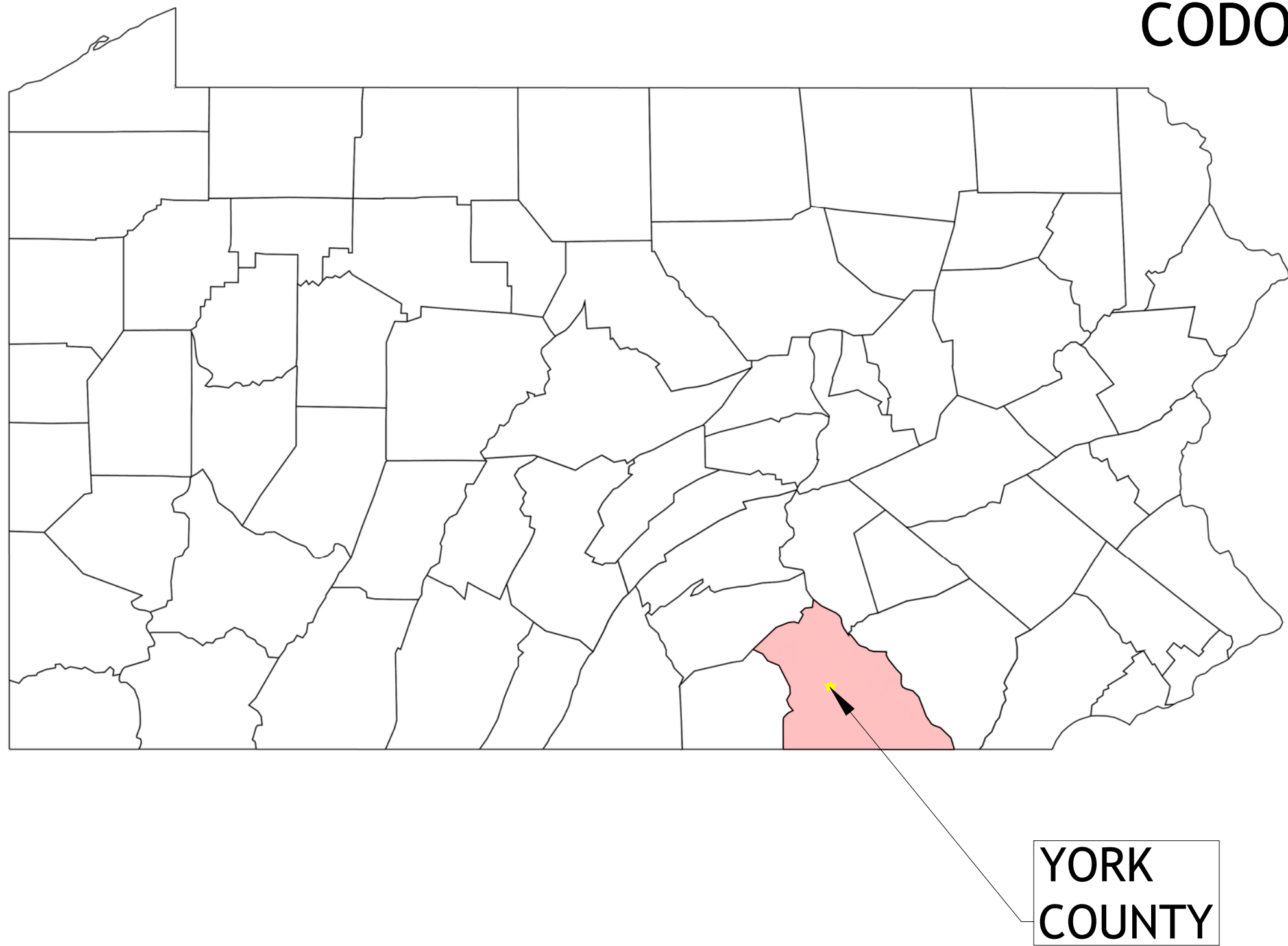
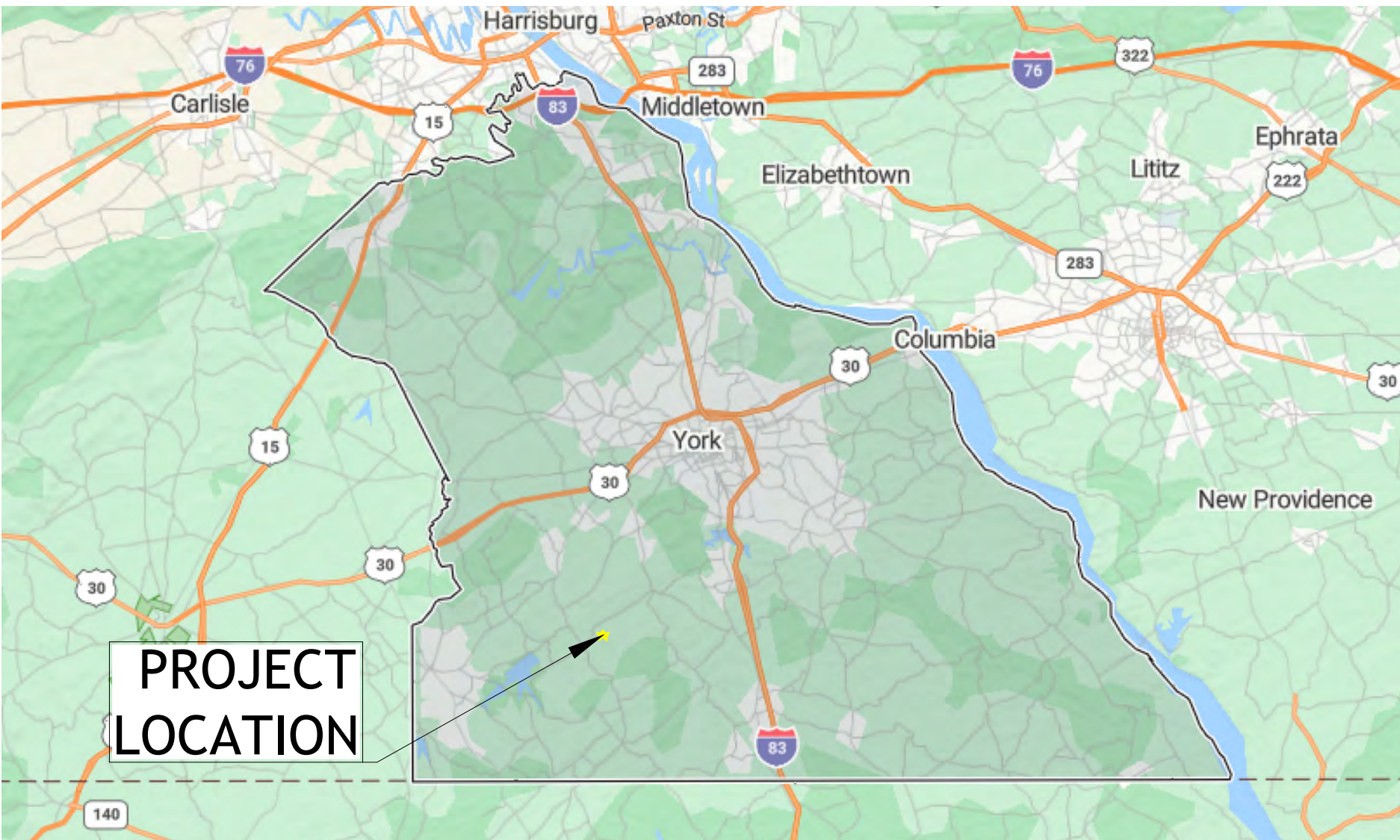


STREAM RESTORATION PROJECT
FOR
BUFFALO VALLEY RUN
CODORUS TOWNSHIP, YORK COUNTY, PENNSYLVANIA

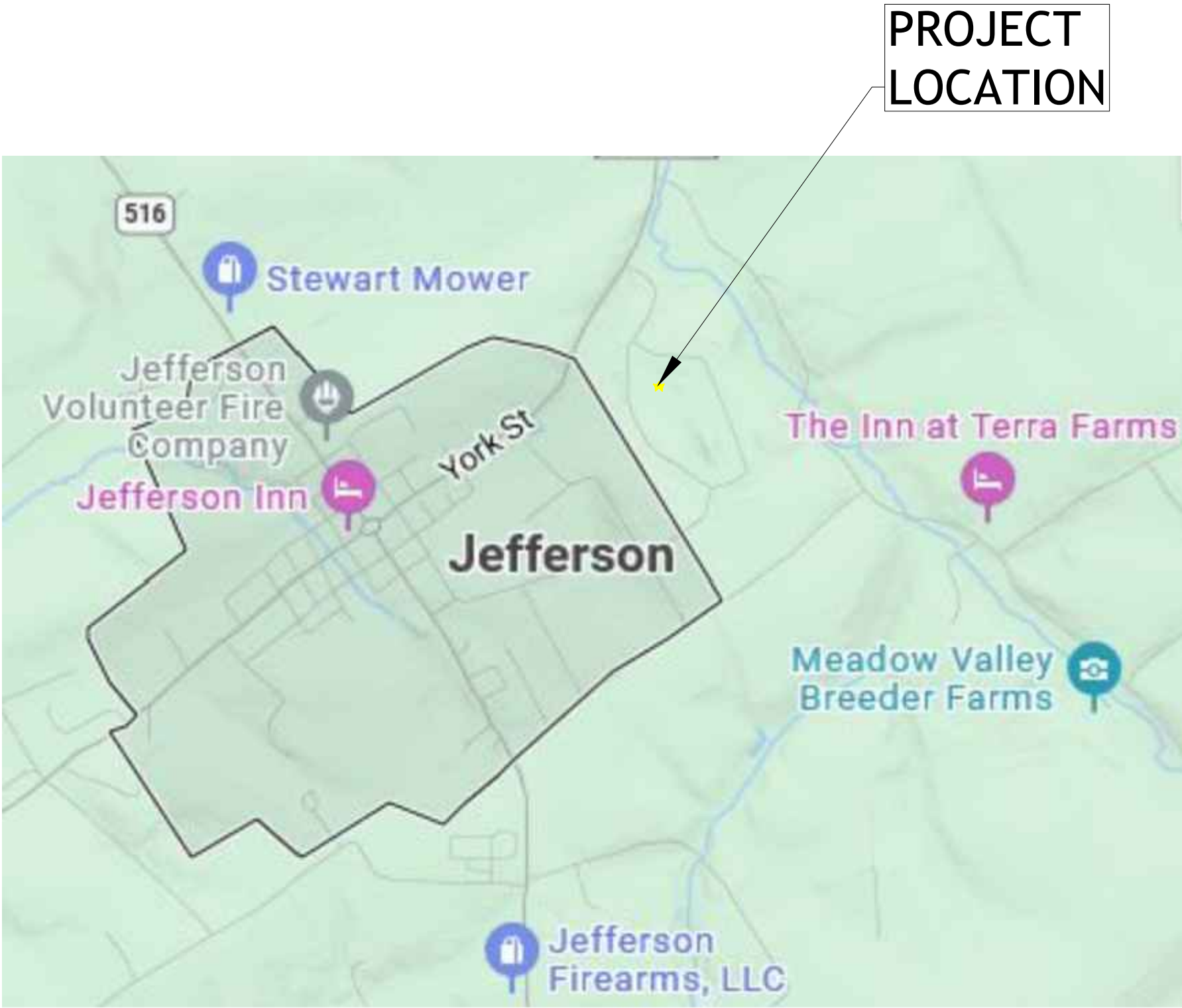


STATE LOCATION MAP



COUNTY MAP

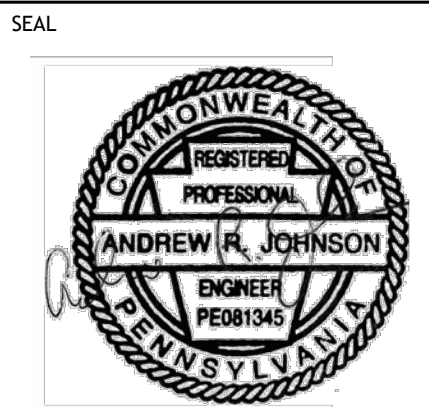
DRAWING INDEX	
C-0	COVER SHEET
C-1	OVERALL SITE PLAN
C-2 TO C-11	ENLARGED SITE PLANS
C-12 TO C-14	TERRA FARMS STREAM CENTERLINE PROFILE
C-15	TERRA FARMS & FEIK STREAM CENTERLINE PROFILES
C-16	FEIK AND FEIK TRIBUTARY STREAM CENTERLINE PROFILES AND DETAILS
C-17	STREAM SECTIONS & PLANTING NOTES
C-18	STREAM SECTIONS & DETAILS
C-19 TO C-20	BIOENGINEERING DETAILS
C-21	EROSION & SEDIMENT CONTROL DETAILS
C-22	EROSION & SEDIMENT CONTROL DETAILS & NOTES



TOWNSHIP MAP

LEGEND

	DECIDUOUS TREE		GAS LINE
	SPOT ELEV.		OVERHEAD ELECTRIC LINE
	UTILITY POLE		WATER LINE
	COMMUNICATIONS BOX		MAJOR CONTOUR
	GAS LINE MARKER		MINOR CONTOUR
	GAS VALVE		TREE LINE
	WATER VALVE		FENCE LINE
	SIGN		CURB LINE
	BENCHMARK		EDGE OF PAVEMENT
	SOILS PROBE		EDGE OF GRAVEL
	WETLAND FLAG		GUIDE RAIL
	PROPOSED BANK STABILIZATION WITH ROOTED TOE PROTECTION OR OTHER BIO-ENGINEERING OPTIONS (SEE DETAILS)		STORM SEWER LINE
			RIGHT-OF-WAY LINE
			100 YEAR FLOOD BOUNDARY LINE
			FLOODWAY BOUNDARY LINE
			MUNICIPAL BOUNDARY LINE
			WETLAND BOUNDARY LINE
			LIMIT OF DISTURBANCE LINE



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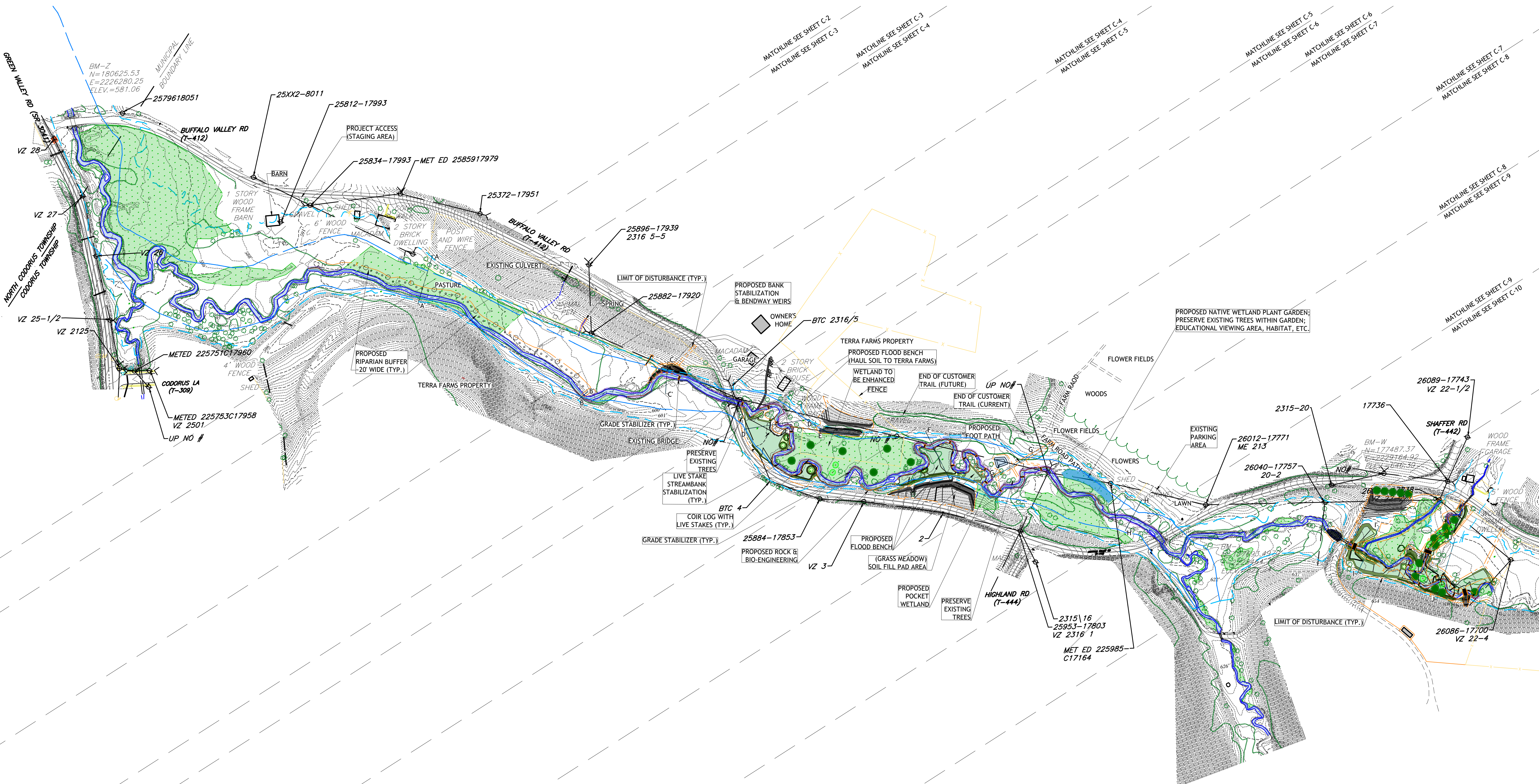
STREAM RESTORATION PROJECT
FOR
BUFFALO VALLEY RUN
CODORUS TOWNSHIP, YORK COUNTY, PENNSYLVANIA

DATE OF PLAN	06/14/2026
DATE OF SURVEY	01/13/2023 - 08/16/2023
REVIEWED BY	A. JOHNSON, PE, CPESC
SCALE	AS NOTED

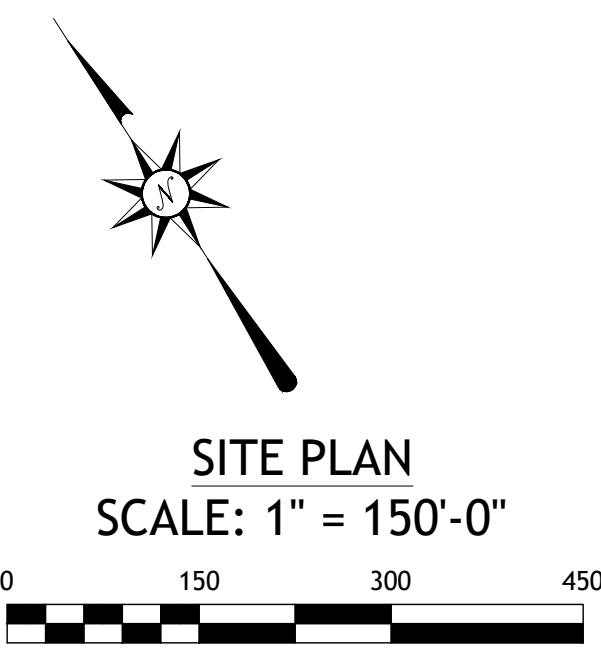
SHEET TITLE
COVER SHEET

C-0

"I, Andrew R. Johnson, do hereby certify pursuant to the penalties of 18 Pa. C.S.A. Sec. 4904 to the best of my knowledge, information and belief, that the information contained in the accompanying plans, specifications, and reports has been prepared in accordance with accepted engineering practice, is true and correct, and is in conformance with Chapter 105 of the rules and regulations of the Department of Environmental Protection."



ESTIMATED EARTHWORK QUANTITIES		
TERRA FARMS PROPERTY		
CUT	1,826	CY
FILL	1,534	CY
CUT/FILL	1.19	
FEIK PROPERTY		
CUT	1,675	CY
FILL	1,418	CY
CUT/FILL	1.18	
TOTAL PROJECT		
CUT	3,501	CY
FILL	2,952	CY
CUT/FILL	1.19	



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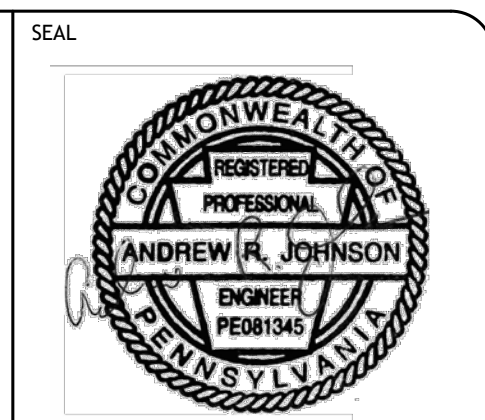
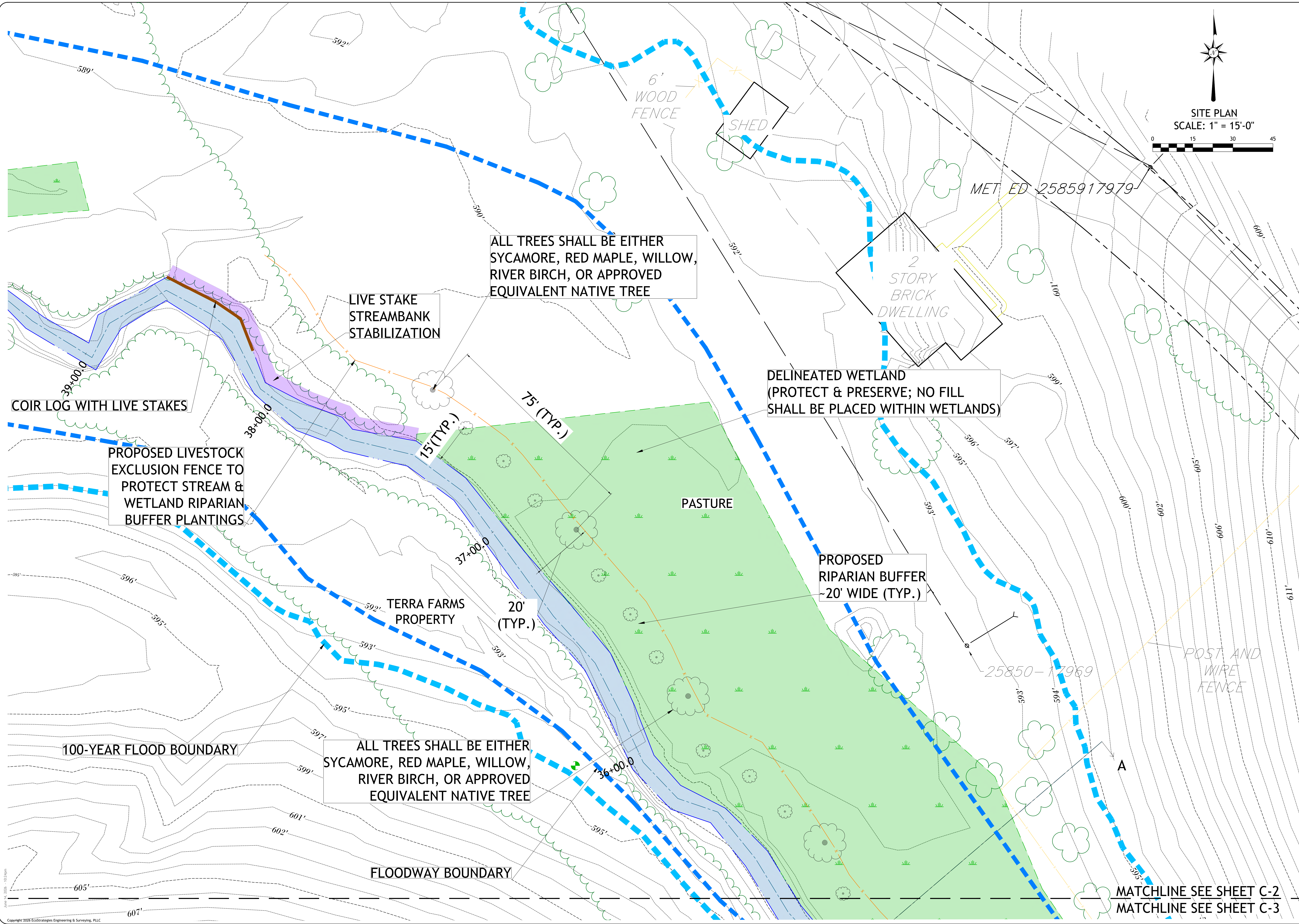
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STREAM RESTORATION PROJECT
FOR
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SCALE	AS NOTED
SHEET TITLE	
OVERALL SITE PLAN	

