



UNITED STATES DEPARTMENT OF THE INTERIOR
 BUREAU OF INDIAN AFFAIRS
 TRIBAL TRANSPORTATION BRIDGE PROGRAM
 BRIDGE PROGRAM OFFICE
 ALBUQUERQUE, NEW MEXICO
 SCOUR COUNTERMEASURE &
 STREAMBANK STABILIZATION STRATEGIES



BIA PROJECT NO#: CHANNEL_

PROJECT LENGTH = FT. (MI.)
 EXCEPTION = FT.

INSERT PLAN VIEW (SCALED)

INSERT CHANNEL FINDINGS DESCRIPTION



COUNTY: T__N, R__W, SEC ____
 LAT. N _____ LONG. W _____

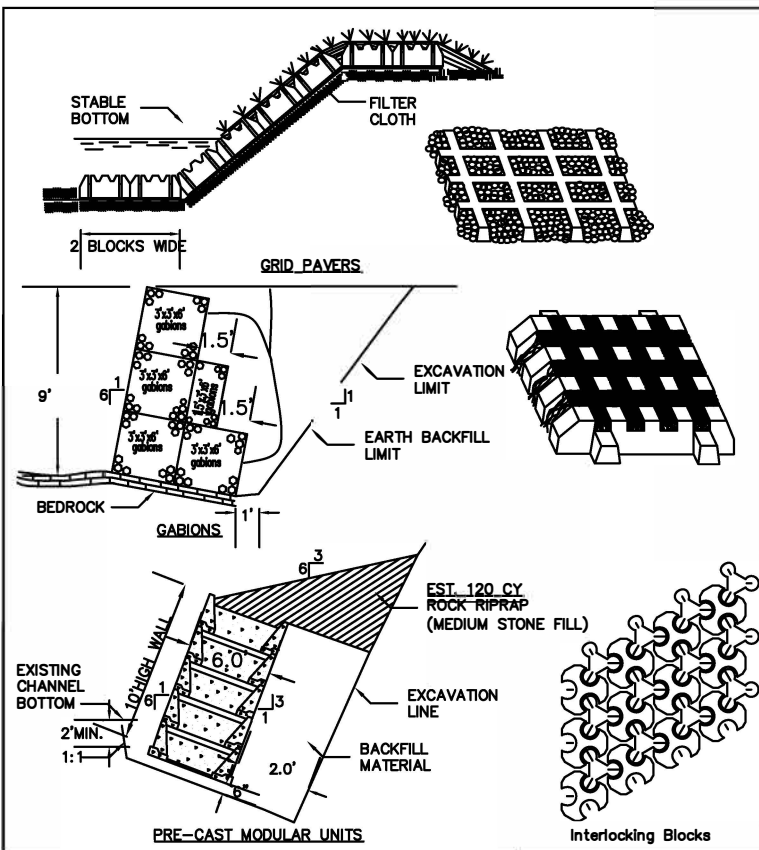
BEFORE DOING ANY WORK WITH HEAVY EQUIPMENT, THE CONTRACTOR SHALL NOTIFY THE UTILITY OWNERS NOT LESS THAN 48 HOURS IN ADVANCED AND SHALL ESTABLISH THE EXACT LOCATIONS AND DEPTH OF ALL UNDERGROUND UTILITIES.

LATEST USDOT STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION
 – ENGLISH GOVERN. APPROVED BY THE U.S. DEPARTMENT OF
 TRANSPORTATION, FEDERAL HIGHWAY ADMINISTRATION.

