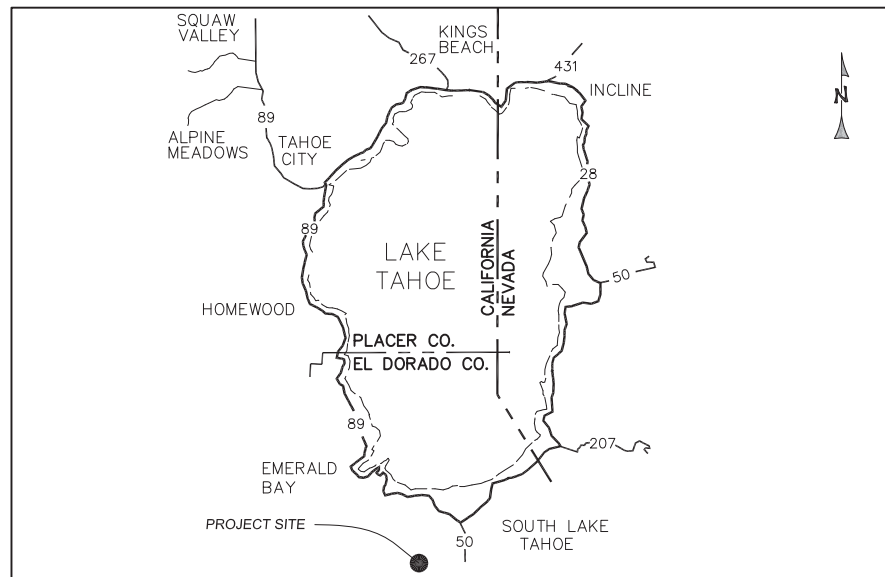
ITEM	VOLUME (CUBIC YARDS)
CUT =	830
FILL =	740

THE ABOVE QUANTITIES ARE APPROXIMATE IN-PLACE VOLUMES CALCULATED FROM THE DIFFERENCE BETWEEN EXISTING GROUND AND PROPOSED FINISH GRADE. EXISTING GROUND IS DEFINED BY THE TOPOGRAPHIC CONTOURS AND/OR SPOT ELEVATIONS ON THE PLAN. PROPOSED FINISH GRADE IS DEFINED AS THE DESIGN SURFACE ELEVATION OF EARTH TO BE CONSTRUCTED.

THE ABOVE QUANTITIES ARE FOR PERMIT PURPOSES ONLY AND HAVE NOT BEEN FACTORED TO INCLUDE ALLOWANCES FOR BULKING, CLEARING AND GRUBBING, SUBSIDENCE, SHRINKAGE, OVER EXCAVATION, RECOMPACTION, AND CONSTRUCTION METHODS.

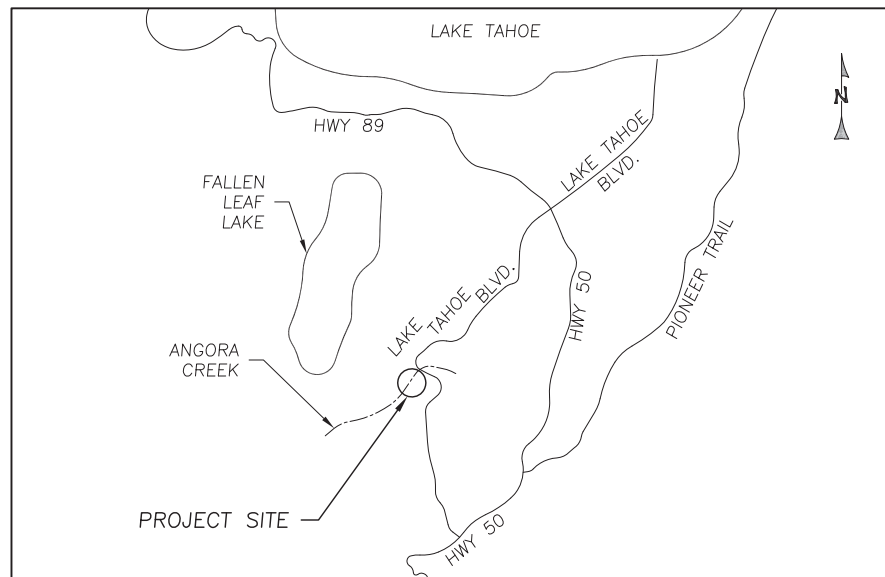
#### SOD SUMMARY

ITEM	AREA (SQUARE FEET)
SALVAGED SOD =	12,800
SOD NECESSARY TO COMPLETE PROJECT =	11,900
SURPLUS =	900



VICINITY MAP

N.T.S.



SITE ACCESS MAP

N.T.S.

#### ABBREVIATIONS

CY	CUBIC YARDS
DIA.	DIAMETER
(E)	EXISTING
E.G.	EXISTING GROUND
EL.	ELEVATION
FG	FINISHED GRADE
FT.	FEET
IN.	INCHES
LF	LINEAR FEET
MAX.	MAXIMUM
MIN.	MINIMUM
(N)	NEW
(NIC)	NOT IN CONTRACT
N.T.S.	NOT TO SCALE
O.C.	ON CENTER
R	RADIUS
R.C.	RELATIVE COMPACTION
SEZ	STREAM ENVIRONMENT ZONE
SF	SQUARE FEET
SWPPP	STORMWATER POLLUTION PREVENTION PLAN
TBD	TO BE DETERMINED
TRPA	TAHOE REGIONAL PLANNING AGENCY
TYP	TYPICAL
USFS	UNITED STATES FOREST SERVICE

#### GENERAL NOTES

- PREPARED AT THE REQUEST OF:  
USDA FOREST SERVICE  
LAKE TAHOE BASIN MANAGEMENT UNIT  
ECOSYSTEM RESTORATION GROUP  
ATTENTION: CRAIG OEHRLI  
35 COLLEGE DRIVE  
SOUTH LAKE TAHOE, CA 96150  
(530) 543-2600
  - TOPOGRAPHIC SURVEY COMPILED BY:  
WATERWAYS CONSULTING, INC.  
403B SWIFT STREET  
SANTA CRUZ, CA 95060  
(831) 421-9291
- SURVEY DATES:  
A) AS-BUILT SURVEY OF ANGORA CREEK WHERE MODIFIED DURING BRIDGE REPLACEMENT, JUNE 2011.  
B) ANGORA CREEK SURVEY, JUNE 2010  
C) ANGORA CREEK AND LAKE TAHOE BLVD AREA TOPO PRIOR TO BRIDGE INSTALLATION PROVIDED BY EL DORADO COUNTY DEPARTMENT OF TRANSPORTATION, DATED: OCTOBER 2005 AND APRIL 2007
- CONTOUR INTERVAL: ONE FOOT
  - BASIS OF BEARINGS:  
S60°17'01"E BETWEEN FOUND CONTROL POINTS #1 AND #2. COORDINATE SYSTEM IS CALIFORNIA STATE PLANE, ZONE 2, NAD27.
  - ELEVATION DATUM:  
EL DORADO COUNTY DEPARTMENT OF TRANSPORTATION #466, ELEVATION = 6343.02 FEET. PK NAIL. SHOWN ON SHT. C2 AS CONTROL POINT #1.
  - INDIVIDUAL TREES WERE NOT LOCATED DURING THIS SURVEY.
  - UNLESS OTHERWISE SPECIFIED ON THE DRAWINGS, ALL WORK SHALL COMPLY WITH: STANDARD SPECIFICATIONS FOR CONSTRUCTION OF ROADS AND BRIDGES ON FEDERAL HIGHWAY PROJECTS, FP-03 U.S. CUSTOMARY UNITS (A.K.A. "STANDARD SPECIFICATION").
  - PARCEL LINES SHOWN HEREON WERE COMPILED FROM RECORD INFORMATION OBTAINED FROM THE EL DORADO COUNTY DEPARTMENT OF TRANSPORTATION. THE LOCATION OF THESE LINES IS SUBJECT TO CHANGE, PENDING THE RESULTS OF A COMPLETE BOUNDARY SURVEY.

#### SECTION AND DETAIL CONVENTION

SECTION OR DETAIL IDENTIFICATION (NUMBER OR LETTER)

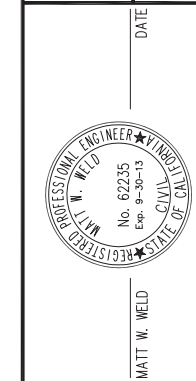


REFERENCE SHEET FROM WHICH DETAIL OR SECTION IS TAKEN.

REFERENCE SHEET ON WHICH SECTION OR DETAIL IS SHOWN.



403B SWIFT ST.  
SANTA CRUZ, CA 95060  
PH:(831)421-9291 // FAX:(888)819-6647  
WWW.WATERWAYS.COM



PREPARED AT THE REQUEST OF:  
**USDA FOREST SERVICE  
LAKE TAHOE BASIN  
MANAGEMENT UNIT**

**COVER SHEET**

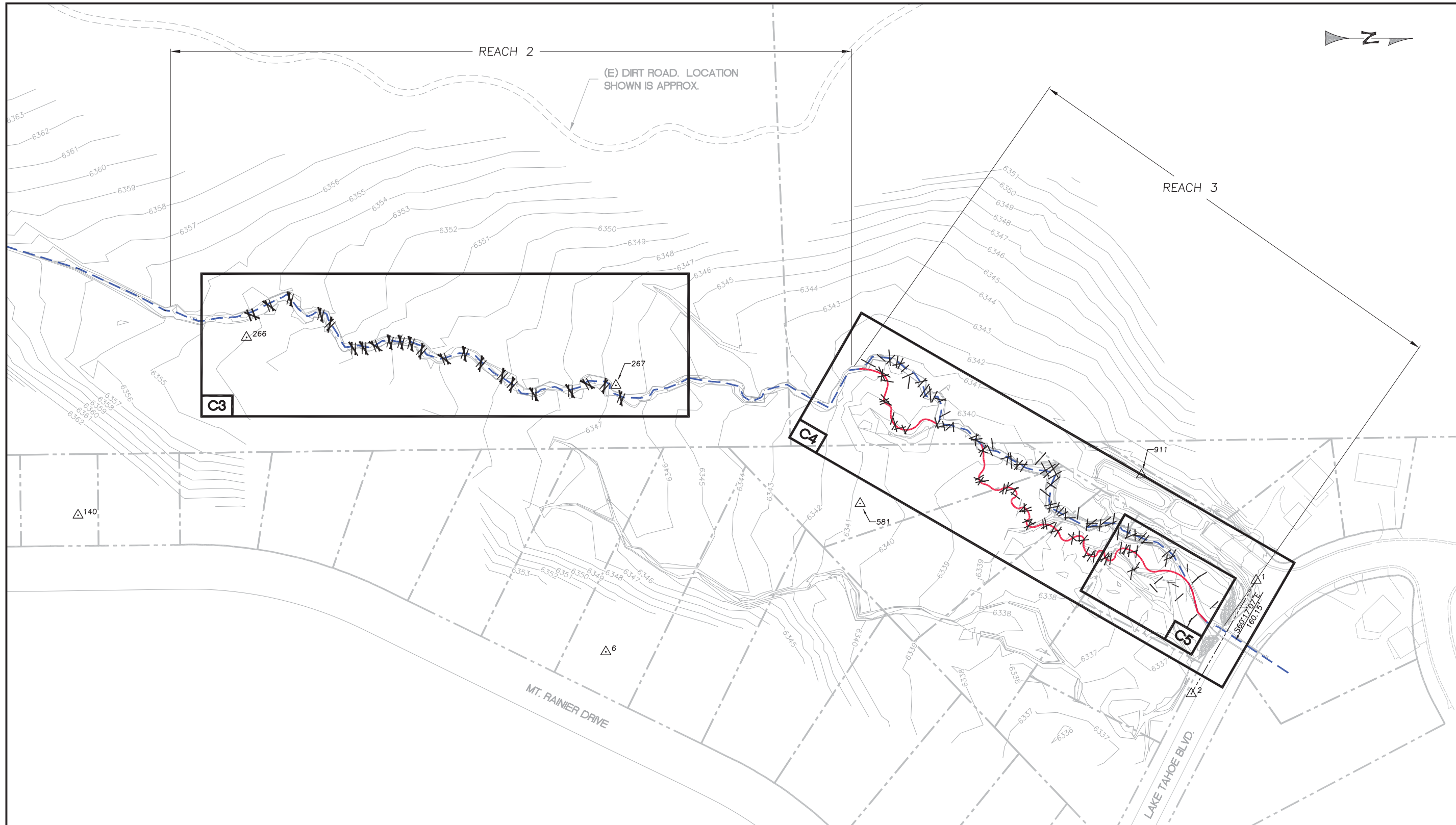
**ANGORA CREEK  
MEADOW-CHANNEL  
RESTORATION PLAN  
100% SUBMITTAL**

DESIGNED BY: MWW  
DRAWN BY: BMS/BMZ  
CHECKED BY: MWW  
DATE: 09/10/11  
JOB NO.: 09-006

BAR IS ONE INCH ON ORIGINAL DRAWING. ADJUST SCALES FOR REDUCED PLOTS

C1 1 OF 17

APPROVED BY	DATE	DATE	DATE
ECOSYSTEM STAFF OFFICER		FOREST ENGINEER	FOREST SUPERVISOR



**SITE OVERVIEW AND SHEET INDEX PLAN**  
 SCALE: 1"=60'

**LEGEND**

	PARCEL LINE
	FLOW LINE
	EXISTING CONTOURS
	EXISTING CHANNEL
	PROPOSED CHANNEL
	PROPOSED LOG STRUCTURE
	EXISTING SURVEY CONTROL POINT

**CONTROL POINTS**




POINT	NORTHING	EASTING	ELEVATION	DESCRIPTION
1	448358.09	2557953.94	6343.02'	FOUND NAIL
2	448278.70	2558093.03	6339.50'	FOUND NAIL
6	447561.49	2558041.62	6359.96'	12" SPIKE
140	446914.89	2557874.14	6378.87'	12" SPIKE
266	447121.22	2557656.07	6354.17'	REBAR
267	447573.79	2557714.98	6347.18'	REBAR
581	447873.01	2557859.70	6341.60'	REBAR
911	448217.74	2557824.77	6341.90'	REBAR



**NOTES:**

1. ALL ACCESS BY HAND CREWS ONLY.
2. LOGS FOR REACH 2 (CLASS 1 AND 2) CAN BE SALVAGED FROM ADJACENT MEADOW.
3. SALVAGE DEAD STANDING LOGS LOCATED 15' FROM THE TOP OF BANK.
4. PREVIOUSLY STOCKPILED LOGS CAN BE USED AT THE DIRECTION OF THE PROJECT LEADER.

**LEGEND**

-  EXISTING CONTOURS
-  PROPOSED LOG STRUCTURE
-  EXISTING SURVEY CONTROL POINT

**REACH 2 LOG PLACEMENT PLAN**

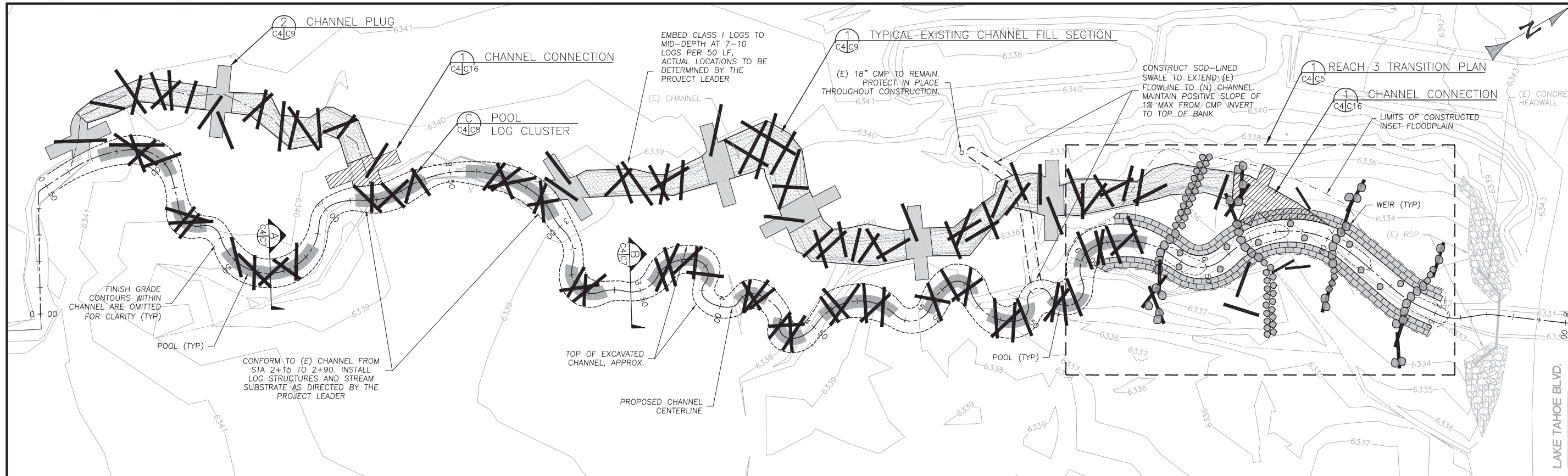
SCALE: 1"=20'

**NOTE:**

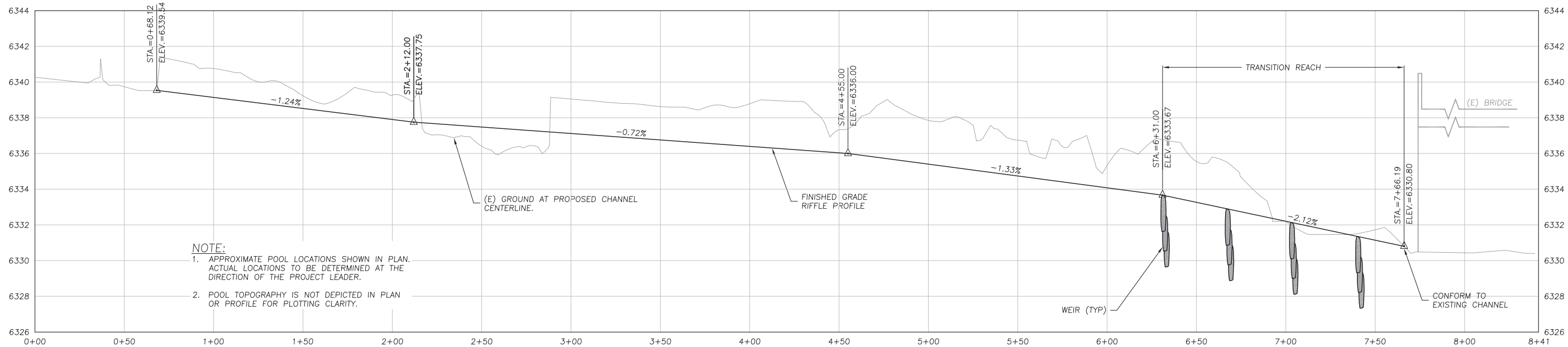
SEE SHEET C6 FOR CLASS 1 AND 2 LOG DIMENSIONS.