C-1



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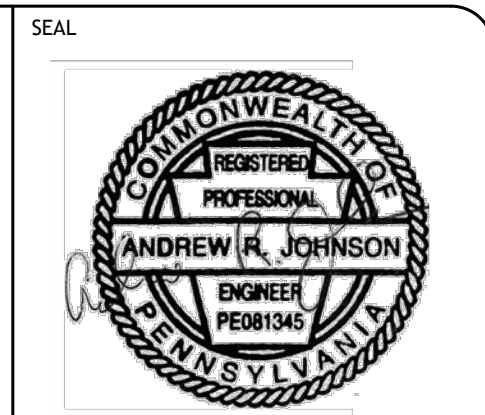
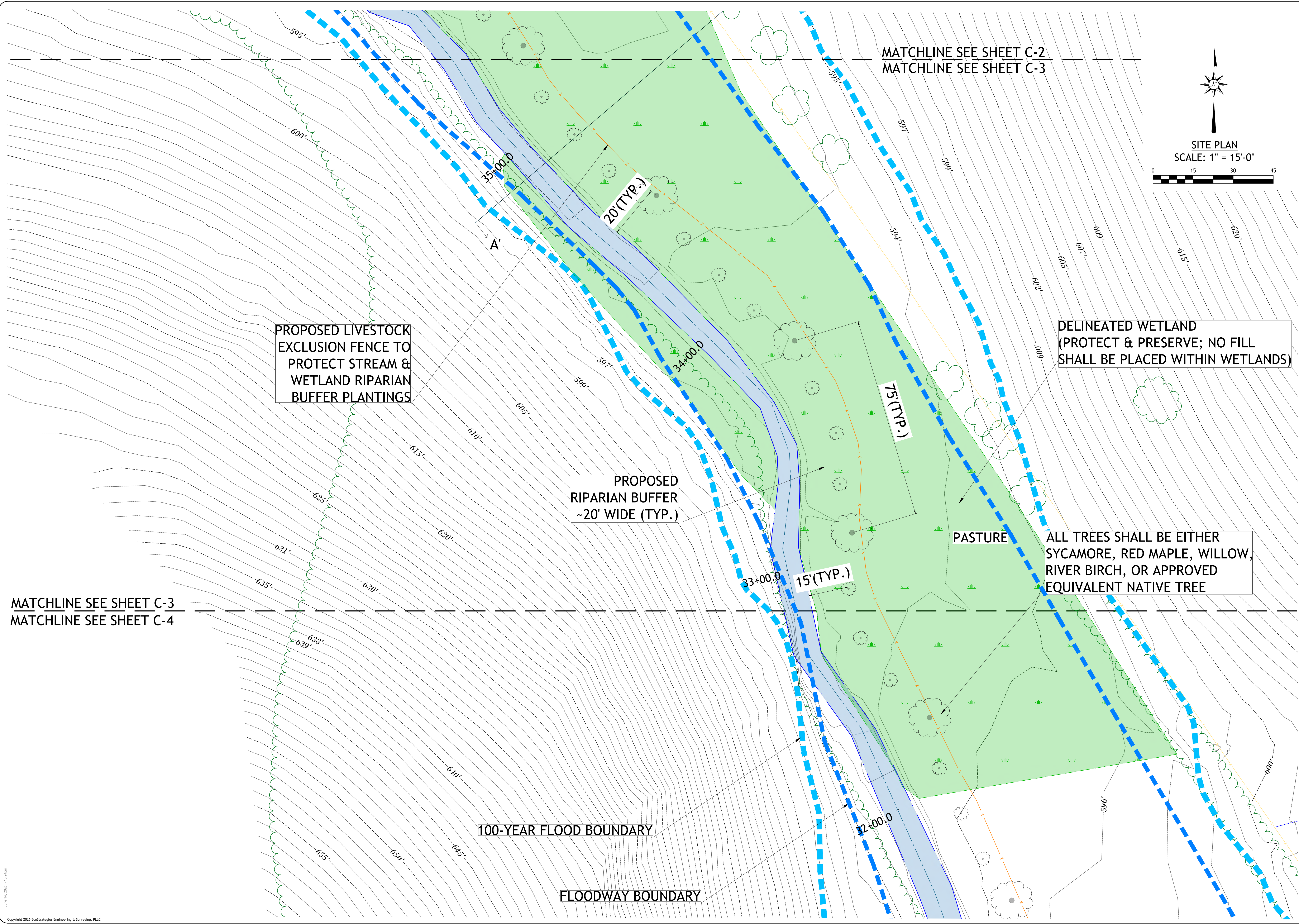
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STREAM RESTORATION PROJECT
FOR
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SCALE	AS NOTED
SHEET TITLE	ENLARGED SITE PLAN

C-2





eco STRATEGIES
ENGINEERING & SURVEYING

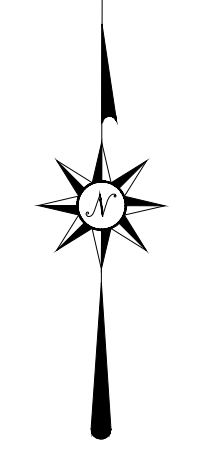
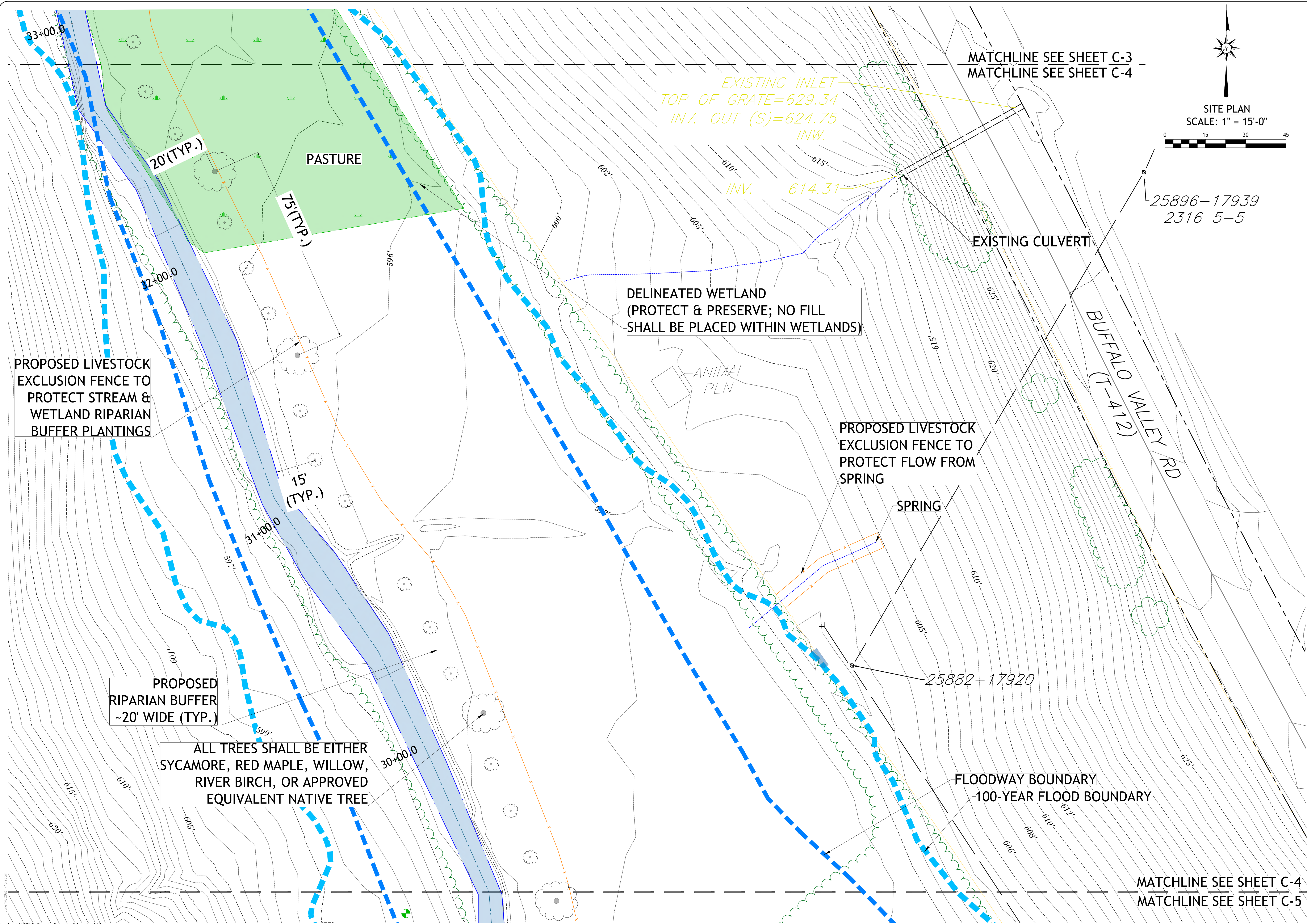
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REVISIONS

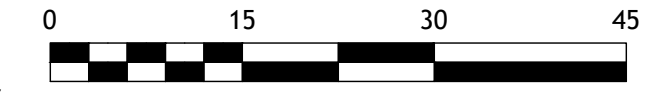
STREAM RESTORATION PROJECT
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DATE OF SURVEY	01/13/2023 - 08/16/2023
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SCALE	AS NOTED
SHEET TITLE	ENLARGED SITE PLAN

C-3



SITE PLAN
SCALE: 1" = 15'-0"



25896-17939
2316 5-5

MATCHLINE SEE SHEET C-3
MATCHLINE SEE SHEET C-4

EXISTING CULVERT

BUFFALO VALLEY RD
(T-412)

PROPOSED LIVESTOCK
EXCLUSION FENCE TO
PROTECT FLOW FROM
SPRING

SPRING

25882-17920

FLOODWAY BOUNDARY
100-YEAR FLOOD BOUNDARY

MATCHLINE SEE SHEET C-4
MATCHLINE SEE SHEET C-5



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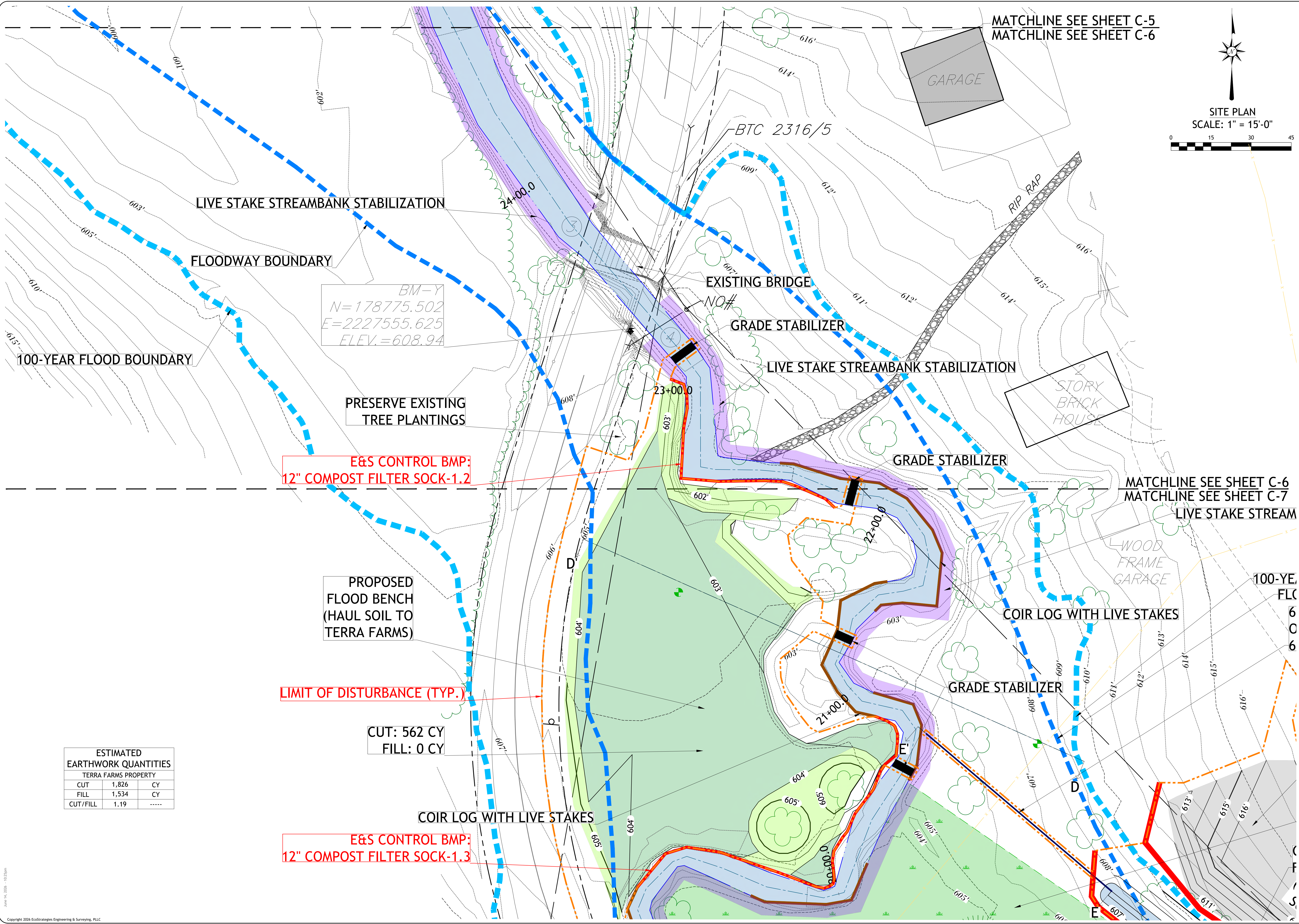
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SCALE	AS NOTED
SHEET TITLE	ENLARGED SITE PLAN

C-4



BM-Y
N=178775.502
E=2227555.625
ELEV.=608.94

E&S CONTROL BMP:
12" COMPOST FILTER SOCK-1.2

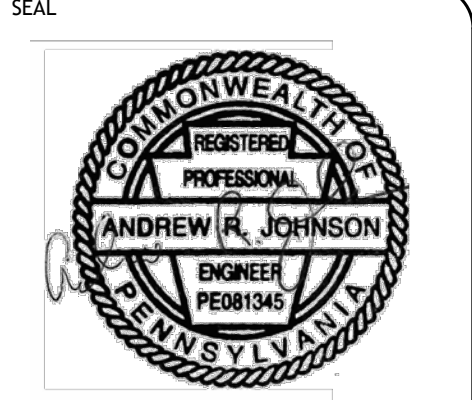
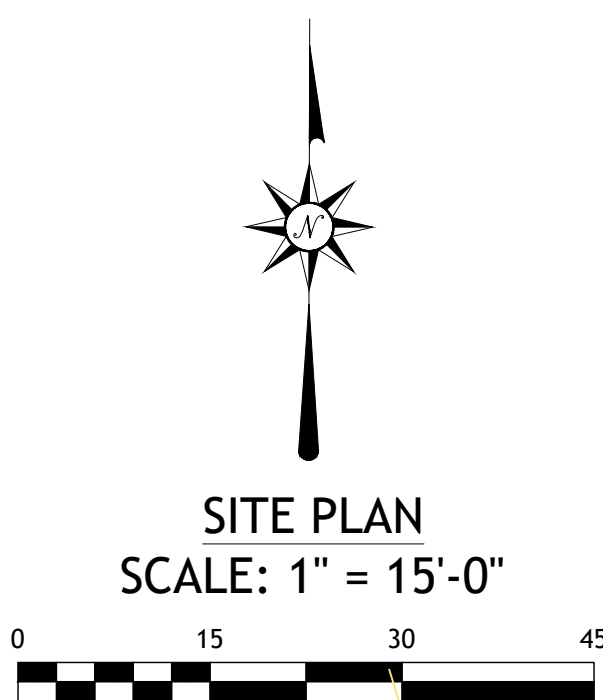
PROPOSED
FLOOD BENCH
(HAUL SOIL TO
TERRA FARMS)

LIMIT OF DISTURBANCE (TYP.)

CUT: 562 CY
FILL: 0 CY

E&S CONTROL BMP:
12" COMPOST FILTER SOCK-1.3

ESTIMATED EARTHWORK QUANTITIES			
TERRA FARMS PROPERTY			
CUT	1,826	CY	
FILL	1,534	CY	
CUT/FILL	1.19	-----	



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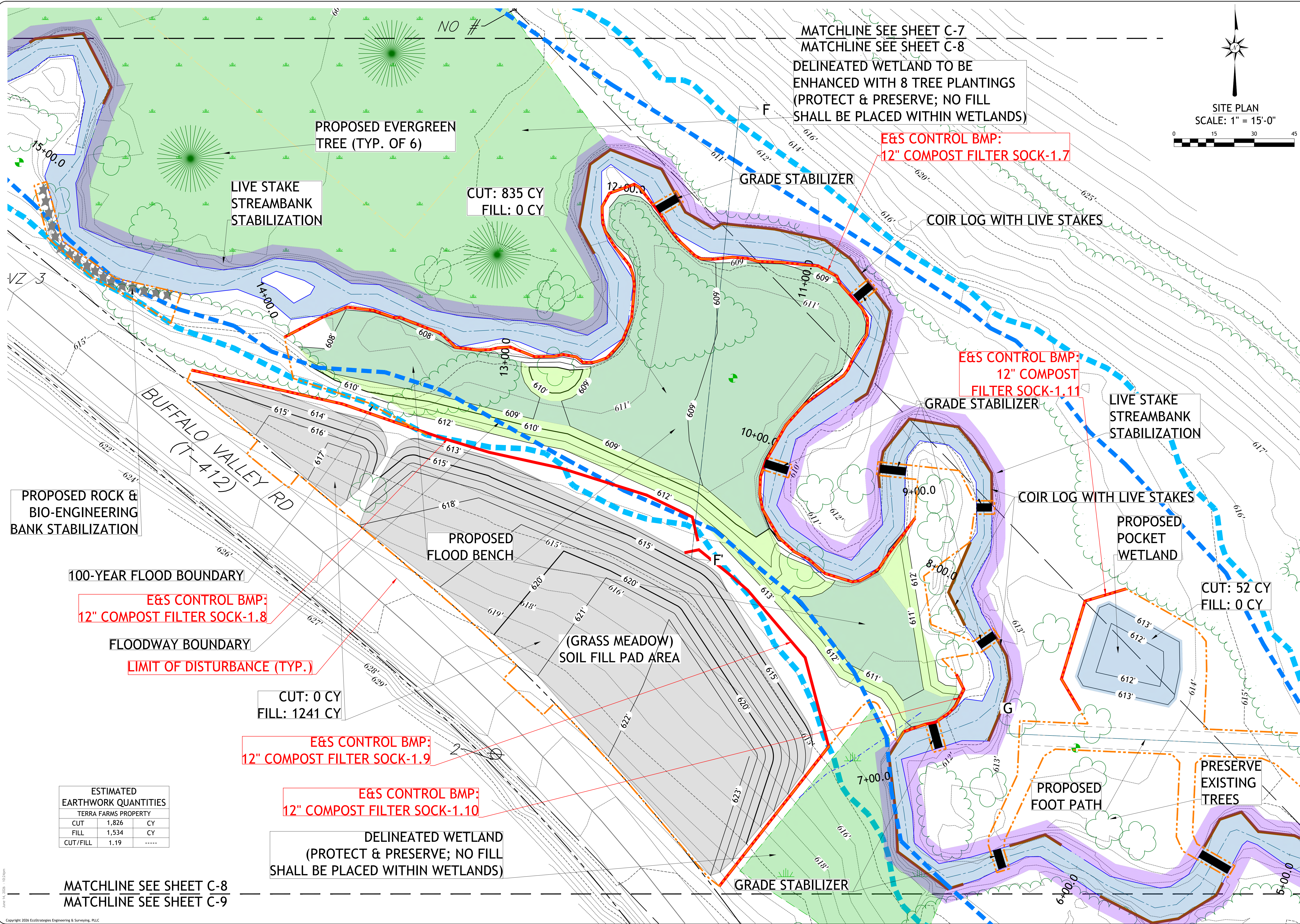
REVISIONS

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SCALE	AS NOTED

SHEET TITLE
ENLARGED
SITE PLAN

C-6



SEAL

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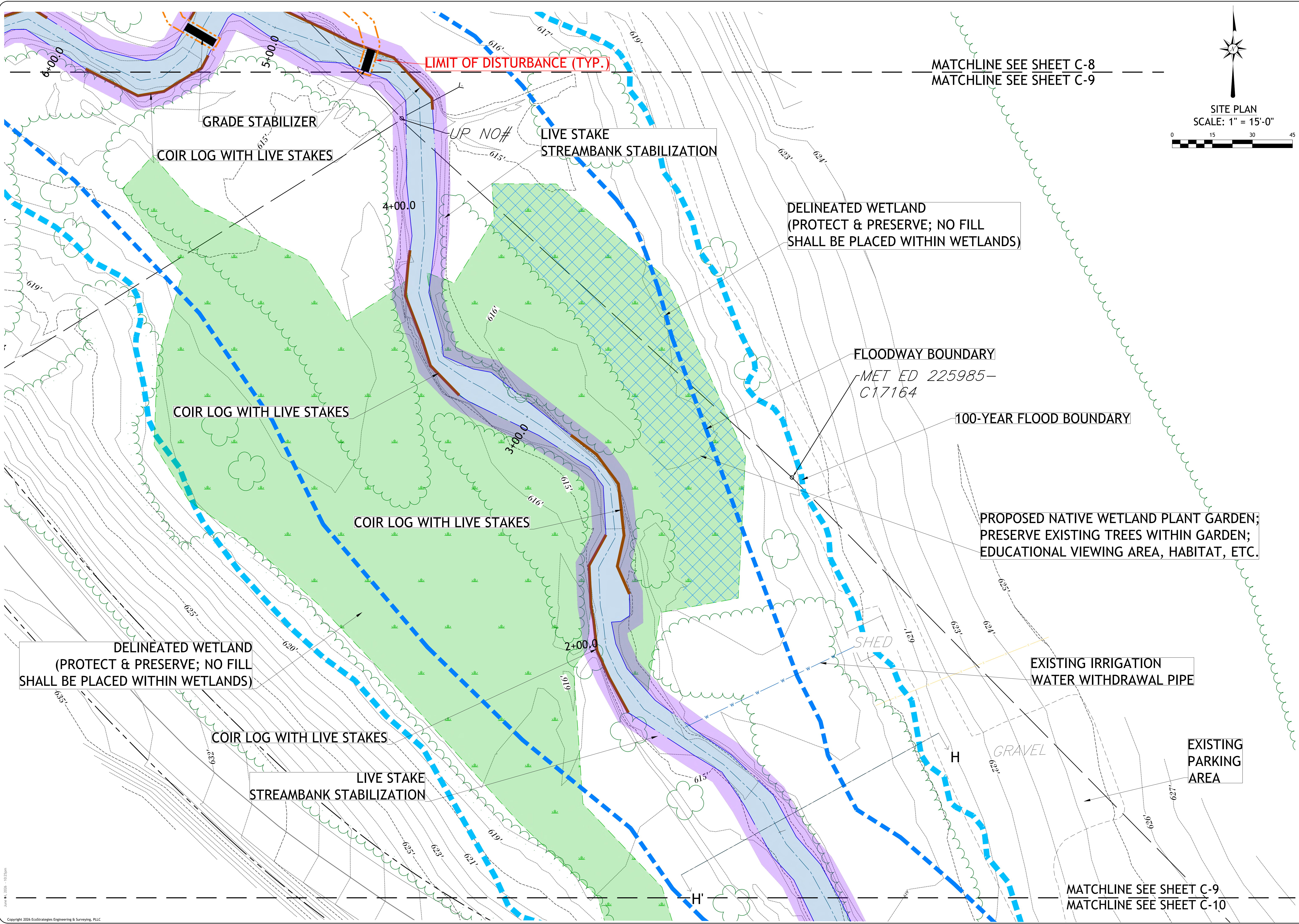
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REVISIONS	

STREAM RESTORATION PROJECT
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SCALE	AS NOTED
SHEET TITLE	ENLARGED SITE PLAN

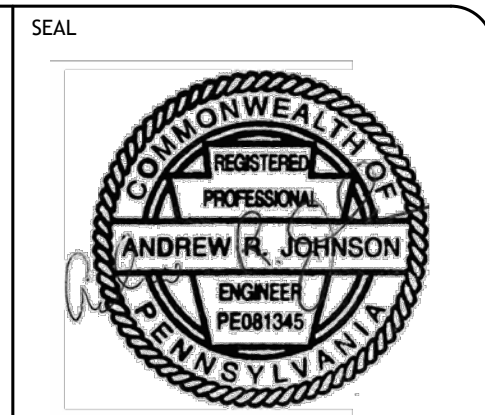
C-8





SITE PLAN
SCALE: 1" = 15'-0"







