STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

September 7, 2004

NC Department of Environment and Natural Resources
Division of Water Quality
1650 Mail Service Center
Raleigh, NC 27699-1650

Attn: Mr. Brian Wrenn
NCDOT Coordinator

Dear Sir:

Subject: Stream relocation/restoration information for replacement of Bridge Nos. 74 and 76 over SR 1242 and Michael's Branch. Davidson County; Federal Aid No. BRSTP-29(10); State Project No. 8.1601401; TIP No. B-3157 USACE Action ID 200020843; DWQ Water Quality Certification No. 3467

The North Carolina Department of Transportation (NCDOT) proposes to replace Bridge Nos. 74 and 76 in their existing locations and improve the interchange at US 29-64-70 and I-85 Bus. in Lexington, Davidson County, North Carolina. A Section 404 Permit was issued on August 24, 2004 and Water Quality Certification issued on July 28, 2004. A condition in the Water Quality Certification (Condition 1) states "*Prior to incurring impacts anywhere on the project, a revised natural channel design shall be submitted to, and approved by, the NC Division of Water Quality. The revised plan shall include proposed construction plans that describe how DOT plans to conduct phased construction of the new stream channel and control downstream transport of sediment in Michael's Branch. Please describe how the phased construction of the stream relocation, the stream meanders, and the bank stabilization and vegetation will be conducted in a dry work area as detailed in Condition 8. of the General Conditions. The revised plan shall be submitted to the NC Division of Water Quality within thirty (30) days of the issuance of this Certification. A copy of the revised stream design and construction plan shall also be submitted to the NC Wildlife Resources Commission.*"

Enclosed with this letter is the requested information and plans. This includes the Project Special Conditions for Erosion Control, temporary stream diversion plans, streambank reforestation plan, and the Erosion Control construction plans.

MAILING ADDRESS:
NC DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS
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LOCATION:
2728 CAPITAL BLVD.
PARKER LINCOLN BUILDING, SUITE 168
RALEIGH NC 27604

If you have any questions, or need additional information, please contact Ms. Rachelle Beauregard at (919) 715-1383.

Sincerely,

for Gregory J. Thorpe, Ph.D, Manager
Project Development and Environmental Analysis Branch

cc: w/attachment

Ms. Marla Chambers, NCWRC
Mr. John Thomas, USACE
Ms. Marella Buncick, USFWS
Mr. Keith Raulston, Division 9 Construction Engineer
Mr. Darin Waller, Resident Engineer
Ms. Diane Hampton, DEO Division 9
Mr. David Harris, Roadside Environmental
Mr. Randy Griffin, Natural Environment Engineering Unit

C200781 **Project Special Provisions** **Davidson County**
Erosion Control

Seeding And Mulching (6)

The kinds of seed and fertilizer, and the rates of application of seed, fertilizer, and limestone, shall be as stated below. During periods of overlapping dates, the kind of seed to be used shall be determined by the Engineer. All rates are in pounds per acre (kilograms per hectare).

August 1 - June 1		May 1 - September 1	
100# (110kg)	Tall Fescue	100# (110kg)	Tall Fescue
15# (17kg)	Kentucky Bluegrass	15# (17kg)	Kentucky Bluegrass
15# (17kg)	Hard Fescue	15# (17kg)	Hard Fescue
500# (560kg)	Fertilizer	25# (28kg)	Kobe or Korean Lespedeza
4000# (4500kg)	Limestone	500# (560kg)	Fertilizer
		4000# (4500kg)	Limestone

Approved Tall Fescue Cultivars:

Adventure	Adventure II	Amigo	Anthem
Apache	Apache II	Arid	Austin
Brookstone	Bonanza	Bonanza II	Chapel Hill
Chesapeake	Chieftain	Coronado	Crossfire II
Debutante	Duster	Falcon	Falcon II
Finelawn Petite	Finelawn	Finelawn I	Genesis
Grande	Guardian	Houndog	Jaguar
Jaguar III	Kentucky 31	Kitty Hawk	Monarch
Montauk	Mustang	Olympic	Pacer
Phoenix	Pixie	Pyramid	Rebel
Rebel Jr.	Rebel II	Renegade	Safari
Shenandoah	Tempo	Titan	Tomahawk
Trailblazer	Tribute	Vegas	Wolfpack
Wrangler			

Approved Kentucky Bluegrass Cultivars:

Adelphi	Baron	Bristol	Challenger
Columbia	Fylking	Glade	Kenblue
Merit	Plush	Ram I	Rugby
Sydsport	Touchdown	Vantage	

Approved Hard Fescue Cultivars:

Aurora	Bardur	Crystal	Reliant	Scaldis

Spartan Valda Waldina Warwick

On cut and fill slopes 2:1 or steeper add 25# (28kg) Rye Grain November 1 - March 1.

On cut and fill slopes 2:1 or steeper add 30# (35 kg) Sericea Lespedeza January 1 - December 31.

Fertilizer shall be 10-20-20 analysis. Upon written approval of the Engineer, a different analysis of fertilizer may be used provided the 1-2-2 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as a 10-20-20 analysis.

Temporary Seeding:

Fertilizer shall be the same analysis as specified for "Seeding and Mulching" and applied at the rate of 400 pounds (450kg) and seeded at the rate of 50 pounds per acre (55kg per hectare). Kobe or Korean Lespedeza, German Millet, or Browntop Millet shall be used in summer months and rye grain during the remainder of the year. The Engineer will determine the exact dates for using each kind of seed.

Fertilizer Topdressing:

Fertilizer used for topdressing shall be 16-8-8 grade and shall be applied at the rate of 500 pounds per acre (560 kg per hectare). Upon written approval of the Engineer, a different analysis of fertilizer may be used provided the 2-1-1 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as 16-8-8 analysis.

Supplemental Seeding:

The kinds of seed and proportions shall be the same as specified for "Seeding and Mulching", and the rate of application may vary from 25# to 75# per acre (28kg to 85kg per hectare). The actual rate per acre (hectare) will be determined by the Engineer prior to the time of topdressing and the Contractor will be notified in writing of the rate per acre (hectare), total quantity needed, and areas on which to apply the supplemental seed. Minimum tillage equipment, consisting of a sod seeder shall be used for incorporating seed into the soil as to prevent disturbance of existing vegetation. A clodbuster (ball and chain) may be used where degree of slope prevents the use of a sod seeder.

above replace with sheet dated 10/19/04

Specialized Seeding Under Guiderail and Guardrail (Hard Fescue/Bluegrass):

General:

Areas under guiderail and guardrail sections shall be seeded in accordance with these provisions and as directed by the Engineer. Perform the work covered by this provision including but not limited to litter and debris removal, mowing, disposal of weeds and other unacceptable growth, grading, soil preparation and amendment, surface smoothing, seed applications, and matting installation.

Materials:

Only approved Hard Fescue and Kentucky Bluegrass seed that complies with Section 1060 of the Standard Specifications shall be used.

Soil Preparation:

Remove litter and other debris. Mow and satisfactorily dispose of weeds or other unacceptable growth on the areas to be seeded.

Prior to seeding, all eroded, uneven and rough areas shall be contour graded and/or filled with soil as directed by the Engineer. The soil shall be scarified or otherwise loosened to a depth of not less than 5 inches (130 mm) with a minimum width of 48 inches (1145 mm) and a maximum width of 52 inches (1320 mm). Clods shall be broken and the top 2 to 3 inches (52 to 78 mm) of soil shall be worked into an acceptable soil bed by the use of soil pulverizers, drags, or harrows.

Soil amendments shall be as follows:

> Limestone: Limestone shall be applied at a rate of 4000 pounds (4500 Kg/Hectare) per acre.
>
> Fertilizer: Fertilizer shall be 10-20-20 analysis and applied at a rate of 500 pounds (560kg/Hectare) per acre.