**TABLE 1: REACH 2 MATERIAL QUANTITIES**

Site #	Log Class		Willows at Banks (LF of stakes)	
	1	2	Left	Right
1	2	6		20
2	2	4		
3		4		15
4	2	1		
5	2	4		20
6		6	15	15
7	1	5	20	20
8		4	10	20
9	2	4	10	20
10	2	4		20
11	3	4	20	20
12		4		10
13	1	4		10
14	5	6	5	10
15	5	8	5	15
16	4	4	15	15
17	4	8	15	15
18		6	20	20
19	4	8		
20	3	4		
21	1	2		
22	5	6		10
<b>TOTAL:</b>	<b>48</b>	<b>106</b>	<b>135</b>	<b>275</b>

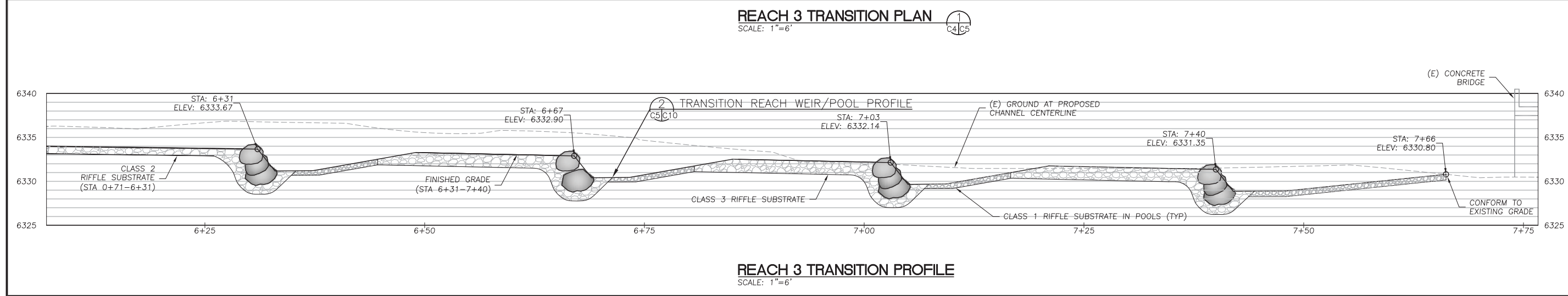
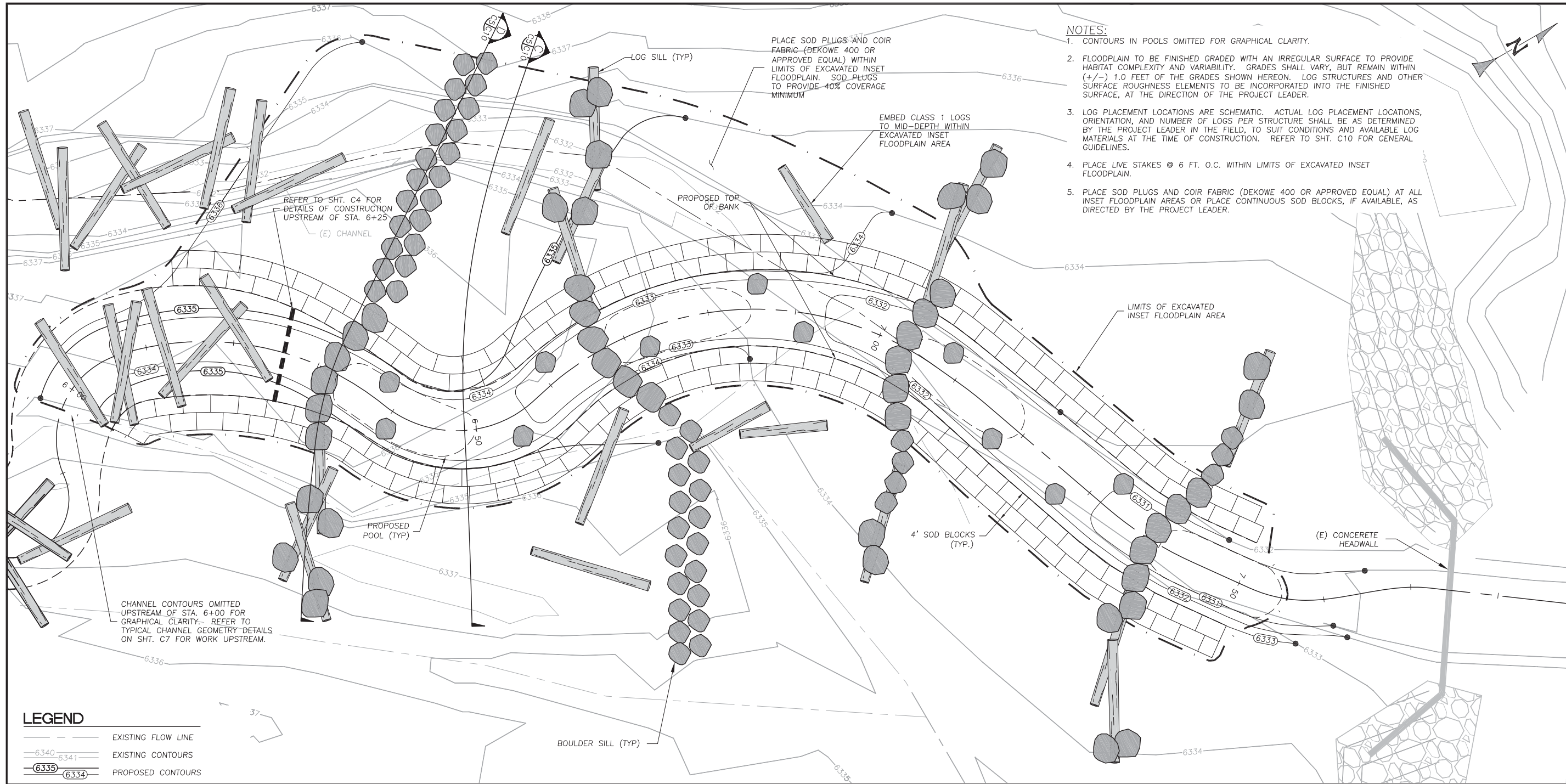


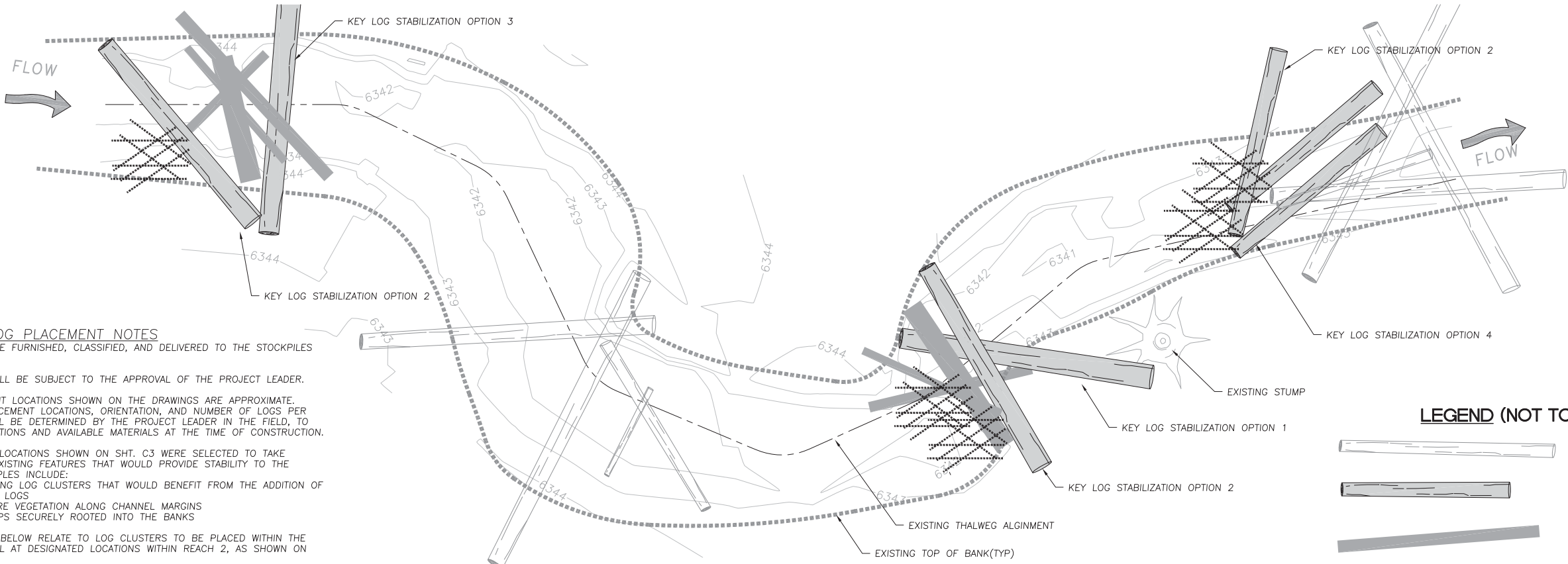
**REACH 3 SITE PLAN**  
SCALE: 1"=20'



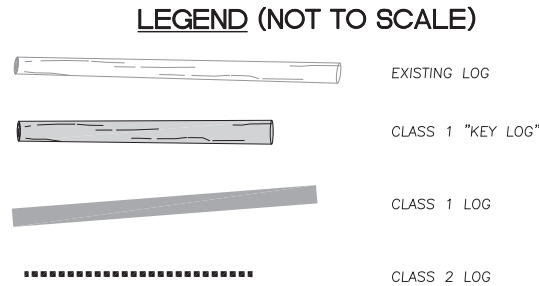
**REACH 3 PROFILE**  
SCALE: H:1"=30', V:1"=3'

**NOTE:**  
1. APPROXIMATE POOL LOCATIONS SHOWN IN PLAN. ACTUAL LOCATIONS TO BE DETERMINED AT THE DIRECTION OF THE PROJECT LEADER.  
2. POOL TOPOGRAPHY IS NOT DEPICTED IN PLAN OR PROFILE FOR PLOTTING CLARITY.





**TYPICAL REACH 2 LOG PLACEMENT PLAN**  
SCALE: 1"=4'



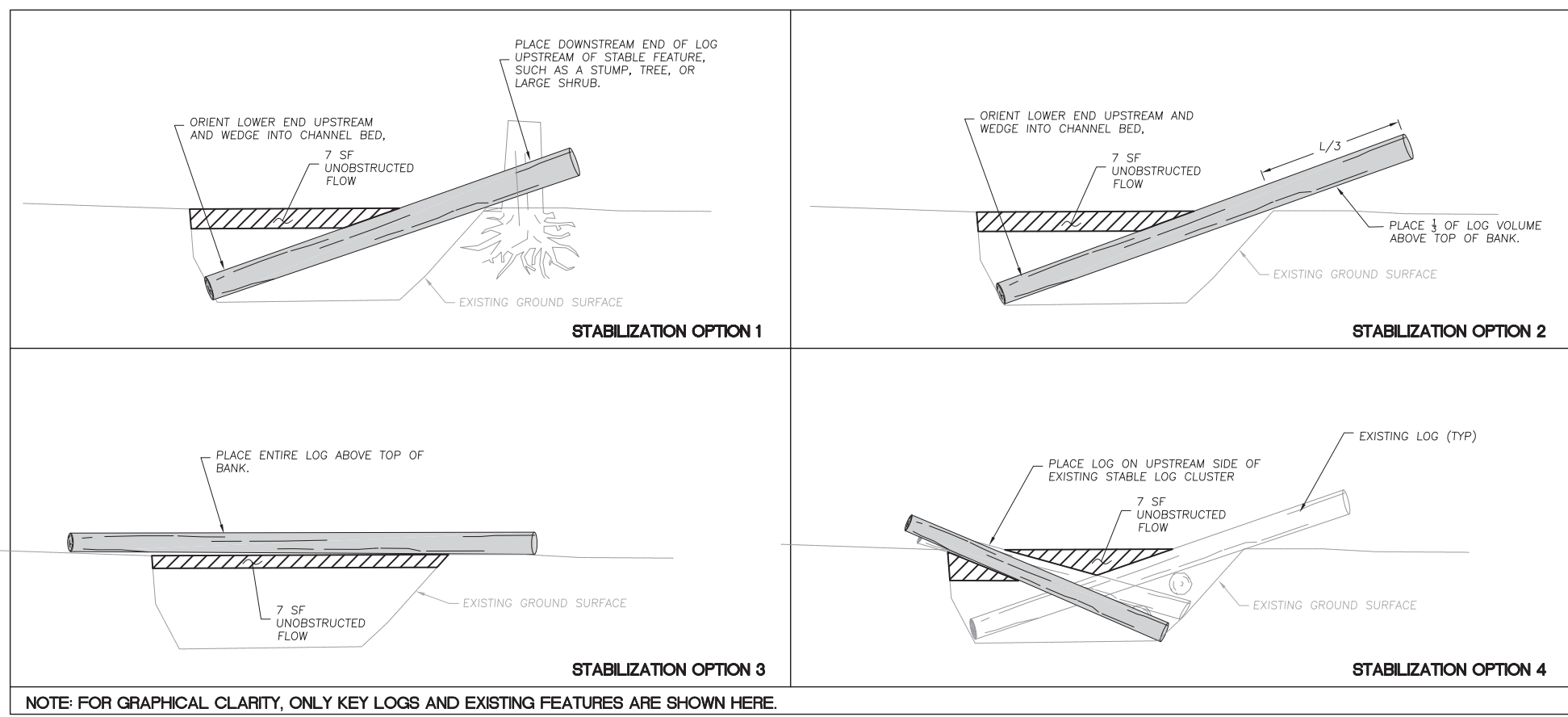
- GENERAL LOG PLACEMENT NOTES**
- LOGS SHALL BE FURNISHED, CLASSIFIED, AND DELIVERED TO THE STOCKPILES BY THE USFS.
  - ALL LOGS SHALL BE SUBJECT TO THE APPROVAL OF THE PROJECT LEADER.
  - LOG PLACEMENT LOCATIONS SHOWN ON THE DRAWINGS ARE APPROXIMATE. ACTUAL LOG PLACEMENT LOCATIONS, ORIENTATION, AND NUMBER OF LOGS PER STRUCTURE SHALL BE DETERMINED BY THE PROJECT LEADER IN THE FIELD, TO BEST SUIT CONDITIONS AND AVAILABLE MATERIALS AT THE TIME OF CONSTRUCTION.
  - THE CLUSTER LOCATIONS SHOWN ON SHT. C3 WERE SELECTED TO TAKE ADVANTAGE OF EXISTING FEATURES THAT WOULD PROVIDE STABILITY TO THE CLUSTERS. EXAMPLES INCLUDE:
    - EXISTING LOG CLUSTERS THAT WOULD BENEFIT FROM THE ADDITION OF MORE LOGS
    - MATURE VEGETATION ALONG CHANNEL MARGINS
    - STUMPS SECURELY ROOTED INTO THE BANKS
  - DESCRIPTIONS BELOW RELATE TO LOG CLUSTERS TO BE PLACED WITHIN THE EXISTING CHANNEL AT DESIGNATED LOCATIONS WITHIN REACH 2, AS SHOWN ON SHT C3.
  - LOGS SHALL BE POSITIONED AS DESCRIBED BELOW AND SHOWN IN TYPICAL SECTIONS AT RIGHT.
  - FOLLOWING PLACEMENT OF LOGS, ADDITIONAL CLASS 1 AND CLASS 2 LOGS SHALL BE PLACED IN A MANNER THAT MAINTAINS A MINIMUM UNOBSTRUCTED CROSS SECTIONAL AREA OF 7 SQ.FT. WITHIN THE TOP HALF OF THE CHANNEL CROSS SECTION TO REDUCE POTENTIAL FOR COMPLETE OBSTRUCTION.
  - ROOTWADS MAY BE LEFT ATTACHED, AS DIRECTED BY THE PROJECT LEADER.

- GENERAL GUIDELINES FOR PLACEMENT AND STABILIZATION**
- A MINIMUM OF 2 CLASS 1 "KEY LOGS" PER CLUSTER SHALL BE STABILIZED AS SHOWN IN DETAILS AT RIGHT. THESE LOGS SHALL GENERALLY BE LOCATED AT THE DOWNSTREAM END OF THE CLUSTER, TO PROVIDE SUPPORT FOR UPSTREAM LOGS (CLASS 1 AND 2).
  - IF A LOG IS PLACED WITH ONE END OUT OF THE WATER, THE END IN THE WATER SHOULD GENERALLY POINT UPSTREAM.
  - ANTICIPATE POTENTIAL MOVEMENT AND PLACE THE LOG SUCH THAT MOVEMENT WILL BE ARRESTED. FOR EXAMPLE, WOOD WILL GENERALLY HAVE TO PIVOT AND TURN TO BE MOBILIZED FROM THE SITE DURING HIGH WATER. WOOD SHOULD BE PLACED SUCH THAT OTHER PIECES OF STABLE WOOD OR A STABLE CHANNEL FEATURE PREVENTS PIVOTING.
  - WOOD SHOULD BE GENERALLY DISTRIBUTED THROUGHOUT THE ENTIRE WATER COLUMN, FROM THE MEADOW SURFACE TO THE BOTTOM OF THE CHANNEL.
  - SOME LOGS MAY SPAN THE CHANNEL TO PROVIDE ANCHOR POINTS FOR OTHER LOGS.
  - CLASS 1 LOGS SHOULD BE PLACED TO USE THE HYDRAULIC FORCE OF WATER TO PIN THEM AGAINST A "KEY LOG" OR AN EXISTING STABLE FEATURE; CLASS 1 LOGS SHOULD GENERALLY BE UPSTREAM OF THE STABLE FEATURE OR "KEY LOG".

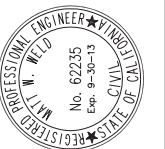
- KEY LOG STABILIZATION**
- STABILIZE CLASS 1 "KEY LOGS" USING ONE OF THE FOLLOWING METHODS:
    - OPTION 1: PLACE DOWNSTREAM END OF LOG AGAINST THE UPSTREAM SIDE OF A STABLE FEATURE ON THE BANK, SUCH AS A MATURE TREE, SHRUB OR STUMP, AND POINT UPSTREAM END INTO BANK.
    - OPTION 2: PLACE 33% (MIN.) OF LOG VOLUME ABOVE THE TOP OF BANK.
    - OPTION 3: PLACE LOG ENTIRELY ABOVE THE TOP OF BANK.
    - OPTION 4: PLACE LOG UPSTREAM OF AN EXISTING STABLE LOG CLUSTER.

- CLASS 2 LOG PLACEMENT**
- CLASS 2 LOGS SHALL BE PLACED ENTIRELY BELOW THE TOP OF BANK.
  - CLASS 2 LOGS SHALL BE PLACED UPSTREAM OF AND/OR BENEATH CLASS 1 LOGS.

LOG CLASS	DIAMETER	LENGTH
1	10" OR GREATER	10-20 FT.
2	3"-10"	6-10 FT.



**REACH 2 KEY LOG STABILIZATION OPTIONS**  
N.T.S.

DATE \_\_\_\_\_  
  
 MATT W. WELD

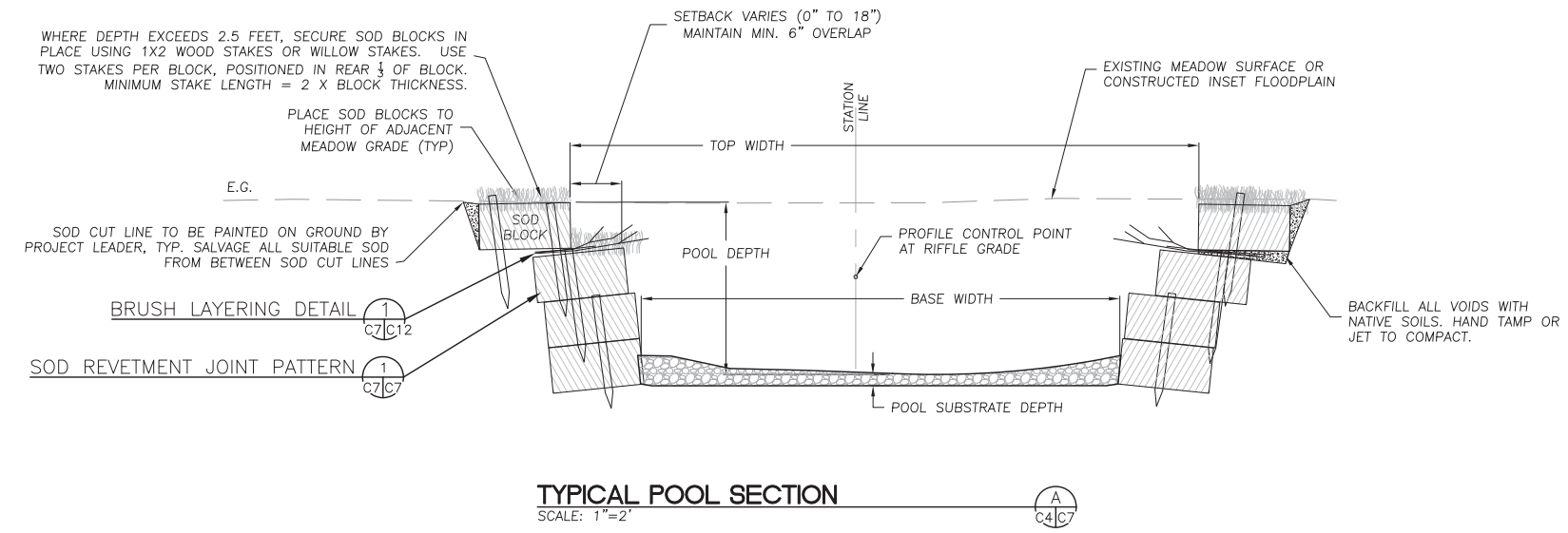
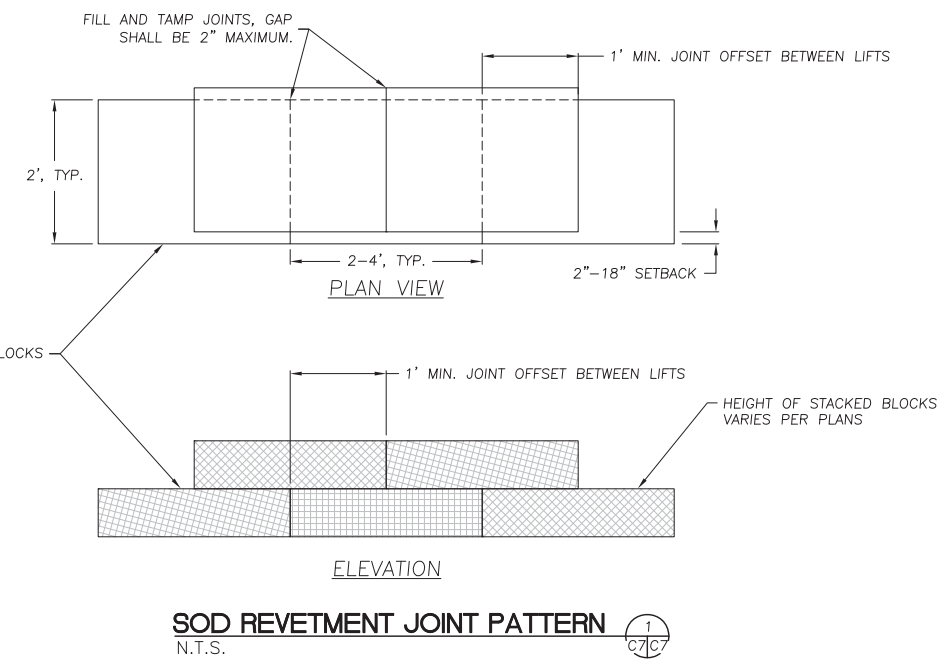
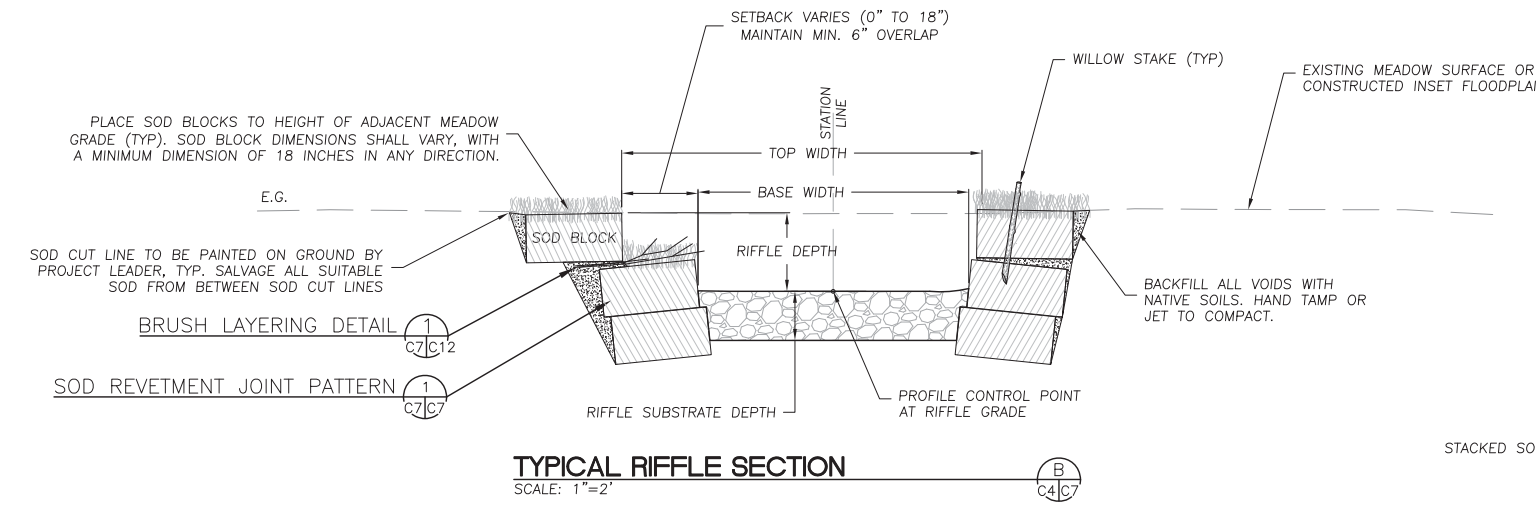
PREPARED AT THE REQUEST OF:  
**USDA FOREST SERVICE  
 LAKE TAHOE BASIN  
 MANAGEMENT UNIT**