CONTACT:
 PHONE:

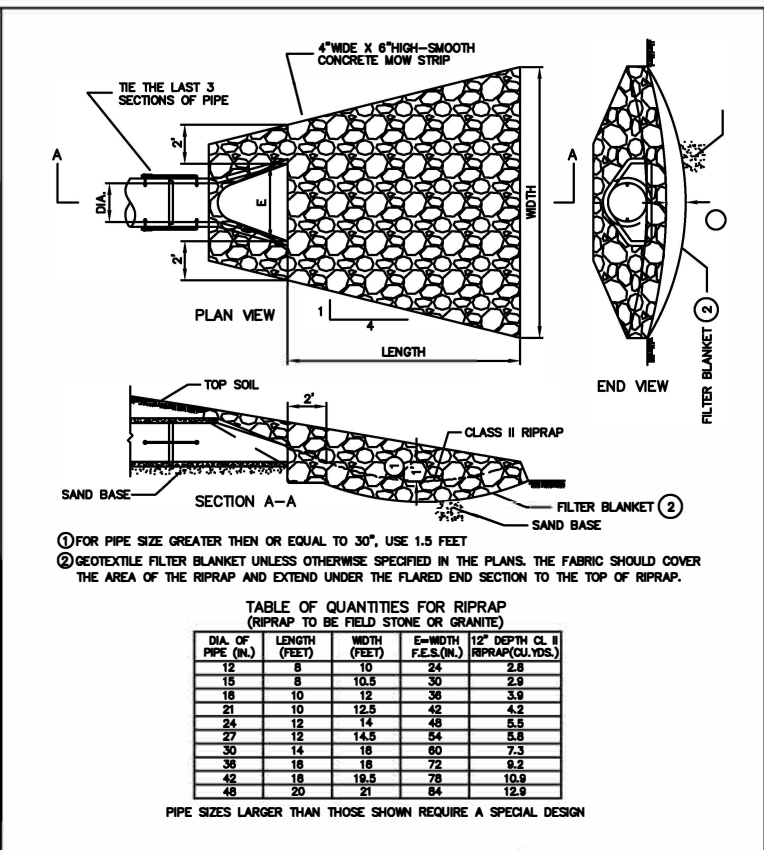
PREPARED FOR ESTIMATES ONLY BY:
 U.S. DEPARTMENT OF THE INTERIOR
 BUREAU OF INDIAN AFFAIRS
 BRIDGE PROGRAM OFFICE
 DIVISION OF TRANSPORTATION
 1001 INDIAN SCHOOL RD, NW
 ALBUQUERQUE, NM 87104
 PHONE: (505)563-3323

SHEET NO. OF	PROJECT ID NO.	BIA REGION	NBI STRUCTURE ID NO.	TRIBE	SHEET NAME TITLE SHEET
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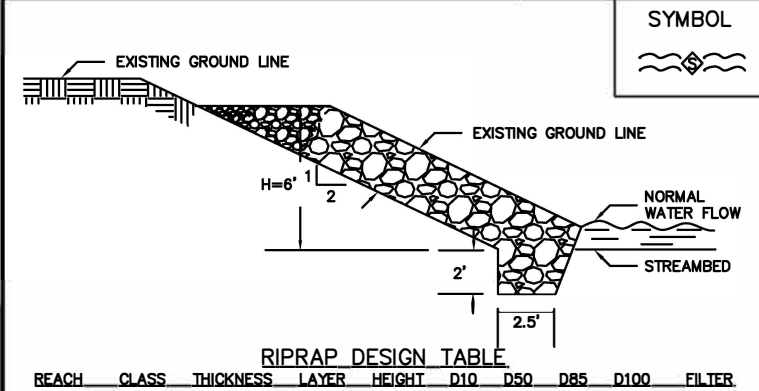
ADAPTED FROM DETAILS PROVIDED BY: USDA - NATURAL RESOURCES CONSERVATION SERVICE (NRCS), US DEPARTMENT OF TRANSPORTATION, FEDERAL HIGHWAY ADMINISTRATION (FHWA), STATE SOIL & WATER CONSERVATION PRACTICES

ARMORED STREAMBANK PROTECTION METHODS



ADAPTED FROM DETAILS PROVIDED BY: USDA - NATURAL RESOURCES CONSERVATION SERVICE (NRCS), US DEPARTMENT OF TRANSPORTATION, FEDERAL HIGHWAY ADMINISTRATION (FHWA), STATE SOIL & WATER CONSERVATION PRACTICES