After soil preparation, lime and fertilizer shall be uniformly distributed by mechanical means using a 48 inch (1065 mm) drop type spreader and thoroughly mixed with the top five inches (130 mm) of the soil by discing, harrowing, or other approved methods.

The area shall then be harrowed, dragged, raked, or prepared by other approved methods which will give a lawn type finish. All trash, debris and stones larger than 1-1/2 inch (38 mm) in diameter or other obstructions shall also be removed.

Application:

(Hard Fescue/Bluegrass) seed shall be uniformly distributed at a rate of 75 pounds per acre (85 kilograms per hectare) of Hard Fescue and 20 pounds per acre (28 kilograms per hectare) of Kentucky bluegrass by mechanical means.

Immediately following the placement of seed, the area shall be rolled or tamped carefully and firmly by means acceptable to the Engineer to ensure a smooth surface. Use of rubber tired equipment to roll shall not be allowed.

Matting:

Immediately upon completion of seeding work and herbicidal application, 48 inch wide matting shall be installed over the seeded area in accordance with Section 1631 of the Standard Specifications.

Basis of Payment:

The quantity of "Specialized Seeding Under Guiderail and Guardrail (Hard Fescue/Bluegrass)" to be paid for will be the actual number of acres (hectares) of guiderail and guardrail sections, measured along the surface of the ground, over which acceptable seeding has been performed. The quantity of seeding will be paid for at the contract unit price per acre (hectare) for "Specialized Seeding Under Guiderail and Guardrail (Fescue/Bluegrass)".

No payment shall be made for "Specialized Seeding Under Guiderail and Guardrail (Fescue/Bluegrass)" in which the work has not been satisfactorily completed. Complete work includes but is not limited to soil preparation, surface smoothing, seeding, and matting.

Mowing:

The minimum mowing height on this project shall be six inches (150 mm).

Specialized Hand Mowing:

The work covered by this section consists of specialized hand mowing around or under fixed objects, including but not limited to guardrails, signs, barriers and slopes in a method acceptable to the Engineer.

The work of specialized hand mowing shall be completed with mechanically powered trimmers, string trimmers, hand operated rotary mowers, or self-propelled mowers of sufficient size and quality to perform the work timely and efficiently.

The quantity of mowing to be performed will be affected by the actual conditions which occur during the construction of the project. The quantity of mowing may be increased, decreased or eliminated entirely at the direction of the Engineer. Such variations in quantity will not be considered as alterations in the details of construction or a change in the character of the work.

The quantity of specialized hand mowing to be paid for will be the actual number of man hours worked while hand mowing along the surface of the ground, at the direction of the Engineer. Where an area has been mowed more than once, at the direction of the Engineer, separate measurement will be made each time the area is mowed.

Payment will be made under:

Specialized Hand Mowing ..... HR

Waste Areas And Borrow Sources:

Payment for temporary erosion control measures, except those made necessary by the Contractor's own negligence or for his own convenience, will be paid for at the appropriate contract unit price for the devices or measures utilized in borrow sources and waste areas.

No additional payment will be made for erosion control devices or permanent seeding and mulching in any commercial borrow or waste pit. All erosion and sediment control practices which may be required on a commercial borrow or waste site will be done at the Contractor's expense.

Temporary Diversion:

The work by this section for installation, maintenance, and cleanout of temporary diversions shall be in accordance with Section 1630. The quantity of excavation for installation and cleanout measured as provided in Article 1630-4 will be paid for at the contract unit price per cubic yard (cubic meter) as provided in Article 1630-5 for "Silt Excavation".

Gravel Construction Entrance:

Description:

The work covered by this section consists of furnishing, installing, and maintaining and removing any and all material required for the construction of a Gravel Construction Entrance.

Materials:

The filter fabric shall meet the requirements of Section 1056 for Type 2 Fabric.