**REACH 3  
 CHANNEL  
 DETAILS -A**

**ANGORA CREEK  
 MEADOW-CHANNEL  
 RESTORATION PLAN  
 100% SUBMITTAL**

DESIGNED BY: MWW  
 DRAWN BY: BMS/BMZ  
 CHECKED BY: MWW  
 DATE: 09/10/11  
 JOB NO.: 09-006

BAR IS ONE INCH ON ORIGINAL DRAWING. ADJUST SCALES FOR REDUCED PLOTS

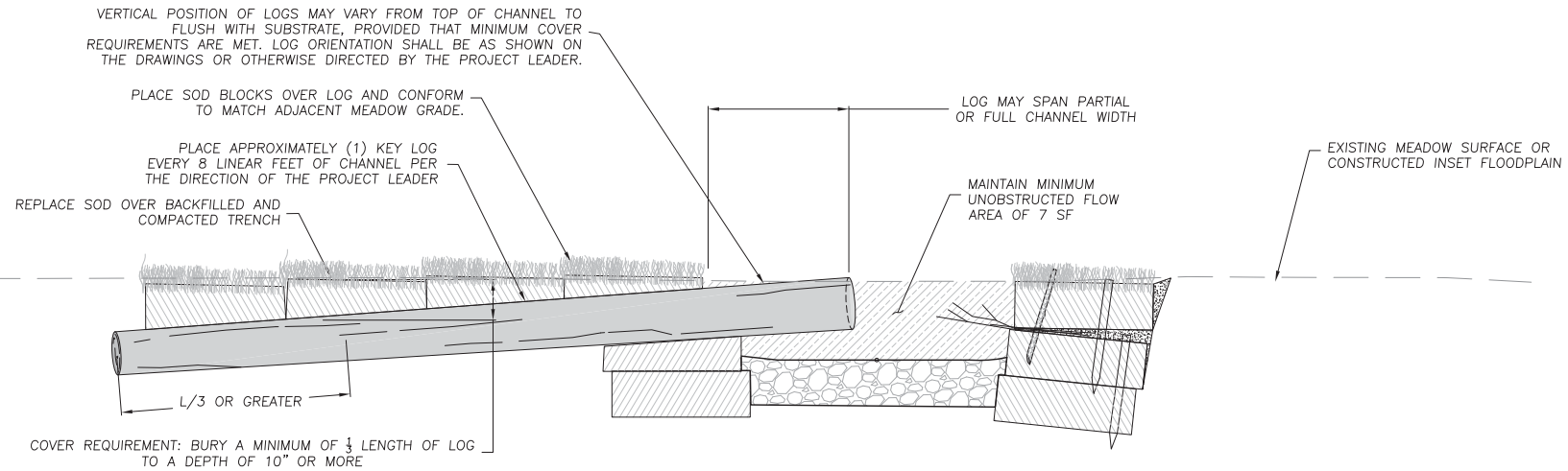


**TABLE 2: TYPICAL CHANNEL GEOMETRIES AND TREATMENTS**

CHANNEL STATION RANGE	CHANNEL SLOPE	RIFFLE DEPTH (FT.)	RIFFLE BASE WIDTH (FT.)	RIFFLE TOP WIDTH (FT.)	POOL DEPTH (FT.)	POOL BASE WIDTH (FT.)	POOL TOP WIDTH (FT.)	RIFFLE SUBSTRATE CLASS	RIFFLE SUBSTRATE DEPTH (IN.)	POOL SUBSTRATE CLASS	POOL SUBSTRATE DEPTH (IN.)	NOTES
0+71 TO 2+12	1.24%	1.5 TO 1.8	4 TO 6	7 TO 11	3 TO 4	6 TO 13	10 TO 17	2	10	1	3	
2+12 TO 4+55	0.72%	1.8 TO 2.3	4 TO 6	7.5 TO 11	3 TO 4	6 TO 13	10 TO 17	2	10	1	3	
4+55 TO 6+31	1.33%	1.4 TO 2.3	4 TO 6	9 TO 11	3 TO 4	6 TO 13	10 TO 17	2	10	1	3	
6+31 TO 7+66	2.12%	1.4 TO 2.0	4 TO 5 AT WEIR CREST	7 TO 9 AT WEIR CREST	3 TO 4	6 TO 13	10 TO 17	3	24	1	6	REFER TO DETAILS ON SHT. C10

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**REACH 3 TYPICAL RIFFLE LOG PLACEMENT**  
 SCALE: 1"=2'

**REACH 3 LOG NOTES**

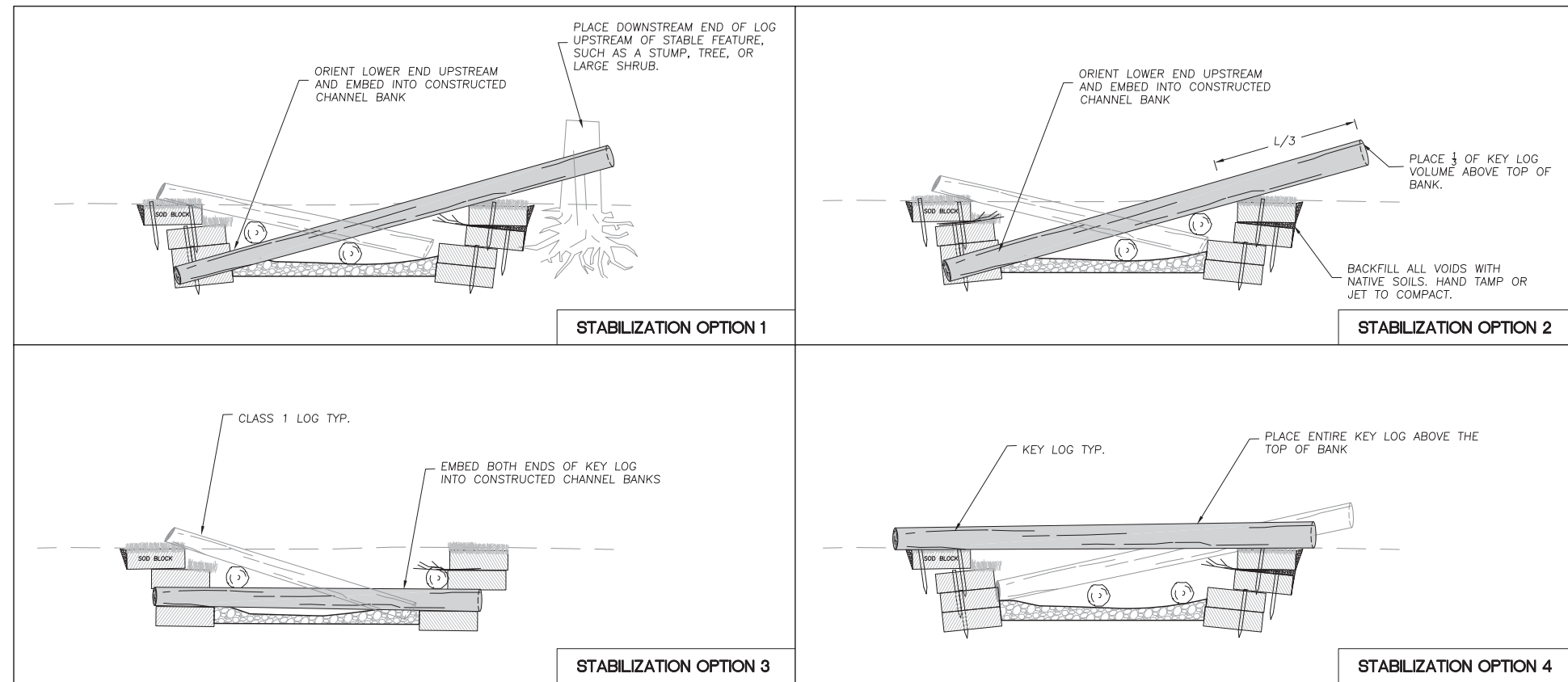
- LOGS SHALL BE FURNISHED, CLASSIFIED, AND DELIVERED TO THE STOCKPILES BY THE USFS.
- LOGS SHALL BE SUBJECT TO THE APPROVAL OF THE PROJECT LEADER.
- LOG LOCATIONS SHOWN ON THE DRAWINGS ARE APPROXIMATE. FINAL LOCATIONS SHALL BE DETERMINED BY THE PROJECT LEADER, BASED ON FIELD CONDITIONS AT THE TIME OF CONSTRUCTION.
- DESCRIPTIONS BELOW RELATE TO LOG CLUSTERS TO BE PLACED WITHIN CONSTRUCTED POOLS OF REACH 3. REFER TO RIFFLE DETAILS FOR DETAILS RELATED TO INDIVIDUAL LOGS TO BE PLACED IN RIFFLES.
- LOG CLUSTERS SHALL CONSIST OF 80 TO 140 LINEAR FEET OF CLASS 1 LOGS PLACED OVER A CHANNEL LENGTH OF LESS THAN OR EQUAL TO 15 FEET, POSITIONED AS DESCRIBED BELOW AND SHOWN IN TYPICAL SECTIONS AT RIGHT. THE SPECIFIED QUANTITY ASSUMES A LOG DIAMETER OF TEN INCHES. ADJUST LENGTHS AS NECESSARY TO ACCOMMODATE VARIATIONS IN LOG DIAMETER.
- LOGS SHALL BE PLACED IN A MANNER THAT MAINTAINS A MINIMUM UNOBSTRUCTED CROSS SECTIONAL AREA OF 7 SQ.FT.
- A MINIMUM OF 2 KEY LOGS PER CLUSTER SHALL BE STABILIZED AS SHOWN IN DETAILS AT RIGHT. THESE LOGS SHALL GENERALLY BE LOCATED AT THE DOWNSTREAM END OF THE CLUSTER, TO PROVIDE SUPPORT FOR UPSTREAM LOGS.
- ROOTWADS MAY BE LEFT ATTACHED, AS DIRECTED BY THE PROJECT LEADER.
- CLASS 2 LOGS ARE NOT USED WITHIN REACH 3.

**GENERAL GUIDELINES FOR PLACEMENT**

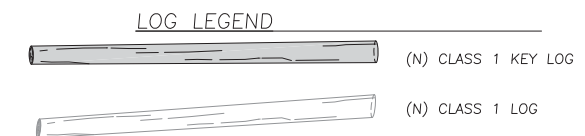
- IF A LOG IS PLACED WITH ONE END OUT OF THE WATER, THE END IN THE WATER SHOULD GENERALLY POINT UPSTREAM.
- IN PLACING ALL LOGS, CARE SHOULD BE TAKEN TO ANTICIPATE POTENTIAL MOVEMENT AND PLACE THE LOG SUCH THAT MOVEMENT WILL BE ARRESTED. FOR EXAMPLE, WOOD WILL GENERALLY HAVE TO PIVOT AND TURN TO BE MOBILIZED FROM THE SITE DURING HIGH WATER. WOOD SHOULD BE PLACED SUCH THAT OTHER PIECES OF STABLE WOOD OR A STABLE CHANNEL FEATURE PREVENTS PIVOTING.
- WOOD SHOULD BE GENERALLY DISTRIBUTED THROUGHOUT THE ENTIRE WATER COLUMN, FROM THE MEADOW SURFACE TO THE BOTTOM OF THE CHANNEL.
- SOME LOGS MAY SPAN THE CHANNEL TO PROVIDE ANCHOR POINTS FOR OTHER LOGS.

**KEY LOG STABILIZATION**

- STABILIZE CLASS 1 LOGS USING ONE OF THE FOLLOWING METHODS:
  - PLACE DOWNSTREAM END OF LOG AGAINST THE UPSTREAM SIDE OF A STABLE FEATURE, SUCH AS A MATURE TREE, SHRUB OR STUMP, AND POINT UPSTREAM END INTO BANK.
  - PLACE 33% (MIN.) OF LOG VOLUME ABOVE THE TOP OF BANK.
  - EMBED LOG INTO EACH BANK OF THE CONSTRUCTED CHANNEL.
  - PLACE ENTIRELY ABOVE THE TOP OF BANK.
- ALL KEY LOGS PLACED BELOW TOP OF BANK SHALL HAVE AT LEAST ONE END EMBEDDED INTO CHANNEL BANK.
- CLASS 1 LOGS SHOULD BE PLACED TO USE THE HYDRAULIC FORCE OF WATER TO PIN THEM AGAINST THE STABLE FEATURE; CLASS 1 LOGS SHOULD GENERALLY BE UPSTREAM OF THE STABLE FEATURE.



**REACH 3 POOL LOG CLUSTER STABILIZATION OPTIONS**  
 SCALE: 1"=4'



CLASS (WOOD)	DIAMETER	LENGTH	COUNT
1	10" OR GREATER	10-20 FEET	173

PREPARED AT THE REQUEST OF:  
**USDA FOREST SERVICE  
 LAKE TAHOE BASIN  
 MANAGEMENT UNIT**

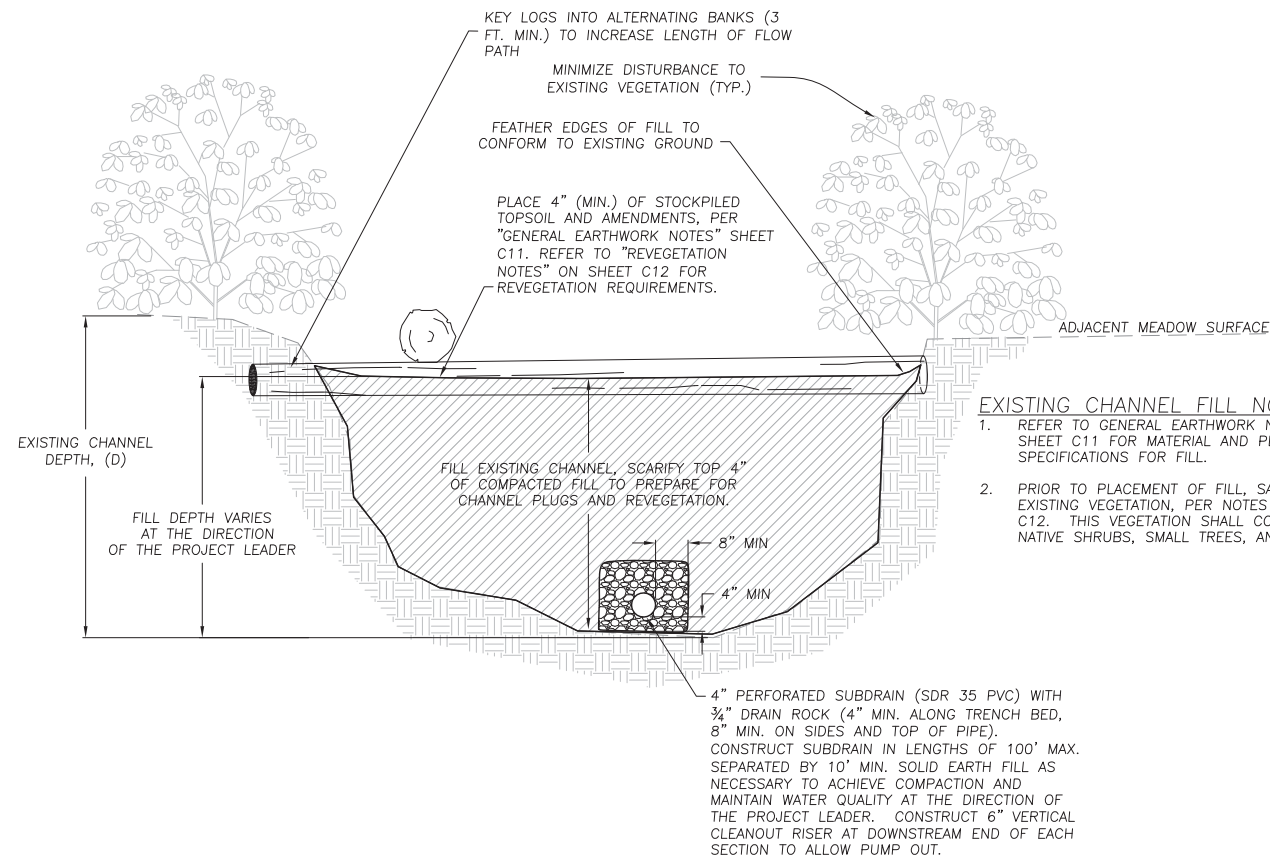
**REACH 3  
 CHANNEL  
 DETAILS - B**

**ANGORA CREEK  
 MEADOW-CHANNEL  
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 0 1"

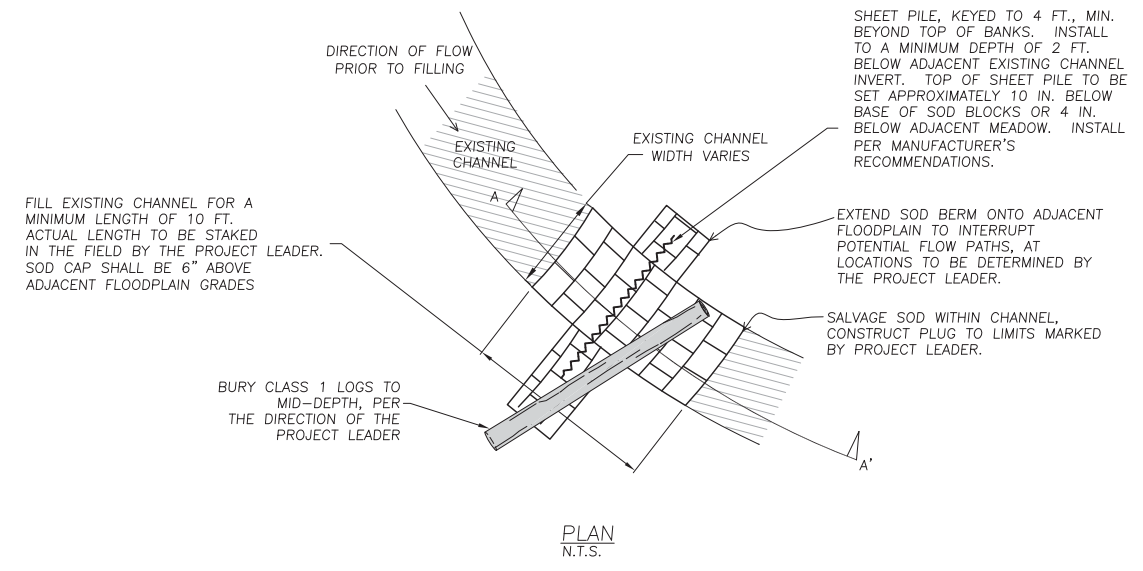
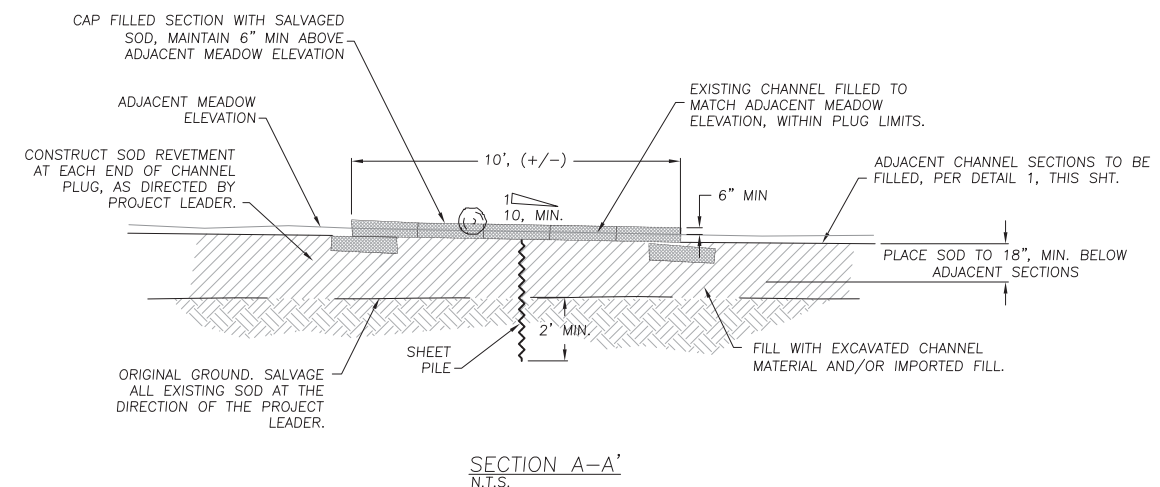