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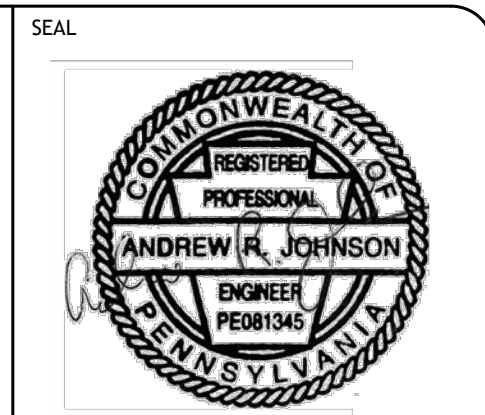
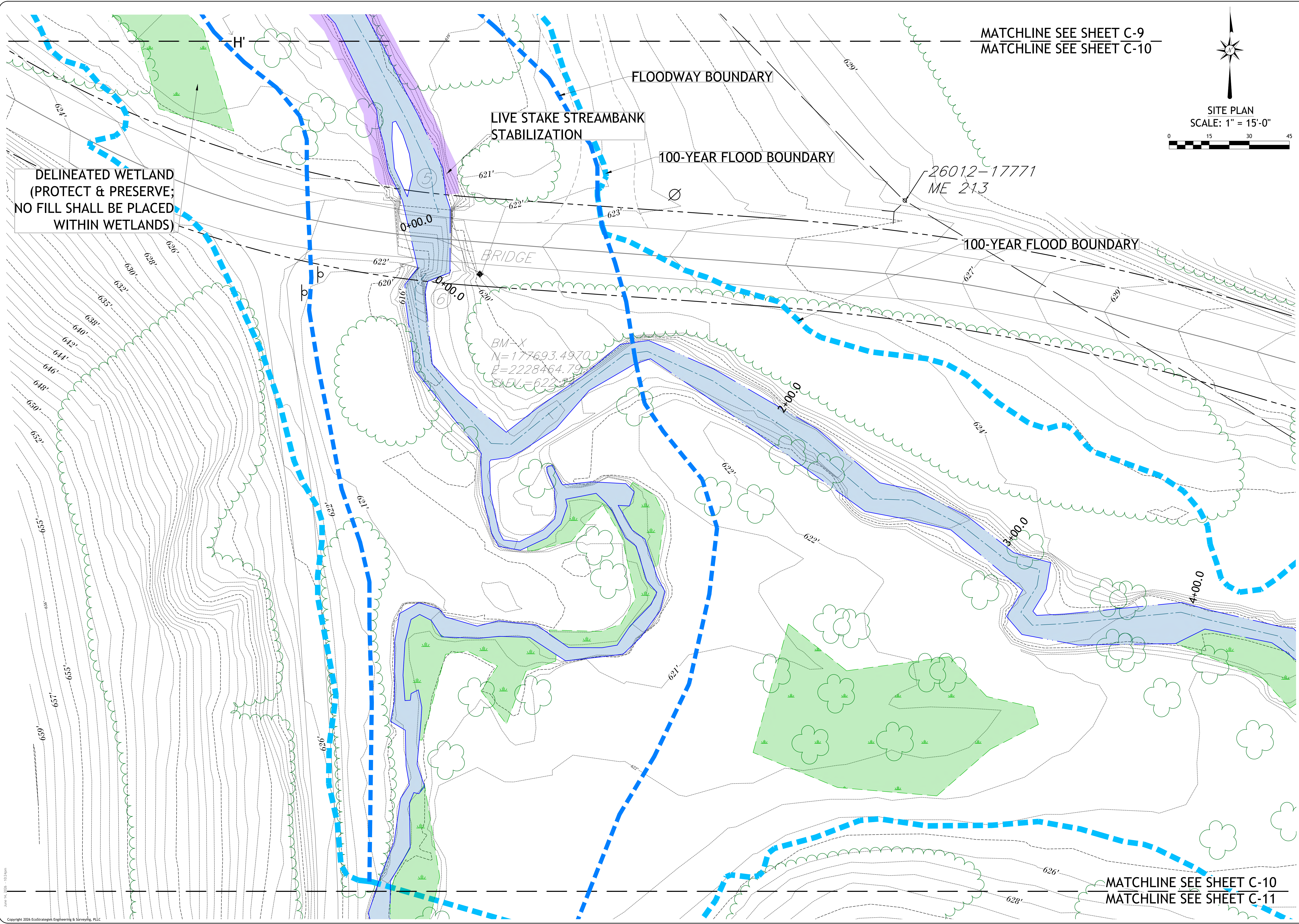
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STREAM RESTORATION PROJECT
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SCALE	AS NOTED
SHEET TITLE	ENLARGED SITE PLAN

C-9



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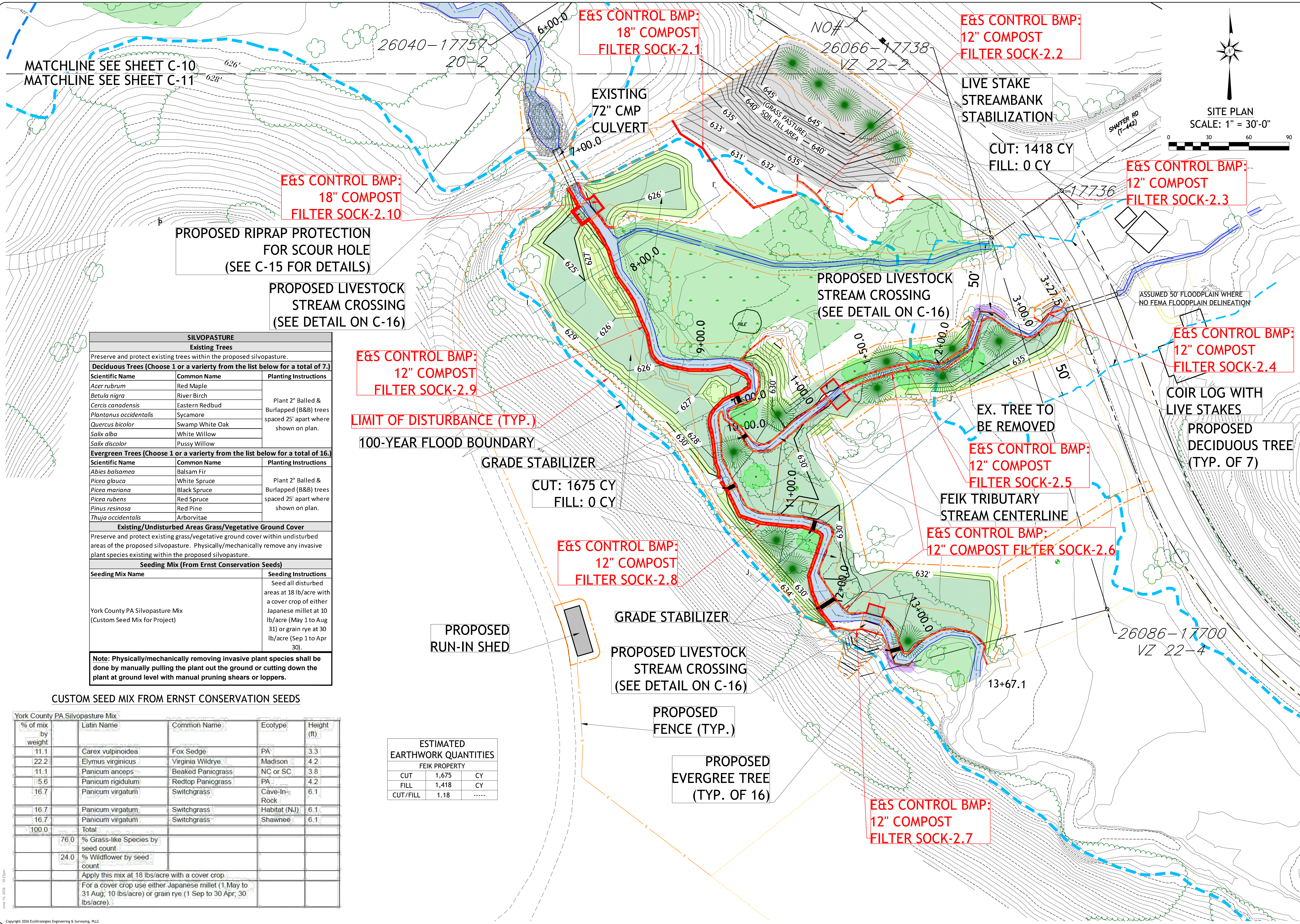
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SCALE	AS NOTED
SHEET TITLE	ENLARGED SITE PLAN

C-10





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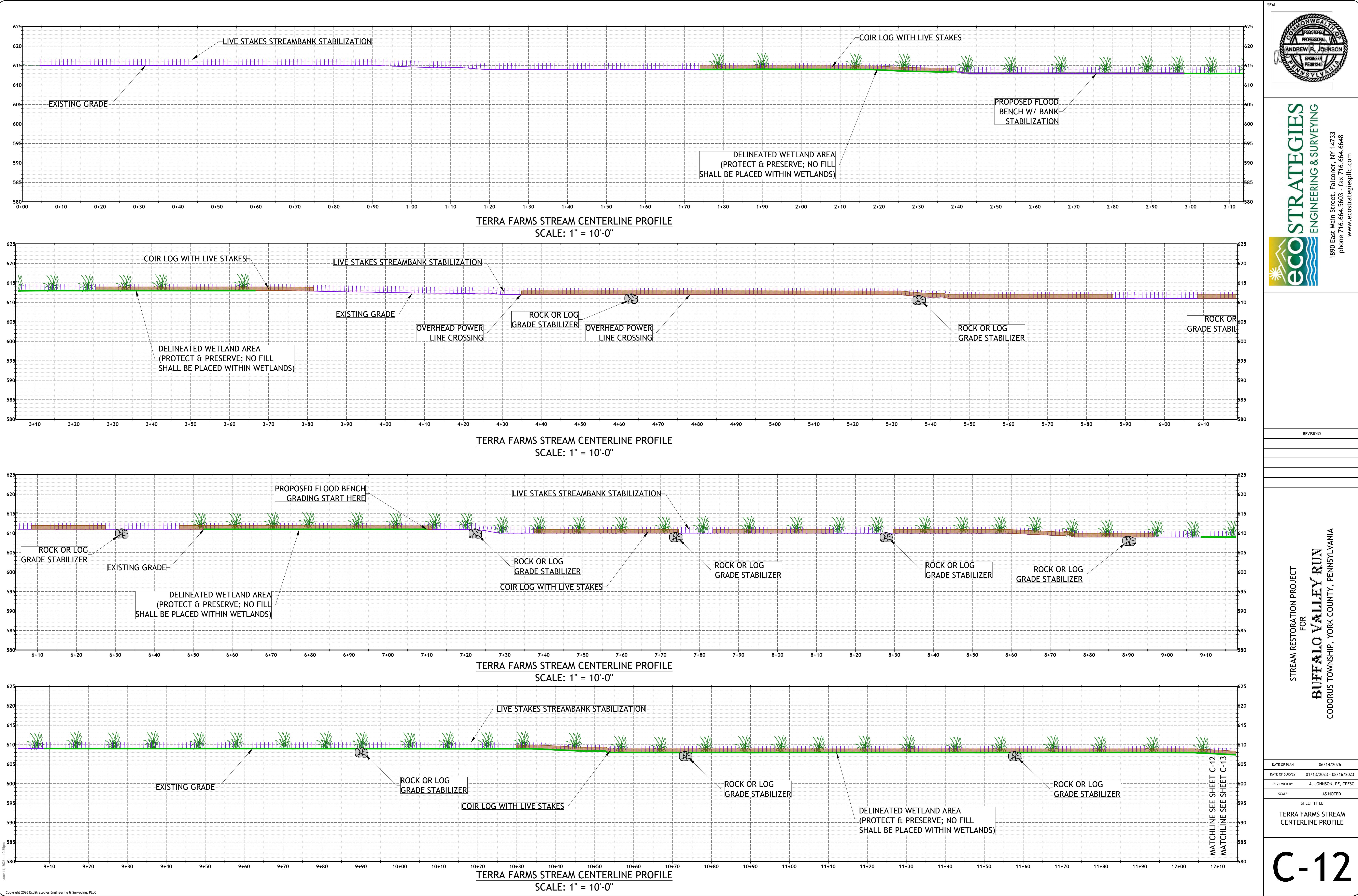
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STREAM RESTORATION PROJECT
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SCALE	AS NOTED
SHEET TITLE ENLARGED SITE PLAN	

C-11



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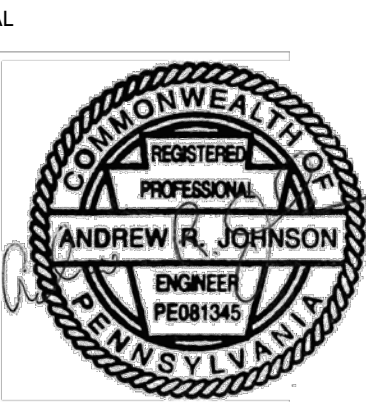
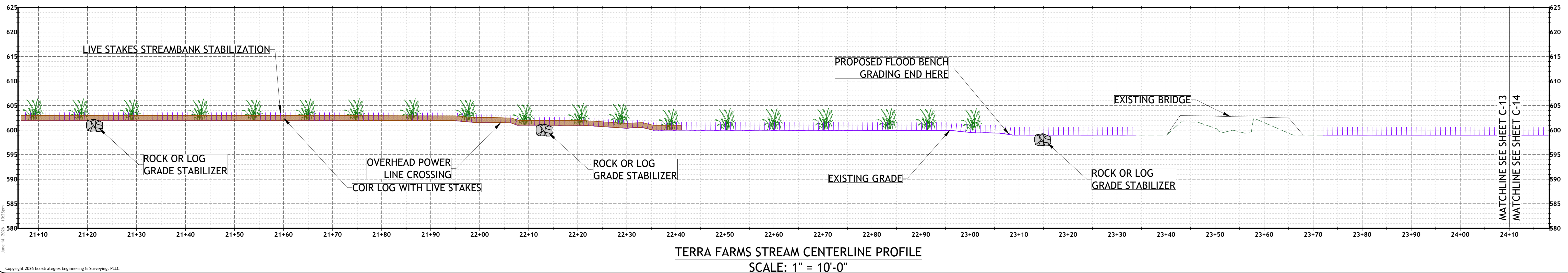
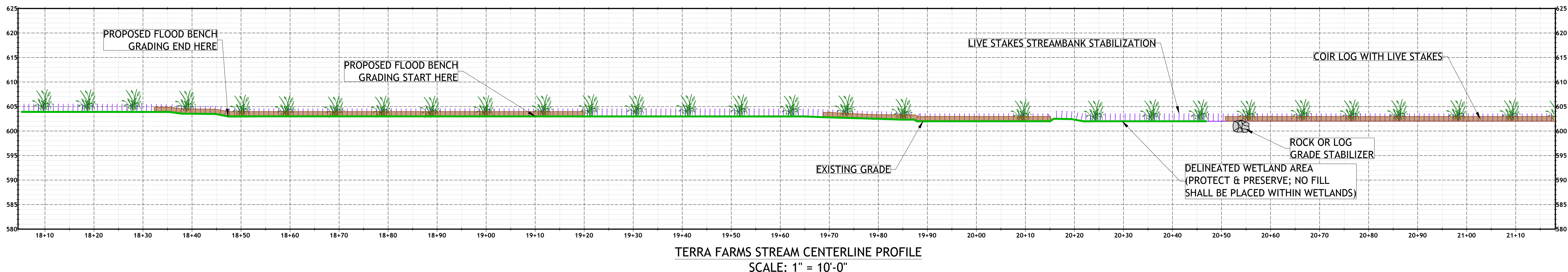
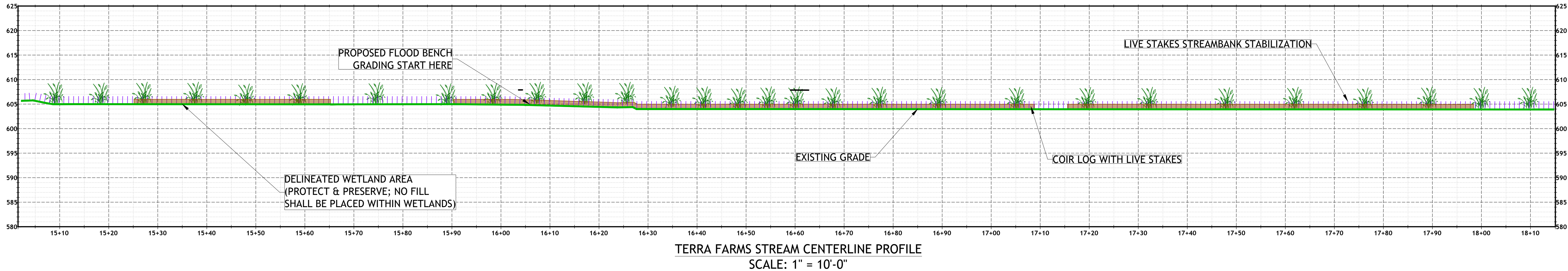
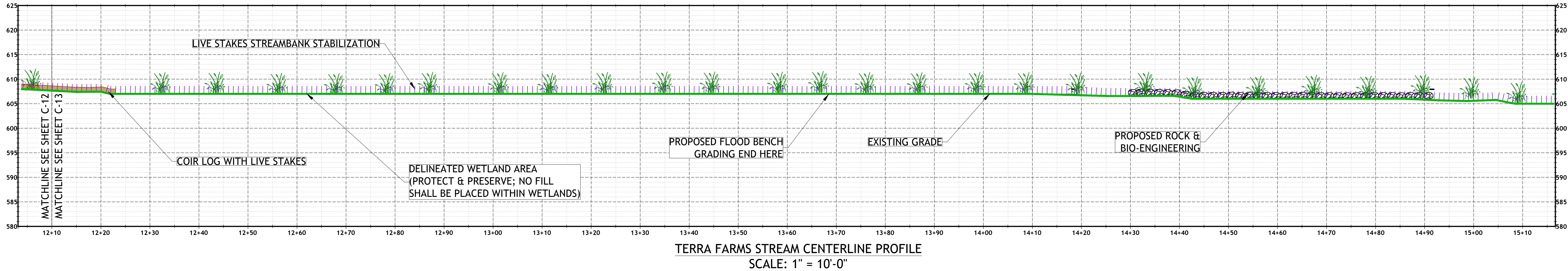
REVISIONS

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SCALE	AS NOTED

SHEET TITLE
TERRA FARMS STREAM
CENTERLINE PROFILE

C-12



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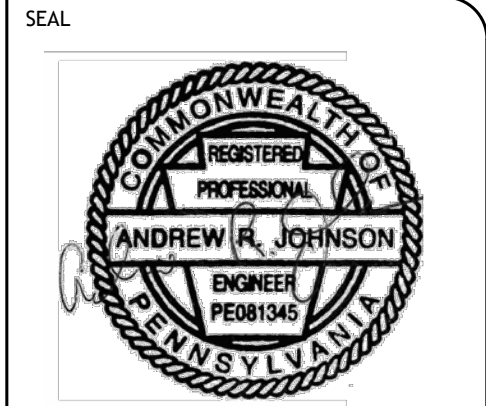
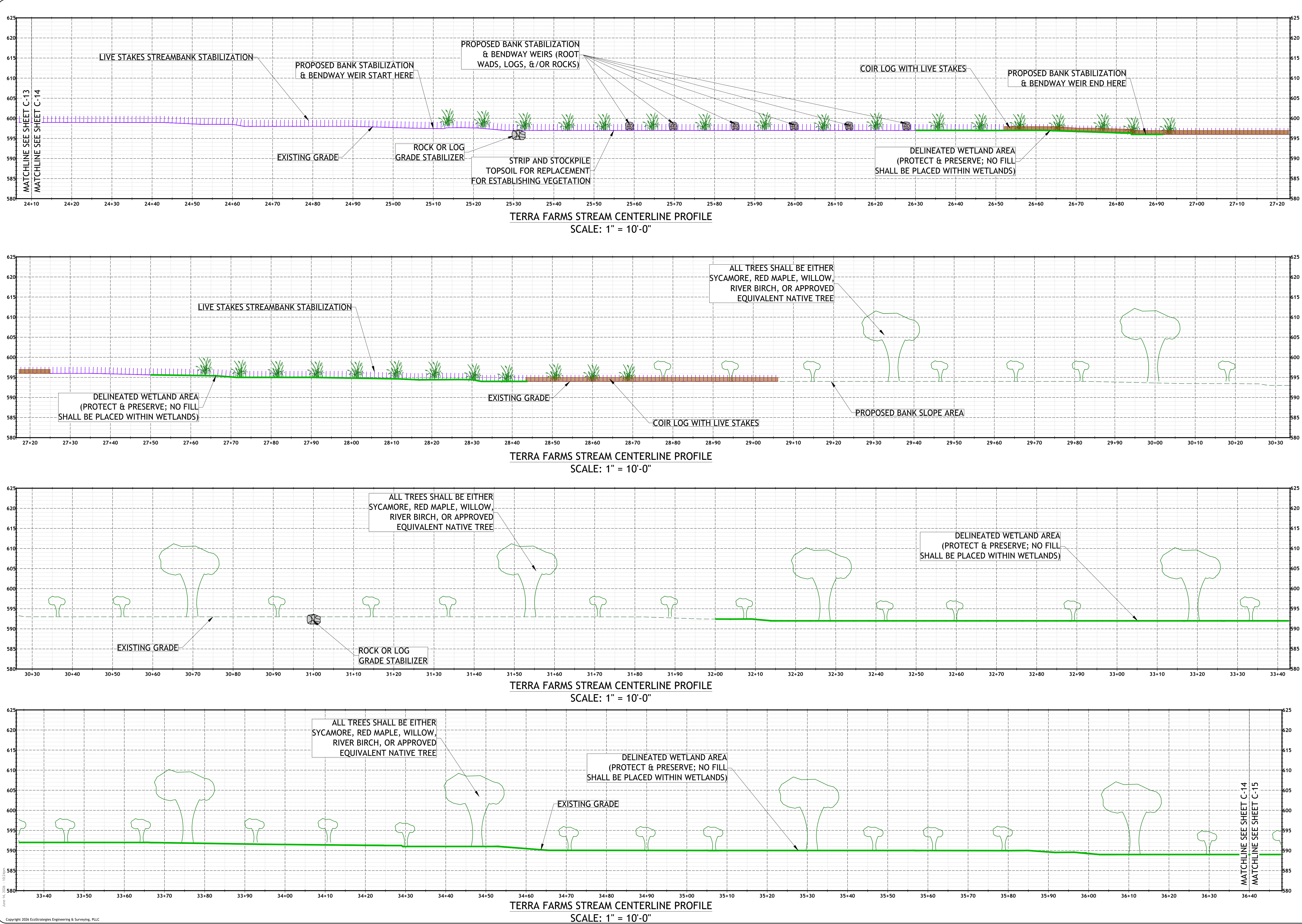
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STREAM RESTORATION PROJECT
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SCALE	AS NOTED

SHEET TITLE
TERRA FARMS STREAM
CENTERLINE PROFILE

C-13



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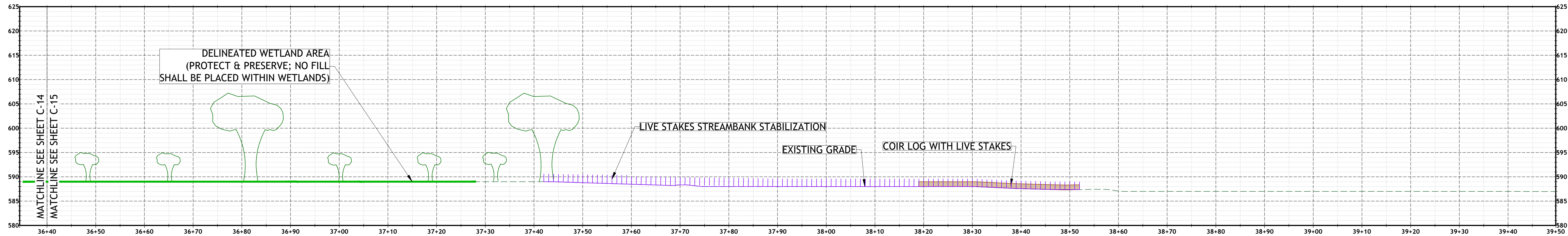
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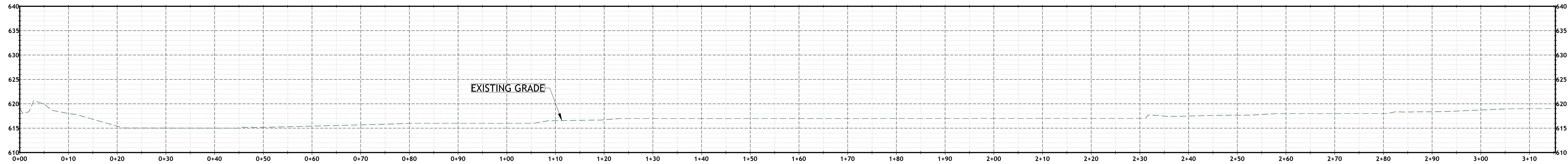
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SCALE	AS NOTED
SHEET TITLE	TERRA FARMS STREAM CENTERLINE PROFILE

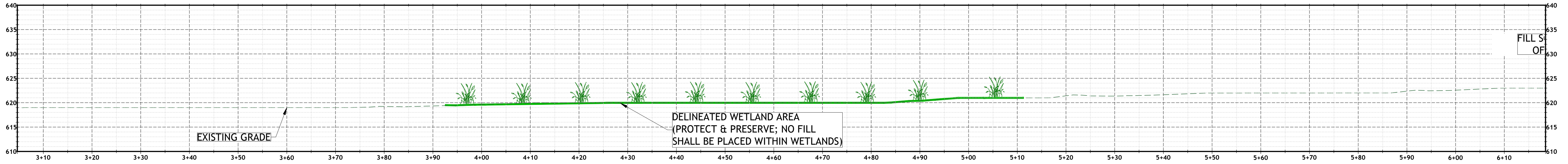
C-14



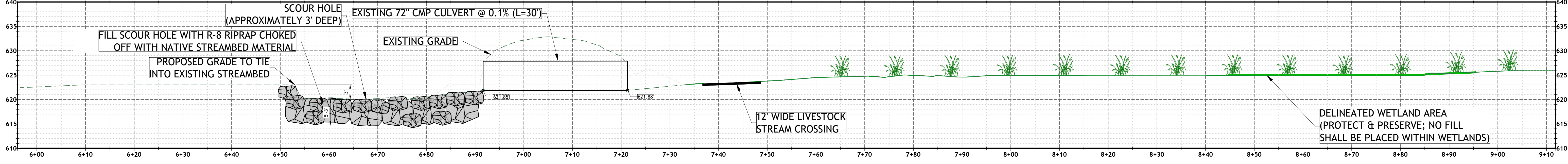
TERRA FARMS STREAM CENTERLINE PROFILE
SCALE: 1" = 10'-0"



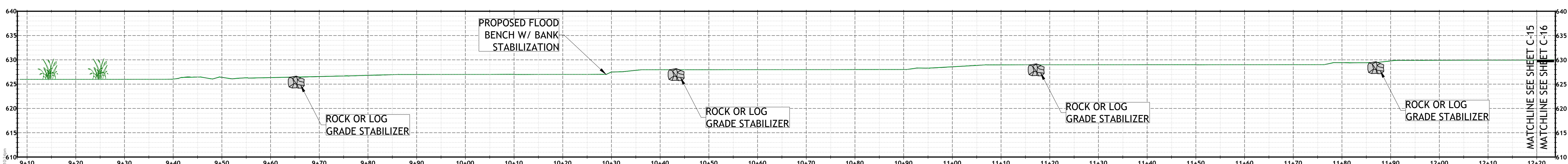
FEIK STREAM CENTERLINE PROFILE
SCALE: 1" = 10'-0"