Stone shall be Class A Stone and shall meet the requirements of Section 1042 for Stone for Erosion Control, Class A.

Construction:

The Contractor shall install a Gravel Construction Entrance in accordance with the details in the plans and at locations as directed by the Engineer.

Method Of Measurement:

Gravel Construction Entrance will not be measured for payment under this section.

Basis Of Payment:

Payment for installation of Filter Fabric shall be paid for at the contract unit price per square yard (square meter) "Filter Fabric for Drainage".

Payment for installation of Class A Stone shall be paid for at the contract unit price per ton (metric ton) "Stone for Erosion Control, Class A".

Such price and payment shall be considered full compensation for all work covered by this provision including all materials, construction, maintenance, and removal of Gravel Construction Entrance as directed by the Engineer.

Impervious Dike:

The work covered by this section consists of furnishing, installing, maintaining, and removing an impervious dike for the purpose of diverting normal stream flow around the construction site. The Contractor shall construct an impervious dike in such a manner approved by the Engineer. The impervious dike shall not permit seepage of water into the construction site or contribute to siltation of the stream. The impervious dike shall be constructed of an acceptable material in the locations noted on the plans or as directed by the Engineer.

Acceptable materials shall include but not be limited to sheet piles, sandbags, and/or the placement of an acceptable size stone lined with polypropylene or other impervious fabric.

Earth material shall not be used to construct an impervious dike when it is in direct contact with the stream unless vegetation can be established before contact with the stream takes place.

The quantity of impervious dike to be paid for will be the actual number of linear feet (meters) of impervious dike(s) constructed, measured in place from end to end of each separate installation which has been completed and accepted.

The quantity of impervious dikes measured as provided above will be paid for at the contract unit price per linear foot (meter) for "Impervious Dike".

The above prices and payments will be full compensation for all work covered by this section including but not limited to furnishing all of the materials in the impervious dike, construction, maintenance, and removal of the impervious dike.

Temporary Pipe For Culvert Construction:

The work covered by this section consists of furnishing, installing, maintaining and removing any and all temporary pipe used on this project in conjunction with the culvert construction. The Contractor shall install temporary pipe in locations shown on the plans in such a manner approved by the Engineer. The temporary pipe shall provide a passage-

way for the stream through the work-site. The minimum size requirements will be as stated on the Erosion and Sediment Control plans.

The quantity of temporary pipe to be paid for will be the actual number of linear feet (meters) of temporary pipe approved by the Engineer and measured in place from end to end.

The quantity of temporary pipe measured as provided above will be paid for at the contract unit price per linear foot (meter) for "___ inch (mm) Temporary Pipe".

The above prices and payments will be full compensation for all work covered by this section including but not limited to furnishing all materials required for installation, construction, maintenance, and removal of temporary pipe.

Stream Channel Relocation Limitations:

The following sequence of construction must be followed in the areas designated on the plans as stream relocation. Failure on the part of the Contractor to follow this sequence, and complete each step prior to proceeding in this area as specified, will be just cause for the Engineer to direct the suspension of work in accordance with Section 108-7 of the Standard Specifications.

1. Clear, but do not grub area within the Environmentally Sensitive Area on the existing stream to be relocated.
2. Construct and stabilize, with vegetation or erosion control materials sufficient to restrain erosion, the proposed stream channel relocation as shown on the plans.
3. Divert water into newly constructed channel only after it has been stabilized and approved.
4. Begin grubbing and/or grading within Environmentally Sensitive Area of existing stream.

The contractor shall perform seeding and mulching and install erosion control matting to all cut/fill slopes adjacent to stream relocations in accordance with the provision contained in this contract and in accordance with Section 1631 of the Standards and Specification Manual.

The above requirements apply to the stream channels being constructed at the following stations:

Sta 14+00-Y1-
Sta 27+00 -Y1-

Coir Fiber Mat:

Description:

Furnish material, install and maintain coir fiber mat in locations shown on the plans or in locations as directed by the engineer. Work includes providing all materials, excavating and backfilling, and placing and securing Coir Fiber Matting.