**EXISTING CHANNEL FILL NOTES**

- REFER TO GENERAL EARTHWORK NOTES SHEET C11 FOR MATERIAL AND PLACEMENT SPECIFICATIONS FOR FILL.
- PRIOR TO PLACEMENT OF FILL, SALVAGE EXISTING VEGETATION, PER NOTES ON SHEET C12. THIS VEGETATION SHALL CONSIST OF NATIVE SHRUBS, SMALL TREES, AND SOD.

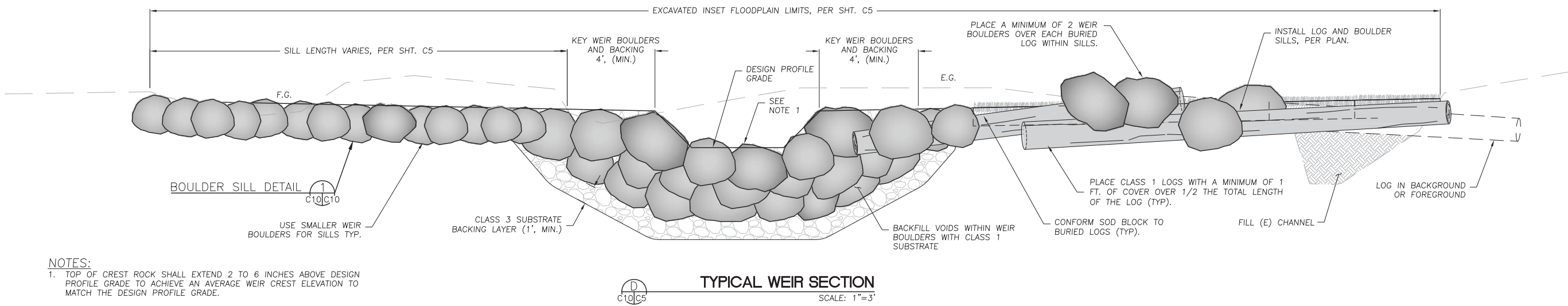
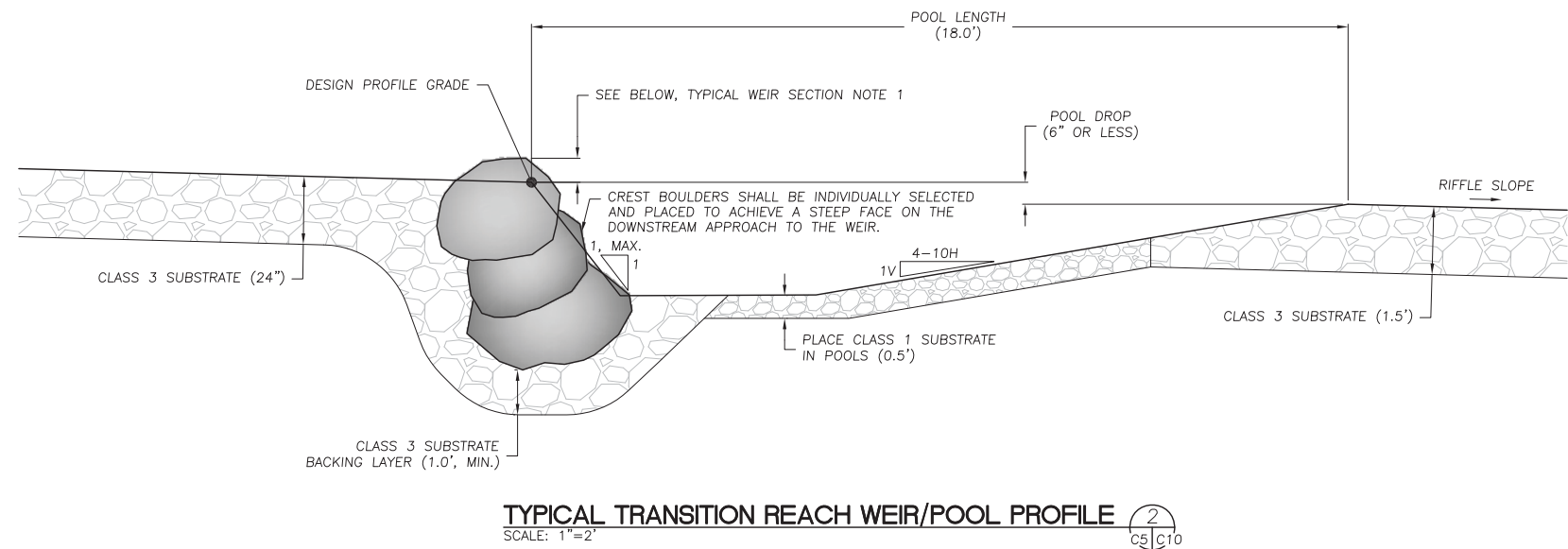
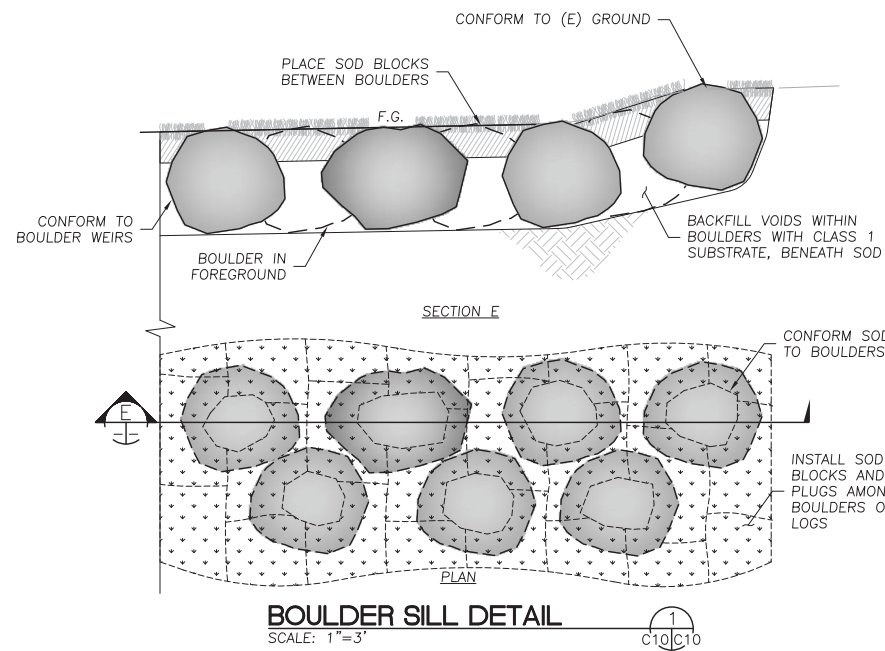
**TYPICAL EXISTING CHANNEL FILL SECTION**  
SCALE: 1"=2'



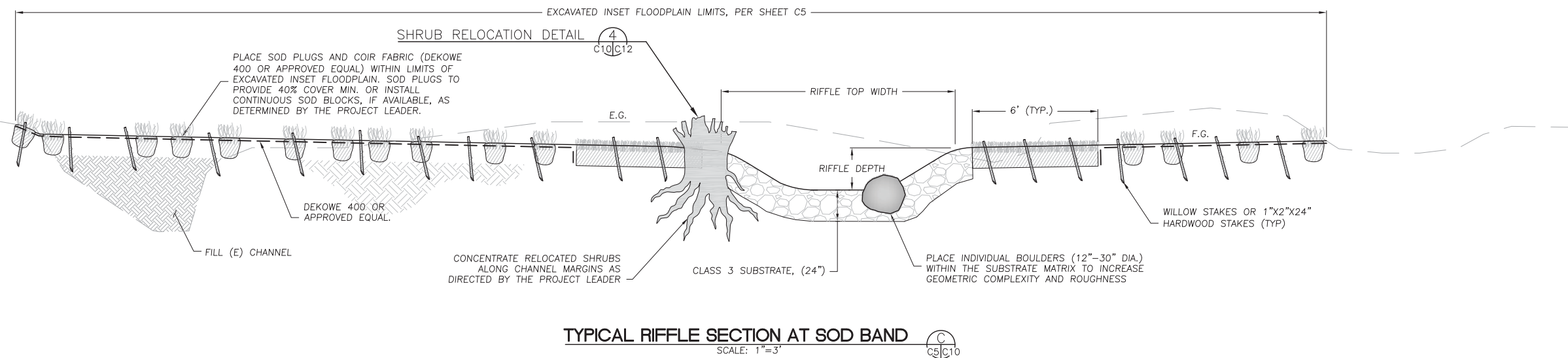
**TYPICAL CHANNEL PLUG**  
N.T.S.

**CHANNEL PLUG NOTES:**

- THE LOCATION OF PLUGS SHALL BE FLAGGED IN THE FIELD BY THE PROJECT LEADER.
- SOD PLUGS SHALL BE INSTALLED SO THERE IS A MAXIMUM 1-FOOT OF ELEVATION DIFFERENCE BETWEEN THE TOP OF ADJACENT PLUGS.
- SHEET PILE SHALL BE VINYL AND CONFORM TO THE FOLLOWING MATERIAL SPECIFICATIONS:  
NOMINAL THICKNESS = 0.20 IN  
WEIGHT PER FOOT = 2.2 LB  
SECTION MODULES = 6 IN<sup>3</sup>/FT  
TENSILE STRENGTH = 6,300 PSI  
IMPACT STRENGTH = 11,000 IN-LB/IN<sup>3</sup>  
MODULES OF ELASTICITY = 380,000 PSI



- NOTES:**
- TOP OF CREST ROCK SHALL EXTEND 2 TO 6 INCHES ABOVE DESIGN PROFILE GRADE TO ACHIEVE AN AVERAGE WEIR CREST ELEVATION TO MATCH THE DESIGN PROFILE GRADE.
  - SILLS MAY BE CONSTRUCTED EITHER OF LOGS OR BOULDERS, AS DIRECTED BY THE PROJECT LEADER.



DATE \_\_\_\_\_  
 MATT W. WELD  
 No. 62235  
 Exp. 9-30-13  
 CIVIL ENGINEER  
 STATE OF CALIFORNIA

PREPARED AT THE REQUEST OF:  
**USDA FOREST SERVICE**  
**LAKE TAHOE BASIN**  
**MANAGEMENT UNIT**

**REACH 3**  
**TRANSITION**  
**DETAILS**

**ANGORA CREEK**  
**MEADOW-CHANNEL**  
**RESTORATION PLAN**  
**100% SUBMITTAL**

DESIGNED BY: MWW  
 DRAWN BY: BMS/BMZ  
 CHECKED BY: MWW  
 DATE: 09/10/11  
 JOB NO.: 09-006

BAR IS ONE INCH ON ORIGINAL DRAWING. ADJUST SCALES FOR REDUCED PLOTS.  
 0 1"  
 C10 OF 17

**ROCK MATERIAL AND TRANSPORTATION NOTES**

- THERE SHALL BE FOUR CLASSES OF ROCK SPECIFIED ON THIS PROJECT;
  - WEIR BOULDERS
  - CLASS 1 SUBSTRATE
  - CLASS 2 SUBSTRATE
  - CLASS 3 SUBSTRATE
- PROVIDE SAMPLES OF EACH ROCK CLASS TO THE PROJECT LEADER FOR APPROVAL, PRIOR TO STOCKPILING ON SITE.
- ALL IMPORTED ROCK SHALL CONFORM TO THE FOLLOWING QUALITY REQUIREMENTS:

WEED-FREE CERTIFICATION

ALL BOULDERS, ROCK, SAND AND GRAVEL, OBTAINED FROM OFF-SITE SOURCES AND TRANSPORTED TO THE SITE SHALL BE OBTAINED, TRANSPORTED AND STORED IN SUCH A WAY THAT NO NOXIOUS WEEDS ARE INTRODUCED TO THE PROJECT SITE. THE DETERMINATION OF NOXIOUS WEEDS SHALL BE AS DESIGNATED BY THE CALIFORNIA AND NEVADA DEPARTMENTS OF AGRICULTURE. USFS SHALL OBTAIN A NOXIOUS WEED CERTIFICATION REPORT FROM A QUALIFIED BOTANIST CERTIFYING THAT THE SOURCE OF MATERIALS TO BE USED BY THE USFS IS FREE OF NOXIOUS WEEDS, AND THAT THE TRANSPORTATION OF MATERIALS PLANNED BY THE USFS WILL NOT RESULT IN NOXIOUS WEEDS BEING INTRODUCED TO THE PROJECT AREA. AT A MINIMUM, THE NOXIOUS WEED CERTIFICATION REPORT SHALL INCLUDE A PLAN MAP OF THE SOURCE PIT, SHOWING THE LOCATION OF THE PROPOSED MATERIALS, THE LOCATION OF ANY NOXIOUS WEEDS, AND THE PROPOSED ROUTE OF ACCESS TO THE MATERIALS. THE REPORT SHALL ALSO CONTAIN SHORT WRITTEN DESCRIPTIONS OF THE SOURCE AREA, ANY NOXIOUS WEED PROBLEMS IN THE SOURCE AREA, AND PROPOSED ACCESS ROUTES.

PRIOR TO HAULING MATERIALS FROM OFF-SITE SOURCES TO THE PROJECT SITE, THE USFS SHALL ARRANGE A SITE INSPECTION BY A QUALIFIED BOTANIST REPRESENTING THE PROJECT LEADER. THIS INSPECTION MUST CONCLUDE THAT NOXIOUS WEEDS WILL NOT BE TRANSPORTED TO THE PROJECT SITE. IF THE INSPECTION CONCLUDES THAT NOXIOUS WEEDS MAY BE TRANSPORTED TO THE PROJECT SITE, USFS SHALL UNDERTAKE MEASURES DESIGNED TO ENSURE THAT NOXIOUS WEEDS ARE NOT TRANSPORTED TO THE PROJECT SITE AS A RESULT OF USFS'S OPERATIONS. THESE MEASURES MAY INCLUDE, BUT ARE NOT LIMITED TO: NOXIOUS WEED CONTROL IN THE SOURCE SITE; MODIFICATION OF ACCESS ROUTES TO AVOID AREAS OF NOXIOUS WEED INFESTATION; CLEANING OF EQUIPMENT LEAVING AREAS OF NOXIOUS WEED INFESTATION; OR REJECTION OF THE SOURCE. NO HAULING WILL BE ALLOWED UNTIL USFS PROVIDES A PLAN FOR NOXIOUS WEED CONTROL DEEMED ADEQUATE BY THE PROJECT LEADER. DURING HAULING OF OFF-SITE MATERIALS TO THE PROJECT SITE, A REPRESENTATIVE OF THE PROJECT LEADER WILL INSPECT THE HAULING OPERATION WEEKLY FOR THE INTRODUCTION OF NOXIOUS WEEDS TO THE PROJECT SITE. HAULING OPERATIONS MAY BE SUSPENDED IMMEDIATELY IF THESE INSPECTIONS FIND THAT THE OPERATIONS POSE A SIGNIFICANT RISK OF NOXIOUS WEED INTRODUCTION TO THE PROJECT SITE.

- INDIVIDUAL ROCK CLASSES AND PLACEMENT METHODS ARE FURTHER DEFINED WITHIN "WEIR CONSTRUCTION" AND "CHANNEL SUBSTRATE" NOTES.

**WEIR CONSTRUCTION NOTES**

- WEIR LOCATIONS AND ELEVATIONS SHOWN ON THE PLANS ARE APPROXIMATE, AND ARE SUBJECT TO CHANGE, AT THE DIRECTION OF THE PROJECT LEADER AND APPROVAL OF THE ENGINEER.
- WEIRS SHALL BE CONSTRUCTED OF WEIR BOULDERS, INDIVIDUALLY PLACED AT THE DIRECTION OF THE PROJECT LEADER.

WEIR BOULDERS SHALL CONSIST OF DENSE, HARD, DURABLE NON-FRIABLE STONE, FREE OF ORGANIC DEBRIS AND OTHER DELETERIOUS SUBSTANCES, MEETING THE FOLLOWING MATERIAL SPECS:

SPECIFIC GRAVITY	2.5, MIN.
ABSORPTION	4.2%, MAX.
DURABILITY INDEX	52, MIN.
SIZE	WEIR AND SILL BOULDERS = 2.5-4.0 FT. (ALONG SECONDARY AXIS)
SHAPE	SUB ROUNDED TO SUBANGULAR

COLOR SHALL BE CONSISTENT THROUGHOUT THE STOCKPILE.

- WEIR BOULDERS SHALL BE PLACED OVER BACKING MATERIALS FOLLOWING SUBGRADE PREPARATION AND INSPECTION BY THE PROJECT LEADER.
- EACH WEIR BOULDER SHALL BE PLACED WITH THREE-POINT CONTACT UPON ADJACENT WEIR BOULDERS. VOIDS WITHIN EACH COURSE OF WEIR BOULDERS SHALL BE BACKFILLED WITH A MIXTURE OF "CHANNEL SUBSTRATE CLASS 1". THE USFS SHALL JET THE MIXTURE WITH A HOSE, SUCH THAT VOIDS BETWEEN WEIR BOULDERS ARE FILLED TO THE SATISFACTION OF THE PROJECT LEADER. BACKFILL MATERIAL SHALL NOT INTERFERE WITH DIRECT CONTACT BETWEEN WEIR BOULDERS. SECOND COURSE SHALL NOT BE PLACED UNTIL THE FIRST COURSE IS APPROVED BY THE PROJECT LEADER. WEIR BOULDERS SHALL BE PLACED SUCH THAT THEIR LONG DIMENSION IS ALIGNED WITH THE DIRECTION OF FLOW.