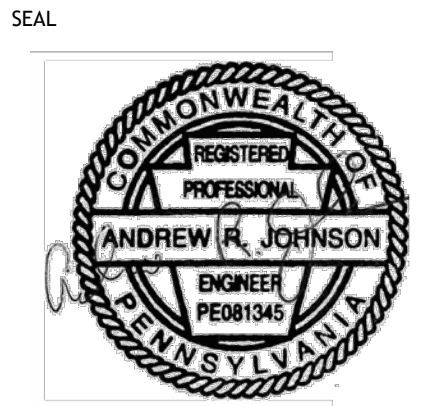
FEIK STREAM CENTERLINE PROFILE
SCALE: 1" = 10'-0"



FEIK STREAM CENTERLINE PROFILE
SCALE: 1" = 10'-0"



FEIK STREAM CENTERLINE PROFILE
SCALE: 1" = 10'-0"



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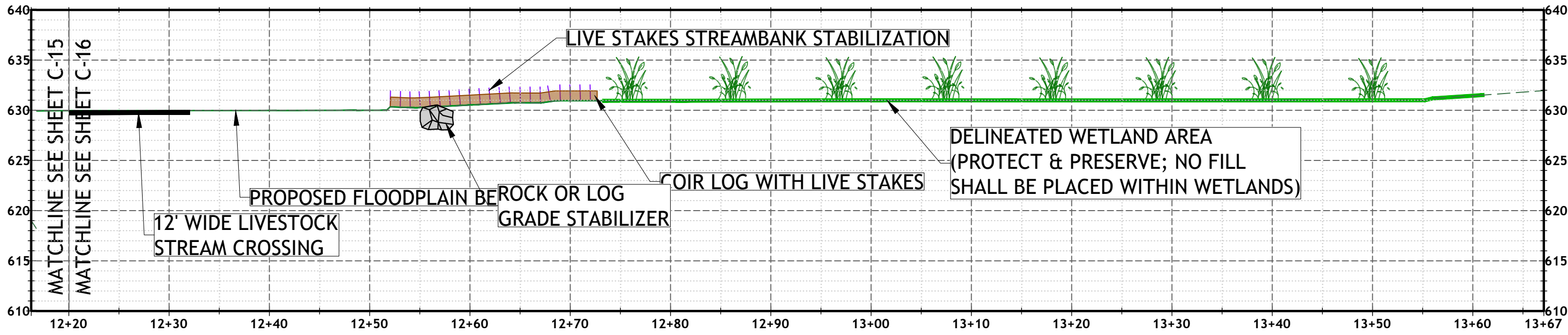
REVISIONS

STREAM RESTORATION PROJECT
FOR
BUFFALO VALLEY RUN
CODORUS TOWNSHIP, YORK COUNTY, PENNSYLVANIA

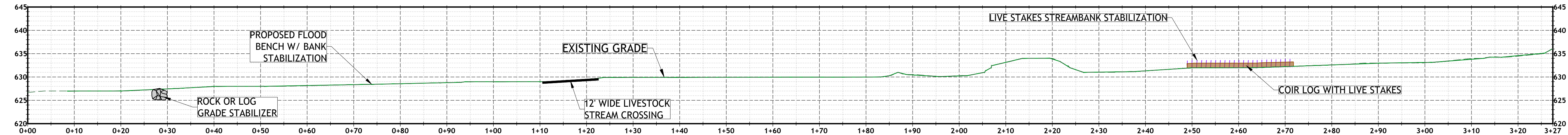
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DATE OF SURVEY	01/13/2023 - 08/16/2023
REVIEWED BY	A. JOHNSON, PE, CPESC
SCALE	AS NOTED
SHEET TITLE	TERRA FARMS & FEIK STREAM CENTERLINE PROFILES

C-15

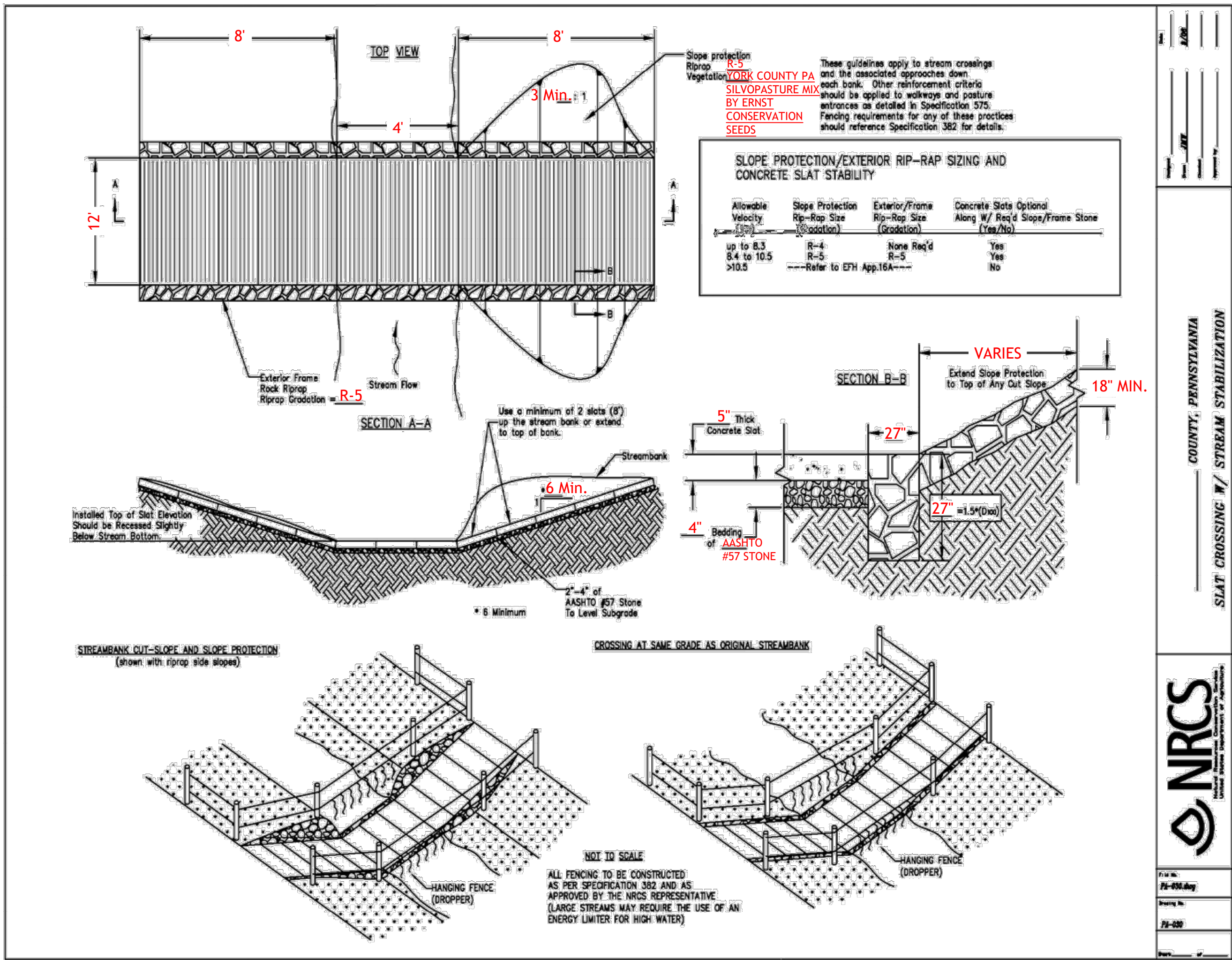
June 14, 2026 10:25pm
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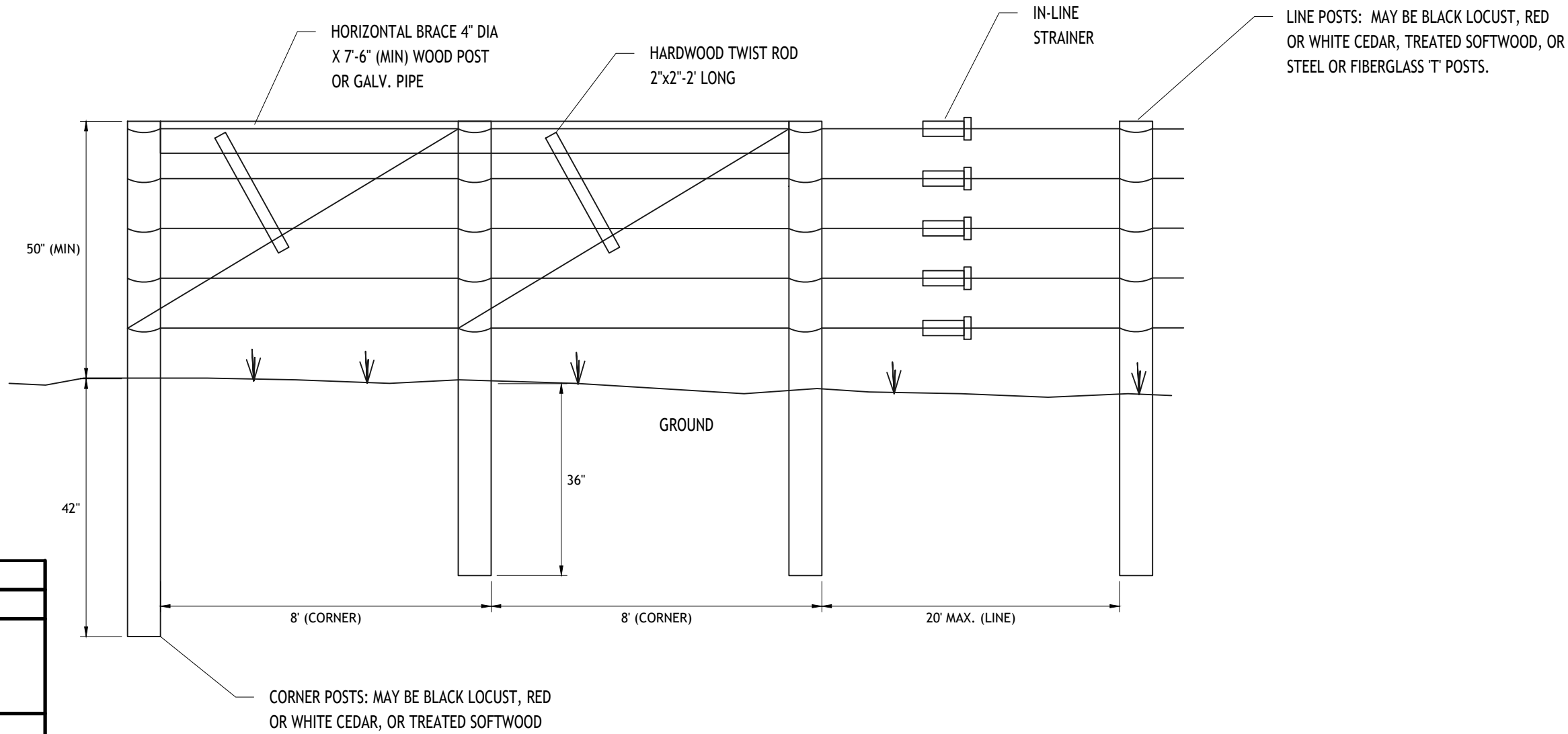
FEIK STREAM CENTERLINE PROFILE
SCALE: 1" = 10'-0"



FEIK TRIBUTARY STREAM CENTERLINE PROFILE
SCALE: 1" = 12'-0"



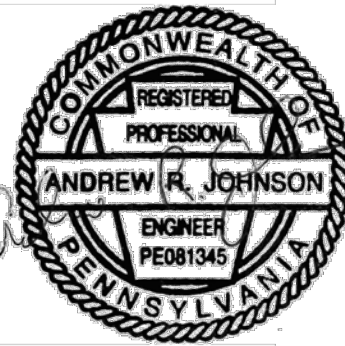
PROPOSED STREAM CROSSING
(PHOTO FROM KEYSTONE CONCRETE PRODUCTS)



LIVESTOCK EXCLUSION FENCE DETAIL
SCALE: NTS

CORNER OR GATE POSTS	5" DIA X 8' MIN LENGTH
LINE POSTS	4" DIA X 7' 6" MIN LENGTH
WIRE	12.5 GAUGE (MIN) HIGH-TENSILE WIRE, 200,000 PSI TENSILE STRENGTH CLASS 3 GALVANIZED WIRE SPACING FROM GROUND TO TOP WIRE: 10", 20", 30", 40", 50" TENSION: 250-300 LBS EACH WIRE, USE IN-LINE STRAINERS.
FASTENING	AT GATE, CORNER AND END BRACES, USE APPROPRIATE KNOTS OR CRIMPING SLEEVES OR WIRE ANCHOR THROUGH POSTS. STAPLE WIRES TO POSTS WITH 1-3/4" - 9 GAUGE GALV. STAPLES WITH SLASH CUT POINTS. DO NOT DRIVE STAPLES TIGHT IN LINE POSTS.

SEAL



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REVISIONS

STREAM RESTORATION PROJECT
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CODORUS TOWNSHIP, YORK COUNTY, PENNSYLVANIA

DATE OF PLAN 06/14/2026
DATE OF SURVEY 01/13/2023 - 08/16/2023
REVIEWED BY A. JOHNSON, PE, CPESC
SCALE AS NOTED

SHEET TITLE
FEIK AND FEIK
TRIBUTARY STREAM
CENTERLINE PROFILES
AND DETAILS

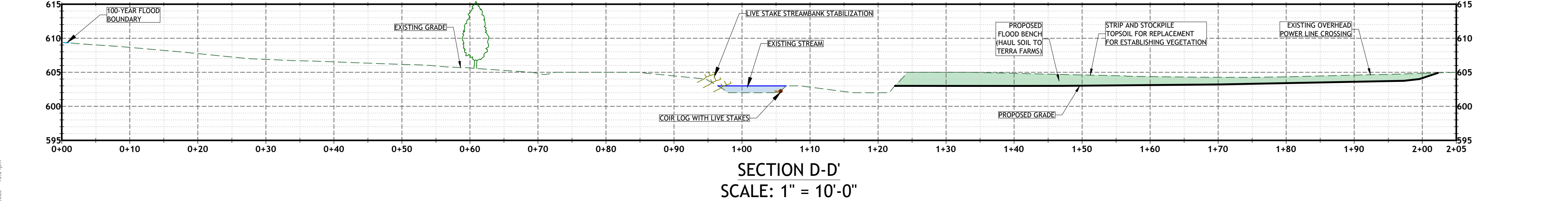
C-16

RIPARIAN BUFFER		
Trees (Choose one or a variety from the list below.)		
Scientific Name	Common Name	Planting Instructions
<i>Acer rubrum</i>	Red Maple	Plant 2" Balled & Burlapped (&&B) trees
<i>Betula nigra</i>	River Birch	20' from edge of water and spaced 75' apart.
<i>Plantanus occidentalis</i>	Sycamore	
<i>Salix discolor</i>	Pussy Willow	
Potted Plants (Choose all from the list below.)		
Scientific Name	Common Name	Planting Instructions
<i>Chelone glabra</i>	White Turtlehead	Plant potted plants 15'
<i>Cornus sericea</i>	Red Osier Dogwood	from edge of water and
<i>Lobelia cardinalis</i>	Cardinal flower	spaced 25' apart.
Existing/Undisturbed Areas Grass/Vegetative Ground Cover		
Preserve and protect existing grass/vegetative ground cover within undisturbed areas of the proposed riparian buffer. Physically/mechanically remove any invasive plant species existing within the proposed riparian buffer.		
Seeding Mix (From Ernst Conservation Seeds)		
Seeding Mix Name		Seeding Instructions
Native Steep Slope Mix with Annual Ryegrass (ERNMX-181)		Seed all disturbed areas at a rate of 60 lb per acre, or 1.5 lb per 1,000 sq ft.

POCKET WETLANDS		
Potted Plants (Choose all from the list below.)		
Scientific Name	Common Name	Planting Instructions
<i>Chelone glabra</i>	White Turtlehead	Plant a variety of 2" plugs and potted plants on a 10' X 10' grid.
<i>Cornus sericea</i>	Red Osier Dogwood	
<i>Lobelia cardinalis</i>	Cardinal flower	Plant one in center of each potted wetland.
<i>Pontederia cordata</i>	Pickerswee	
Plug Plantings (Choose a variety from the list below.)		
Scientific Name	Common Name	Planting Instructions
<i>Asclepias incarnata</i>	Swamp Milkweed	Plant a variety of 2" plugs and potted plants on a 10' X 10' grid.
<i>Carex crinita</i>	Fringed Sedge	
<i>Carex stricta</i>	Tussock Sedge	
<i>Eupatorium maculatum</i>	Spotted Joe-Pye Weed	
<i>Helonium autumnale</i>	Sneezeweed	
<i>Helianthus angustifolius</i>	Swamp Sunflower	
<i>Iris versicolor</i>	Blue-Flag Iris	
<i>Lobelia siphilitica</i>	Blue Lobelia	
<i>Panicum clandestinum</i>	Deertongue Grass	
<i>Verbena hastata</i>	Blue Vervain	
<i>Vernonia noveboracensis</i>	New York Ironweed	
Seeding Mix (From Ernst Conservation Seeds)		
Seeding Mix Name		Seeding Instructions
Native Steep Slope Mix with Annual Ryegrass (ERNMX-181)		Seed all disturbed areas at a rate of 60 lb per acre, or 1.5 lb per 1,000 sq ft.

NATIVE WETLAND PLANT GARDEN		
Trees (Existing)		
Preserve and protect existing trees within the native wetland plant garden.		
Potted Plants (Choose all from the list below.)		
Scientific Name	Common Name	Planting Instructions
<i>Chelone glabra</i>	White Turtlehead	Plant a variety of 2" plugs and potted plants on a 3' X 3' grid.
<i>Cornus sericea</i>	Red Osier Dogwood	
<i>Labellia cardinalis</i>	Cardinal flower	
Plug Plantings (Choose a variety from the list below.)		
Scientific Name	Common Name	Planting Instructions
<i>Asclepias incarnata</i>	Swamp Milkweed	Plant a variety of 2" plugs and potted plants on a 3' X 3' grid.
<i>Carex crinita</i>	Fringed Sedge	
<i>Carex stricta</i>	Tussock Sedge	
<i>Eupatorium maculatum</i>	Spotted Joe-Pye Weed	
<i>Helenium autumnale</i>	Sneezeweed	
<i>Helianthus angustifolius</i>	Swamp Sunflower	
<i>Iris versicolor</i>	Blue-Flag Iris	
<i>Lobelia siphilitica</i>	Blue Lobelia	
<i>Panicum clandestinum</i>	Deertongue Grass	
<i>Verbena hastata</i>	Blue Vervain	
<i>Vernonia noveboracensis</i>	New York Ironweed	
Grass/Vegetative Ground Cover (Existing)		
Preserve and protect existing grass/vegetative ground cover within the native wetland plant garden. Physically/mechanically remove any invasive plant species existing within the native wetland plant garden.		

Note: Physically/mechanically removing invasive plant species shall be done by manually pulling the plant out the ground or cutting down the plant at ground level with manual pruning shears or loppers.

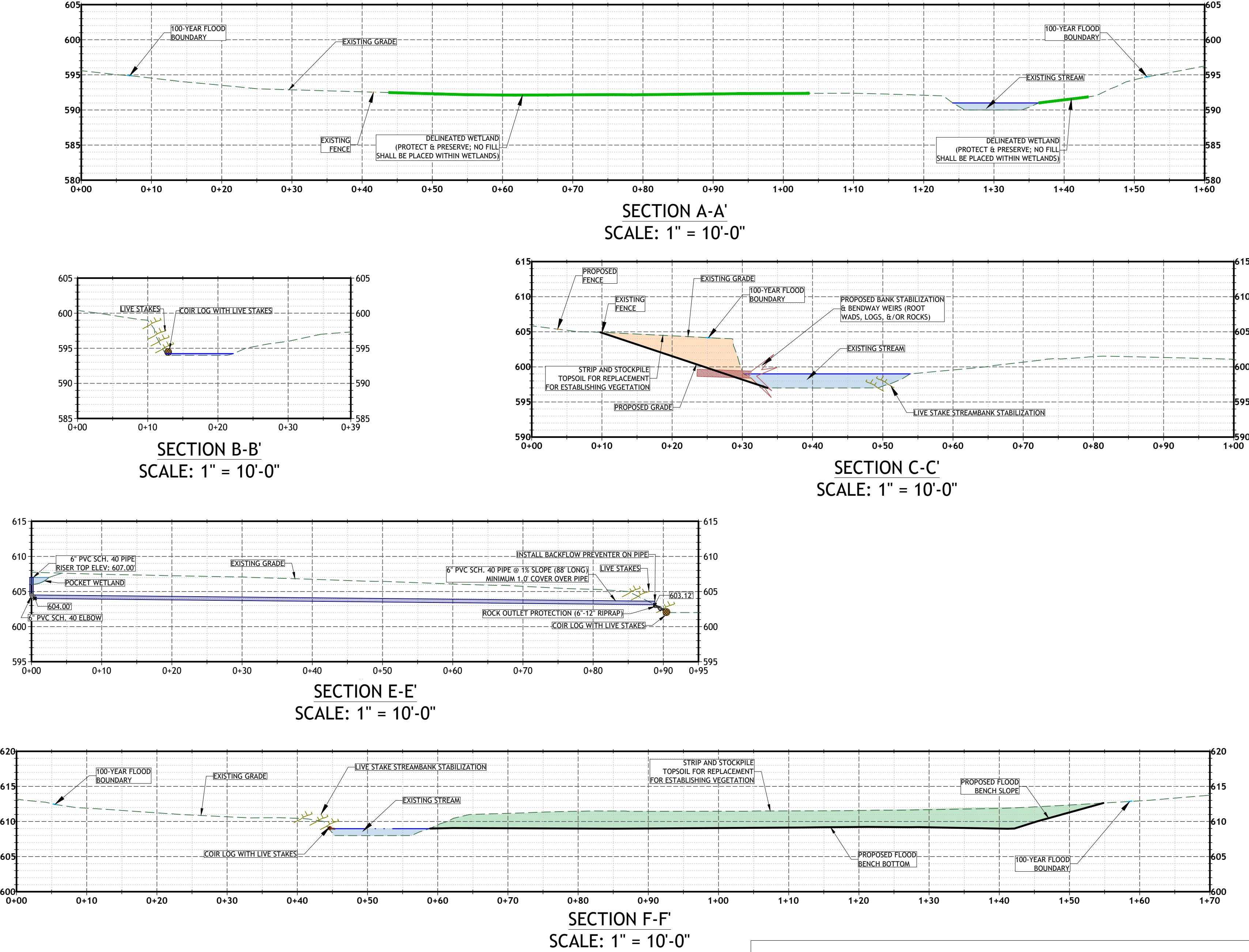


EXISTING DELINEATED WETLAND TO BE ENHANCED WITH TREE PLANTINGS		
Existing Trees		
Preserve and protect existing trees within the existing delineated wetland to be enhanced with tree plantings.		
Deciduous Trees (Choose 1 or 2 from the list below for a total of 2.)		
Scientific Name	Common Name	Planting Instructions
<i>Acer rubrum</i>	Red Maple	Plant 2" Balled & Burlapped (B&B) trees where shown on plan.
<i>Betula nigra</i>	River Birch	
<i>Plantanus occidentalis</i>	Sycamore	
<i>Salix alba</i>	White Willow	
<i>Salix discolor</i>	Pussy Willow	
Evergreen Trees (Choose 1 or a variety from the list below for a total 6.)		
Scientific Name	Common Name	Planting Instructions
<i>Abies balsamea</i>	Balsam Fir	Plant 2" Balled & Burlapped (B&B) trees where shown on plan.
<i>Picea glauca</i>	White Spruce	
<i>Picea mariana</i>	Black Spruce	
<i>Picea rubens</i>	Red Spruce	
<i>Pinus resinosa</i>	Red Pine	
<i>Thuja occidentalis</i>	Arborvitae	
Grass/Vegetative Ground Cover (Existing)		
Preserve and protect existing grass/vegetative ground cover within the existing delineated wetland to be enhanced with tree plantings. Physically/mechanically remove any invasive plant species existing within the existing delineated wetland to be enhanced with tree plantings.		

STREAMBANK STABILIZATION OF GRADED/DISTURBED STREAMBANKS		
Live Stakes (Choose a variety from the list below.)		
Scientific Name	Common Name	Planting Instructions
<i>Alnus incana</i>	Speckled Alder	Plant a variety of 3' live stakes on a 1' x 1' grid.
<i>Cephalanthus occidentalis</i>	Buttonbush	
<i>Cornus sericea</i>	Red Osier Dogwood	
<i>Platanus occidentalis</i>	Sycamore	
<i>Salix discolor</i>	Pussy Willow	
<i>Sambucus canadensis</i>	Elderberry	
Seeding Mix (From Ernst Conservation Seeds)		
Seeding Mix Name	Seeding Instructions	
Native Steep Slope Mix with Annual Ryegrass (ERNMX-181)	Seed all disturbed areas at a rate of 60 lb per acre, or 1.5 lb per 1,000 sq ft.	