Materials:

(A) Matting:

Provide matting to meet the following requirements:

100 % coconut fiber (coir) twine woven into a high strength matrix.
Thickness - 0.30 in. minimum. (7.6 mm)
Tensile Strength - 1348 x 626 lb/ft minimum (1650.5 x 766.5 kg/m)
Elongation - 34% x 38% maximum
Flexibility (mg-cm)- 65030 x 29590
Flow Velocity- Observed 11 ft/sec (3.35 m/s)
Weight - 20 oz/SY (678 g/SM)
Size - 6.6 x 164 ft (120 SY) or (100 SM)
"C" Factor - 0.002
Open Area (measured) - 50%

(B) Stakes:

Provide wooden stakes 12 in. (300 mm) in length with a notch cut 1 in. (25 mm)from top.

Construction Methods:

Place the matting immediately upon final grading. Provide a smooth soil surface free from stones, clods, or debris which will prevent the contact of the matting with the soil. Take care to preserve the required line, grade, and cross section of the area covered.

Unroll the matting and apply without stretching such that it will lie smoothly but loosely on the soil surface. Bury the top slope end of each piece of matting in a narrow trench at least 6 in. (150 mm) deep and tamp firmly. Where one roll of matting ends and a second roll begins, overlap the end of the upper roll over the buried end of the second roll so there is a 6 in. (150 mm) overlap. Construct check trenches at least 12 in. (0.3 m) deep every 50 ft. (16 m) longitudinally along the edges of the matting or as directed by the Engineer. Fold over and bury matting to the full depth of the trench, close and tamp firmly. Overlap matting at least 6 in. (150 mm) where 2 or more widths of matting are installed side by side.

Place stakes across the matting at ends, junctions, and check trenches approximately 1 ft. (0.3 m) apart with notch facing upslope.

Place stakes along the outer edges and down the center of each strip of matting 3 feet (1 meter) apart. Place stakes along all lapped edges 1 ft. (0.3 m) apart. Refer to details in the plan sheets.

The Engineer may require adjustments in the trenching or staking requirements to fit individual site conditions.

Method of Measurement:

The quantity of coir fiber matting measured will be paid for according to the actual number of square yards (square meters) measured along the surface of the ground over which coir fiber matting is installed and accepted.

Basis of Payment:

The quantity of Coir Fiber Matting, measured as provided above, will be paid for at the contract unit price per square yards (square meters) for "Coir Fiber Matting."

Payment will be made under:

Coir Fiber Matting ..... Square Yards (Square Meters)

Minimize Removal Of Vegetation

The Contractor shall minimize removal of vegetation at stream banks and disturbed areas within the project limits as directed by the Engineer.

Stockpile Areas

The Contractor shall install and maintain erosion control devices sufficient to contain sediment around any erodible material stockpile areas as directed by the Engineer.

Streambank Reforestation:

Streambank reforestation will be planted in areas designated on the plans and as directed by the Engineer. See the streambank reforestation detail sheet.

Seedlings shall be planted as soon as practical following permanent seeding and mulching. Type I seedlings shall be planted along both streambanks. Type II seedlings shall be planted in a 26 ft. (8 meters) wide swath from top of bank along both sides of stream.

Seasonal limitations: Seedlings shall be planted from November 15 through March 15.

Root dip: the roots of reforestation seedlings shall be coated with a slurry of water, and either a fine clay ("kaolin") or a superabsorbent that is made to be used as a bare root dip.

The type, mixture ratio, method of application, and the time of application shall be submitted to the Engineer for approval.

With the approval of the Engineer, seedlings may be coated before delivery to the job or at the time of planting, but at no time shall the roots of the seedlings be allowed to dry out. The roots shall be moistened immediately prior to planting.

Measurement:

The quantity of streambank reforestation to be paid for will be the actual number of acres (hectares) of land, measured along of the surface of ground, which has been acceptably planted with seedlings in accordance with these specifications.