**CHANNEL SUBSTRATE NOTES**

- CHANNEL SUBSTRATE SHALL CONSIST OF WASHED PIT-RUN SANDS, GRAVELS, AND COBBLES. ALL IMPORTED CHANNEL SUBSTRATE SHALL BE THOROUGHLY WASHED PRIOR TO DELIVERY TO THE SITE. WASHING SHALL, AT A MINIMUM, CONSIST OF PLACING THE MATERIAL ON A CLEAN SURFACE AND REPEATEDLY WASHING THE STOCKPILE, UNDER SUPERVISION OF THE PROJECT LEADER, UNTIL THE TURBIDITY OF THE WASTEWATER LEAVING THE STOCKPILE IS VISIBLY DETERMINED BY THE PROJECT LEADER TO BE ACCEPTABLE.
- CHANNEL SUBSTRATE SHALL CONSIST OF DENSE, HARD, DURABLE NON-FRIABLE STONE FREE OF ORGANIC DEBRIS AND OTHER DELETERIOUS SUBSTANCES. THE ROCK SHALL HAVE MINIMUM SPECIFIC GRAVITY OF 2.5 AND SHALL BE SUBROUNDED TO ROUNDED. VOLCANIC CINDER MATERIAL SHALL NOT BE ACCEPTABLE.
- PLACEMENT OF CHANNEL SUBSTRATE SHALL BE PER THE LINES AND GRADES SHOWN ON THE PLANS, OR AS DIRECTED BY THE PROJECT LEADER. PLACE UPON SUBGRADE SOILS IN SUCH A MANNER TO PRODUCE A RELATIVELY UNIFORM GRADED MASS. PLACE MATERIAL TO THICKNESSES SHOWN ON THE PLANS. UNIFORMLY DISTRIBUTE LARGER STONES TO PRODUCE THE REQUIRED GRADATION OF ROCK, AS DIRECTED BY THE PROJECT LEADER. PREVENT CONTAMINATION OF ROCK MATERIALS BY EXCAVATION AND/OR DISTURBANCE OF NATIVE EARTH MATERIALS.

TABLE 3: SUBSTRATE GRADATION REQUIREMENTS			
PERCENT PASSING	PARTICLE DIAMETER (in.)		
	CLASS 1	CLASS 2	CLASS 3
100	5	4	24
70-90	3.30	3	18
40-60	1.80	1.50	10
15-22	0.30	0.30	0.50
8-15	0.08	0.08	0.08
VOLUME (CY)	38	32	47

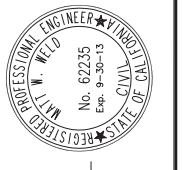
**GENERAL EARTHWORK NOTES**

- PROTECT SENSITIVE AREAS TO REMAIN UNDISTURBED WITH BOUNDARY FENCING PRIOR TO COMMENCING WORK.
- GRADING OPERATIONS SHALL NOT BE PERMITTED UNTIL STOCKPILE AND STAGING AREA EROSION AND SEDIMENT CONTROL MEASURES ARE IN PLACE IN ACCORDANCE WITH THE PROJECT SWPPP.
- THE USFS SHALL BE RESPONSIBLE FOR CONTINUOUS DUST CONTROL IN ACCORDANCE WITH THE SWPPP CONDITIONS OF THE PERMITS. THE USFS SHALL BE RESPONSIBLE FOR THE REGULAR CLEANING OF ALL MUD, DIRT, DEBRIS, ETC., FROM ANY AND ALL ADJACENT ROADS.
- PRIOR TO PLACEMENT OF FILL, EXISTING SURFACE SHALL BE CLEARED AND GRUBBED FREE OF TOPSOIL AND NATIVE VEGETATION. FILL SHALL BE PLACED AND COMPACTED IN 8" LIFTS. COMPACTION SHALL BE ACCOMPLISHED BY EXCAVATOR TRACKING AND BUCKET COMPACTION.
- GRADING SHALL CONFORM TO DIVISION 200 "EARTHWORK" OF THE STANDARD SPECIFICATIONS.
- ALL FINISH GRADES SHOWN IN CUT SHALL BE EXCAVATED TO DESIGN GRADE. ANY AREAS OVER-EXCAVATED SHALL BE FILLED & RECOMPACTED TO 90% RELATIVE COMPACTION, OR AS DIRECTED BY THE PROJECT LEADER.
- COMPACTION SHALL BE PER SECTION 204.11 "COMPACTION" OF THE STANDARD SPECIFICATIONS.
- THERE WILL BE NO IMPORTED FILL WITH THE EXCEPTION OF ROCK, WHERE SPECIFIED ON THE DRAWINGS.
- ALL FINISHED AREAS WITH CUT AND FILL SLOPES SHALL BE SHAPED AS SHOWN ON THE PLANS. NO ADDITIONAL SLOPING WILL BE ALLOWED.
- TOPSOIL EXCAVATED FROM DIRECTLY BELOW SOD TO A DEPTH OF 2 FEET BELOW THE MEADOW SURFACE SHALL BE SEGREGATED AND STOCKPILED FOR USE AS TOPSOIL FILL WITHIN DESIGNATED AREAS.
- THE USFS SHALL COORDINATE WITH THE EL DORADO COUNTY DEPARTMENT OF TRANSPORTATION WITH RESPECT TO THE CONDITION OF COUNTY ROADS USED FOR CONSTRUCTION ACTIVITIES. THE USFS SHALL BE RESPONSIBLE FOR NEGOTIATING ANY COUNTY-REQUIRED REPAIR TO THEIR ROADS DUE TO CONSTRUCTION TRAFFIC GENERATED BY THE CONTRACT. THE USFS IS SOLELY RESPONSIBLE FOR THE COST OF ANY REPAIRS TO COUNTY ROADS.
- ALL TREES TO REMAIN OR BE SALVAGED AND REPLANTED, UNLESS OTHERWISE CALLED OUT ON THE PLANS. USFS SHALL PROVIDE PROTECTION FOR ALL TREES TO REMAIN WITHIN THE CONSTRUCTION AREA, PER TRPA STANDARDS.

**"DEKOWE 400" INSTALLATION NOTES**

- REMOVE LARGE ROCKS, SOIL CLOUDS, VEGETATION, AND OTHER SHARP OBJECTS THAT COULD KEEP SLOPE PROTECTION FABRIC FROM INTIMATE CONTACT WITH SUB-GRADE.
- PREPARE SURFACE BY LOOSENING TWO TO THREE INCHES OF SOIL ABOVE FINAL GRADE.
- SELECT AND APPLY SOIL AMENDMENTS, FERTILIZER, AND SEED, WHERE SPECIFIED, PRIOR TO INSTALLATION OF SLOPE PROTECTION FABRIC.
- SECURE FABRIC WITH HARDWOOD STAKES (24" LONG 2X4 CUT DIAGONALLY) AT 3 FT. O.C. STAKE AT 18 INCHES O.C. ALONG SEAMS AND AT PERIMETER.
- OVERLAP FABRIC AT LEAST 18" AT SEAMS PERPENDICULAR TO FLOW. SHINGLE IN WATER FLOW DIRECTION.
- OVERLAP ALL OTHER SEAMS AT LEAST 8".
- EXTEND SLOPE PROTECTION FABRIC TWO TO THREE FEET OVER CREST OF SLOPE, SECURE IN TWELVE-INCH DEEP X 6-INCH WIDE ANCHOR TRENCH WITH A ROW OF STAKES APPROXIMATELY 12 INCHES APART. BACKFILL AND COMPACT THE TRENCH.
- WHERE SLOPE PROTECTION FABRIC ABUTS AGAINST ROCK SLOPE PROTECTION OR OTHER ROCK PLACEMENTS, THE SLOPE PROTECTION FABRIC SHALL BE PLACED UNDER THE FIRST COURSE OF ADJACENT ROCK AND ALSO STAKED PER NOTES ABOVE.
- ALTERNATE INSTALLATION METHODS MUST BE APPROVED BY ENGINEER PRIOR TO EXECUTION.

**WATERWAYS CONSULTING INC.**  
 403B SWIFT ST.  
 SANTA CRUZ, CA 95060  
 PH:(831)421-9291 // FAX:(888)819-6847  
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DATE \_\_\_\_\_  
  
 MATT W. WELO

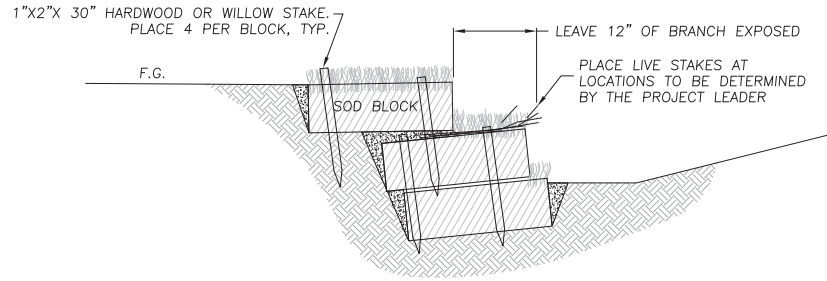
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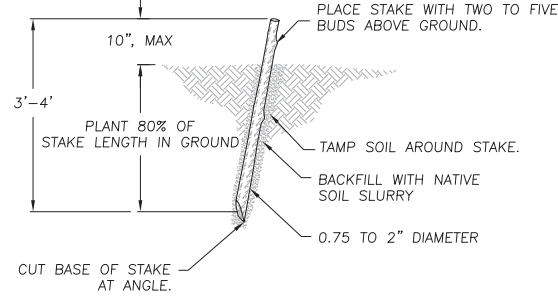
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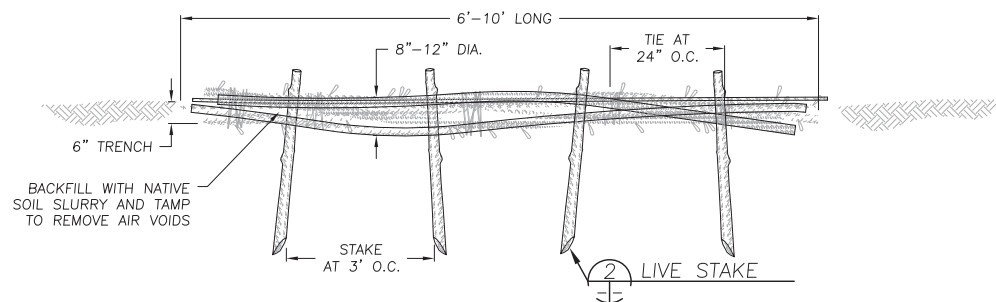
**BRUSH LAYERING DETAIL**

N.T.S.



**LIVE STAKE**

N.T.S.



**LIVE FASCINE**

SCALE: 1"=2'



**REVEGETATION NOTES**

- REVEGETATION WORK SHALL CONSIST OF SEED APPLICATION, MULCH AND SLASH PLACEMENT AND THE HARVEST, HANDLING, AND PLACEMENT OF SOD AND WILLOW MATERIALS AS SHOWN ON THESE PLANS AND PER THESE NOTES.
- REFER TO "SOD NOTES", THIS SHEET, FOR THE SALVAGE AND PLACEMENT OF WETLAND SOD.
- SLASH SHALL BE COMPOSED OF 1/4" TO 6" DIAMETER BRANCHES, WITH LEAVES OR NEEDLES ATTACHED. SLASH SHALL BE OBTAINED WITHIN THE PROJECT AREA. SLASH SHALL BE RANDOMLY DISPERSED UPON INSET FLOODPLAIN AND CHANNEL FILL AREAS AND SLOPES, TO PROVIDE MULCH AND HYDRAULIC ROUGHNESS UNTIL NATIVE VEGETATION IS ESTABLISHED. SLASH COVERAGE REQUIREMENT SHALL VARY BY SITE, AS DIRECTED BY THE PROJECT LEADER, TO ACHIEVE THE PROJECT OBJECTIVES. TYPICAL COVERAGE SHALL BE BETWEEN 10% AND 30%, DETERMINED BY VISUAL INSPECTION.

**MULCH**

- MATERIALS**
- MULCH SHALL CONSIST OF PINE NEEDLES AND ASSOCIATED DUFF MATERIAL, "HYDROSTRAW", OR WOOD CHIP MULCH.
  - PINE NEEDLE MULCH:
    - SHALL CONTAIN NO MORE THAN 15% IMPURITIES DEFINED AS PINE CONES, TWIGS OR OTHER WOODY ORGANIC MATERIAL.
    - SHALL CONTAIN NO MORE THAN 1% BY VOLUME MINERAL SOIL AND NO MORE THAN 10% DECOMPOSED ORGANIC MATTER.
    - THE NEEDLE LENGTH OF THE MATERIAL SHALL BE AS FOLLOWS: 25% TO BE LESS THAN 1 INCH IN LENGTH; 50% TO BE BETWEEN 1 INCH AND 3 INCHES; 25% TO BE GREATER THAN 3 INCHES.
  - WOOD CHIP MULCH SHALL BE 100% CHIPPED WOOD AND BARK 3/8" TO 3".
  - "HYDROSTRAW" SHALL BE AS MANUFACTURED BY HYDROSTRAW (WWW.HYDROSTRAW.COM), OR EQUIVALENT.

**APPLICATION**

- MULCH SHALL BE APPLIED AT DISTURBED LOCATIONS NOT SPECIFIED TO RECEIVE SOD, FABRIC, OR OTHER SURFACE STABILIZATION TREATMENTS, AS DIRECTED BY THE PROJECT LEADER.
- PINE NEEDLE OR WOOD CHIP MULCH SHALL BE APPLIED BY HAND TO ATTAIN A RELATIVELY UNIFORM MULCH-SURFACE CONTACT ACHIEVING 80% COVER.
- PINE NEEDLE OR WOOD CHIP MULCH SHALL BE APPLIED TO A THICKNESS OF 1.5 INCHES OVER ALL DISTURBED SLOPES STEEPER THAN 6H:1V. MULCH SHALL BE APPLIED TO A MINIMUM THICKNESS OF 0.5 INCHES ON SLOPES 6H:1V AND Milder.
- AFTER PINE NEEDLE MULCH APPLICATION, A STABILIZING EMULSION (TACKIFIER) SHALL BE APPLIED PER THE MANUFACTURER'S SPECIFICATIONS.
- THE STABILIZING EMULSION SHALL BE A PROCESSED ORGANIC DERIVATIVE OF PLANTAGO INSULARIES, USED AS A SOIL BINDER, OR EQUIVALENT, SUBJECT TO THE APPROVAL OF THE PROJECT LEADER.
- "HYDROSTRAW" SHALL BE PNEUMATICALLY APPLIED PER THE MANUFACTURER'S RECOMMENDATIONS, AS FOLLOWS:
  - 2000 LB/ACRE FOR SLOPES 4H:1V AND Milder
  - 2000-3000 LB/ACRE FOR SLOPES 3H:1V TO 4H:1V
  - 3000-4000 LB/ACRE FOR SLOPES 2H:1V TO 3H:1V

**LIVE STAKE SALVAGE AND INSTALLATION**

- ALL REQUIRED PLANT MATERIAL SPECIFIED FOR USE AS CUTTINGS SHALL BE SALVAGED WITHIN 7 DAYS OF INSTALLATION, FROM WITHIN THE PROJECT AREA, OR AT ANOTHER SOURCE WITHIN THE ANGORA WATERSHED AND APPROVED BY THE PROJECT LEADER. MATERIALS SHALL BE HARVESTED DURING DORMANCY OR AFTER OCTOBER 1 FROM HEALTHY, LIVE SPECIMENS. MATERIALS WITH FURROWED BARK SHALL NOT BE ACCEPTABLE. ALL CUTS SHALL BE CLEAN, WITHOUT SPLIT OR FRAYED ENDS. BUTT ENDS SHALL BE CUT DIAGONALLY AND TOPS CUT SQUARE. ALL REMAINING LEAVES SHALL BE REMOVED PRIOR TO INSTALLATION. DIMENSIONS FOR SALVAGED MATERIALS ARE INDICATED ON THE DETAILS.
- CUTTINGS SHALL BE PLACED IN WATER-FILLED 50 GALLON GARBAGE CANS OR EQUIVALENT CONTAINERS (MINIMUM DEPTH 3 FEET) PRIOR TO THEIR PLACEMENT FOR 5-7 DAYS. FRESHLY BROKEN TWIGS (< 1/2 INCH IN DIAMETER) SHALL BE PLACED IN THE WATER-FILLED CONTAINERS WITH THE CUTTINGS. THERE SHALL BE 6-12 INCHES OF TWIGS ADDED TO EACH CONTAINER. THE CUTTINGS SHALL BE SOAKED WITH THE BUDS FACING UPWARD. WATER LEVELS SHALL BE MAINTAINED TO WITHIN 3 INCHES OF THE TOP OF THE CONTAINER
- CUTTINGS SHALL BE INSTALLED WITHOUT INCURRING DAMAGE TO THE PLANT MATERIAL, AT LOCATIONS FLAGGED BY THE PROJECT LEADER.
- EXISTING VEGETATION THAT IS NOT WITHIN THE LIMITS OF THE PROJECT AREA SHALL NOT BE CUT, REMOVED OR OTHERWISE DISTURBED, EXCEPT FOR SALVAGE OF CUTTINGS AT LOCATIONS PREVIOUSLY APPROVED AND FLAGGED BY THE PROJECT LEADER.

**SEEDING NOTES**

- SEEDING INCLUDES HANDLING OF THE SEED, PREPARATION OF THE SEEDBED, AND HYDROSEEDING OR HAND BROADCASTING SEED AS SPECIFIED ON THE DRAWINGS OR SWPPP.
- NATIVE SEED MIX WILL BE SELECTED AND PROVIDED BY THE USFS. SEED MAY BE EITHER HAND BROADCAST OR MECHANICALLY APPLIED. OTHER METHODS OF SEEDING MUST BE APPROVED BY THE PROJECT LEADER.
- SEED MATERIALS SHALL BE STORED IN A COOL DRY ENVIRONMENT PRIOR TO APPLICATION.
- SEED APPLICATION SHALL BE CONDUCTED IN THE FALL PRIOR TO SNOW ACCUMULATION AND GROUND FREEZE BUT FOLLOWING IRRIGATION OF THE SEEDBED TO FIELD CAPACITY.
- THE SEEDBED SHALL BE PREPARED PRIOR TO SEED APPLICATION. SEEDBED PREPARATION INCLUDES LOOSENING OF COMPACTED SOILS TO A DEPTH OF 2 INCHES, BREAKING DOWN SOIL CLUMPS LARGER THAN 2 INCHES IN DIAMETER, GRADING OF THE SURFACE TO BE NON-UNIFORM, ROUGH AND NATURAL IN APPEARANCE.
- SEED APPLICATION SHALL COMMENCE FOLLOWING THE PREPARATION OF THE SEEDBED AND BEFORE APPLICATION OF SLASH OR MULCH. SEED APPLICATION INCLUDES UNIFORMLY BROADCASTING SEED OVER PREPARED AREAS AND LIGHT RAKING TO A DEPTH OF 1/4" TO 1/2". SEED SHALL NOT BE LEFT UNCOVERED FOR MORE THAN 24 HOURS. MULCH SHALL BE APPLIED TO ALL SEEDED AREAS FOLLOWING SEED APPLICATION.

**SOD NOTES**

**HARVEST**

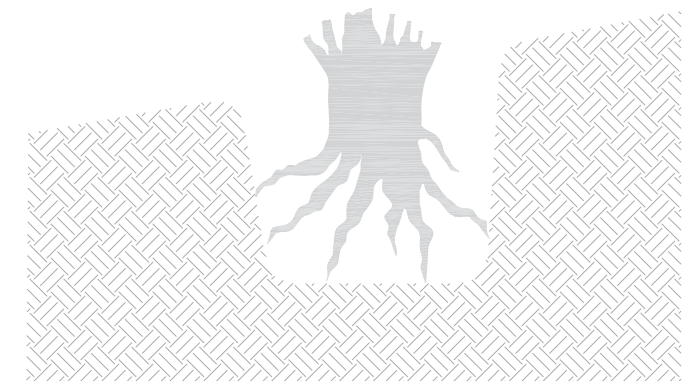
- HARVESTED SOD SHALL CONSIST OF ABOVE GROUND AND BELOW GROUND PLANT MATERIALS INCLUDING LEAVES, ROOTS, AND THE SOIL BOUND BY THE ROOT MASS. SOIL MASS OF SOD SHALL CONTAIN A UNIFORM DISTRIBUTION OF ROOTS WITH A MINIMUM 50 PERCENT ROOT MASS BY VOLUME TO A DEPTH OF 6 INCHES FROM THE ROOT CROWN. ALL SOD MUST BE COMPOSED OF NATIVE SPECIES, BE WEED FREE, AND BE PRE-APPROVED BY PROJECT LEADER.
- SOD SHALL BE HARVESTED FROM LOCATIONS AS INDICATED ON THE DRAWINGS AND DELINEATED IN THE FIELD BY THE PROJECT LEADER. SOD SHALL BE HARVESTED IN LINEAR STRIPS, ALIGNED PARALLEL TO THE CONTOURS. STRIP WIDTHS SHALL BE HARVESTED SUCH THAT THERE IS LESS THAN 8 INCHES FALL OVER ANY CONTIGUOUS HARVESTED AREA. BUFFER STRIPS OF UNDISTURBED SOD SHALL BE LEFT IN PLACE BETWEEN THE HARVESTED STRIPS. THE MINIMUM BUFFER WIDTH SHALL BE SIX FEET.
- SOD SHALL BE MOISTENED THROUGH THE ROOT ZONE BEFORE HARVEST. THE ABOVE GROUND PORTIONS OF SOD PLANTS SHALL BE MOWED PRIOR TO HARVEST TO A HEIGHT OF 3 TO 4 INCHES AS MEASURED FROM THE ROOT CROWN. MULCH PRODUCED IN MOWING OPERATIONS SHALL BE STOCKPILED IN THE STOCKPILE AREA.
- SOD MATERIALS SHALL BE HARVESTED ACCORDING TO THE FOLLOWING SPECIFICATIONS: SOD BLOCKS OR BLANKETS SHALL BE PRECUT INTO MINIMUM 2-FOOT BY 3-FOOT BY 1-FOOT THICK SECTIONS. SOD PLUGS SHALL BE 4" (MIN.) DIAMETER. ALL SOD MATERIALS SHALL BE HARVESTED IN A MANNER RESULTING IN CLEAN, VERTICAL EDGES.
- SOD SHALL BE LIFTED FROM THE SUBGRADE IN CONTIGUOUS SECTIONS USING MACHINERY EQUIPPED TO HANDLE SOD WITHOUT COMPROMISING ROOT MASS OR THATCH INTEGRITY. SOD HARVEST SHALL PROGRESS IN SUCH A MANNER AS TO MINIMIZE THE DISTURBANCE OF THE SOIL BOUND BY THE ROOT MASS AND THE INTEGRITY OF THE SOD SECTION. SOD SECTIONS WILL BE REJECTED WHEN, IN THE OPINION OF THE PROJECT LEADER, THEY ARE OF INSUFFICIENT ROOT MASS, THEY HAVE BECOME TOO DRY, OR ARE OTHERWISE DAMAGED.