STREAMBANK STABILIZATION OF EXISTING/UNDISTURBED STREAMBANKS		
Live Stakes (Choose a variety from the list below.)		
Scientific Name	Common Name	Planting Instructions
<i>Alnus incana</i>	Speckled Alder	Plant a variety of 3' live stakes on a 1' X 1' grid.
<i>Cephalanthus occidentalis</i>	Buttonbush	
<i>Cornus sericea</i>	Red Osier Dogwood	
<i>Platanus occidentalis</i>	Sycamore	
<i>Salix discolor</i>	Pussy Willow	
<i>Sambucus canadensis</i>	Elderberry	

ALL REMAINING DISTURBED AREAS TO BE VEGETATED (FLOOD BENCHES, SOIL FILL AREAS, ETC.)	
Seeding Mix (From Ernst Conservation Seeds)	
Seeding Mix Name	Seeding Instructions
Native Steep Slope Mix with Annual Ryegrass (ERNMX-181)	Seed all disturbed areas at a rate of 60 lb per acre, or 1.5 lb per 1,000 sq ft.



Date: August 02, 2024

Native Steep Slope Mix w/Annual Ryegrass - ERNMX-181

Botanical Name		Common Name	Price/Lb
29.00	<i>Andropogon gerardi</i> , 'Southlow'-NY Ecotype	Big Bluestem, 'Southlow'-MI Ecotype	10.76
20.00	<i>Lolium multiflorum</i>	Annual Ryegrass	1.20
15.00	<i>Sorghastrum nutans</i> , NY4 Ecotype	Indiangrass, NY4 Ecotype	14.94
15.00	<i>Elymus virginicus</i> , Madison-NY Ecotype	Virginia Wildrye, Madison-NY Ecotype	9.96
6.60	<i>Elymus canadensis</i>	Canada Wildrye	12.10
4.80	<i>Panicum virgatum</i> , 'Shawnee'	Switchgrass, 'Shawnee'	13.50
4.00	<i>Agrostis perennans</i> , Albany Pine Bush-NY Ecotype	Autumn Bentgrass, Albany Pine Bush-NY Ecotype	16.80
2.80	<i>Panicum clandestinum</i> , Tioga	Deertongue, Tioga	22.18
1.00	<i>Rudbeckia hirta</i>	Blackeyed Susan	31.20
0.70	<i>Ceropegia lincolniata</i>	Lanceleaf Ceropegia	28.80
0.70	<i>Echinacea purpurea</i>	Purple Coneflower	43.20
0.70	<i>Helopsis helianthoides</i> , PA Ecotype	Oxeye Sunflower, PA Ecotype	33.60
0.60	<i>Chamaecrista fasciculata</i> , PA Ecotype	Partridge Pea, PA Ecotype	12.00
0.20	<i>Aster pilosus</i> , PA Ecotype	Heath Aster, PA Ecotype	264.00
0.20	<i>Monarda fistula</i>	Wild Bergamot	96.00
0.10	<i>Apocynum cannabinum</i> , PA Ecotype	Indianhemp, PA Ecotype	192.00
0.10	<i>Asclepias syriaca</i>	Common Milkweed	96.00
0.10	<i>Solidago rugosa</i> , PA Ecotype	Wrinkleleaf Goldenrod, PA Ecotype	264.00

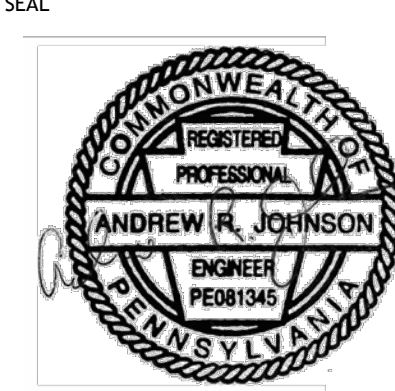
100.00 %	Mix Price/Lb Bulk:	\$12.10
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Seeding Rate: 60 lb per acre, or 1.5 lb per 1,000 sq ft

Erosion Control & Revegetation; Grasses & Grass-like Species - Herbaceous Perennial; Herbaceous Flowering Species - Herbaceous Perennial

The native grass and forb species tolerate poor soils typically found on steep slopes in the eastern United States. Mix formulations are subject to change without notice depending on the availability of existing and new products. While the formula may change, the guiding philosophy and function of the mix will not.

**Price quotes guaranteed for 30 days.
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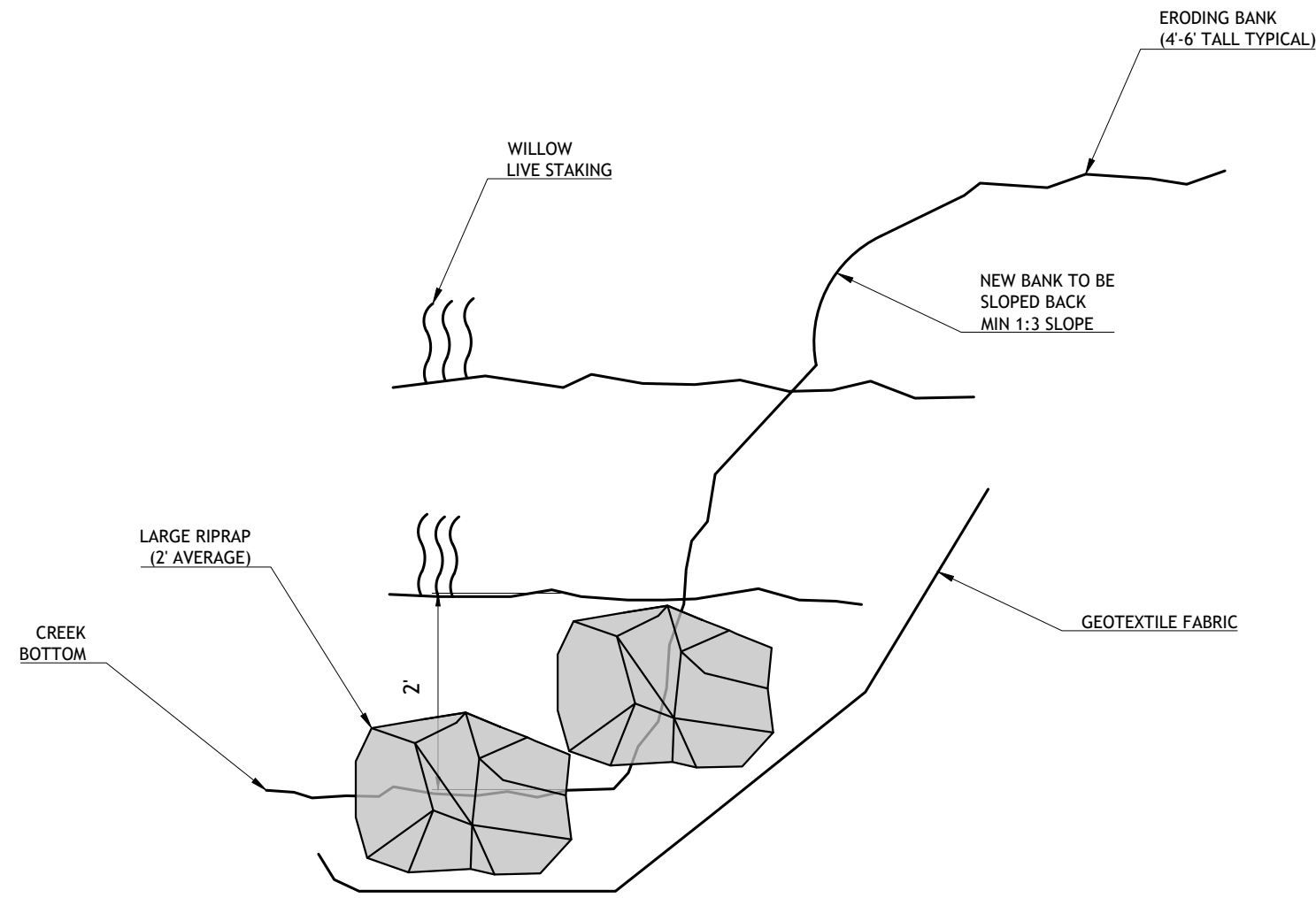
STREAM RESTORATION PROJECT
FOR
BUFFALO VALLEY RUN
CODORUS TOWNSHIP, YORK COUNTY, PENNSYLVANIA

DATE OF PLAN	06/14/2026
DATE OF SURVEY	01/13/2023 - 08/16/2023
REVIEWED BY	A. JOHNSON, PE, CPESC
SCALE	AS NOTED

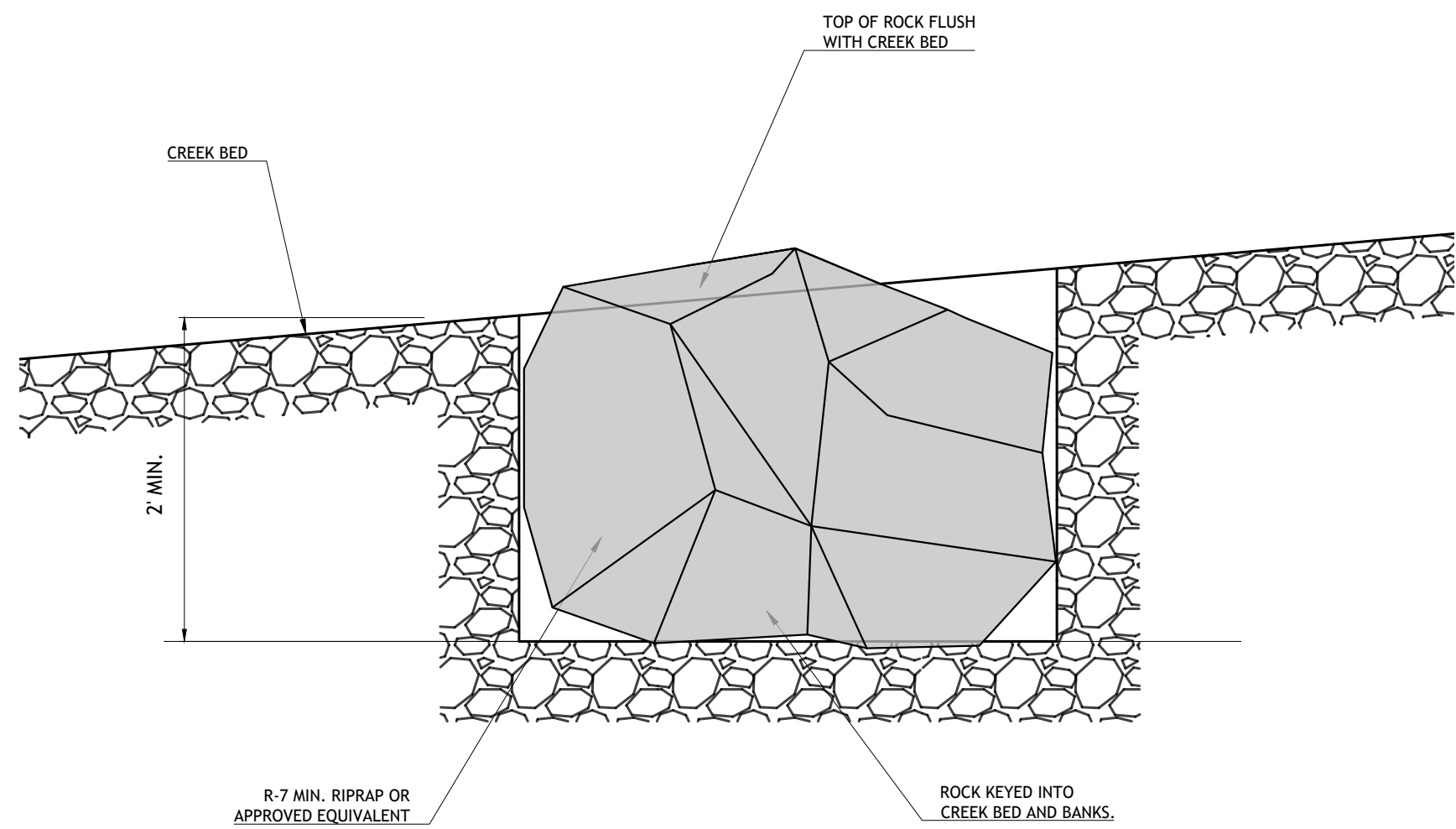
SHEET TITLE

STREAM SECTIONS
& PLANTING NOTES

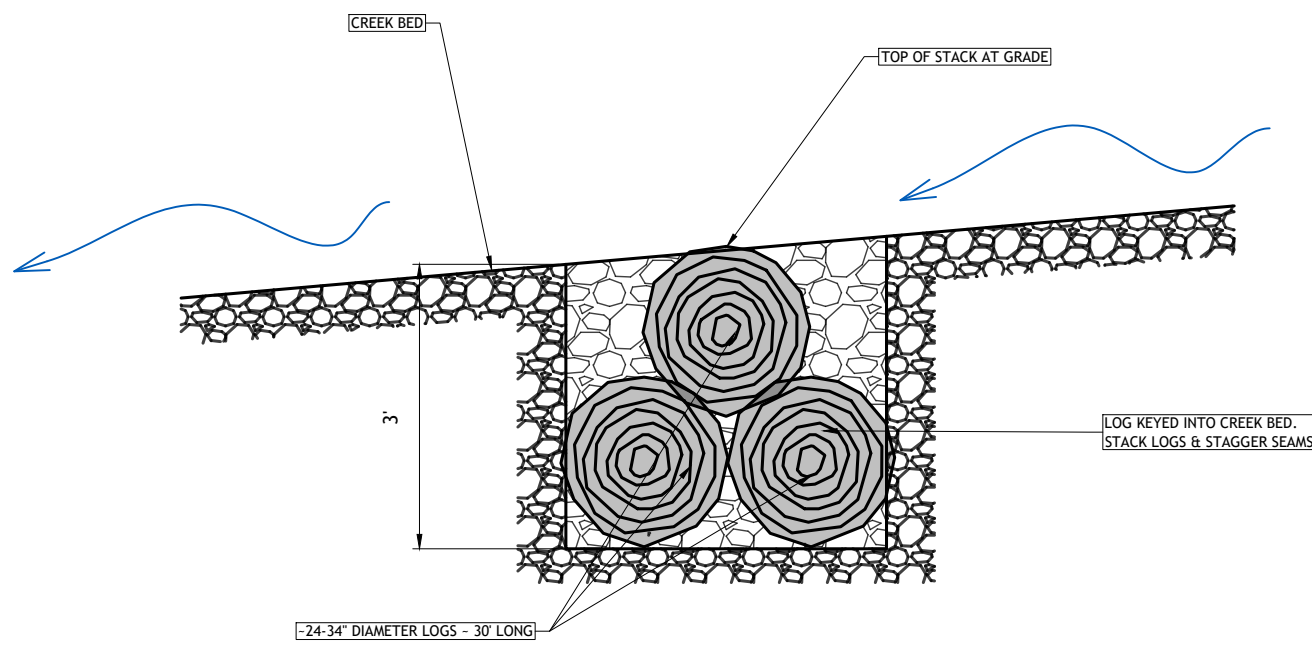
C-17



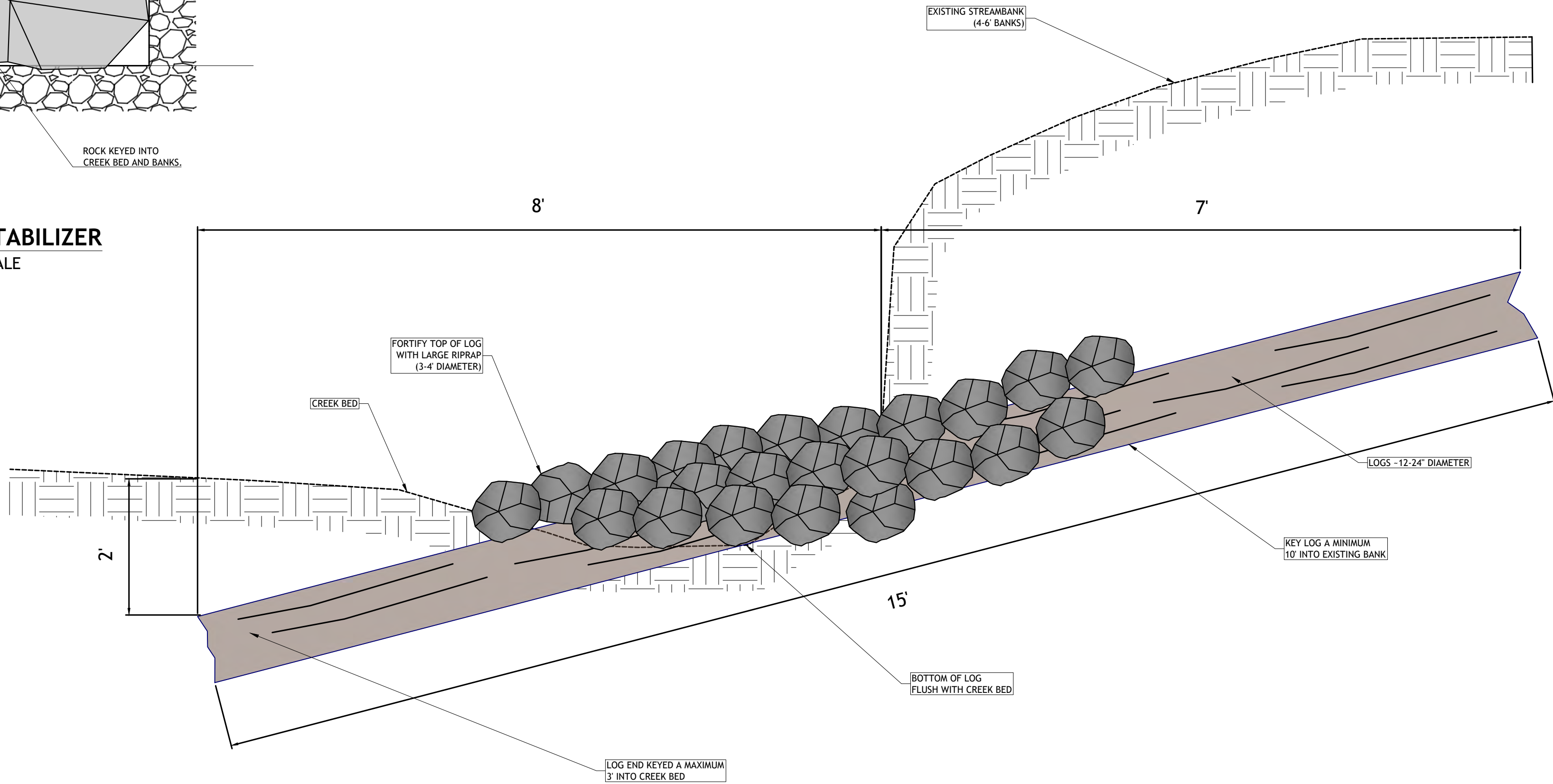
ROCK TOE PROTECTION
WITH LIVE STAKING



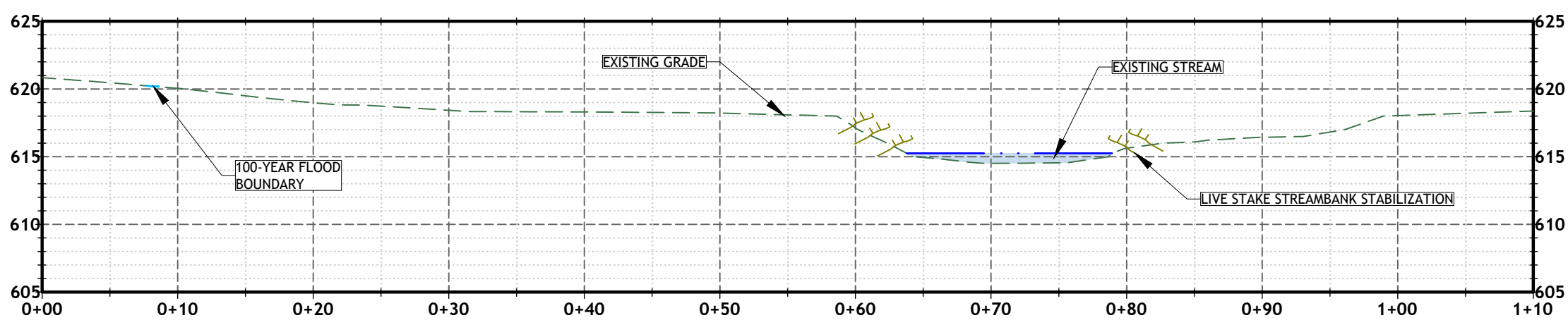
ROCK GRADE STABILIZER
NOT TO SCALE



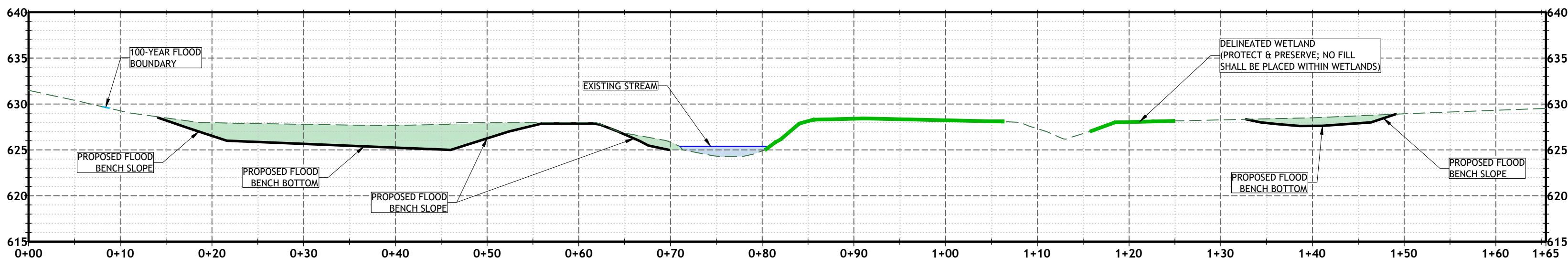
LOG GRADE STABILIZER
NOT TO SCALE



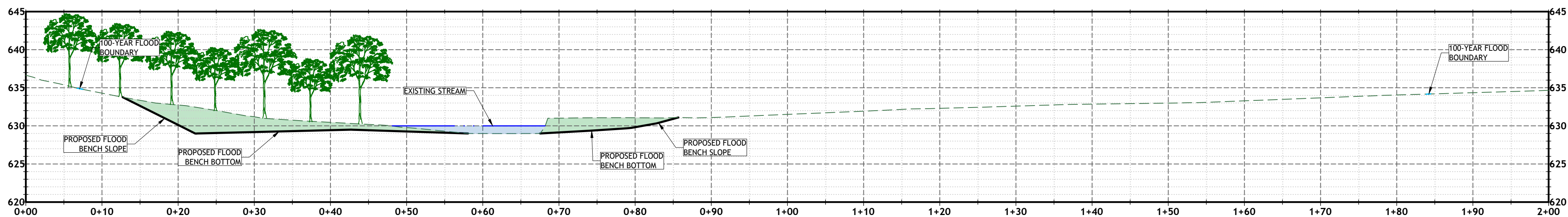
LOG VANE CROSS SECTION C-C' - (TYPICAL)
NOT TO SCALE



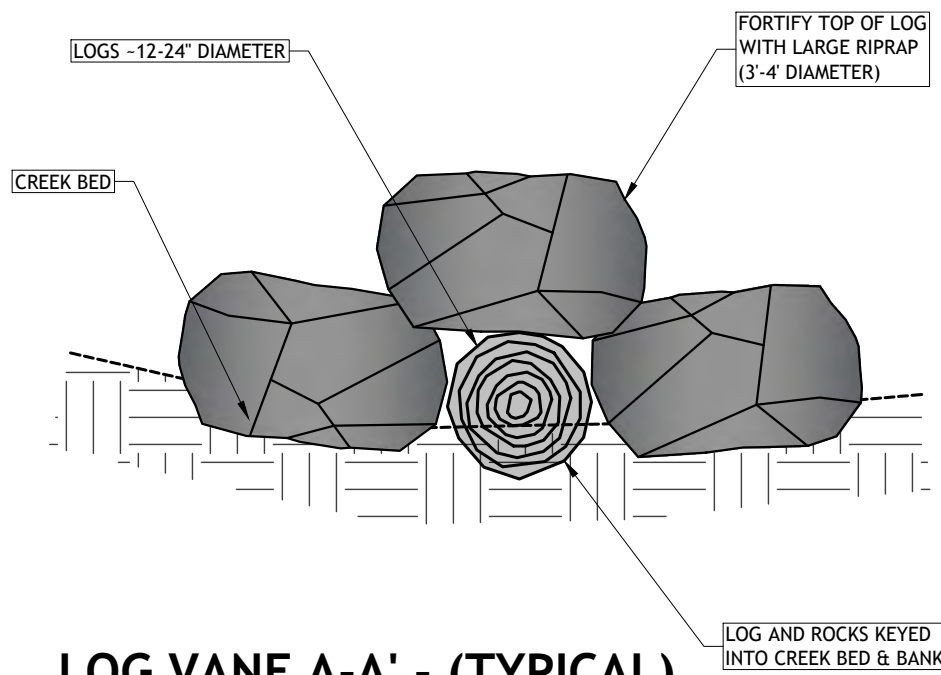
SECTION H-H'
SCALE: 1" = 10'-0"



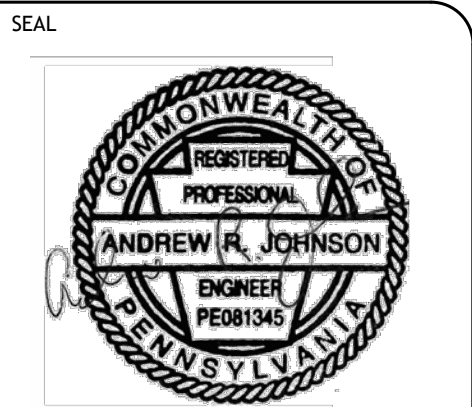
SECTION I-I'
SCALE: 1" = 10'-0"



SECTION J-J'
SCALE: 1" = 10'-0"



LOG VANE A-A' - (TYPICAL)
NOT TO SCALE



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STREAM RESTORATION PROJECT
FOR
BUFFALO VALLEY RUN
CODORUS TOWNSHIP, YORK COUNTY, PENNSYLVANIA

DATE OF PLAN	06/14/2026
DATE OF SURVEY	01/13/2023 - 08/16/2023
REVIEWED BY	A. JOHNSON, PE, CPESC
SCALE	AS NOTED
SHEET TITLE	SECTIONS & DETAILS

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BIOENGINEERING

A number of bioengineering techniques have been developed in recent years that effectively stabilize streambanks while providing a more natural appearance than is afforded by hard armor. The following are a few examples:

Live stakes are woody vegetative cuttings, typically willow, dogwood or other species tolerant of occasional flooding, that are capable of rooting when inserted into the ground. When properly prepared, handled, and placed, the stakes will root, grow, and form a stabilizing root mat. This mat reinforces the soil by binding soil particles, extracting excess moisture, and providing a protective cover.