PIPE OUTLET STABILIZATION METHOD



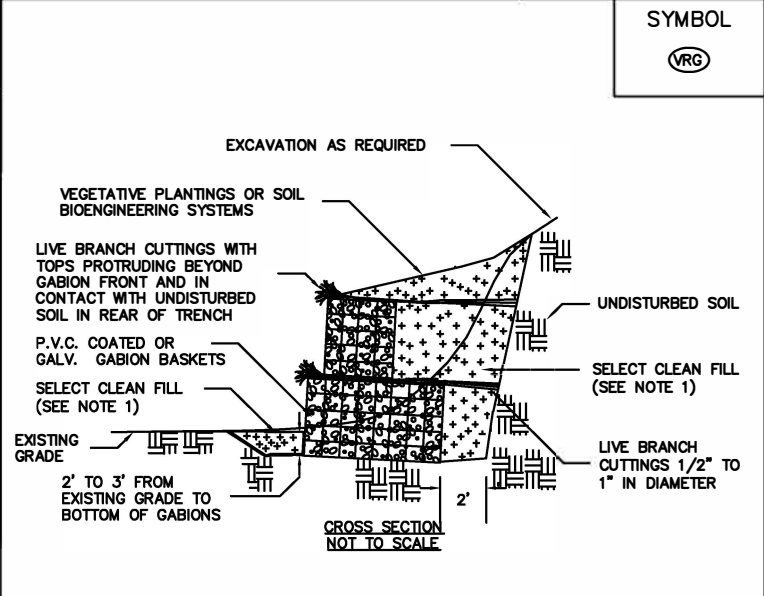
REACH	CLASS	THICKNESS	LAYER	HEIGHT	D10	D50	D85	D100	FILTER
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CONSTRUCTION SPECIFICATIONS

1. SLOPE SHALL BE GRADED TO 2:1 OR FLATTER PRIOR TO PLACING FILTER, FILTER FABRIC, OR RIPRAP.
2. RIPRAP SHALL BE PLACED TO MAINTAIN A UNIFORM GRADATION. LARGER STONE SHALL BE PLACED AT THE TOE.
3. ENDS OF THE RIPRAP SHALL BE KEYED INTO A STABLE BANK. WHEN TYING INTO OTHER STRUCTURES, LARGER RIPRAP CAN BE LAID IN STEPS OR STACKED AS NEEDED TO FIT. STONES LARGER THAN THOSE DESIGNED FOR FLOW SHALL BE USED FOR THIS PURPOSE.
4. REMAINING DISTURBED AREAS SHALL BE GRADED AND PERMANENTLY SEEDED AND MULCHED.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NATURAL RESOURCES CONSERVATION SERVICE (NRCS), US DEPARTMENT OF TRANSPORTATION, FEDERAL HIGHWAY ADMINISTRATION (FHWA), STATE SOIL & WATER CONSERVATION PRACTICES

RIPRAP STREAMBANK PROTECTION DETAILS



CONSTRUCTION SPECIFICATIONS

1. ALL SELECT CLEAN FILL FOR GABIONS SHALL BE HAND TAMPED IN 6" LIFTS.
2. A 1" LAYER OF BACKFILL SHALL BE PLACED ON TOP OF THE ROW OF GABIONS AND RAKED. THE CUTTINGS SHALL BE PLACED ON THE BACKFILL MATERIAL AND ANOTHER 1" LAYER OF BACKFILL SHALL BE PLACED ON THE CUTTINGS BETWEEN THE GABIONS.
3. CLASS 2, TYPE B OR C, INTERMEDIATE EROSION CONTROL PRODUCT SHALL BE INSTALLED ON THE FRONT INSIDE FACE AND ANY OTHER EXPOSED VERTICAL SURFACE OF THE GABIONS.