**INSTALLATION**

- LOCATIONS FOR INSTALLATION OF SOD MATERIALS ARE AS SHOWN ON THESE PLANS OR AS DIRECTED BY THE PROJECT LEADER. THE SUBGRADE FOR SOD INSTALLATION SHALL CONSIST OF NATIVE SOILS GRADED TO A SMOOTH, FRIABLE SURFACE. PRIOR TO PLACEMENT THE SUBGRADE SHALL BE SATURATED TO A MINIMUM DEPTH OF FOUR INCHES. THE SUBGRADE FOR STACKED SOD BLOCK INSTALLATION SHALL BE DEWATERED AS NECESSARY.
- SOD SHALL BE INSTALLED WITHIN 30 MINUTES OF HARVEST UNLESS STORAGE IS OTHERWISE APPROVED IN WRITING BY THE PROJECT LEADER. UPON APPROVAL OF THE PROJECT LEADER, SOD MAY BE STORED AND MAINTAINED ON DESIGNATED MEADOW ACCESS ROADS OR IN STAGING AND STOCKPILE AREAS. STORED SOD SHALL NOT BE STACKED AND SHALL BE PLACED ROOTS DOWN WITH EDGES SNUGLY ADJOINING ADJACENT SECTIONS. SOD ON THE PERIMETER OF THE STORAGE AREA SHALL HAVE THE OUTERMOST EDGES DRAPED WITH SATURATED BURLAP WITHIN 30 MINUTES OF STORAGE TO PROTECT ROOTS AND CONSERVE SOIL MOISTURE. STORED SOD SHALL BE IRRIGATED TO FIELD CAPACITY WITHIN 30 MINUTES OF STORAGE AND SHALL BE KEPT MOIST DURING THE STORAGE PERIOD OR AS DIRECTED BY THE PROJECT LEADER.
- SOD BLANKETS AND BLOCKS SHALL BE INSTALLED WITH SIDES SNUGLY ADJOINING ADJACENT SECTIONS. VOIDS BETWEEN SOD BLANKETS AND BLOCKS SHALL BE BACK-FILLED WITH NATIVE TOPSOIL AND HAND-TAMPED. SOD BLANKETS AND BLOCKS SHALL BE FIRMLY TAMPED OR ROLLED AFTER PLACEMENT TO MINIMIZE AIR POCKETS BETWEEN THE PREPARED SURFACE AND ROOTS. SOD BLANKETS AND BLOCKS SHALL BE INSTALLED SO THAT THE TOP SURFACE FORMS A CONTINUOUS SHAPE.
- SOD PLUGS SHALL BE PLANTED THREE FEET O.C., WHERE INDICATED ON THE DRAWINGS.

**RESTORATION**

- WITHIN THREE DAYS AFTER COMPLETION OF THE SOD HARVEST, A 10 FOOT WIDE TOPSOIL WEDGE SHALL BE PLACED AROUND THE PERIMETER OF SOD HARVEST AREAS, OR AS DIRECTED BY THE PROJECT LEADER. THE TOPSOIL WEDGE SHALL BE SLOPED AT 10H:1V SO THAT THE EDGE OF UNDISTURBED GROUND SLOPES GENTLY TOWARD THE CENTER OF THE SALVAGE AREA. THE TOPSOIL SHALL BE COMPACTED TO 85% R.C.



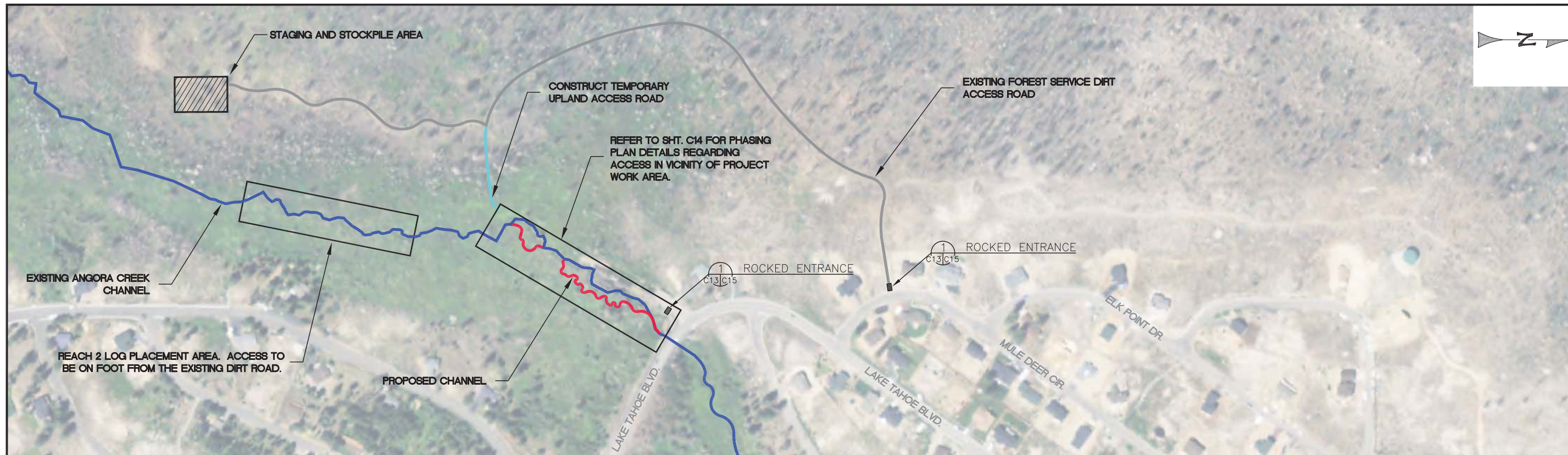
**SHRUB RELOCATION DETAIL**

SCALE: 1"=1'



**WILLOW RELOCATION NOTES**

- WILLOW AND ALDER RELOCATION AND TRANSPLANT WILL OCCUR WHEN WILLOWS AND/OR ALDERS ARE TO BE REMOVED DUE TO PROJECT GRADING, AT THE DIRECTION OF THE PROJECT LEADER. RELOCATION SHALL TAKE PLACE IN A MANNER THAT MINIMIZES DISTURBANCE AND STRESS TO THE PLANT BEING MOVED. RELOCATION SHALL OCCUR ONLY WITH THE SOIL MOISTENED TO A MINIMUM DEPTH OF 18". WILLOW SPECIMENS THAT ARE TO BE RELOCATED SHALL HAVE ALL STEMS TRIMMED 1-3" ABOVE THE GROUND PRIOR TO EXCAVATION AS NOTED IN THE RELOCATION DETAIL. RELOCATION SHALL BE ACCOMPLISHED BY EXCAVATING A TRENCH AROUND THE CIRCUMFERENCE/DRIP LINE OF THE PLANT MATERIAL SEVERING ALL ROOTS IN THE TRENCH. ROOTS SHALL BE CUT CLEANLY AND SHALL NOT BE CRUSHED, SPLIT OR TORN. THE EXCAVATED ROOTBALL SHALL BE PROTECTED BY COMPLETELY WRAPPING WITH BURLAP PER STANDARD NURSERY PRACTICE. DO NOT PERMIT CRACKING OF ROOTBALL OR LOSS OF SOIL. TRANSPLANTED MATERIALS THAT CAN NOT BE IMMEDIATELY PLANTED IN THEIR SPECIFIED LOCATION SHALL BE TEMPORARILY PLANTED IN A SAFE LOCATION AND HAND WATERED UNTIL THEY CAN BE MOVED TO THEIR FINAL LOCATION. TRANSPLANTED SPECIMENS SHALL BE HAND WATERED TWICE A WEEK DURING THE CONSTRUCTION PERIOD.
- WILLOW RELOCATION PLANTS SHALL BE INSTALLED IN AREAS DESIGNATED FOR PLANTING, AT THE DIRECTION OF THE PROJECT LEADER. PLANT MATERIAL SHALL BE INSTALLED BY EXCAVATING A PLANTING HOLE LARGE ENOUGH TO RECEIVE THE ROOTBALL. EXCAVATE HOLES USING HAND TOOLS OR OTHER METHODS APPROVED BY THE PROJECT LEADER THAT MINIMIZES DISTURBANCE TO ADJACENT AREAS. THE SIZE OF THE HOLE SHALL DEPEND ON THE SIZE OF THE WILLOW MATERIAL TO BE RELOCATED. THE HOLE SHALL BE BROKEN-IN WITH A CROWBAR UNTIL IT IS AT LEAST THE WIDTH OF THE WILLOW MATERIAL PLUS 4 INCHES SPACE FOR BACKFILL, LEAVING THE SIDES ROUGH WITHOUT "AUGER SLICK". INSTALL ALL WILLOW MATERIAL UPRIGHT AND IN THE CENTER OF THE HOLE AND THE SPACE AROUND IT BACKFILLED WITH NATIVE SOIL SO THAT A MINIMUM OF FOUR INCHES (4") OF NATIVE SOIL IS AROUND THE SIDES OF THE ROOT BALL. BREAK UP THE BOTTOM SIX INCHES (6") OF SOIL PRIOR TO PLACING PLANT. BACKFILL AND TAMP AROUND THE ROOTBALL WITH MOIST, CRUMBLY, NATIVE SOIL (FREE OF ROCK, STICKS AND DEBRIS EXCEEDING 1/2 INCH IN DIAMETER) MAKING SURE THAT FIRM CONTACT IS MADE WITH THE SIDES OF THE ROOTBALL AND LEAVING NO AIR POCKETS. THE WILLOW MATERIAL SHALL BE SET SO THAT THE ROOT CROWN IS 1/2" TO 3/4" HIGHER THAN AVERAGE SURROUNDING GRADE. DO NOT PLACE ORGANIC MATTER BENEATH THE PLANT'S ROOT BALL. WHEN THE BACKFILL AROUND THE ROOTBALL IS APPROXIMATELY TWO-THIRDS COMPLETED, THE PLANT SHALL BE THOROUGHLY WATERED, AFTER WHICH THE BACKFILL SHALL BE COMPLETED TO THE FINISHED GRADE. DISPOSE OF BALANCE OF BORINGS AROUND PLANTING IN A MANNER THAT WATER IS SHED AWAY FROM THE CROWN OR TRUNK OF PLANT. DO NOT PLACE NATIVE SOIL BACKFILL OVER THE TOP OF THE ROOTBALL.



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DATE \_\_\_\_\_  
 MATT W. WELD  
 No. 62235  
 Exp. 9-30-13  
 CIVIL  
 STATE OF CALIFORNIA

PREPARED AT THE REQUEST OF:  
**USDA FOREST SERVICE  
 LAKE TAHOE BASIN  
 MANAGEMENT UNIT**

**ACCESS  
 PLAN OVERVIEW**

**ANGORA CREEK  
 MEADOW-CHANNEL  
 RESTORATION PLAN  
 100% SUBMITTAL**

DESIGNED BY: MWW  
 DRAWN BY: BMS/BMZ  
 CHECKED BY: MWW  
 DATE: 09/10/11  
 JOB NO.: 09-006

BAR IS ONE INCH ON ORIGINAL DRAWING. ADJUST SCALES FOR REDUCED PLOTS  
 0 1"

C13 OF 17

- LEGEND**
- EXISTING DIRT ROAD
  - EXISTING CHANNEL
  - PROPOSED CHANNEL
  - PROPOSED DRY UPLAND ACCESS ROAD
  - ▨ PROPOSED STAGING AND STOCKPILE AREA

**SITE ACCESS OVERVIEW**  
 SCALE: 1"=150'

**CONSTRUCTION ACCESS NOTES**

1. REFER TO PHASING PLAN FOR DETAILS REGARDING ACCESS IN THE VICINITY OF THE PROJECT WORK AREA.
2. ALL VEHICLES AND EQUIPMENT SHALL BE RESTRICTED TO THE APPROVED ACCESS ROADS SHOWN OR AS SPECIFIED IN THE APPROVED SWPPP.
3. DUST CONTROL, VEGETATION MANAGEMENT, EQUIPMENT STORAGE AND ACCESS ROAD USE TO BE CARRIED OUT IN STRICT ACCORDANCE WITH THE PLANS, THE SWPPP AND PERMIT REQUIREMENTS.
4. THE USFS SHALL POST TRUCK WARNING SIGNS ON LAKE TAHOE BLVD. SIGNS SHALL BE POSTED AT THE INTERSECTION OF THE STOCKPILE ACCESS ROAD, AT THE INTERSECTION OF THE PROJECT SITE ACCESS ROADS, AND AT THE SOUTH END OF ELK POINT DRIVE. SIGNS SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS AND REQUIRED PERMITS.
5. THE USFS SHALL PREPARE AND IMPLEMENT A TRAFFIC SAFETY PLAN, SPECIFYING THE USE OF APPROPRIATE SIGNAGE AND FLAGMEN WHERE WORK WILL AFFECT THE PUBLIC RIGHT OF WAY.
6. THE USFS IS RESPONSIBLE FOR PROTECTING PUBLIC SAFETY AND MANAGING ALL PUBLIC ACCESS WITHIN THE PROJECT SITE, ALONG ROADS, ACCESS ROADS, AND WITHIN STOCKPILE AREAS.
7. ALL EQUIPMENT SHALL BE STEAM-CLEANED TO THE SATISFACTION OF THE PROJECT LEADER, PRIOR TO TRANSPORTING IT ONTO THE PROJECT SITE. ANY EQUIPMENT LEAVING THE PROJECT SITE DURING THE COURSE OF THE PROJECT SHALL BE STEAM-CLEANED UPON RETURN TO THE PROJECT SITE.
8. ONLY THE MINIMAL AMOUNT OF CLEARING NEEDED TO GAIN ACCESS TO WORK SITES AND STOCKPILE AREAS SHALL BE PERMITTED. ANY TREES OVER 4-INCH DIAMETER OBSTRUCTING THE TRAVEL PATH SHALL BE CUT AT NO MORE THAN 4 INCHES ABOVE GROUND LEVEL. GRUBBING SHALL NOT BE PERMITTED. IF REQUIRED TO GAIN ACCESS, FALLEN LOGS MAY BE MOVED FROM THE PATH. ONLY THE MINIMAL SPOT GRADING NEEDED TO GAIN ACCESS SHALL BE PERMITTED. CUT TREES AND REMOVED LOGS SHALL BE REPLACED TO BLOCK ACCESS TEMPORARY ROADS, AT THE DIRECTION OF THE PROJECT LEADER, UPON PROJECT COMPLETION.
9. ANY ACCESS ROADS OR OTHER AREAS WHERE RUTS HAVE BEEN CREATED WILL BE TREATED BY SPOT GRADING TO SCARIFY RUTTED AREAS AND RESTORE THEM TO THE APPROXIMATE ORIGINAL GRADE WITHIN A TOLERANCE OF +/- 0.4 FEET.
10. AT PROJECT COMPLETION ALL TEMPORARY ACCESS ROADS SHALL BE BLOCKED AT THE INTERSECTION WITH PERMANENT ROADS BY PLACING SLASH, TREES, OR DOWN LOGS REMOVED FROM THE ACCESS ROAD AT THEIR SAME APPROXIMATE ORIGINAL LOCATIONS. TWO OR MORE LOGS OF 18 INCHES OR MORE IN DIAMETER SHALL BE PLACED ON THE EDGE OF THE ROAD SHOULDER IN SUCH A MANNER SO AS TO PRECLUDE ENTRY BY VEHICLES.
11. TEMPORARY ACCESS ROAD CONSTRUCTION AND DECOMMISSIONING SHALL COMPLY WITH THE REQUIREMENTS OF THE SWPPP.
12. REFER TO PROJECT SWPPP FOR TEMPORARY BMPs TO BE EMPLOYED ALONG ACCESS ROUTES AND STAGING AREAS.
13. NO MATERIAL STORAGE OR PARKING OF EQUIPMENT SHALL OCCUR ON THE MEADOW, EXCEPT AS SHOWN ON THE PLANS OR AS DIRECTED BY THE PROJECT LEADER.
14. ACCESS ROADS SHALL NOT BE USED AS TEMPORARY STORAGE FOR CONSTRUCTION DEBRIS AND TRASH. ALL CONSTRUCTION DEBRIS SHALL BE HAULED AWAY AS THE PROJECT PROGRESSES.
15. CONSTRUCTION OF MEADOW ACCESS ROADS SHALL BE LIMITED TO THE ACCESS ALIGNMENTS SHOWN ON THE PLANS. ALL OTHER TRAVEL WITHIN THE MEADOW SHALL BE RANDOM AND DISPERSED, WITH EVERY EFFORT MADE TO AVOID REPEATING TRAVEL PATHS. ONLY LOW GROUND PRESSURE EQUIPMENT WILL BE ALLOWED OFF THE ACCESS ROADS. TYPE OF EQUIPMENT, DURATION OF THIS ACCESS AND ALLOWABLE CONDITIONS FOR THIS ACCESS WILL BE AT THE DISCRETION OF THE PROJECT LEADER.
16. SOIL SHALL NOT BE STORED, STOCKPILED, OR OTHERWISE PLACED ON ANY SURFACE THAT IS NOT DESIGNATED FOR SUCH TREATMENT ON THE DRAWINGS. MATERIALS MAY BE SORTED ON AREAS DESIGNATED AS TEMPORARY ACCESS ROADS AFTER THE INSTALLATION OF THE SURFACE TREATMENT.

**NOTES:**

1. SYMBOLS REPRESENT APPROXIMATE STRUCTURE AND ACCESS LOCATIONS. ACTUAL LOCATIONS TO BE DETERMINED IN THE FIELD BY THE PROJECT LEADER.
2. REFER TO THE PROJECT SWPPP FOR ADDITIONAL SPECIFICATIONS COVERING TEMPORARY ACCESS ROADS.
3. STOCKPILE AND STAGING AREA LOCATIONS SHOWN ARE APPROXIMATE. THE FINAL LOCATION OF THE STOCKPILE AND STAGING AREAS WILL BE STAKED IN THE FIELD BY THE PROJECT LEADER. SEE ADDITIONAL NOTES ON SHT. C15.

**DRY UPLAND ACCESS ROAD NOTES:**

1. DRY UPLAND ACCESS ROADS WILL BE USED IN DRY MEADOW AND UPLAND AREAS, AS SHOWN ON THE PHASING AND ACCESS PLANS, OR AS DETERMINED BY THE PROJECT LEADER. DRY UPLAND ACCESS ROADS SHALL BE UNIMPROVED ACCESS ROUTES. EMPLOY BEST MANAGEMENT PRACTICES, AS OUTLINED IN THE STORM WATER POLLUTION PROTECTION PLAN.
2. DRY UPLAND ACCESS ROADS SHALL BE RIPPED, MULCHED, AND SEEDED AT THE COMPLETION OF WORK, IN ACCORDANCE WITH THE REVEGETATION DETAILS.