Source Unknown

Stakes should be freshly cut, healthy, straight, and at least 1 year old with side branches removed and bark intact. Cuttings should be ½" to 1 ½" diameter and 2 to 3 feet long. Bases should be cut cleanly at an angle to facilitate insertion into the soil. Tops should be square to aid in tamping.

APPLICATIONS

- Live Stakes should be installed during the dormant period.
- They are an effective streambank protection where site conditions are uncomplicated, construction time is limited, and an inexpensive method is desired.
- Live Stakes can be used to repair small earth slips and slumps in frequently wet areas.
- They can be used to peg down some erosion control blankets.

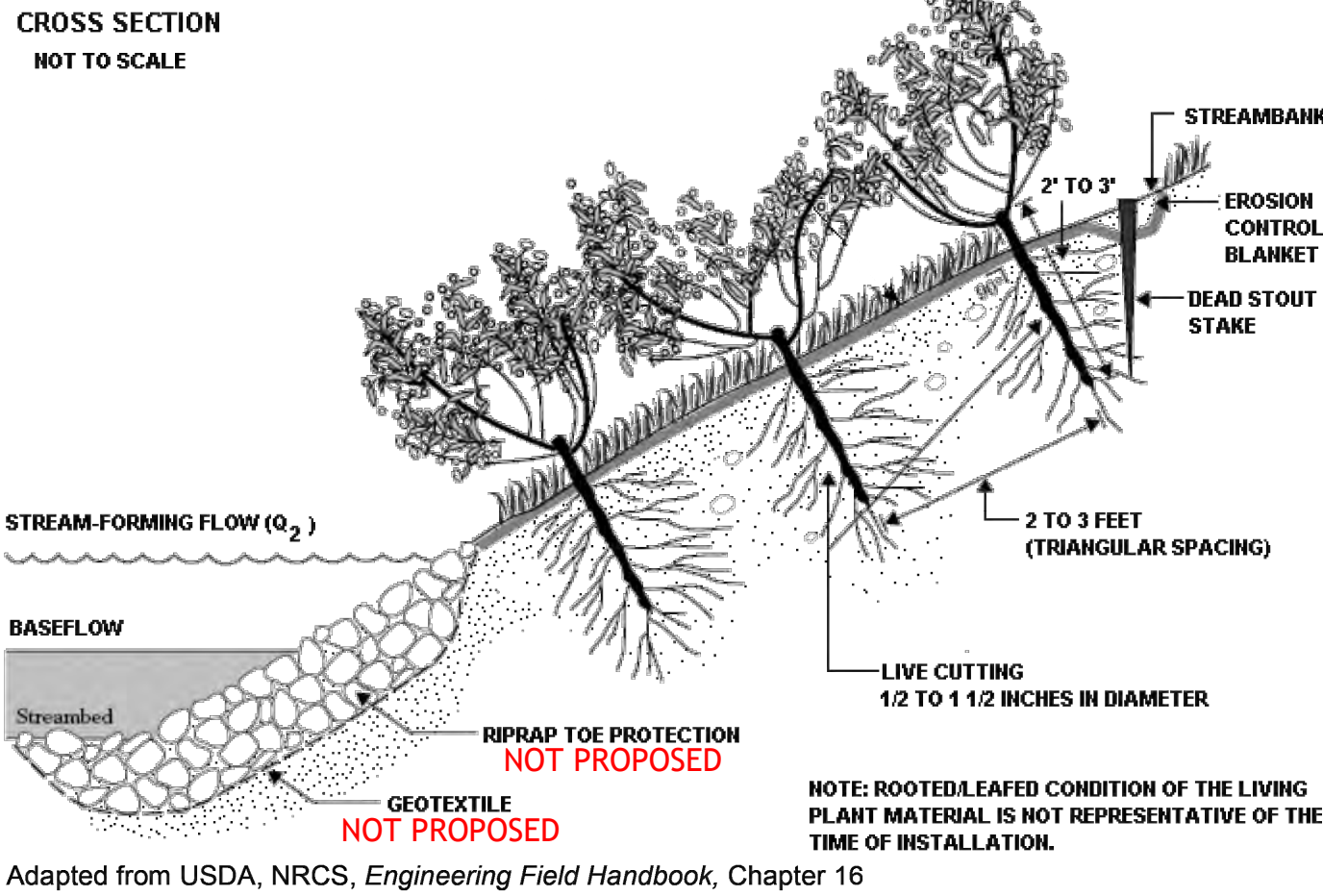
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- Natural colonization by surrounding plant communities can be enhanced by the installation of live stakes.
- Intervening areas between other bioengineering techniques can be stabilized with live stakes.
- Live stakes enhance natural habitat.

INSTALLATION GUIDELINES **NO GRADING PROPOSED**

- ~~Grade slopes to 2H:1V, or flatter for less cohesive soils or presence of sand lenses. Install suitable toe protection, such as properly sized riprap, below the stream-forming flow. Elevation (2-year storm = Q₂, often marked by a lack of vegetation).~~
- Erodible slopes should be blanketed prior to inserting cuttings.
- Keep cuttings fresh and moist after they have been cut into appropriate lengths. Cuttings should be installed the same day that they are prepared. If this is not possible, it is recommended that they be soaked 24 hours prior to installation.
- Tamp cuttings into the ground at 90 degrees to the slope and angled downstream. Approximately 4/5 of the cutting should be inserted into the ground. 2 to 5 bud scars should remain above ground. Buds should be oriented up, and soil should be firmly packed around the stake.
- Care should be taken to avoid splitting the stakes during installation. Split stakes should be replaced. If there is difficulty in tamping the stakes, an iron bar can be used to make a pilot hole.
- Stakes should be placed 2 to 3 feet apart using triangular spacing.

FIGURE 15.6
Live Stakes



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NOTE: NO FILL SHALL BE PLACED AND NO EXCAVATION SHALL OCCUR WITHIN DELINEATED WETLANDS.

Live fascines are long bundles of branch cuttings bound together. They are typically placed in shallow trenches on slopes and streambanks to reduce erosion and shallow sliding.



Source Unknown

Cuttings should be ½" to 1" in diameter cut from species that root easily and have long, straight branches, such as willow or dogwood. They should be tied together with untreated twine to form a live fascine ranging from 5 to 10 feet long depending upon site conditions and handling limitations. Diameters of the bundles should be 6 to 8 inches. All buds should be oriented in the same direction. Cuttings should be staggered so that tops are evenly distributed length wise along the bundle.

APPLICATIONS

- Live fascines are an effective streambank stabilization technique. When properly installed, there is a minimum of site disturbance.
- Live fascines can be used to protect slopes from shallow — 1 to 2 foot depth — slides.
- Typically, live fascines are placed above the bankfull elevation, although for small watersheds (< 2,000 acres) they may be placed below the bankfull elevation.
- Live fascines offer immediate protection from surface erosion.
- Conditions for native plant colonization are enhanced.

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INSTALLATION GUIDELINES

- Prepare the live fascine bundle and live stakes immediately prior to installation.
- Dig a 10" X 10" trench along contour at the base of the slope just above stream-forming flow, 2-year-24-hour peak flow elevation = Q₂. Note: A suitable toe protection such as, properly sized riprap, should be installed below the trench. See Figure 15.7.
- Additional trenches should be spaced on the slope at intervals shown in Table 15.1.
- Intervals between trenches should be seeded, mulched, and covered with a suitable erosion control blanket.
- Place live fascine into the trench as shown in Figure 15.7.
- Drive dead stakes directly through the live fascine until flush with the top of the bundle. Use extra stakes at bundle overlaps.
- Tamp in live stakes immediately downslope (adjacent to) the bundle leaving the top 3" of the live stake exposed.
- Place moist soil along the sides of the bundles leaving the top of the live fascine slightly exposed.

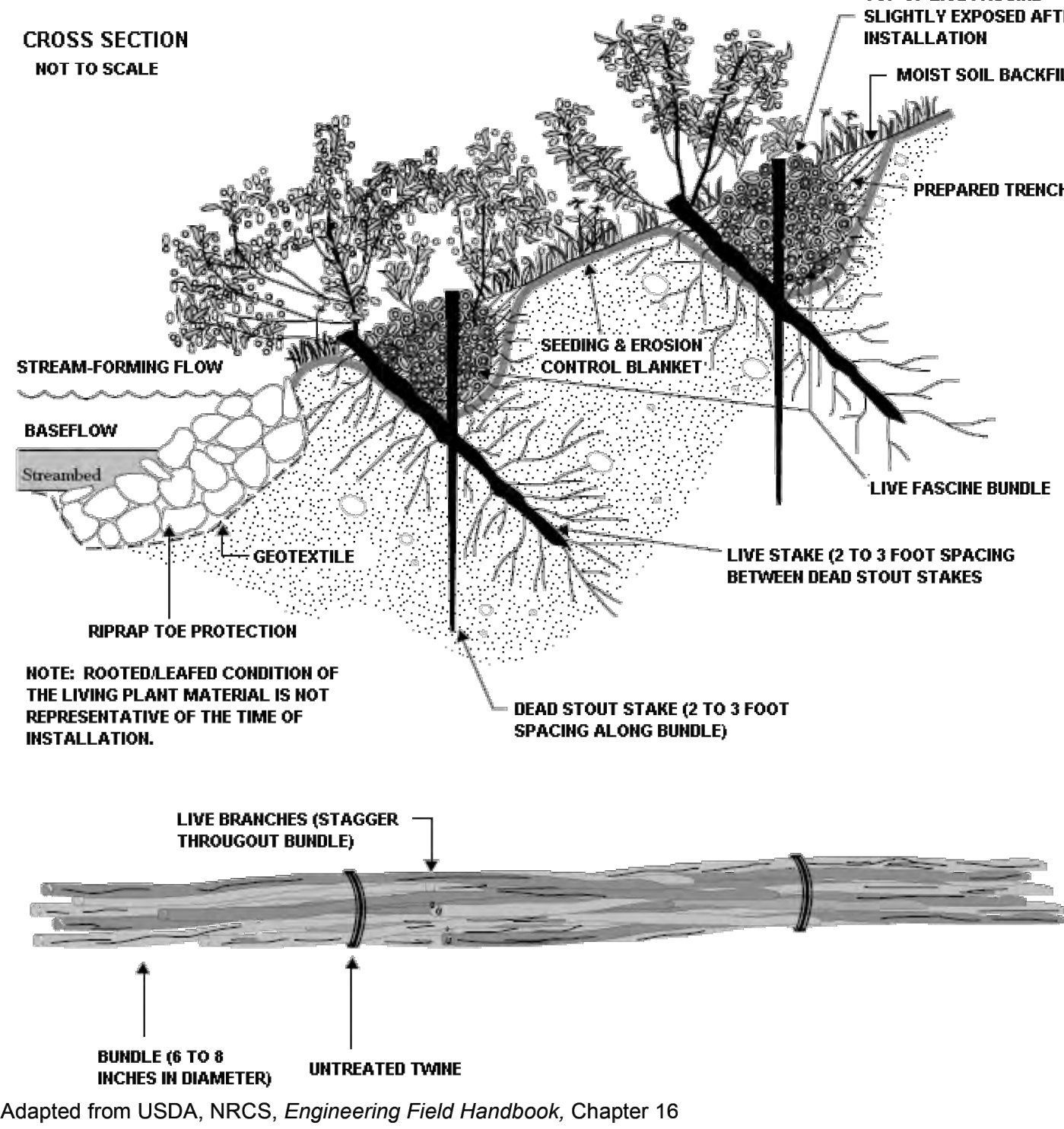
TABLE 15.1
Live Fascine Spacing (ft)

Slope Steepness	Predominant Soils		
	Erosive	Non-erosive	Fill
3H:1V or flatter	3 to 5	5 to 7	3 to 5 *
Up to 1H:1V	3*	3 to 5	Not recommended

* Not recommended alone

Adapted from USDA, NRCS, Engineering Field Handbook, Chapter 16

FIGURE 15.7
Live Fascines



Adapted from USDA, NRCS, Engineering Field Handbook, Chapter 16

Branchpacking is the alternating of layers of live branches and compacted backfill to repair small scour holes and slips in streambanks. It provides a filter barrier that prevents erosion from bankfull and overbank flows. Branchpacking rapidly establishes a vegetated streambank and enhances colonization by native vegetation.



Source Unknown

Soil is immediately reinforced. The live branches serve as tensile reinforcement. Once the plant tops begin to grow, the branchpacking system becomes increasingly effective in retarding runoff and minimizing erosion. Sediment trapped by the vegetation refills the hole, while the roots spread throughout the surrounding soil to form a unified mass.

The live branches should range from ½" to 2" in diameter and be long enough to reach from the undisturbed soil at the back of the trench and extend slightly from the rebuilt streambank.

APPLICATIONS

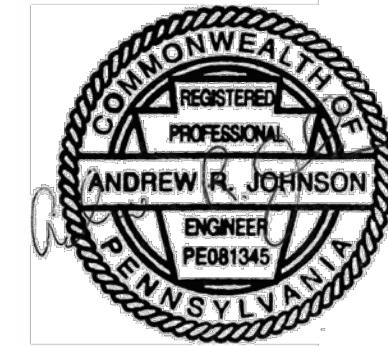
- Branchpacking is an effective means of repairing holes in streambanks ranging from 2 to 4 feet in height and depth.
- It is typically not effective in repairing slump areas greater than 4 feet high or 4 feet deep.

INSTALLATION GUIDELINES

- Divert any concentrated upslope runoff away from the repair area.
- Prepare the cuttings immediately prior to installation.
- Install suitable toe protection, such as, properly sized riprap or fiber log, below the stream-forming flow elevation (2-year storm elevation = Q₂).

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SEAL



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STREAM RESTORATION PROJECT
FOR
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DATE OF PLAN 06/14/2026
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REVIEWED BY A. JOHNSON, PE, CPESC
SCALE AS NOTED

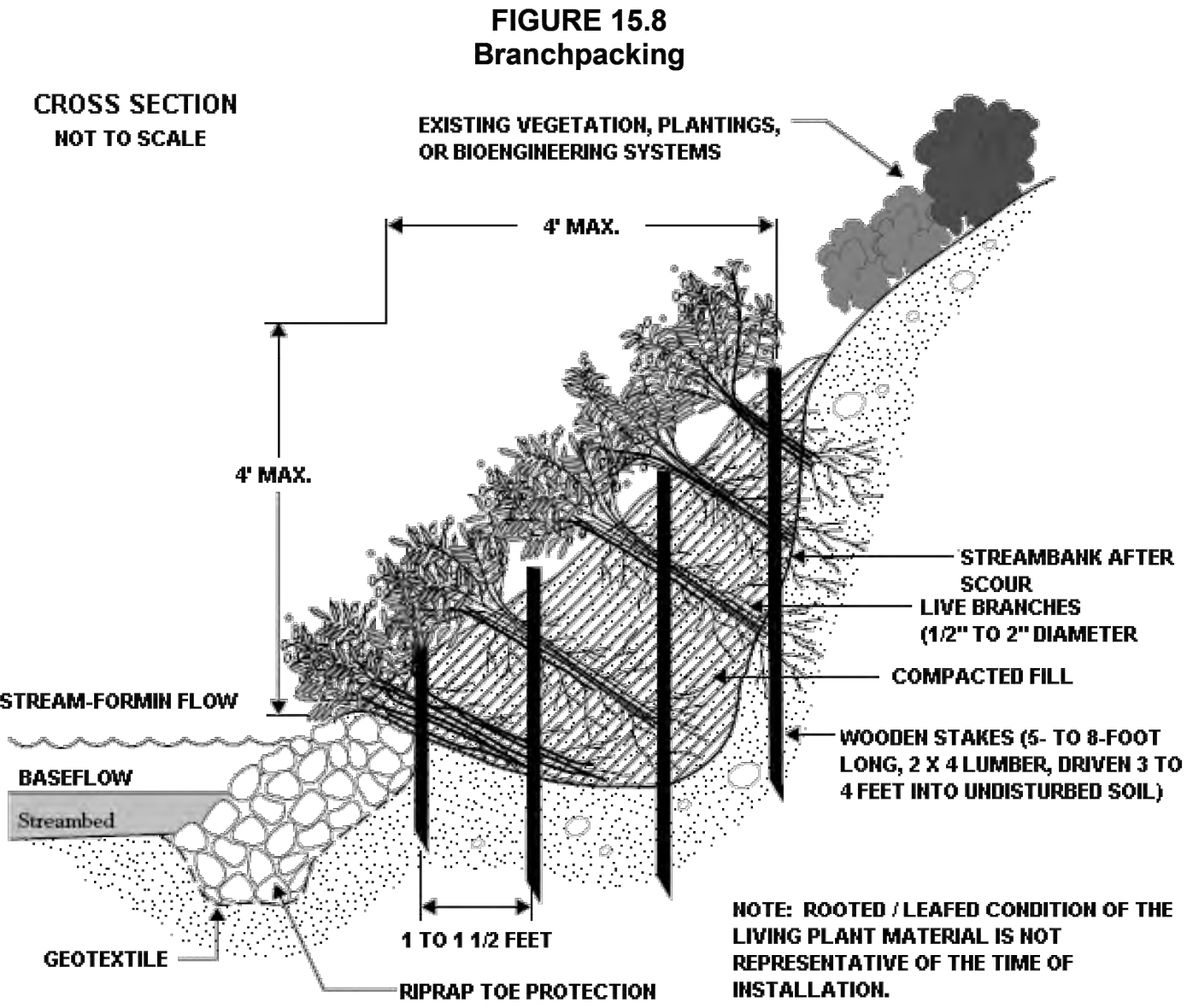
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DETAILS

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- Beginning at the lowest point just above the Q₂ elevation, drive wooden stakes vertically 3 to 4 feet into the ground. Stakes should be spaced 1 to 1 ½ feet apart as shown in Figure 15.8.
- Place initial layer of branches 4" to 6" thick in the bottom of the hole, between the vertical stakes and perpendicular to the slope face. Branches should be placed in a crisscross pattern with buds generally pointing toward the slope face. Basal ends of the branches should touch the undisturbed soil at the back of the hole.
- Cover each layer of branches with a layer of compacted soil to ensure soil contact with the branches.
- Subsequent layers of branches should be installed with the basal ends lower than the growing tips.
- The final layer should conform to the existing slope.



Adapted from USDA, NRCS, *Engineering Field Handbook*, Chapter 16

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Fiber rolls, or coir logs, are cylindrical structures composed of natural materials, such as coconut husk, bound together with twine. It is commonly manufactured in 12" and 18" diameters with lengths of 20 feet. Fiber rolls are often staked at the toe of slope (stream-forming elevation, Q₂ level) below bioengineering systems (e.g. live stakes).



PA DEP

Fiber rolls encourage plant growth within the roll by trapping sediment.

Prefabricated rolls can be expensive. When wet, they can be rather heavy and cumbersome to handle.

Some manufacturers have estimated their effective life to be 6 to 10 years.

APPLICATIONS

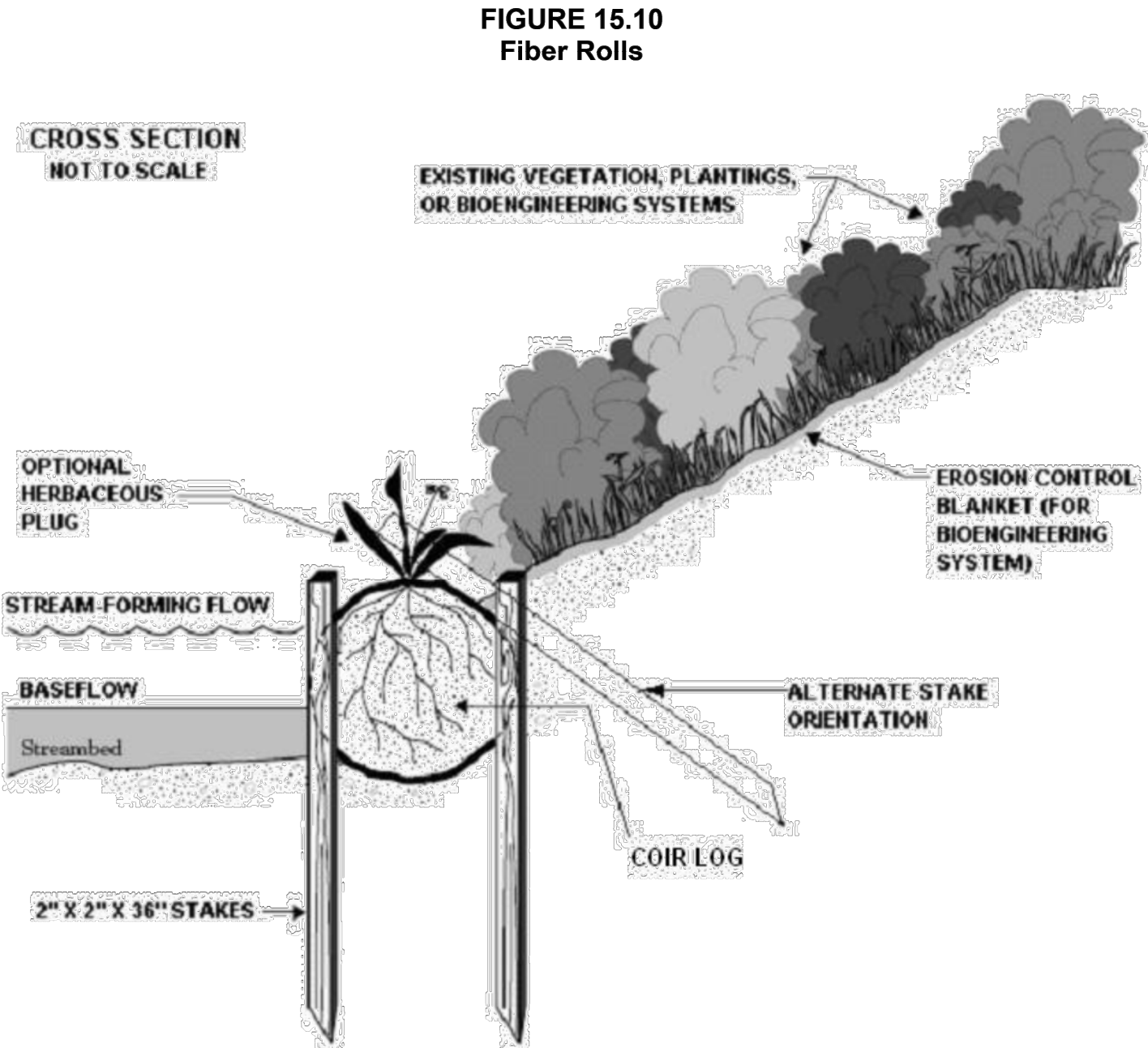
- Fiber rolls can be used to protect slopes from shallow slides or undermining.
- Because of their flexibility, they can be molded to the existing curvature of the streambank.

INSTALLATION GUIDELINES

- It is recommended that the fiber roll be saturated prior to installation to minimize floatation.
- Excavate a shallow trench at the toe of slope to a depth slightly below the channel grade.
- Place the fiber roll in the trench.
- Drive 2" X 2" X 36" stakes between the binding and the fiber, as shown in Figure 15.10. Stakes should be placed on 2 to 4 foot centers depending upon anticipated flow velocities. Tops of stakes should not extend above fiber roll. Where floatation is a possibility, the landward stakes may be driven perpendicular to the bank slope.