ADAPTED FROM DETAILS PROVIDED BY: USDA - NATURAL RESOURCES CONSERVATION SERVICE (NRCS), US DEPARTMENT OF TRANSPORTATION, FEDERAL HIGHWAY ADMINISTRATION (FHWA), STATE SOIL & WATER CONSERVATION PRACTICES

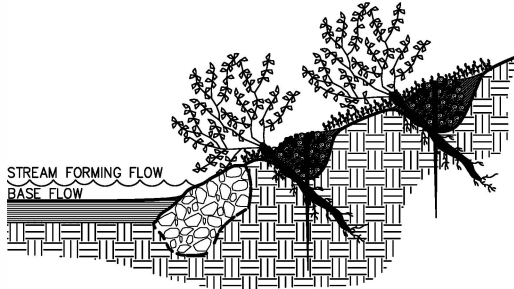
VEGETATED ROCK GABIONS

STREAMBANK STABILIZATION

FASCINE BUNDLE DETAIL



LIVE FASCINE CROSS-SECTION DETAIL

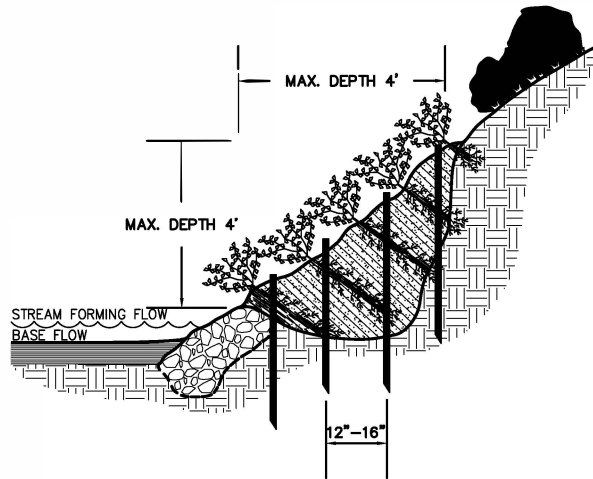


NOTES:

1. ROOTED/LEAFED CONDITION OF THE LIVING PLANT MATERIAL IS NOT REPRESENTATIVE OF THE TIME OF INSTALLATION.
2. LIVE FASCINES SHALL BE PREPARED FROM FRESHLY CUT DORMANT PLANTS AND INSTALLED WITHIN 8 HOURS OF THE TIME THE MATERIAL IS HARVESTED, UNLESS PROPERLY STORED.
3. LIVE FASCINE SHALL BE OBTAINED FROM SOURCES APPROVED BY ENGINEER.
4. LIVE FASCINES SHALL BE 4"-8" IN DIAMETER WITH MINIMUM 8' LENGTH.
5. BEGINNING AT THE BASE OF THE SLOPE, A TRENCH SHALL BE DUG LARGE ENOUGH TO CONTAIN THE LIVE FASCINES. THE LIVE FASCINES SHALL BE PLACED IN THE TRENCH. WHERE ENDS MEET IN THE TRENCH, THE FASCINES SHALL OVERLAP BY 18".
6. THE TRENCH SHALL BE BACKFILLED WITH MOIST SOIL AND HAND TAMPED. THE TOP OF THE FASCINE SHALL BE SLIGHTLY EXPOSED WHEN THE INSTALLATION IS COMPLETE AS SHOWN ON CROSS SECTION.
7. SEED OR OTHER EROSION CONTROL MATERIAL SHALL BE USED BETWEEN THE FASCINE ROWS, AS SPECIFIED IN THE CONTRACT DOCUMENTS.
8. LIVE FASCINE TRENCHES SHALL BE FROM 3' TO 8' APART, ACCORDING TO SLOPE AND/OR CONTRACT DOCUMENTS.