**WET MEADOW ACCESS NOTES:**

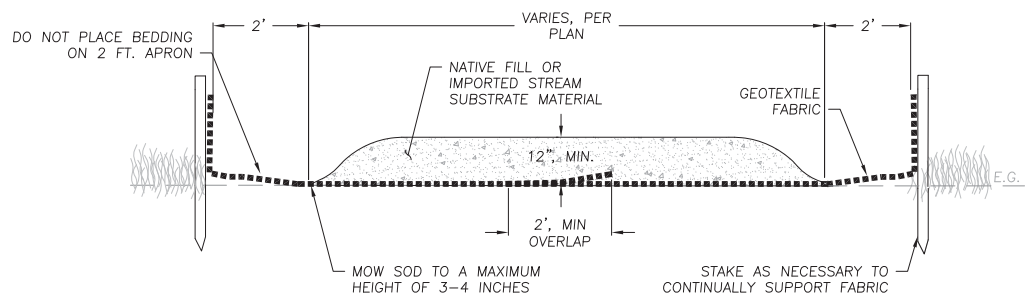
1. ACCESS TO WET MEADOW AREAS (AS DETERMINED BY THE PROJECT LEADER) SHALL BE OVER ONE OF TWO POSSIBLE CONSTRUCTED TEMPORARY SURFACE TREATMENTS ("LANDING MATS" OR "EARTH FILL WET MEADOW ACCESS ROAD"), DESIGNED TO MINIMIZE DISTURBANCE TO THE MEADOW SURFACE. THE INTENT OF THESE CONSTRUCTED SURFACES IS TO MINIMIZE COMPACTION IMPACTS TO THE MEADOW FROM THE OPERATION OF HEAVY EQUIPMENT.

**LANDING MATS**

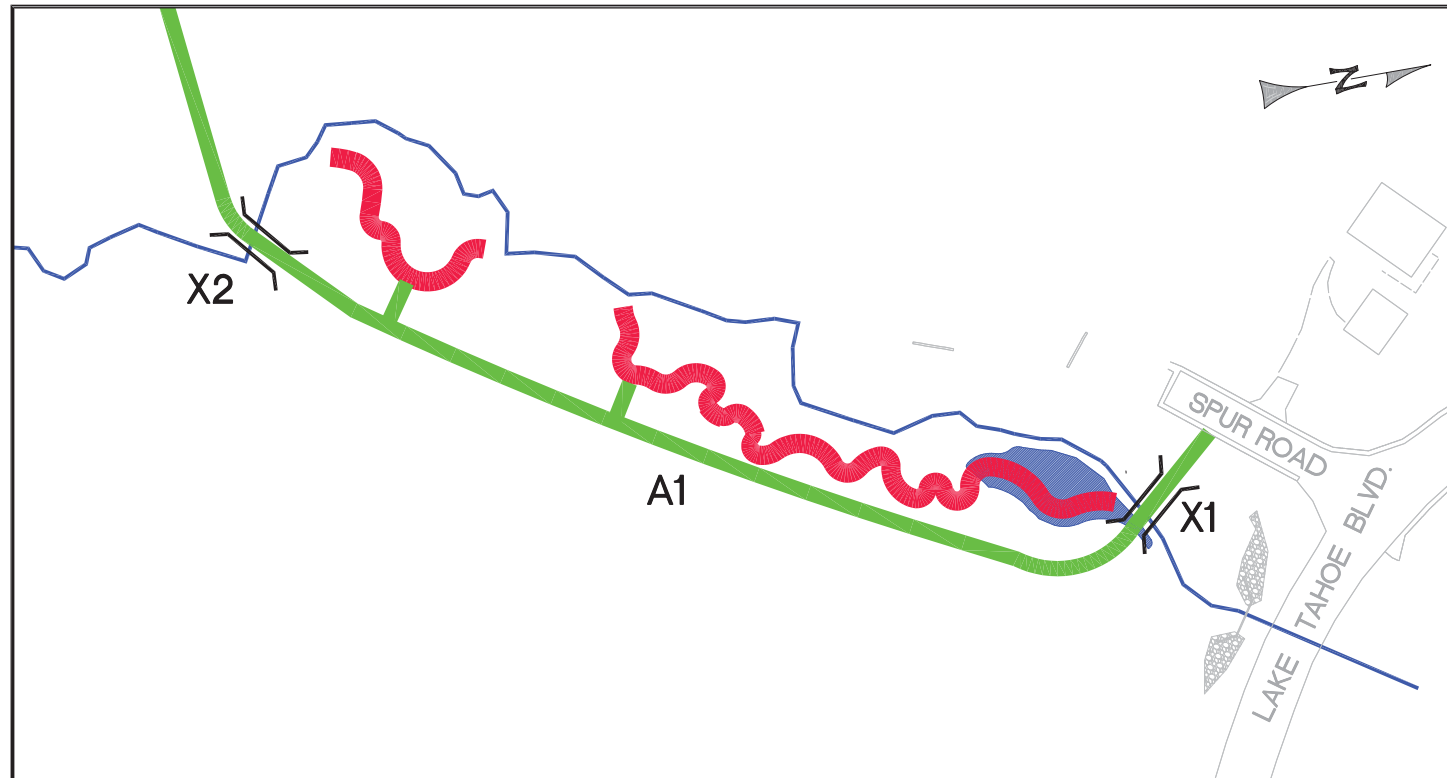
1. USE "DURADEK" (<http://www.duradeckmats.com/>) OR EQUIVALENT RIGID MODULAR ROAD SYSTEM, CAPABLE OF PROTECTING MEADOW BY WIDELY DISTRIBUTING WHEEL LOADS.

**EARTH FILL WET MEADOW ACCESS ROAD**

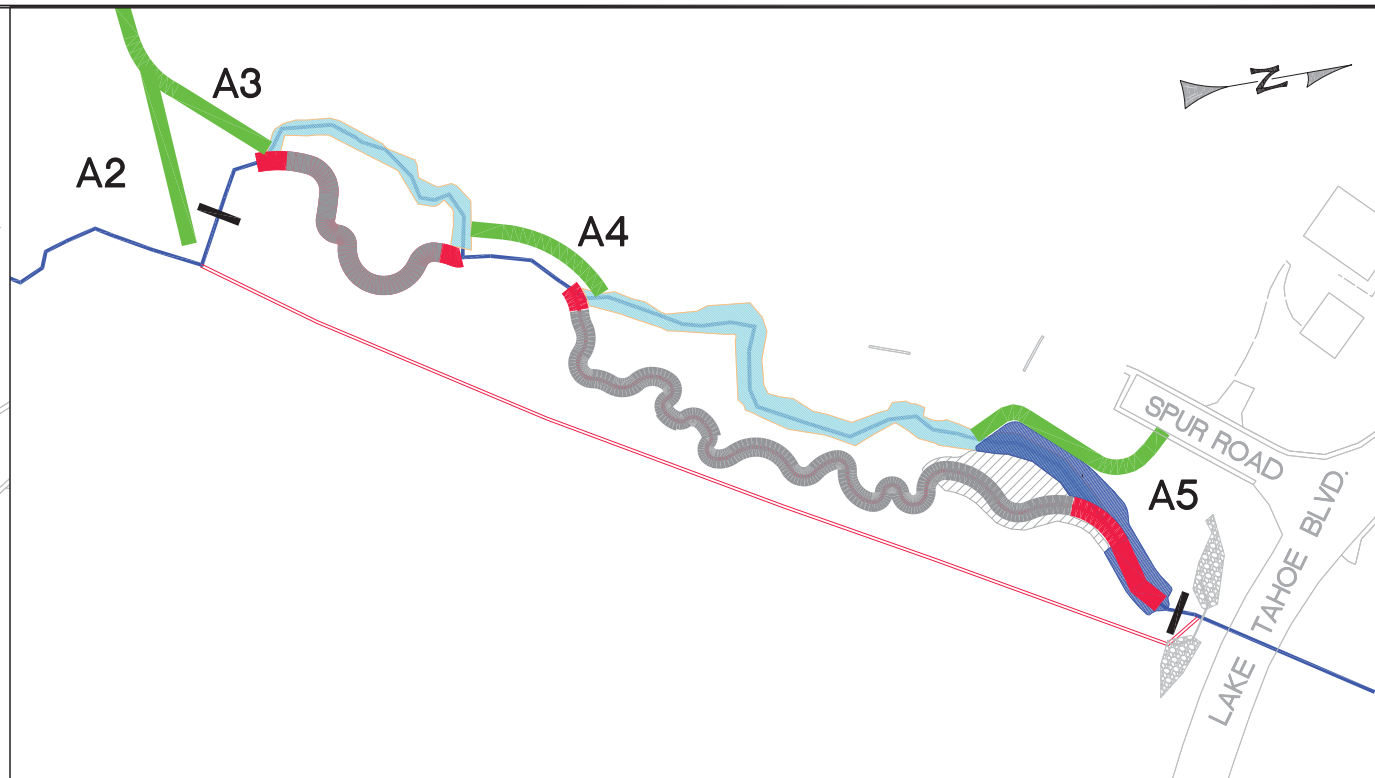
1. PRIOR TO PLACEMENT OF THE GEOTEXTILE, THE AREA TO BE COVERED SHALL BE MOWED TO A HEIGHT OF 3 TO 4 INCHES AS MEASURED FROM THE ROOT CROWN.
2. ADJACENT BORDERS OF THE FABRIC SHALL BE OVERLAPPED 2 FEET.
3. SHOULD THE FABRIC BE DAMAGED DURING PLACEMENT, THE TORN OR PUNCTURED SECTION SHALL BE REPAIRED BY PLACING A PIECE OF FABRIC THAT IS LARGE ENOUGH TO COVER THE DAMAGED AREA AND TO MEET THE OVERLAP REQUIREMENT. DAMAGE TO THE FABRIC DURING THE PROJECT SHALL BE REPAIRED. STRAW OR HAY BALE SEDIMENT BARRIERS WILL NOT BE ALLOWED.
4. AFTER THESE ROAD SURFACES ARE NO LONGER REQUIRED, ALL SOIL MATERIAL, FABRIC AND POSTS SHALL BE REMOVED IN A MANNER THAT PREVENTS SOIL SPILLAGE ONTO THE EXISTING GROUND SURFACE.



**EARTH FILL WET MEADOW ACCESS ROAD**  
 SCALE: 1"=2'



**YEAR 1 - PHASING PLAN**  
SCALE: 1"=50'



**YEAR 2 - PHASING PLAN**  
SCALE: 1"=50'

**YEAR 1 CONSTRUCTION**

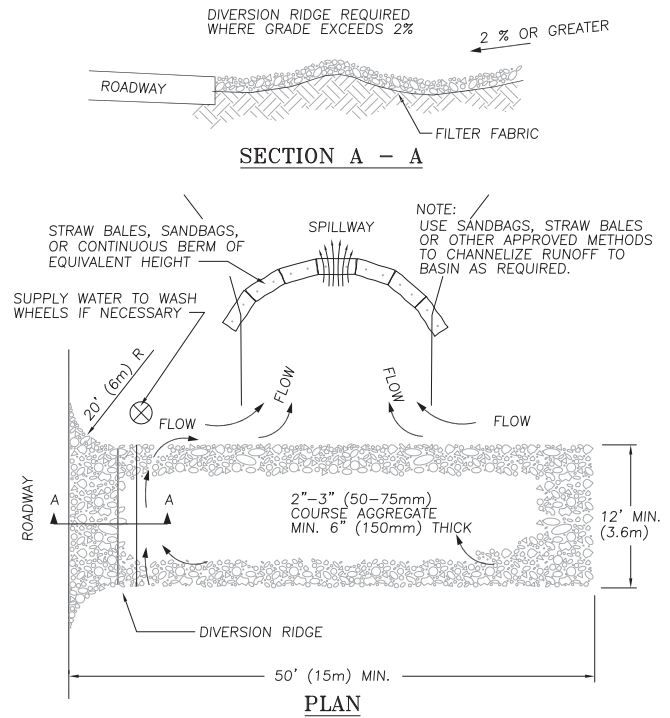
- INSTALL BMPs AT STAGING AREA AND ALONG EXISTING DIRT ACCESS ROAD
- CONSTRUCT DRY UPLAND ACCESS FROM STAGING AREA
- SALVAGE AND STOCKPILE WOOD
- INSTALL CROSSINGS X1 AND X2
- CONSTRUCT ACCESS ROAD A1
- SALVAGE SOD AND CONSTRUCT NEW CHANNEL ALIGNMENTS, LEAVING PLUGS AT CONNECTION POINTS
- CONSTRUCT UPSTREAM AND RIGHT BANK PORTION OF INSET FLOODPLAIN AND WEIRS
- REVEGETATE COMPLETED AREAS
- REMOVE WET MEADOW ACCESS ROAD AND CROSSINGS
- WINTERIZE THE SITE

**YEAR 2 CONSTRUCTION**

- INSTALL BMPs AT STAGING AREA AND ALONG EXISTING DIRT ACCESS ROAD
- CONSTRUCT ACCESS ROAD A2
- INSTALL PUMPED DIVERSION AROUND REACH 3 WITH ALUMINUM PIPE (MECH. JOINTS)
- CONSTRUCT ACCESS ROADS A3-A5 (FILLING OLD CHANNEL)
- CONSTRUCT REACH 3 CHANNEL CONNECTIONS AND PLUGS
- FLUSH NEW CHANNEL AND DIVERT FLOW TO NEW REACH 3 CHANNEL
- COMPLETE LEFT BANK OF INSET FLOODPLAIN CONSTRUCTION
- STABILIZE ACCESS ROADS AND REVEGETATE DISTURBED AREAS
- INSTALL REACH 2 LOG STRUCTURES (CONCURRENT WITH OTHER WORK)
- REMOVE DIVERSION AND WINTERIZE SITE

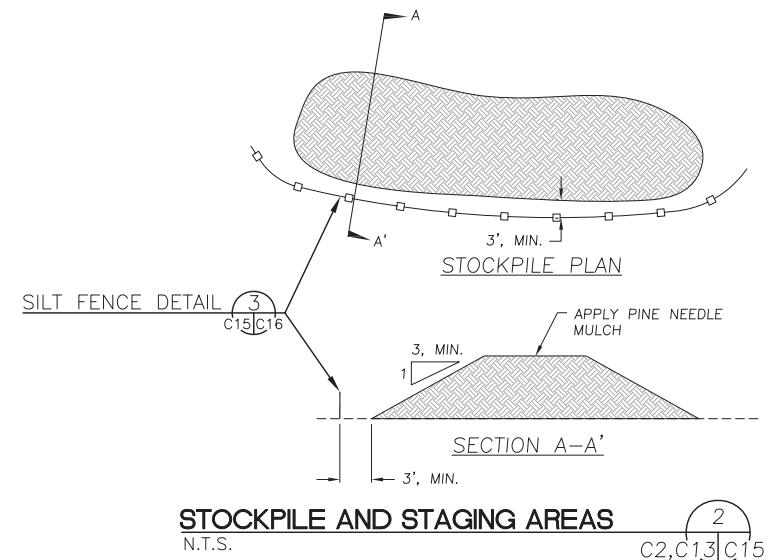
**LEGEND**

- EXISTING CHANNEL
- DIVERSION PIPE
- CHANNEL CONSTRUCTED PRIOR YEAR
- NEW CHANNEL CONSTRUCTION
- TEMPORARY WET MEADOW ACCESS ROAD
- TEMPORARY STREAM CROSSING
- CHANNEL FILL AREA (YEAR 2 WET-MEADOW ACCESS ALIGNMENT)
- CONSTRUCTED INSET FLOODPLAIN AREA
- CONSTRUCTED INSET FLOODPLAIN AREA PRIOR YEAR
- COFFER DAM



- NOTES:**
1. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHT-OF-WAYS. THIS MAY REQUIRE TOP DRESSING, REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
  2. WHEN NECESSARY, WHEELS SHALL BE CLEANED PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY.
  3. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.
  4. MUD, DIRT AND DEBRIS TRACKED ONTO BARKER PASS ROAD WILL BE CLEANED BY THE USFS, AS NECESSARY.

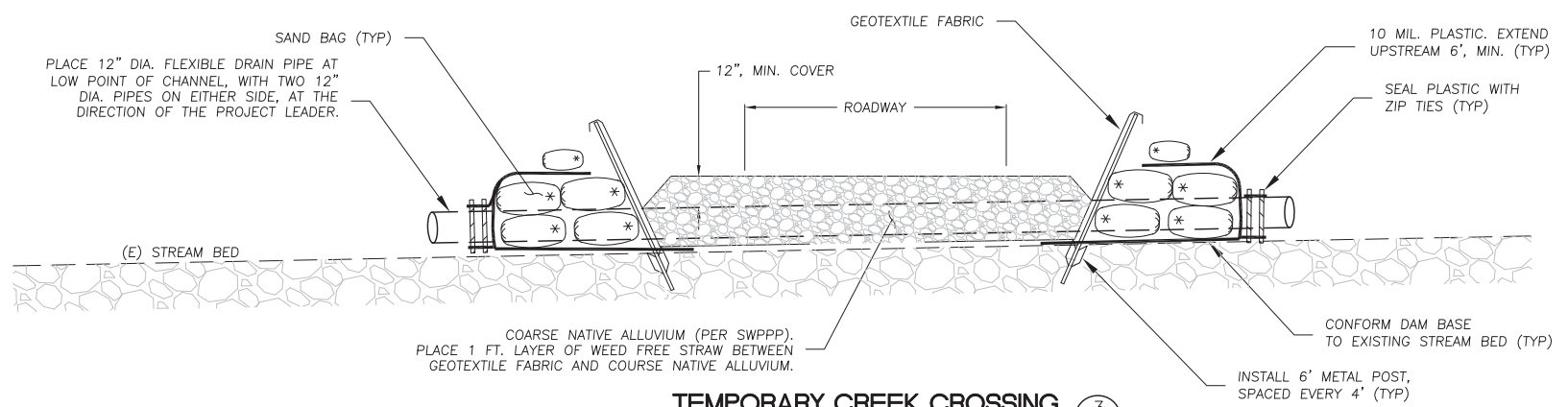
**ROCKED ENTRANCE DETAIL**  $\frac{1}{C13 \mid C15}$   
N.T.S.



**STOCKPILE AND STAGING AREAS**  $\frac{2}{C2, C13 \mid C15}$   
N.T.S.

**STOCKPILE AREA NOTES**

1. STOCKPILE AREA STOCKPILE AREA ESTABLISHMENT AND DECOMMISSIONING SHALL COMPLY WITH THE REQUIREMENTS OF THE SWPPP.
2. STOCKPILE AREA LIMITS AND TREATMENTS WILL BE IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS, OR AS DIRECTED BY THE PROJECT LEADER.
3. THE DOWNSLOPE PERIMETER AND SIDES OF THE STOCKPILE AREA SHALL BE CONTAINED WITH SILT FENCE AND ORANGE PLASTIC BOUNDARY FENCE PER DETAILS 2 AND 2, SHT C16. BOUNDARY FENCING SHALL CONTINUE AROUND THE UPPER LIMITS TO FULLY ENCLOSE THE AREA AND ALONG THE ROADWAY LEADING TO THE STOCKPILE AREA. THE PROJECT LEADER SHALL DIRECT FENCE PLACEMENT TO AVOID EXISTING VEGETATION.
4. ALL EQUIPMENT AND MATERIALS SHALL BE STORED, MAINTAINED AND REFUELED IN A DESIGNATED PORTION OF THE STOCKPILE AREA.
5. AT PROJECT COMPLETION, EXCESS MATERIALS SHALL BE STOCKPILED NEATLY WITHIN THE STOCKPILE AREA, AS DIRECTED BY THE PROJECT LEADER. SILT FENCE, COIR ROLLS, AND BOUNDARY FENCE SHALL REMAIN IN PLACE.
6. NO OPERATIONS SHALL BE PERMITTED UNTIL STOCKPILE AREA EROSION CONTROL MEASURES ARE IN PLACE AND APPROVED BY THE PROJECT LEADER.
7. ALL TEMPORARY EROSION CONTROL MEASURES SHALL BE MAINTAINED BY THE USFS, IN A CONDITION MEETING THE CONTRACT SPECIFICATIONS AND ALL APPLICABLE PERMIT REQUIREMENTS, UNTIL PROJECT COMPLETION.
8. THE ROAD EXTENDING FROM LAKE TAHOE BLVD. TO THE STOCKPILE AREA SHALL BE GRADED AS NECESSARY TO ASSURE CONTINUAL POSITIVE DRAINAGE THROUGH THE INSTALLATION OF WATER BARS OR ROLLING DIPS, AT LOCATIONS TO BE DETERMINED BY THE PROJECT LEADER.
9. THE ENTRANCES TO PUBLIC PAVED ROADS SHALL BE ROCKED, TO AVOID TRACKING OF SEDIMENTS, PER DETAIL 1, THIS SHT.
10. USFS SHALL INSTALL STOCKPILE AND STAGING AREA PROTECTION AS NECESSARY TO PROTECT THE MEADOW AND ADJACENT AREAS FROM UNACCEPTABLE DISTURBANCE. UNACCEPTABLE DISTURBANCE IS DEFINED AS NO GREATER COMPACTION, SOD VOIDS, DAMAGE TO VEGETATION, OR CONTAMINATION AS DETERMINED BY THE PROJECT LEADER.
11. UPON COMPLETION OF PROJECT, ALL STOCKPILED MATERIAL AND FENCING SHALL BE REMOVED. COMPACTED SOIL (WITHIN STAGING AREA ONLY) SHALL BE SCARIFIED TO A DEPTH OF 8" AND BLADED SMOOTH TO REMOVE ALL RUTS AND BERMS. ALL DISTURBED AREAS OF NATIVE SOIL SHALL BE REVEGETATED BY FOREST SERVICE STAFF, PER "REVEGETATION NOTES".
12. ALL EXISTING TREES SHALL BE PROTECTED IN THE VICINITY OF STOCKPILE AND STAGING AREAS, IN ACCORDANCE WITH CURRENT TRPA STANDARDS.
13. STOCKPILE SHALL BE GRADED SO THAT WATER DRAINS FREELY FROM THE TOP OF THE PILE.
14. SILT FENCES SHALL BE OFFSET BY A MINIMUM OF 3' FROM THE TOE OF STOCKPILE.
15. ALL STOCKPILED SOIL SHALL BE WINTERIZED AT THE END OF PROJECT PHASE 1, PER SWPPP.
16. TOPSOIL SHALL BE SEGREGATED FROM GENERAL FILL IN THE STOCKPILE.