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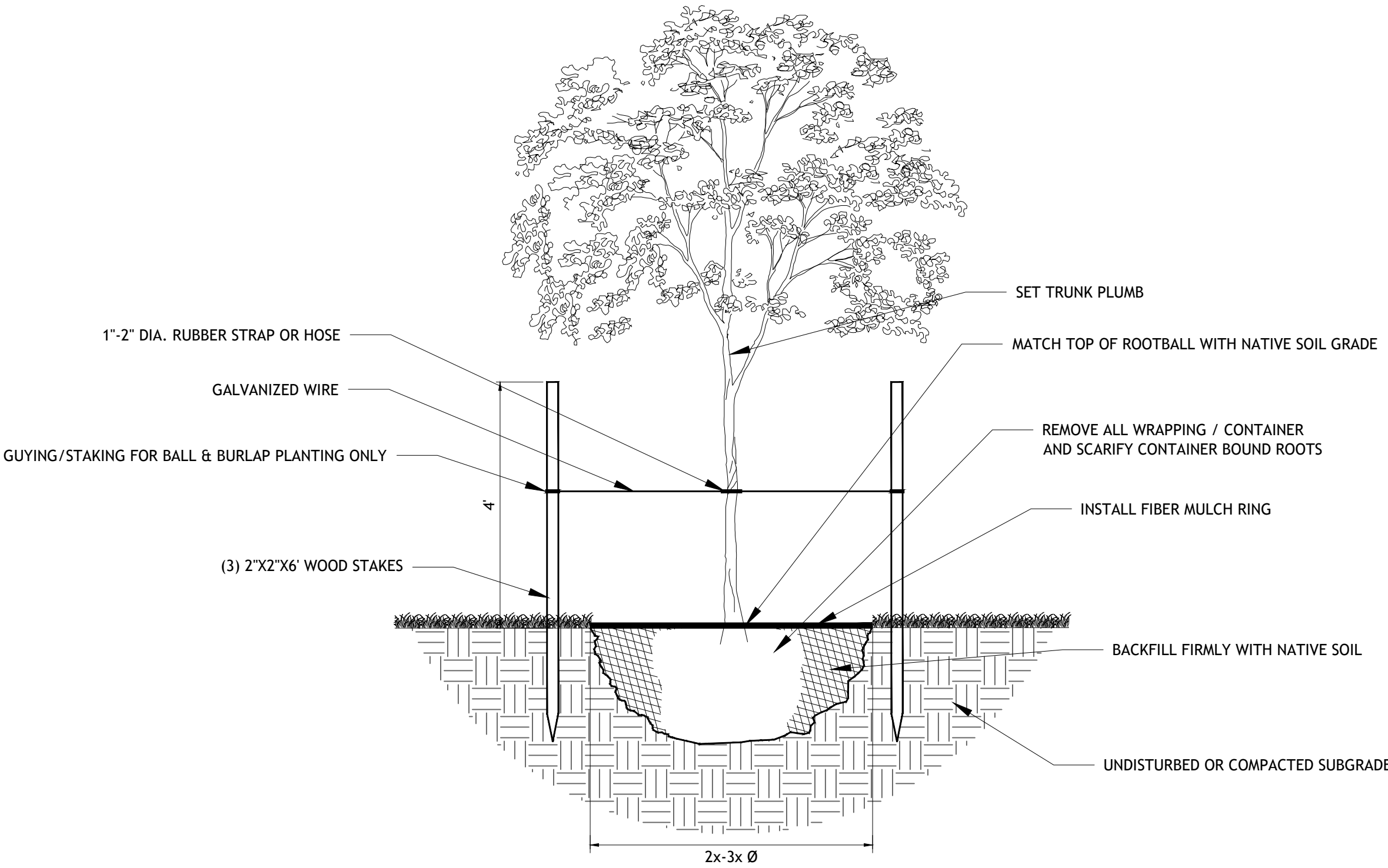
- In areas that experience ice or wave action, rolls may be secured with 16-gage wire tied around notched stakes.
- Backfill the soil behind the fiber roll.



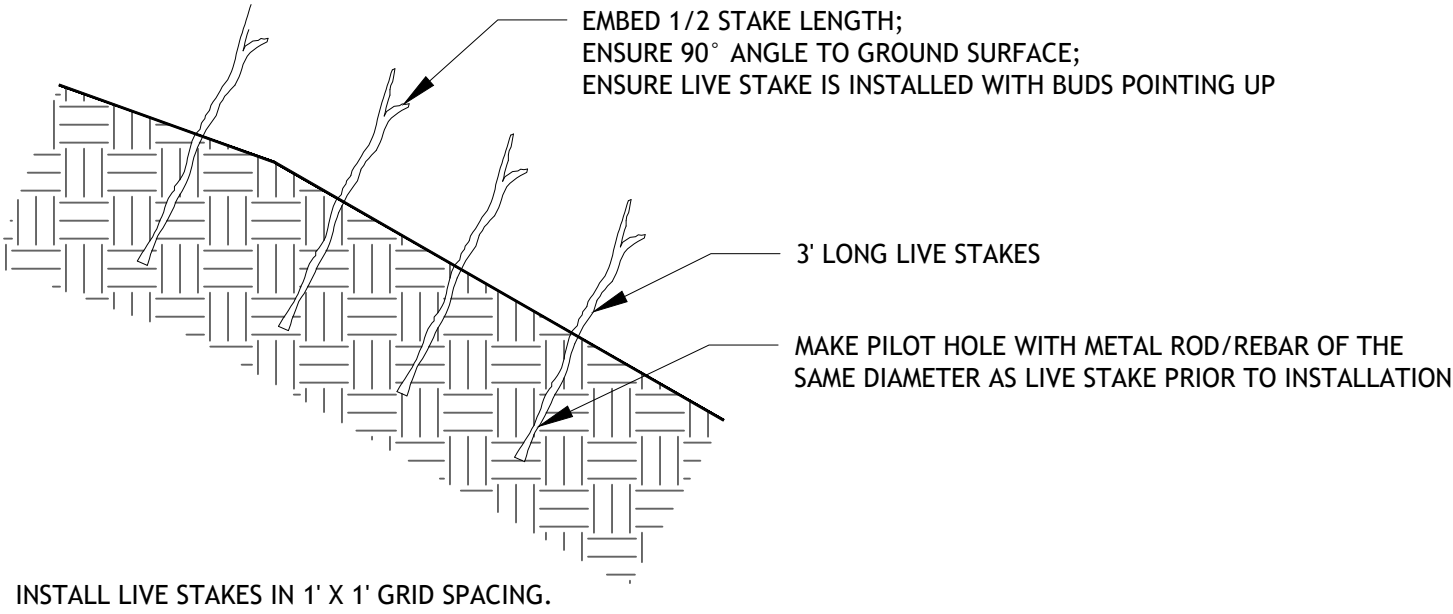
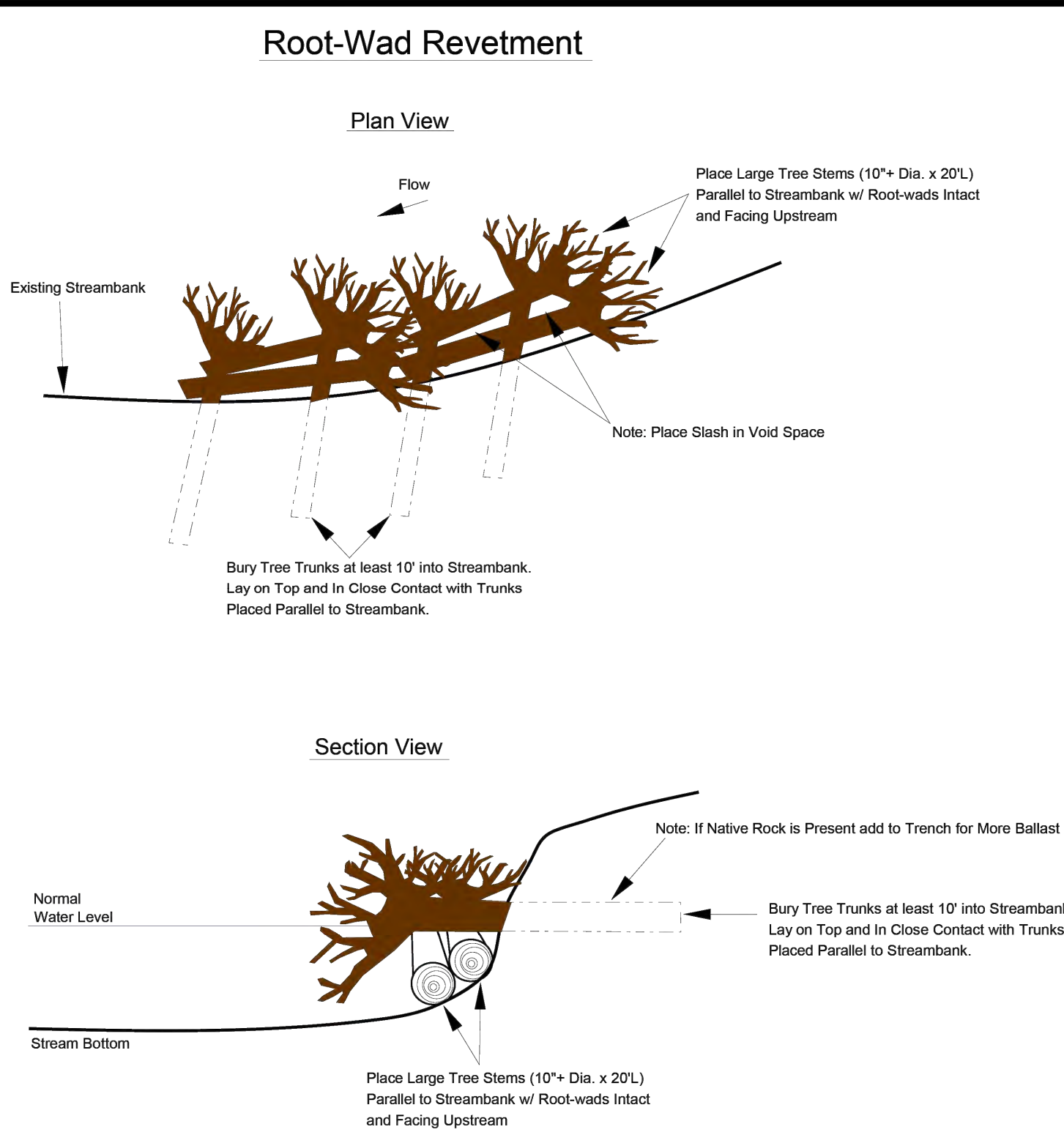
Adapted from USDA, NRCS, *Engineering Field Handbook*, Chapter 16

For more information about these and other bioengineering techniques, Chapter 16 of the USDA, NRCS *Engineering Handbook* is recommended.

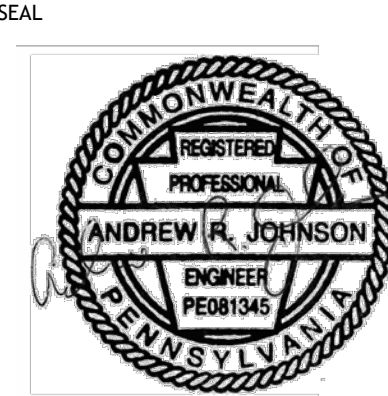
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TREE & SHRUB PLANTING DETAIL
NOT TO SCALE



LIVE STAKING DETAIL
NOT TO SCALE



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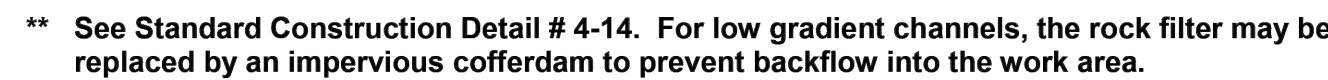
STREAM RESTORATION PROJECT
FOR
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SCALE	AS NOTED

SHEET TITLE
**BIOENGINEERING
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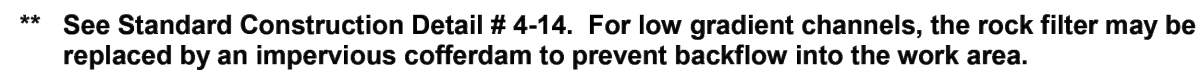
C-20

Bypass Channel with Non-Erosive Lining



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Rigid or Flexible Pipe Flume Through a Work Area



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Rock Filters

Note: Not Suitable for Channels less than two feet total depth

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Erosion Control Blanket Installation



Slope surface shall be free of rocks, clods, sticks, and grass.

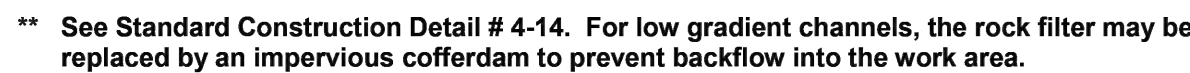
Blanket shall have good continuous contact with underlying soil throughout entire length. Lay blanket loosely and stake or staple to maintain direct contact with soil. Do not stretch blanket.

The blanket shall be stapled in accordance with the manufacturer's recommendations.

Blanketed areas shall be inspected weekly and after each runoff event until perennial vegetation is established to a minimum uniform 70% coverage throughout the blanketed area. Damaged or displaced blankets shall be restored or replaced within 4 calendar days.

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FIGURE 3.11



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Pumped Water Filter Bag



Low volume filter bags shall be made from non-woven geotextile material sewn with high strength, double stitched “J” type seams. They shall be capable of trapping particles larger than 150 microns. High volume filter bags shall be made from woven geotextiles that meet the following standards:

A suitable means of accessing the bag with machinery required for disposal purposes shall be provided. Filter bags shall be replaced when they become $\frac{1}{2}$ full of sediment. Spare bags shall be kept available for replacement of those that have failed or are filled. Bags shall be placed on straps to facilitate removal unless bags come with lifting straps already attached.

Bags shall be located in well-vegetated (grassy) area, and discharge onto stable, erosion resistant areas. Where this is not possible, a geotextile underlayment and flow path shall be provided. Bags may be placed on filter stone to increase discharge capacity. Bags shall not be placed on slopes greater than 5%. For slopes exceeding 5%, clean rock or other non-erodible and non-polluting material may be placed under the bag to reduce slope steepness.

No downslope sediment barrier is required for most installations. Compost berm or compost filter sock shall be installed below bags located in HQ or EV watersheds, within 50 feet of any receiving surface water or where grassy area is not available.

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FIGURE 3.12



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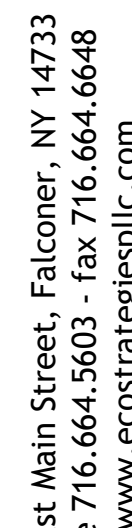
Sandbag Diversion Dam or Cofferdam



Jersey Barrier Cofferdam – End View



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SHEET TITLE

EROSION & SEDIMENT CONTROL DETAILS

GENERAL NOTES FOR EROSION AND SEDIMENT CONTROL PLAN

1. ALL EARTH DISTURBANCES, INCLUDING CLEARING AND GRUBBING AS WELL AS CUTS AND FILLS SHALL BE DONE IN ACCORDANCE WITH THE APPROVED E&S PLAN. A COPY OF THE APPROVED DRAWINGS (STAMPED, SIGNED AND DATED BY THE REVIEWING AGENCY) MUST ALWAYS BE AVAILABLE AT THE PROJECT SITE. THE REVIEWING AGENCY SHALL BE NOTIFIED OF ANY CHANGES TO THE APPROVED PLAN PRIOR TO IMPLEMENTATION OF THOSE CHANGES. THE REVIEWING AGENCY MAY REQUIRE A WRITTEN SUBMITTAL OF THOSE CHANGES FOR REVIEW AND APPROVAL AT ITS DISCRETION.
2. AT LEAST 7 DAYS PRIOR TO STARTING ANY EARTH DISTURBANCE ACTIVITIES, INCLUDING CLEARING AND GRUBBING, THE OWNER AND/OR OPERATOR SHALL WRITE, AT THE CONTRACTOR'S, THE LANDOWNER, APPROPRIATE MUNICIPAL OFFICIALS, THE E&S PLAN PREPARER, THE PCSM PLAN PREPARER, THE LICENSED PROFESSIONAL RESPONSIBLE FOR OVERSIGHT OF CRITICAL STAGES OF IMPLEMENTATION OF THE PCSM PLAN, AND A REPRESENTATIVE FROM THE LOCAL CONSERVATION DISTRICT TO AN ON-SITE PRECONSTRUCTION MEETING.
3. AT LEAST 3 DAYS PRIOR TO STARTING ANY EARTH DISTURBANCE ACTIVITIES, OR EXPANDING INTO AN AREA PREVIOUSLY UNMARKED, THE PENNSYLVANIA ONE CALL SYSTEM INC. SHALL BE NOTIFIED AT 1-800-242-1776 FOR THE LOCATION OF EXISTING UNDERGROUND UTILITIES.
4. ALL EARTH DISTURBANCE ACTIVITIES SHALL PROCEED IN ACCORDANCE WITH THE SEQUENCE PROVIDED ON THE PLAN DRAWINGS. DEVIATION FROM THAT SEQUENCE MUST BE APPROVED IN WRITING FROM THE LOCAL CONSERVATION DISTRICT OR BY THE DEPARTMENT PRIOR TO IMPLEMENTATION.
5. AREAS TO BE FILLED ARE TO BE CLEARED, GRUBBED, AND STRIPPED OF TOPSOIL TO REMOVE TREES, VEGETATION, ROOTS AND OTHER OBJECTIONABLE MATERIALS.
6. CLEARING, GRUBBING, AND TOPSOIL STRIPPING SHALL BE LIMITED TO THOSE AREAS DESCRIBED IN EACH STAGE OF THE CONSTRUCTION SEQUENCE. GENERAL SITE CLEARING, GRUBBING AND TOPSOIL STRIPPING MAY NOT COMMENCE IN ANY STAGE OR PHASE OF THE PROJECT UNTIL THE E&S BMPs SPECIFIED BY THE BMP SEQUENCE FOR THAT STAGE OR PHASE HAVE BEEN INSTALLED AND ARE FUNCTIONING AS DESCRIBED IN THIS E&S PLAN.
7. AT NO TIME SHALL CONSTRUCTION VEHICLES BE ALLOWED TO ENTER AREAS OUTSIDE THE LIMIT OF DISTURBANCE BOUNDARIES SHOWN ON THE PLAN MAPS. THESE AREAS SHOULD BE CLEARLY MARKED AND/OR FENCED OFF BEFORE CLEARING AND GRUBBING OPERATIONS BEGIN.
8. TOPSOIL REQUIRED FOR THE ESTABLISHMENT OF VEGETATION SHALL BE STOCKPILED AT THE LOCATION(S) SHOWN ON THE PLAN MAP(S) IN THE AMOUNT NECESSARY TO COMPLETE THE FINISH GRADING OF ALL EXPOSED AREAS THAT ARE TO BE STABILIZED BY VEGETATION. EACH STOCKPILE MUST BE PROTECTED IN THE MANNER SHOWN ON THE PLAN DRAWINGS. STOCKPILE HEIGHTS SHALL NOT EXCEED 35 FEET. STOCKPILE SLOPES SHALL BE 2H:1V OR FLATTER.
9. IMMEDIATELY UPON DISCOVERING UNFORESEEN CIRCUMSTANCES POSING THE POTENTIAL FOR ACCELERATED EROSION AND/OR SEDIMENT POLLUTION, THE OPERATOR SHALL IMPLEMENT APPROPRIATE BEST MANAGEMENT PRACTICES TO MINIMIZE THE POTENTIAL FOR EROSION AND SEDIMENT POLLUTION AND NOTIFY THE LOCAL CONSERVATION DISTRICT AND/OR THE REGIONAL OFFICE OF THE DEPARTMENT.
10. ALL BUILDING MATERIALS AND WASTES SHALL BE REMOVED FROM THE SITE AND RECYCLED OR DISPOSED OF IN ACCORDANCE WITH THE DEPARTMENT'S SOLID WASTE MANAGEMENT REGULATIONS AT 25 PA. CODE 260.1 ET SEQ., 271.1, AND 287.1 ET. SEQ. NO BUILDING MATERIALS OR WASTES OR UNUSED BUILDING MATERIALS SHALL BE BURNED, BURIED, DUMPED, OR DISCHARGED AT THE SITE.
11. ALL OFF-SITE WASTE AND BORROW AREAS MUST HAVE AN E&S PLAN APPROVED BY THE LOCAL CONSERVATION DISTRICT OR THE DEPARTMENT FULLY IMPLEMENTED PRIOR TO BEING ACTIVATED.
12. THE CONTRACTOR IS RESPONSIBLE FOR ENSURING THAT ANY MATERIAL BROUGHT ON SITE IS CLEAN FILL. FORM FP-001 MUST BE RETAINED BY THE PROPERTY OWNER FOR ANY FILL MATERIAL AFFECTED BY A SPILL OR RELEASE OF A REGULATED SUBSTANCE BUT QUALIFYING AS CLEAN FILL DUE TO ANALYTICAL TESTING.
13. ALL PUMPING OF WATER FROM ANY WORK AREA SHALL BE DONE ACCORDING TO THE PROCEDURE DESCRIBED IN THIS PLAN, OVER UNDISTURBED VEGETATED AREAS.
14. UNTIL THE SITE IS STABILIZED, ALL EROSION AND SEDIMENT BMPs SHALL BE MAINTAINED PROPERLY. MAINTENANCE SHALL INCLUDE INSPECTIONS OF ALL EROSION AND SEDIMENT BMPs AFTER EACH RUNOFF EVENT AND ON A WEEKLY BASIS. ALL PREVENTATIVE AND REMEDIAL MAINTENANCE WORK, INCLUDING CLEAN OUT, REPAIR, REPLACEMENT, REGRADING, RESEEDING, REMULCHING AND RENETTING MUST BE PERFORMED IMMEDIATELY. IF THE E&S BMPs FAIL TO PERFORM AS EXPECTED, REPLACEMENT BMPs, OR MODIFICATIONS OF THOSE INSTALLED WILL BE REQUIRED.
15. A LOG SHOWING DATES THAT E&S BMPs WERE INSPECTED AS WELL AS ANY DEFICIENCIES FOUND AND THE DATE THEY WERE CORRECTED SHALL BE MAINTAINED ON THE SITE AND BE MADE AVAILABLE TO REGULATORY AGENCY OFFICIALS AT THE TIME OF INSPECTION.
16. SEDIMENT TRACKED ONTO ANY PUBLIC ROADWAY OR SIDEWALK SHALL BE RETURNED TO THE CONSTRUCTION SITE BY THE END OF EACH WORKDAY AND DISPOSED IN THE MANNER DESCRIBED IN THIS PLAN. IN NO CASE SHALL THE SEDIMENT BE WASHED, SHOVELED, OR SWEEP INTO ANY ROADSIDE DITCH, STORM SEWER, OR SURFACE WATER.
17. ALL SEDIMENT REMOVED FROM BMPs SHALL BE DISPOSED OF IN THE MANNER DESCRIBED ON THE PLAN DRAWINGS.
18. AREAS WHICH ARE TO BE TOPSOILED SHALL BE SCARIFIED TO A MINIMUM DEPTH OF 3 TO 5 INCHES – 6 TO 12 INCHES ON COMPACTED SOILS – PRIOR TO PLACEMENT OF TOPSOIL. AREAS TO BE VEGETATED SHALL HAVE A MINIMUM 4 INCHES OF TOPSOIL IN PLACE PRIOR TO SEEDING AND MULCHING. FILL OUTSLOPES SHALL HAVE A MINIMUM OF 2 INCHES OF TOPSOIL.
19. ALL FILLS SHALL BE COMPACTED AS REQUIRED TO REDUCE EROSION, SLURPAGE, SETTLEMENT, SUBSIDENCE OR OTHER RELATED PROBLEMS. FILL INTENDED TO SUPPORT BUILDINGS, STRUCTURES AND CONDUITS, ETC. SHALL BE COMPACTED IN ACCORDANCE WITH LOCAL REQUIREMENTS OR CODES.
20. ALL EARTHEN FILLS SHALL BE PLACED IN COMPACTED LAYERS NOT TO EXCEED 9 INCHES IN THICKNESS.
21. FILL MATERIALS SHALL BE FREE OF FROZEN PARTICLES, BRUSH, ROOTS, SOD, OR OTHER FOREIGN OR OBJECTIONABLE MATERIALS THAT WOULD INTERFERE WITH OR PREVENT CONSTRUCTION OF SATISFACTORY FILLS.
22. FROZEN MATERIALS OR SOFT, MUCKY, OR HIGHLY COMPRESSIBLE MATERIALS SHALL NOT BE INCORPORATED INTO FILLS.
23. FILL SHALL NOT BE PLACED ON SATURATED OR FROZEN SURFACES.
24. SEEPS OR SPRINGS ENCOUNTERED DURING CONSTRUCTION SHALL BE HANDLED IN ACCORDANCE WITH THE STANDARD AND SPECIFICATION FOR SUBSURFACE DRAIN OR OTHER APPROVED METHOD.
25. ALL GRADED AREAS SHALL BE PERMANENTLY STABILIZED IMMEDIATELY UPON REACHING FINISHED GRADE. CUT SLOPES IN COMPETENT BEDROCK AND ROCK FILLS NEED NOT BE VEGETATED. SEEDS AREAS WITHIN 50 FEET OF A SURFACE WATER, OR AS OTHERWISE SHOWN ON THE PLAN DRAWINGS, SHALL BE BLANKETED ACCORDING TO THE STANDARDS OF THIS PLAN.
26. IMMEDIATELY AFTER EARTH DISTURBANCE ACTIVITIES CEASE IN ANY AREA OR SUBAREA OF THE PROJECT, THE OPERATOR SHALL STABILIZE ALL DISTURBED AREAS DURING NON-GERMINATING MONTHS. MULCH OR PROTECTIVE BLANKETING SHALL BE APPLIED AS DESCRIBED IN THE PLAN. AREAS NOT AT FINISHED GRADE, WHICH WILL BE REACTIVATED WITHIN 1 YEAR, MAY BE STABILIZED IN ACCORDANCE WITH THE TEMPORARY STABILIZATION SPECIFICATIONS. THOSE AREAS WHICH WILL NOT BE REACTIVATED WITHIN 1 YEAR SHALL BE STABILIZED IN ACCORDANCE WITH THE PERMANENT STABILIZATION SPECIFICATIONS.
27. PERMANENT STABILIZATION IS DEFINED AS A MINIMUM UNIFORM, PERENNIAL 70% VEGETATIVE COVER OR OTHER PERMANENT NON-VEGETATIVE COVER WITH A DENSITY SUFFICIENT TO RESIST ACCELERATED EROSION. CUT AND FILL SLOPES SHALL BE CAPABLE OF RESISTING FAILURE DUE TO SLUMPING, SLIDING, OR OTHER MOVEMENTS.
28. E&S BMPs SHALL REMAIN FUNCTIONAL AS SUCH UNTIL ALL AREAS TRIBUTARY TO THEM ARE PERMANENTLY STABILIZED OR UNTIL THEY ARE REPLACED BY ANOTHER BMP APPROVED BY THE LOCAL CONSERVATION DISTRICT OR THE DEPARTMENT.
29. UPON COMPLETION OF ALL EARTH DISTURBANCE ACTIVITIES AND PERMANENT STABILIZATION OF ALL DISTURBED AREAS, THE OWNER AND/OR OPERATOR SHALL CONTACT THE LOCAL CONSERVATION DISTRICT FOR AN INSPECTION PRIOR TO REMOVAL/CONVERSION OF THE E&S BMPs.
30. AFTER FINAL SITE STABILIZATION HAS BEEN ACHIEVED, TEMPORARY EROSION AND SEDIMENT BMPs MUST BE REMOVED OR CONVERTED TO PERMANENT POST-CONSTRUCTION STORMWATER MANAGEMENT (PCSM) BMPs. AREAS DISTURBED DURING REMOVAL OR CONVERSION OF THE BMPs SHALL BE STABILIZED IMMEDIATELY. IN ORDER TO ENSURE RAPID REVEGETATION OF DISTURBED AREAS, SUCH REMOVAL/CONVERSIONS ARE TO BE DONE ONLY DURING THE GERMINATING SEASON.
31. UPON COMPLETION OF ALL EARTH DISTURBANCE ACTIVITIES AND PERMANENT STABILIZATION OF ALL DISTURBED AREAS, THE OWNER AND/OR OPERATOR SHALL CONTACT THE LOCAL CONSERVATION DISTRICT TO SCHEDULE A FINAL INSPECTION.
32. FAILURE TO CORRECTLY INSTALL E&S BMPs, FAILURE TO PREVENT SEDIMENT-LODEN RUNOFF FROM LEAVING THE CONSTRUCTION SITE, OR FAILURE TO TAKE IMMEDIATE CORRECTIVE ACTION TO RESOLVE FAILURE OF E&S BMPs MAY RESULT IN ADMINISTRATIVE, CIVIL, AND/OR CRIMINAL PENALTIES BEING INSTITUTED BY THE DEPARTMENT AS DEFINED IN SECTION 602 OF THE PENNSYLVANIA CLEAN STREAMS LAW. THE CLEAN STREAMS LAW PROVIDES FOR UP TO \$10,000 PER DAY IN CIVIL PENALTIES, UP TO \$10,000 IN SUMMARY CRIMINAL PENALTIES, AND UP TO \$25,000 IN MISDEMEANOR CRIMINAL PENALTIES FOR EACH VIOLATION.