STREAMBANK STABILIZATION

BRANCHPACKING CROSS-SECTION



NOTES:

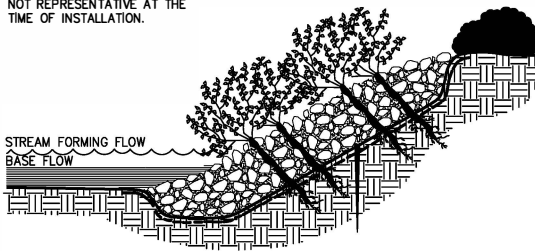
1. ROOT/LEAFED CONDITION OF THE LIVING PLANT MATERIAL IS NOT REPRESENTATIVE OF THE TIME OF INSTALLATION.
2. STARTING AT THE LOWEST POINT, DRIVE THE WOODEN POSTS VERTICALLY 3' TO 4' INTO THE GROUND AND SET THEM 12"-16" APART.
3. A LAYER OF LIVING BRANCHES (4"-6" THICK) IS PLACED IN THE BOTTOM OF THE HOLE, BETWEEN THE VERTICAL POSTS. THEY SHALL BE PLACED IN A CRISSCROSS CONFIGURATION.
4. THE FINAL INSTALLATION SHALL MATCH THE EXISTING SLOPE. BRANCHES SHOULD PROTRUDE ONLY SLIGHTLY FROM THE FILLED FACE.
5. EACH LAYER OF BRANCHES SHALL BE FOLLOWED BY A 12" LAYER OF SOIL HAND TAMPED TO ENSURE CONTACT WITH THE BRANCH CUTTINGS.
6. THE SOIL SHALL BE MOIST OR MOISTENED TO ENSURE THAT LIVE BRANCHES DO NOT DRY OUT.
7. WHERE SPECIFIED, LIVE STAKES SHALL BE USED IN PLACE OF POSTS.

STREAM STABILIZATION

JOINT PLANTING CROSS SECTION

NOTES:

ROOTED/LEAFED CONDITION OF THE LIVING PLANT MATERIAL IS NOT REPRESENTATIVE AT THE TIME OF INSTALLATION.

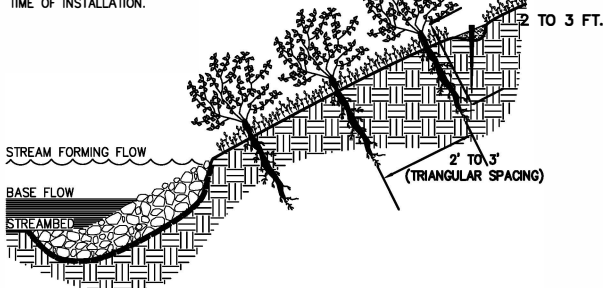


STREAM STABILIZATION

LIVE STAKING CROSS-SECTION

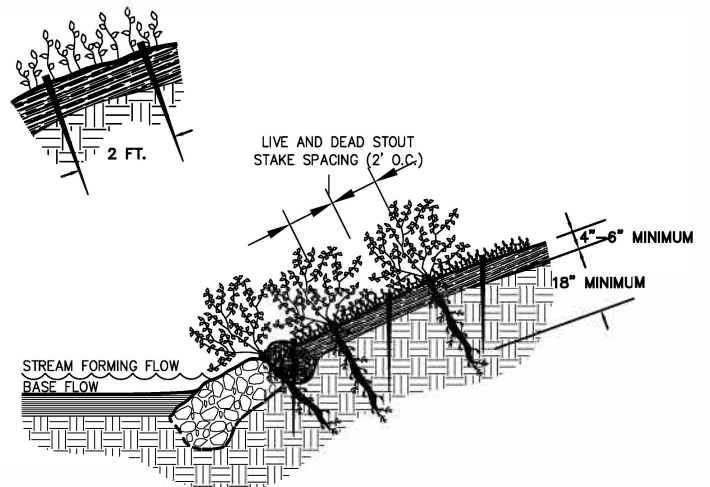
NOTES:

ROOTED/LEAFED CONDITION OF THE LIVING PLANT MATERIAL IS NOT REPRESENTATIVE AT THE TIME OF INSTALLATION.