**TEMPORARY CREEK CROSSING**  $\frac{3}{C14 \mid C15}$   
SCALE: N.T.S.

DATE \_\_\_\_\_  
MATT W. WELD  
Professional Engineer  
No. 62235  
Exp. 9-30-13  
CIVIL  
STATE OF CALIFORNIA

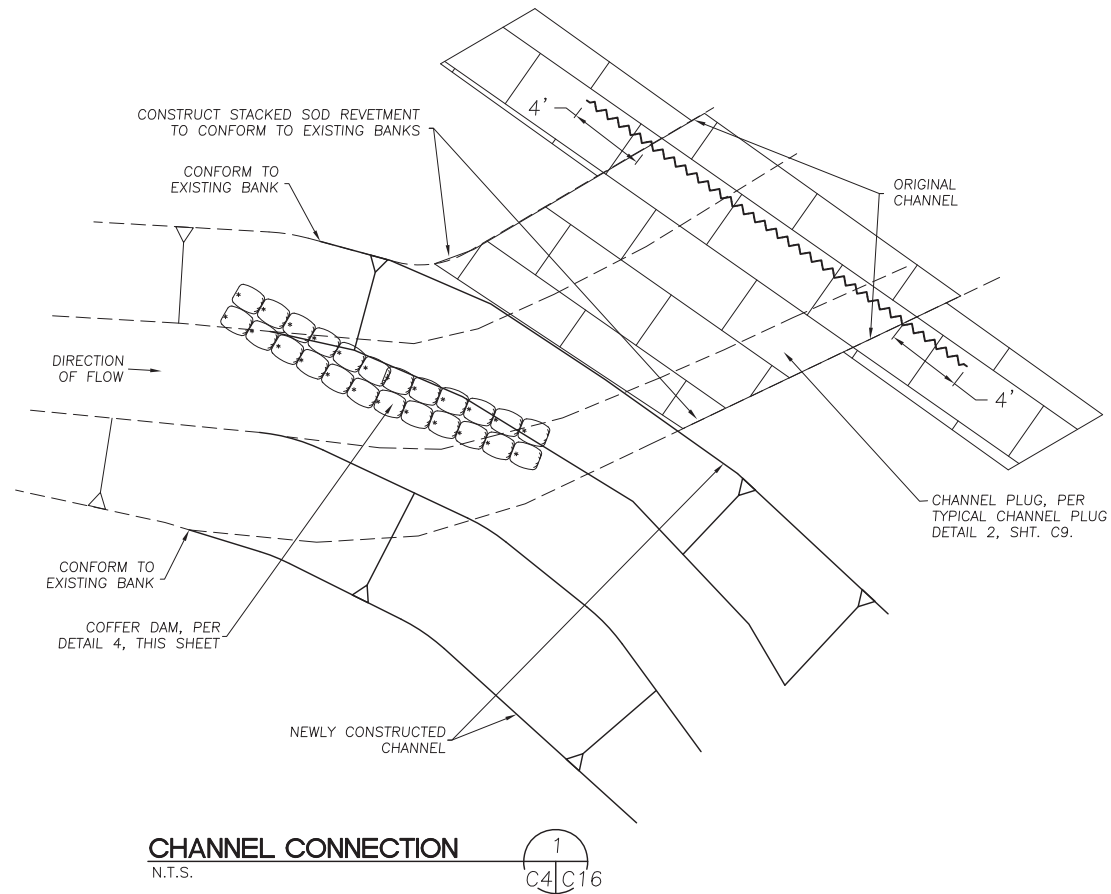
PREPARED AT THE REQUEST OF:  
**USDA FOREST SERVICE  
LAKE TAHOE BASIN  
MANAGEMENT UNIT**

**IMPLEMENTATION  
DETAILS - A**

**ANGORA CREEK  
MEADOW-CHANNEL  
RESTORATION PLAN  
100% SUBMITTAL**

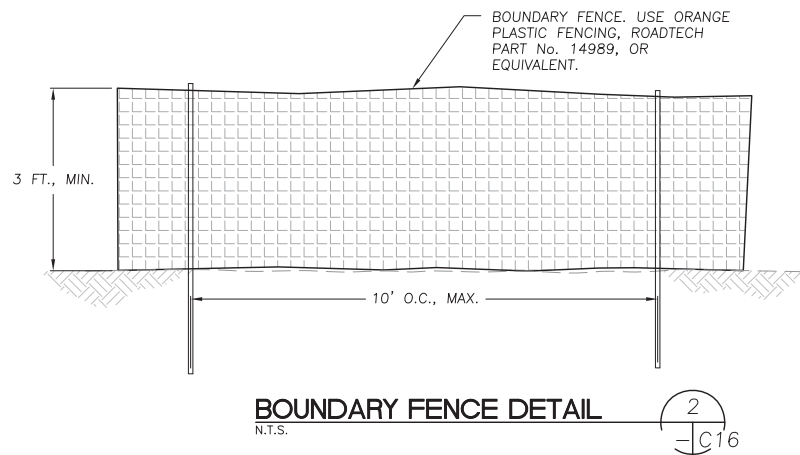
DESIGNED BY: MWW  
DRAWN BY: BMS/BMZ  
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BAR IS ONE INCH ON ORIGINAL DRAWING. ADJUST SCALES FOR REDUCED PLOTS  
0 1"



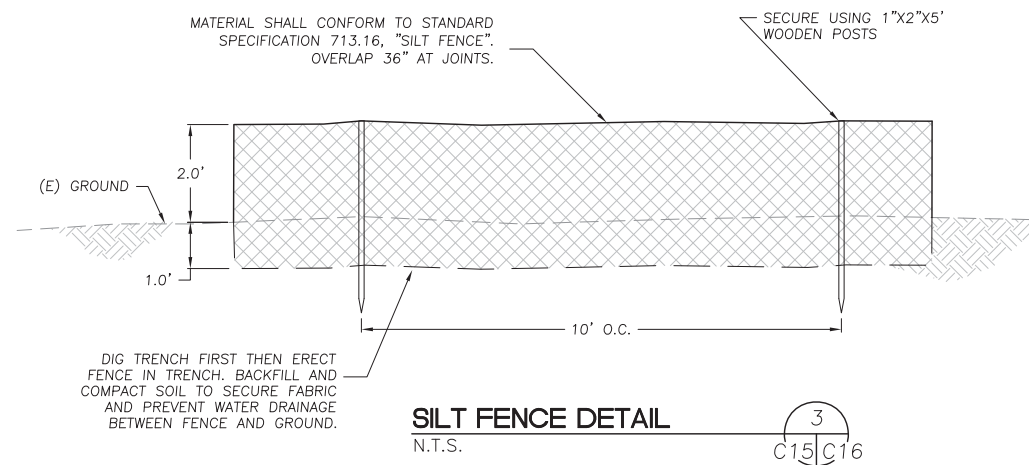
**CHANNEL CONNECTION**  
N.T.S. 1 C4 | C16

- NOTES:
1. COFFER DAMS SHALL BE PLACED TO ISOLATE THE WORK AREA FROM FLOWING WATER PRIOR TO THE CONSTRUCTION OF CHANNEL CONNECTION, PER DETAIL 4, THIS SHEET.
  2. TURBID WATER ISOLATED BY SANDBAG COFFER DAMS SHALL BE PUMPED TO DEWATERING AREAS PRIOR TO REMOVING DAMS PER THE PROJECT SWPPP.
  3. CONSTRUCTED BANKS SHALL PROVIDE SMOOTH TRANSITIONS FROM EXISTING CHANNEL BANK TO PROPOSED CHANNEL BANK.



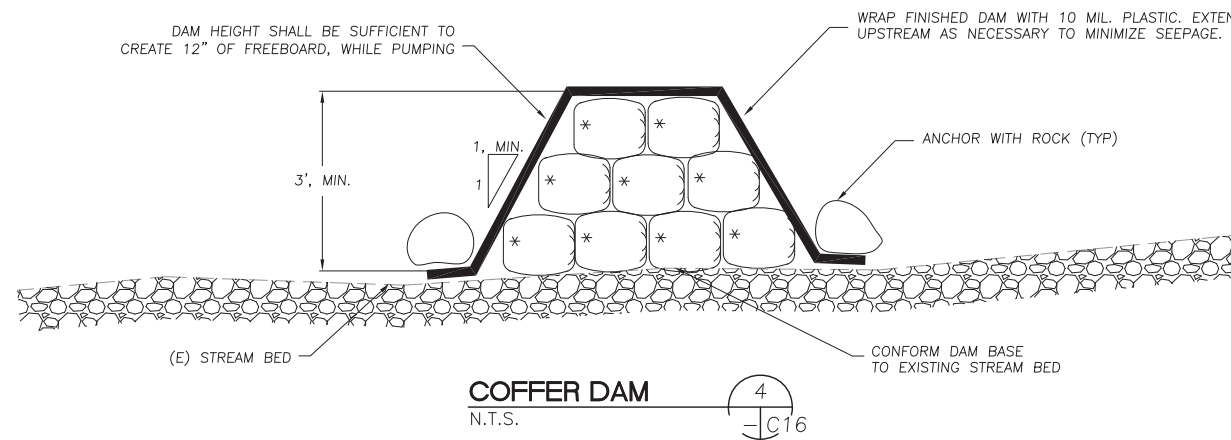
**BOUNDARY FENCE DETAIL**  
N.T.S. 2 C16

- NOTES:
1. COMPLY WITH THE PROJECT STORMWATER POLLUTION PREVENTION PLAN.
  2. BOUNDARY FENCE SHALL BE INSTALLED AT LOCATIONS INDICATED ON THE SWPPP AND AS DIRECTED BY THE PROJECT LEADER. PRIOR TO GRADING OR CLEARING AND GRUBBING OPERATIONS. ALL FENCING SHALL BE REMOVED AND DISPOSED OF BY THE USFS AT THE COMPLETION OF WORK, AS DIRECTED BY THE PROJECT LEADER.
  3. NO FENCING SHALL BE NAILED TO TREES.
  4. THE OUTSIDE LIMIT OF THE GEOTEXTILE FABRIC USED FOR MEADOW ACCESS ROADS SHALL SERVE AS BOUNDARY FENCE FOR THOSE AREAS ACCESSED BY TEMPORARY ROADS.
  5. NO EQUIPMENT, MATERIALS OR PERSONNEL WILL BE ALLOWED OUTSIDE THE BOUNDARY FENCE.
  6. USFS SHALL INSPECT THE BOUNDARY FENCE PERIODICALLY DURING THE PROJECT AND MAKE NECESSARY REPAIRS.

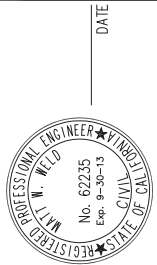


**SILT FENCE DETAIL**  
N.T.S. 3 C15 | C16

- SILT FENCE NOTES:
1. COMPLY WITH THE PROJECT STORMWATER POLLUTION PREVENTION PLAN.
  2. INSTALL THE SWPPP FENCE AT LOCATIONS INDICATED ON THE PLANS AND AS DIRECTED BY THE PROJECT LEADER, PRIOR TO GRADING OR CLEARING AND GRUBBING OPERATIONS.
  3. ALL MATERIALS AND INSTALLATION SHALL BE MAINTAINED THROUGH THE DURATION OF CONSTRUCTION.
  4. FENCING SHALL BE INSPECTED DAILY AND ANY FALLEN OR FAILED FENCING SHALL BE REPLACED PRIOR TO THE START OF EACH DAY'S WORK.
  5. ACCUMULATED SEDIMENTS SHALL BE REMOVED FROM THE BASE OF FENCE AND DISPOSED OF PRIOR TO FENCE REMOVAL. SHOULD EXCESSIVE SEDIMENTS ACCUMULATE, THE USFS SHALL PERIODICALLY REMOVE SEDIMENTS AT THE DIRECTION OF THE PROJECT LEADER.
  6. ALL FENCING SHALL BE REMOVED AND DISPOSED OF BY THE USFS AT THE COMPLETION OF WORK, AS DIRECTED BY THE PROJECT LEADER.



**COFFER DAM**  
N.T.S. 4 C16



MATT W. WELD

PREPARED AT THE REQUEST OF:  
**USDA FOREST SERVICE  
LAKE TAHOE BASIN  
MANAGEMENT UNIT**

IMPLEMENTATION  
DETAILS - B

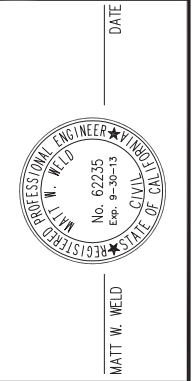
**ANGORA CREEK  
MEADOW-CHANNEL  
RESTORATION PLAN  
100% SUBMITTAL**

DESIGNED BY: MWW  
DRAWN BY: BMS/BMZ  
CHECKED BY: MWW  
DATE: 09/10/11  
JOB NO.: 09-006

BAR IS ONE INCH ON ORIGINAL DRAWING. ADJUST SCALES FOR REDUCED PLOTS







DATE \_\_\_\_\_

PREPARED AT THE REQUEST OF:  
**USDA FOREST SERVICE  
 LAKE TAHOE BASIN  
 MANAGEMENT UNIT**

**IMPLEMENTATION  
 NOTES**

**ANGORA CREEK  
 MEADOW-CHANNEL  
 RESTORATION PLAN  
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**DEWATERING AND DIVERSION NOTES**

DEWATERING

- SOME PUMPING MAY BE REQUIRED TO DEWATER THE SITE DURING GRADING WORK AND CHANNEL SUBSTRATE JETTING OPERATIONS. EXCAVATION SHALL NOT OCCUR UNTIL PUMPS ARE IN PLACE.
- PUMP TURBID WATER TO APPROVED DISPOSAL LOCATIONS IDENTIFIED IN THE SWPPP.
- MONITOR WATER LEVEL AND WATER CLARITY IN BASINS DURING OPERATIONS AND ADJUST PUMP RATES ACCORDINGLY. MANAGE DEWATERING OPERATIONS SUCH THAT DISCHARGED WATER DOES NOT RE-ENTER THE BANKFULL CHANNEL AS OVERLAND FLOW.

DIVERSION

- INSTALL A TEMPORARY DIVERSION AT LOCATIONS DETERMINED BY THE PROJECT LEADER, BASED ON EXISTING CONDITIONS AT THE TIME OF CONSTRUCTION.

**EROSION CONTROL NOTES**

- THE USFS SHALL FULLY ADHERE TO ALL SITE REQUIREMENTS FOR CONTROLLING SITE RUN-ON, RUN-OFF, AND EROSION, AS DEFINED IN PERMIT CONDITIONS OF APPROVAL. FURTHER, THE USFS SHALL STRICTLY ADHERE TO BEST MANAGEMENT PRACTICES (BMPs) INDICATED ON THE DRAWINGS AND THE STORMWATER POLLUTION PREVENTION PLAN (SWPPP).
- THE BMPS SHOWN ON THE DRAWINGS ARE SCHEMATIC AND SUBJECT TO CHANGE. REFER TO THE SWPPP, AS AMENDED, FOR DETAILED BMP SPECIFICATIONS.
- DURING CONSTRUCTION, THE USFS SHALL BE RESPONSIBLE FOR THE INSTALLATION AND MAINTENANCE OF ALL EROSION CONTROL MEASURES.
- IF A RAIN EVENT IS PREDICTED, ADDITIONAL BMPS MAY BE REQUIRED AT THE DIRECTION OF THE PROJECT LEADER.
- AT THE COMPLETION OF CONSTRUCTION, THE FINISHED SURFACE OF CONSTRUCTED FLOODPLAIN AREAS WILL BE HOSED WITH A HIGH-PRESSURE WATER JET TO WASH FINES INTO THE INTERSTICES OF THE PLACED MATERIAL ANY AND ALL RUNOFF FROM THIS PROCESS SHALL BE DIRECTED TOWARD OR PUMPED TO APPROPRIATE DISCHARGE LOCATIONS IDENTIFIED IN THE SWPPP.
- UNPAVED ACCESS ROUTES SHALL BE WATERED REGULARLY, IN ACCORDANCE WITH DUST CONTROL REQUIREMENTS OF THE SWPPP.
- ALL DISTURBED AREAS SHALL BE STABILIZED PRIOR TO OCTOBER 15TH.
- THE USFS SHALL BE RESPONSIBLE FOR MAINTAINING CLOSE ATTENTION TO FLOWS AND FORECASTED WEATHER CONDITIONS DURING CONSTRUCTION. SHOULD A RAIN EVENT BE FORECAST OR INCREASED FLOWS BE PREDICTED FROM FIELD OBSERVATIONS, THE USFS SHALL BE RESPONSIBLE FOR TAKING ALL NECESSARY MEASURES TO PREPARE THE SITE. MEASURES SHALL INCLUDE, AT A MINIMUM; REMOVAL OF ALL MACHINERY AND TOOLS FROM THE CHANNEL, CONSTRUCTION OF TEMPORARY GRAVEL/COBBLE BERMS TO ISOLATE DISTURBED AREAS CONTAINING ERODABLE SOILS, PREPARATION OF A SAFE AND STABLE FLOW PATH THROUGH THE CONSTRUCTION SITE, AND ANY OTHER MEASURES TO PROTECT WATER QUALITY, AS DIRECTED BY THE PROJECT LEADER.

**CHANNEL FLUSHING AND FINAL DIVERSION NOTES**

FLUSHING

- FLUSHING SHALL CONSIST OF CONSTRUCTING A SANDBAG COFFER DAM AT THE DOWNSTREAM END OF THE NEWLY CONSTRUCTED CHANNEL TO FORM A BASIN, AND THEN PUMPING WATER FROM THE EXISTING CHANNEL TO INTRODUCE FLOWS IN A CONTROLLED MANNER. TURBID WATERS FROM FLUSHES MAY BE PUMPED TO AN APPROVED DEWATERING AREA, PER PROJECT SWPPP DETAILS, AT THE DIRECTION OF THE PROJECT LEADER. ALL COLLECTED SEDIMENTS SHALL BE DISPOSED OF IN A MANNER CONSISTENT WITH THE SWPPP REQUIREMENTS.
- PRIOR TO FLUSHING OPERATIONS, INSTALL TEMPORARY CHECK DAMS AT VARIOUS RIFFLE LOCATIONS WITHIN THE CHANNEL, TO REDUCE FILLING VELOCITIES AND TO FLATTEN THE WATER SURFACE, ALLOWING FOR FULL SATURATION OF THE BANKS TO THE HEIGHT OF THE MEADOW SURFACE. CHECK DAMS SHALL CONSIST OF 4mi. PLASTIC SHEETING SECURED WITH STEEL FENCE POSTS DRIVEN INTO THE BED, WITH SANDBAGS ALONG THE BANKS. THE LOCATION OF CHECK DAMS SHALL BE AT THE DIRECTION OF THE PROJECT LEADER. ALL TEMPORARY CHECK DAMS SHALL BE REMOVED PRIOR TO FINAL DIVERSION.
- CHANNEL FLUSHING SHALL BE CONDUCTED BY USFS STAFF, BEGINNING IN THE EARLY SPRING OF YEAR 2. FLUSHING SHALL CONTINUE UNTIL RESULTING DISCHARGES HAVE REACHED A TURBIDITY LEVEL WITHIN ALLOWABLE STANDARDS ESTABLISHED BY LRWQCB.

FINAL DIVERSION

- THE FINAL DIVERSION SHALL BE CONDUCTED PRIOR TO OCTOBER 1ST OF YEAR 2, FOLLOWING APPROVAL OF FINAL FLUSHING OPERATIONS BY LRWQCB.
- THE FINAL DIVERSION SHALL BE PERFORMED AS OUTLINED IN THE SWPPP, OR AS DIRECTED BY THE PROJECT LEADER TO BEST SUIT FIELD CONDITIONS AND PHASING.