BMP MAINTENANCE SCHEDULE

- TEMPORARY DAM
RESET OR REPLACE ANY BARRIERS, SANDBAGS, LINERS AND ROCK, AS NEEDED, AFTER FLOOD EVENTS OR OTHER DAMAGE.
- ROCK FILTER
RESET OR REPLACE ROCK FILTER, AS NEEDED, AFTER FLOOD EVENTS OR OTHER DAMAGE. SEDIMENT FROM THE ROCK FILTER SHALL BE REMOVED WHEN ACCUMULATIONS REACH 1/3 THE HEIGHT OF THE OUTLET. CLOGGED FILTER STONE (AASHTO #57) SHOULD BE REPLACED, AS NEEDED.
- SEDIMENT FILTER BAG
CLEAN AND/OR REPLACE SEDIMENT FILTER BAGS WHEN THEY BECOME ONE-HALF FULL. SPARE BAGS MUST BE KEPT ON THE PROJECT SITE TO REPLACE FILLED OR DAMAGED BAGS. A SUITABLE MEANS OF ACCESSING THE BAG WITH MACHINERY REQUIRED FOR DISPOSAL PURPOSES SHALL BE PROVIDED.
- COMPOST FILTER SOCK
ACCUMULATED SEDIMENT SHALL BE REMOVED WHEN IT REACHES HALF THE ABOVEGROUND HEIGHT OF THE SOCK AND DISPOSED OF IN ACCORDANCE WITH THE E&S PLAN. DAMAGED SOCKS SHALL BE REPAIRED ACCORDING TO MANUFACTURER'S SPECIFICATIONS OR REPLACED. BIODEGRADABLE FILTER SOCKS SHOULD BE REPLACED AFTER 6 MONTHS.
- COMPOST SOCK WASHOUT
ACCUMULATED CONCRETE WASHWATER WASTE SHALL BE REMOVED WHEN IT REACHES HALF THE ABOVEGROUND HEIGHT OF THE SOCK AND DISPOSED OF IN ACCORDANCE WITH THE E&S PLAN. DAMAGED SOCKS SHALL BE REPAIRED ACCORDING TO MANUFACTURER'S SPECIFICATIONS OR REPLACED. BIODEGRADABLE FILTER SOCKS SHOULD BE REPLACED AFTER 6 MONTHS.

GENERAL NOTES

1. CONTRACTOR WILL MAKE EVERY EFFORT TO PERFORM EARTH DISTURBING ACTIVITIES DURING DRY WEATHER AND LOW/DRY STREAM FLOW CONDITIONS. PROPER PLANNING AND SEQUENCING OF CONSTRUCTION ACTIVITIES IS CRITICAL TO MINIMIZING IMPACTS TO THE STREAM.
2. EARTH DISTURBANCE ACTIVITIES ARE ANTICIPATED TO BE APPROXIMATELY ONE TO TWO MONTHS TO COMPLETE.
3. THE STREAM WILL BE TEMPORARILY DIVERTED/BYPASSED AROUND IN-STREAM DISTURBANCE AREAS AS DESCRIBED IN THE GENERAL SEQUENCE OF CONSTRUCTION.
4. CONTRACTOR WILL KEEP ALL POLLUTANTS AND SEDIMENT FROM ENTERING THE STREAM OR BECOMING ENTRAINED IN STORMWATER RUNOFF. EXTRA CARE MUST BE TAKEN AT ALL TIMES TO PROTECT THE STREAM.
5. CONTRACTOR SHALL MAINTAIN GOOD HOUSEKEEPING PRACTICES AT ALL TIMES.
6. CONTRACTOR WILL KEEP ALL CONSTRUCTION MATERIALS AND SOIL PILES ABOVE THE HIGH-WATER MARK OF THE STREAM AND AT LEAST 10 FEET FROM THE STREAM BANKS OR FLOW PATHS. COMPOST FILTER SOCK OR OTHER APPROVED PERIMETER CONTROLS AROUND STOCKPILES WILL ALSO BE INSTALLED, AS NECESSARY.
7. SOIL STOCKPILES WILL BE COVERED WITH PLASTIC SHEETING OR CONTAINED WITH OTHER CONTROLS IF LEFT OVERNIGHT OR EXPOSED TO PRECIPITATION.
8. ANY DISTURBED AREAS WILL BE PROMPTLY SEEDED AND MULCHED AFTER CONSTRUCTION. AFTER 70% GRASS COVERAGE, THE COMPOST FILTER SOCK CAN BE REMOVED.
9. THE CONTRACTOR IS RESPONSIBLE TO TAKE ANY MEANS NECESSARY TO ESTABLISH PERMANENT SOIL STABILIZATION. ALL OF THE EROSION AND SEDIMENT CONTROLS HAVE TO BE CONSTRUCTED AND BE FUNCTIONAL BEFORE ANY EARTH DISTURBANCE CAN BEGIN.
10. DURING CONSTRUCTION IF FOR SOME REASON UNFORESEEN POTENTIAL ISSUE WITH ACCELERATED EROSION AND SEDIMENT POLLUTION OCCURS THE CONTRACTOR SHOULD IMMEDIATELY INSTALL THE NECESSARY BMPs TO CONTROL THIS POTENTIAL THREAT. THE CONTRACTOR SHOULD THEN CONTACT THE PROJECT ENGINEER.
11. THERE SHOULD ALWAYS BE A COPY OF THE APPROVED DRAWINGS AVAILABLE FOR REFERENCE ON THE CONSTRUCTION SITE.
12. THE E&S BMPs MUST REMAIN FUNCTIONAL UNTIL ALL THE TRIBUTARY AREA TO THEM ARE STABILIZED OR UNTIL A NEW BMP IS INSTALLED TO REPLACE THE EXISTING BMP.
13. UPON COMPLETION OF ALL EARTH DISTURBANCE ACTIVITIES AND PERMANENT STABILIZATION OF THESE AREAS, THE CONTRACTOR SHALL CONTACT THE INSPECTOR PRIOR TO REMOVAL/CONVERSION OF THE E&S BMPs.
14. AFTER FINAL STABILIZATION IS ACHIEVED, THE TEMPORARY E&S BMPs MUST BE REMOVED OR CONVERTED TO PERMANENT POST-CONSTRUCTION STORMWATER MANAGEMENT (PCSM) BMPs. THE AREAS DISTURBED BY THE REMOVAL OR CONVERSION OF THE BMPs MUST BE STABILIZED IMMEDIATELY. TO ENSURE THE ESTABLISHMENT OF VEGETATION, THE REMOVAL/CONVERSION SHOULD TAKE PLACE DURING THE GERMINATING SEASON.
15. UPON THE COMPLETION OF ALL THE EARTH DISTURBANCE ACTIVITIES AND THE PERMANENT STABILIZATION OF THESE AREAS, THE INSPECTOR NEEDS TO BE CONTACTED SO A POST-CONSTRUCTION INSPECTION CAN BE CONDUCTED.

CONSTRUCTION SEQUENCE

1. AT LEAST 3 DAYS BEFORE STARTING ANY EARTH DISTURBANCE ACTIVITIES, ALL CONTRACTORS INVOLVED IN THOSE ACTIVITIES SHALL NOTIFY THE PENNSYLVANIA ONE CALL SYSTEM INCORPORATED AT 1-800-242-1776 OR 811 FOR THE LOCATION OF EXISTING UNDERGROUND UTILITIES.
2. PRIOR TO EARTH DISTURBANCE, FIELD MARK THE LIMIT OF DISTURBANCE (LOD) / PERMIT BOUNDARY AND WETLANDS TO BE PROTECTED.
3. IDENTIFY AND CONFIRM ACCESS ROUTES AND ENTRANCES TO EARTH DISTURBANCE AREAS. MOST EARTH DISTURBANCE AREAS ARE CLOSE TO THE EXISTING ASPHALT PUBLIC ROAD OR GRAVEL DRIVEWAYS, WHERE POSSIBLE, IT IS RECOMMENDED TO BEGIN EARTH DISTURBANCE AT THE EDGE OF THE STREAM AND WORK BACK TOWARDS TO THE ACCESS ROUTE AND/OR ENTRANCE TO "PAINT YOUR WAY OUT OF THE ROOM". DOING THIS WILL PRESERVE THE EXISTING VEGETATION AS LONG AS POSSIBLE BETWEEN THE AREA OF EARTH DISTURBANCE AND ACCESS ROUTE/ENTRANCE. DUE TO THE SHORT DURATION OF THE ACCESS NEEDED FOR AN INDIVIDUAL AREA OF EARTH DISTURBANCE, A RUMBLE PAD IS RECOMMENDED INSTEAD OF A ROCK CONSTRUCTION ENTRANCE. SEDIMENT TRACKED ONTO ANY PUBLIC ROADWAY SHALL BE RETURNED THE CONSTRUCTION SITE BY THE END OF EACH WORKDAY AND DISPOSED IN THE MANNER DESCRIBED IN THIS PLAN. IN NO CASE SHALL THE SEDIMENT BE WASHED, SHOVELED, OR SWEEP INTO ANY ROADSIDE DITCH, STORM SEWER, OR SURFACE WATER.
4. INSTALL COMPOST FILTER SOCK. ANY DISTURBED AREAS WHICH ARE NOT CONTROLLED BY A SEDIMENT CONTROL BMP SHALL BE STABILIZED BY THE END OF THE WORKDAY.
5. TEMPORARILY DIVERT/BYPASS THE STREAM AROUND IN-STREAM DISTURBANCE AREAS BY EITHER (1) BYPASS CHANNEL, (2) PIPE FLUME, (3) PUMP BYPASS, OR (4) COFFERDAM DIVERSION. SEE SHEET C-21 FOR THE SPECIFICS OF EACH OPTION AND WHAT COMPONENTS TO INSTALL FOR EACH OPTION. FLOOD BENCHES CAN BE USED AS BYPASS CHANNELS. END THE STREAM DIVERSION/BYPASS PROCESS ONCE THE WORK IS COMPLETED AND STABILIZED WITHIN AN IN-STREAM DISTURBANCE AREA.
6. EXCAVATE FOR THE CONSTRUCTION/INSTALLATION OF THE FLOOD BENCHES, POCKET WETLANDS, STREAMBANK STABILIZATION, BENDWAY WEIRS, RIPRAP PROTECTION, GRADE STABILIZERS, AND LIVESTOCK STREAM CROSSINGS. ALL EXCAVATED MATERIAL SHALL BE PLACED OUTSIDE OF THE 100-YEAR FLOODPLAIN. THE CUT AND FILL QUANTITIES ARE BALANCED. THEREFORE, NO SURPLUS CUT MATERIAL IS ANTICIPATED THAT WOULD NEED TO BE HAULED OFF-SITE.
- 6.1. TERRA FARMS
- 6.1.1. ALL MATERIAL EXCAVATED FOR THE CONSTRUCTION OF THE POCKET WETLAND SHOWN ON SHEET C-7 SHALL BE PLACED IN THE "SOIL FILL AREA" THAT IS IMMEDIATELY UPSLOPE OF THE POCKET WETLAND. IF NEEDED OR DESIRED, EXCAVATED MATERIAL FROM OTHER EXCAVATION AREAS AT TERRA FARMS MAY BE PLACED IN THIS "SOIL FILL AREA".
- 6.1.2. ALL OTHER MATERIAL EXCAVATED AT TERRA FARMS SHALL BE PLACED IN THE "SOIL FILL PAD AREA" (SHOWN ENTIRELY ON SHEET C-8).
- 6.2. FEIK PROPERTY (SHOWN ENTIRELY ON SHEET C-11): ALL MATERIAL EXCAVATED AT THE FEIK PROPERTY SHALL BE PLACED IN THE "SOIL FILL AREA" THAT IS SOUTH OF THE INTERSECTION OF THE DRIVEWAY AND BUFFALO VALLEY ROAD.
7. INSTALL ALL PLANTINGS, COR LOGS WITH LIVE STAKES, LIVE STAKES, FENCING, SPRING DEVELOPMENT FEATURES, ETC.
8. PROVIDE FINAL STABILIZATION MEASURES SUCH AS PERMANENT SEEDING AND MULCHING.
9. REMOVE TEMPORARY SEDIMENT POLLUTION CONTROL MEASURES WHEN AT LEAST 70% UNIFORM, PERENNIAL VEGETATIVE COVER IS ACHIEVED PER THE PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION. SEED AND MULCH ALL AREAS THAT WERE DISTURBED DURING CONSTRUCTION.

THERMAL IMPACTS

THERMAL IMPACTS ASSOCIATED WITH THE PROPOSED STREAM RESTORATION PROJECT WILL BE AVOIDED TO THE MAXIMUM EXTENT POSSIBLE THROUGH IMPLEMENTATION OF PROVISIONS AND BEST MANAGEMENT PRACTICES DETAILED IN THE EROSION AND SEDIMENT CONTROL PLAN. A SUMMARY OF MINIMIZATION MEASURES DESIGNED TO PROTECT AGAINST THERMAL IMPACTS RESULTING FROM THE CONSTRUCTION ACTIVITIES ARE SUMMARIZED BELOW:

- ☐ THE REMOVAL OF VEGETATION, ESPECIALLY TREE/CANOPY COVER, WILL BE LIMITED TO ONLY THAT NECESSARY FOR CONSTRUCTION. LIMITING THE VEGETATION REMOVAL WILL REDUCE SHADE LOSS NEAR THE STREAM, THEREFORE PRESERVING THE NATURAL COOLING PROPERTIES OF THE SHADE PROVIDED BY TREE CANOPY. TREE AND LIVE STAKE PLANTINGS WILL PROVIDE ADDITIONAL SHADE AS THESE PLANTINGS GROW AND MATURE.
- ☐ NO NEW IMPERVIOUS AREAS ARE BEING PROPOSED AS PART OF THIS STREAM RESTORATION PROJECT.

MATERIAL RECYCLING AND DISPOSAL

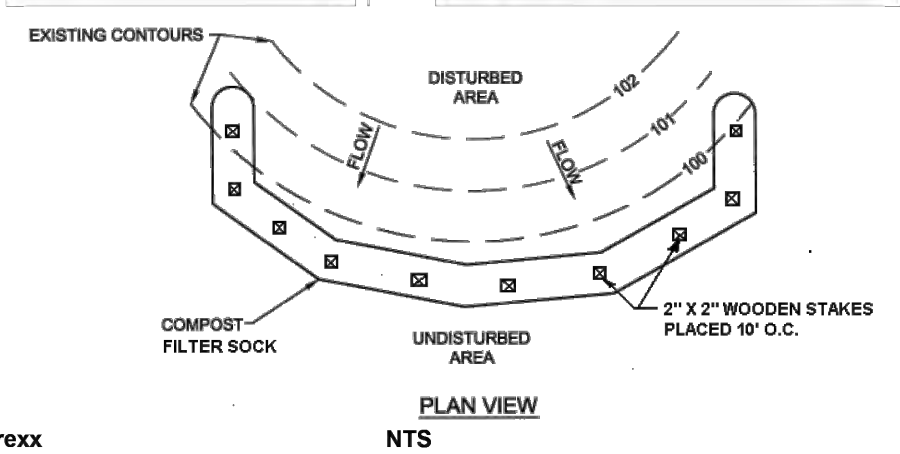
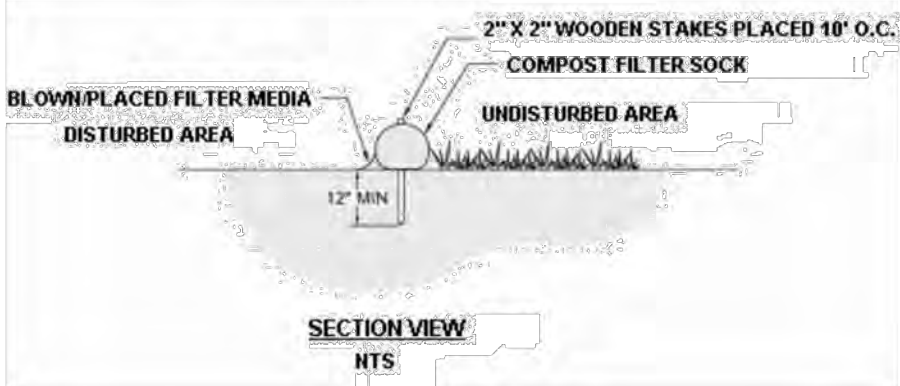
1. CONTRACTOR WILL DEVELOP AND IMPLEMENT PROCEDURES WHICH WILL ENSURE THAT THE PROPER MEASURES FOR DISPOSAL AND RECYCLING OF MATERIALS ASSOCIATED WITH OR FROM THE PROJECT SITE IN ACCORDANCE WITH DEPARTMENT OF ENVIRONMENTAL PROTECTION REGULATIONS. CONSTRUCTION WASTES INCLUDE, BUT ARE NOT LIMITED TO, EXCESS SOIL MATERIALS, EXCESS ROCK, BUILDING MATERIALS, SANITARY WASTES, ETC. THAT COULD ADVERSELY IMPACT WATER QUALITY.
2. MATERIAL WHICH IS DEPOSITED AGAINST EROSION AND SEDIMENT CONTROL STRUCTURE BMPs DURING CONSTRUCTION WILL BE UTILIZED AS FILL MATERIAL, IF SUITABLE. THE FILL MATERIAL CAN BE USED ON THE PROJECT PROPERTY OR ON PRIVATE PROPERTY WHERE FILL MATERIAL IS DESIRED. NO EXISTING WETLAND AREAS ARE TO BE FILLED. ANY UNSUITABLE DEPOSITED MATERIAL SHOULD BE PROPERLY DISPOSED OF AT A LANDFILL.
3. THE CONTRACTOR WILL INSPECT THE PROJECT AREA WEEKLY AND PROPERLY DISPOSE OF ALL CONSTRUCTION WASTES. MEASURES SHOULD BE PLANNED AND IMPLEMENTED FOR HOUSEKEEPING, MATERIALS MANAGEMENT, AND LITTER CONTROL. WHEREVER POSSIBLE, REUSABLE WASTES WILL BE SEGREGATED FROM OTHER WASTE AND STORED SEPARATELY FOR RECYCLING.

EROSION AND SEDIMENT BEST MANAGEMENT PRACTICES MAINTENANCE INSPECTION SCHEDULE

1. UNTIL THE ENTIRE CONSTRUCTION AREA WITHIN THE LIMITS OF DISTURBANCE IS STABILIZED, ALL THE E&S BMPs MUST REMAIN IN PLACE AND BE MAINTAINED PROPERLY. THEY MUST BE INSPECTED ON A WEEKLY BASIS AND AFTER EACH STORMWATER EVENT. THEY MUST BE REPAIRED OR REPLACED IF NEEDED TO ENSURE EFFECTIVE AND EFFICIENT OPERATION. ACCUMULATED SEDIMENT SHOULD BE REMOVED AS DESCRIBED UNDER THE BMP MAINTENANCE SCHEDULE SECTION AND DISPOSED OF FOLLOWING THE PROCEDURE DESCRIBED IN THE MATERIAL RECYCLING AND DISPOSAL SECTION.
2. THE CONTRACTOR IS RESPONSIBLE TO KEEP A LOG ON THE CONSTRUCTION SITE FOR THE PURPOSE OF DOCUMENTING THE INSPECTION OF THE E&S BMPs. THIS SHOULD BE KEPT IN A LOCATION WHERE ALL PERSONNEL, BOTH CONTRACTORS AND REGULATORS CAN HAVE ACCESS TO IT. THE DATE AND TIME THE INSPECTION WAS DONE SHOULD BE DOCUMENTED. ALSO, THE REASONING FOR THE INSPECTION SHOULD BE NOTED. FOR EXAMPLE, WEEKLY CHECK OR AFTER A RUNOFF/STORM EVENT. ADDITIONAL HANDWRITTEN OR COMPUTER-GENERATED SHEETS MAY BE ATTACHED TO THIS SHEET IF ADDITIONAL SPACE IS NEEDED.

BMP	RESULTS	DATE	BY	BMP	RESULTS	DATE	BY

STANDARD CONSTRUCTION DETAIL #4-1
COMPOST FILTER SOCK



Filterrexx

Sock fabric shall meet standards of Table 4.1. Compost shall meet the standards of Table 4.2.

Compost filter sock shall be placed at existing level grade. Both ends of the sock shall be extended at least 8 feet up slope at 45 degrees to the main sock alignment (Figure 4.1). Maximum slope length above any sock shall not exceed that shown on Figure 4.2. Stakes may be installed immediately downslope of the sock if so specified by the manufacturer.

Traffic shall not be permitted to cross filter socks.

Accumulated sediment shall be removed when it reaches half the aboveground height of the sock and disposed in the manner described elsewhere in the plan.

Socks shall be inspected weekly and after each runoff event. Damaged socks shall be repaired according to manufacturer's specifications or replaced within 24 hours of inspection.

Biodegradable filter socks shall be replaced after 6 months; photodegradable socks after 1 year. Polypropylene socks shall be replaced according to manufacturer's recommendations.

Upon stabilization of the area tributary to the sock, stakes shall be removed. The sock may be left in place and vegetated or removed. In the latter case, the mesh shall be cut open and the mulch spread as a soil supplement.

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TABLE 4.1
Compost Sock Fabric Minimum Specifications

Material Type	3 mil HDPE	5 mil HDPE	5 mil HDPE	Multi-Filament Polypropylene (MFPP)	Heavy Duty Multi-Filament Polypropylene (HDMFPP)
Material Characteristics	Photo-degradable	Photo-degradable	Bio-degradable	Photo-degradable	Photo-degradable
Sock Diameters	12" 18"	12" 18" 24" 32"	12" 18" 24" 32"	12" 18" 24" 32"	12" 18" 24" 32"
Mesh Opening	3/8"	3/8"	3/8"	3/8"	1/8"
Tensile Strength		26 psi	26 psi	44 psi	202 psi
Ultraviolet Stability % Original Strength (ASTM G-155)	23% at 1000 hr.	23% at 1000 hr.		100% at 1000 hr.	100% at 1000 hr.
Minimum Functional Longevity	6 months	9 months	6 months	1 year	2 years

Two-ply systems	
Inner Containment Netting	HDPE biaxial net Continuously wound Fusion-welded junctures 3/4" X 3/4" Max. aperture size
	Composite Polypropylene Fabric (Woven layer and non-woven fleece mechanically fused via needle punch)
	3/16" Max. aperture size
	3/16" Max. aperture size
Outer Filtration Mesh	
Sock fabrics composed of burlap may be used on projects lasting 6 months or less.	
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TABLE 4.2
Compost Standards

Organic Matter Content	80% - 100% (dry weight basis)
Organic Portion	Fibrous and elongated
pH	5.5 - 8.0
Moisture Content	35% - 55%
Particle Size	98% pass through 1" screen
Soluble Salt Concentration	5.0 dS/m (mmhos/cm) Maximum

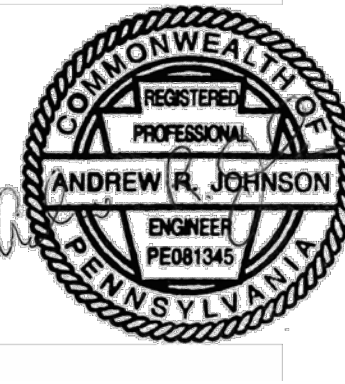
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ALTERNATIVE TO RUMBLE PAD
ROCK CONSTRUCTION ENTRANCE

STANDARD CONSTRUCTION DETAIL #3-1

NOT TO SCALE

SEAL



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