Payment:

The quantity of streambank reforestation will be paid for at the contract unit price per acre (hectare) for "Streambank Reforestation".

Payment will be made under:

Streambank Reforestation.....ACR (HA)

Safety Fence:

Description:

The work of "Safety Fence" shall consist of furnishing, installing and maintaining polyethylene or polypropylene fence along the outside riparian buffer, wetland, or water boundary located within the construction corridor to mark the areas that have been approved to infringe within the buffer, wetland or water, and as directed by the Engineer in accordance with the special provisions included herein. The fence shall be installed prior to any land disturbing activities.

Materials:

Fence Material:

Polyethylene or polypropylene fence shall be a preconstructed safety fence approved by the Engineer.

Posts:

Either wood posts or steel posts may be used. Wood posts shall be nominal 2" x 4" (51 mm x 102 mm) or 4" x 4" (102 mm x 102 mm), lengths as required, structural light framing, grade No. 2, Southern Pine. Steel posts shall be at least 5 feet (1.6 m) in length, approximately 1 3/8" (35 mm) wide measured parallel to the fence, and have a minimum

weight of 1.25 lb./ft. (1.9 kg/m) of length. The steel post shall be equipped with an anchor plate having a minimum area of 14 square inches (90 square centimeters).

Clearing and Grading:

No additional clearing and grubbing is anticipated for the installation of this fence; however, if any clearing and grubbing is required, it will be the minimum required for the installation of the safety fence. Such clearing shall include satisfactory removal and disposal of all trees, brush, stumps and other objectionable material.

The fence shall be erected to conform to the general contour of the ground. When determined necessary by the Engineer, minor grading along the fence line shall be done to meet this requirement provided no obstructions to proper drainage are created.

Installation:

Posts shall be set and maintained in a vertical position and may be hand set or set with a post driver. If hand set, all backfill material shall be thoroughly tamped. If power driven, wood posts may be sharpened to a dull point. Posts damaged by power driving shall be removed and replaced prior to final acceptance. The tops of all wood posts shall be cut at a 30 degree angle. The wood posts may, at the option of the Contractor, be cut at this angle either before or after the posts are erected.

The fence fabric shall be attached to the wood posts with one 2" (51 mm) galvanized wire staple across each cable or to the steel posts with wire or other acceptable means.

The Contractor shall be required to maintain the safety fence in a satisfactory condition for the duration of the project as determined by the Engineer.

Method of Measurement:

The quantity of safety fence to be paid for shall be the actual number of linear feet (meter) of "Safety Fence", installed in place and accepted. No direct payment will be made for post and post bracing. Cost shall be included in the cost of the fence per linear foot (meter).

Basis of Payment:

The quantity of safety fence measured as provided above will be paid for at the contract unit price per linear foot (meter) of safety fence. Such payment will be full compensation for the work as described in the above paragraphs, including but not limited to clearing and grading, furnishing and installing fence fabric with necessary posts and post bracing, staples, tie wires, tools, equipment and incidentals necessary to complete the work.

Payment will be made under:

Safety Fence.....LF (M)

Temporary Stream Diversion:

Description:

The work covered by this section consists of furnishing, installing, maintaining and removing any and all pump-around systems used on this project. The Contractor shall install a pump-around system in locations chosen by the Contractor and approved by the Engineer. The pump-around system shall provide a passageway for the stream flow around the work site. The number of pump-arounds may be increased, decreased, or eliminated entirely at the direction of the Engineer. Such variations in quantity will not be considered as alterations in the details of construction or a change in the character of the work. (See pump-around operation on the Temporary Stream Diversion detail in the plans.)

Construction:

Install impervious dikes as shown on the detail. Pump water around work site. If the water is turbid or exposed to bare soil, pump through a special stilling basin. Follow detail for the pump-around. Once the work is complete in an area remove the impervious dikes and pump system. Place structures in the area and stabilize immediately (e.g., seed and mulch) following removal of pump-around system.