STREAMBANK STABILIZATION

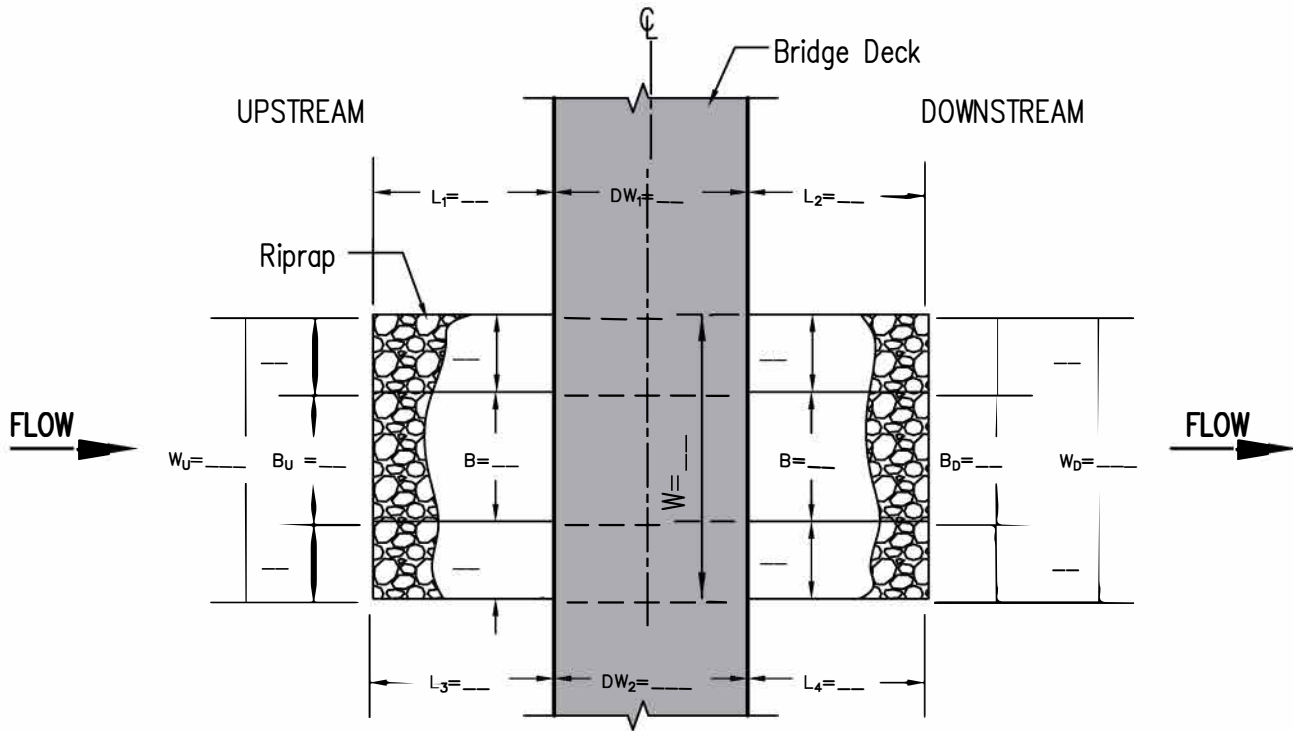
BRUSHMATTRESS CROSS-SECTION



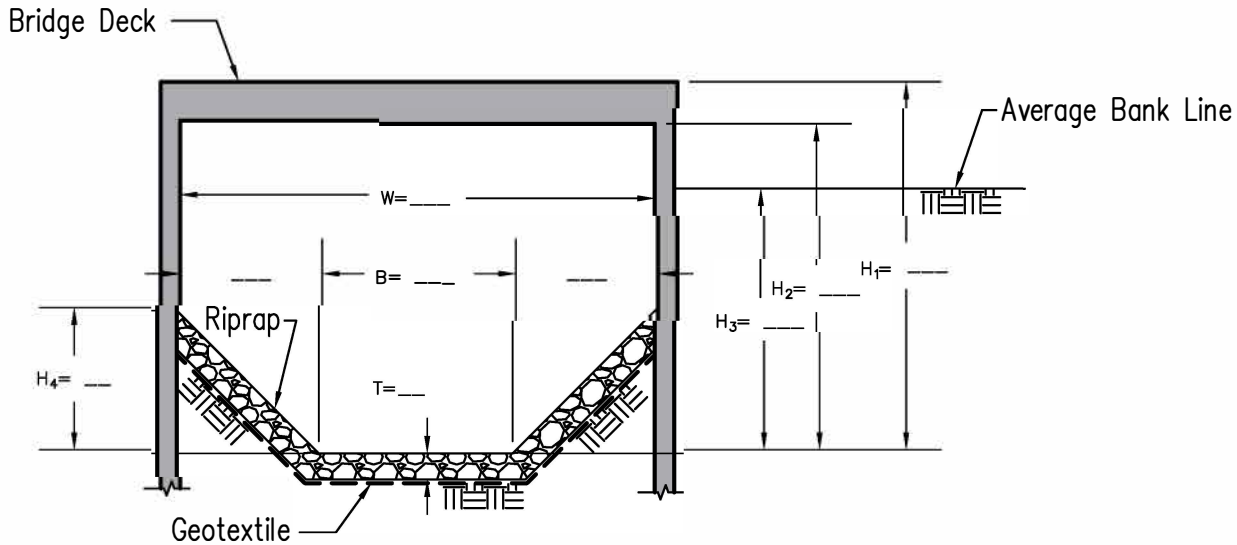
NOTES:

1. ROOTED/LEAFED CONDITION OF THE LIVING PLANT MATERIAL IS NOT REPRESENTATIVE AT THE TIME OF INSTALLATION.
2. LAYERS SHALL BE COMPRISED OF LIVE QUICK-ROOTING SPECIES. SEE CONTRACT DOCUMENTS.
3. FILL MATTRESS WITH SOIL AND EVENLY DISTRIBUTE TO APPROXIMATELY 4" MIN. IN DEPTH AND HAND TAMP.
4. PLACE STAKES EVENLY OVER THE GRADED FACE USING 2' SQUARE SPACING. IF LIVE STAKES ARE SPECIFIED, ALTERNATE EVERY OTHER ONE WITH A DEAD STOUT STAKE.
5. STRETCH 16 GAUGE GALVANIZED WIRE DIAGONALLY FROM ONE STAKE TO ANOTHER BY TIGHTLY WRAPPING WIRE AROUND STAKES, NO CLOSER THAN 6" FROM THE TOP OF STAKE. WIRE SHALL NOT BE ATTACHED TO LIVE STAKES. POUND STAKES TO COMPRESS MATTRESS.
6. LIVE FASCINES AND LIVE STAKES ARE INSTALLED WHEN AND WHERE DIRECTED ON THE PLAN SHEET.

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PLAN



SECTION ON CENTERLINE

NOTES:

1. The rock riprap shall meet USDOT requirements for Gradation No. _____, Quality Designation "A" or as designated by engineer.
2. The riprap shall be placed according to USDOT Construction Specification Rock Riprap. The rock may be equipment placed.
3. Geotextile (non-woven, needle punched) Minimum criteria:
 Grab tensile strength (lb) ASTM D 4632 _____ 202
 Elongation at failure (%) ASTM D 4632 _____ ≥ 50
 Trapezoidal tear strength (lb) ASTM D 4533 _____ 79
 Puncture strength (lb) ASTM D 6241 _____ 433
 Ultraviolet light (% retained strength) ASTM D 4355 _____ min 50
 Apparent opening size (AOS) ASTM D 4751 _____
 _____ max 0.22 mm (US sieve size 70)
 Permittivity sec^{-1} / ASTM D 4491 _____ min 0.7
4. Any geotextile splices shall overlap a minimum of 18 inches, with upstream or upslope geotextile overlapping the abutting downslope geotextile.

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