The special stilling basins shall be installed and removed as shown on the Temporary Stream Diversion detail and as directed by the Engineer.

The filter fabric shall meet the requirements of Section 1056 for Type 2 Fabric.

Sediment control stone shall meet the requirements of Section 1005. Install stone according to the detail shown on the plans.

The special stilling basins shall be a water permeable fabric bag that traps sand, silt, and fines as sediment laden water is pumped into it. This device shall be constructed such that it is portable and can be used adjacent to each pump-around system.

The special stilling basins shall be a bag constructed to a minimum size of 10' x 15' made from a nonwoven fabric. It shall have a sewn-in 8 in. (maximum) spout for receiving pump discharge. The bag seams shall be sewn with a double needle machine using a high strength thread. The seams shall have a minimum wide width strength as follows:

Test Method	Minimum Specifications
ASTM D-4884	60 lb/in

The fabric used to construct the bag shall be stabilized to provide resistance to ultra-violet degradation and meet the following specifications for flow rates, strength, and permeability:

Property	Test Method	Units	Minimum Specifications

Weight	ASTM D-3776	oz/yd	8.0
Grab tensile	ASTM D-4632	lb	200.0
Puncture	ASTM D-4833	lb	130.0
Flow rate	ASTM D-4491	gal/min/sf	80.0
Permittivity	ASTM D-4991	1/sec	1.5
UV Resistance	ASTM D-4355	%	70.0

The special stilling basins shall be placed so the incoming water flows into and through the bag without causing erosion. The neck or spout of the bag shall be tied off tightly to stop the water from flowing out of the bag without going through the walls.

The special stilling basins shall be replaced and disposed of when it is 3/4 full of sediment or when it is impractical for the bag to filter the sediment out at a reasonable flow rate. Prior approval from the Engineer must be received before removal and replacement.

The Contractor shall be responsible for providing a sufficient quantity of bags to contain silt from pumped effluent during construction.

Method of Measurement:

Impervious dikes will be paid for according to the Special Provision included in this contract.

The quantity of special stilling basin(s) to be paid for will be the actual number of bags used during pump-around operation as specified and accepted by the Engineer.

Measurement of filter fabric will be made by the number of square yards (square meters) as measured over the surface of the ground over which filter fabric has been acceptably placed.

The quantity of sediment control stone will be measured according to Article 1610-4.

Temporary Stream Diversion will be incidental to the Stream Channel Relocation Construction. This shall include multiple installations and removals of the pump-around system.

Basis of Payment:

Payment for Special Stilling Basin(s) will be made under:

Filter Fabric for Drainage .....SY(SM)
Sediment Control Stone .....TON (MT)
Special Stilling Basin .....EA

The above prices and payments will be full compensation for all work covered by this section including, but not limited to furnishing all of the necessary materials, construction, maintenance and removal of the impervious dikes, special stilling basins, and pump-around system.

Environmentally Sensitive Areas:

This project is located in an "Environmentally Sensitive Area". This designation requires special procedures to be used for clearing and grubbing, temporary stream crossings, and grading operations within the area identified on the plans. This also requires special procedures to be used for seeding and mulching and staged seeding within the project.

Clearing and Grubbing:

In areas identified on the erosion control plans as "Environmentally Sensitive Areas", the Contractor may perform clearing operations, but not grubbing operations until immediately prior to beginning grading operations as described in Section 200, Article 200-1, in the Standard Specifications. The "Environmentally Sensitive Area" shall be defined as a 50 foot (16 meter) buffer zone on both sides of the stream (or depression), measured from top of streambank, (or center of depression). Only clearing operations (not grubbing) shall be allowed in this buffer zone until immediately prior to beginning grading operations. Erosion control devices shall be installed immediately following the clearing operation.

Grading:

Once grading operations begin in identified "Environmentally Sensitive Areas", work will progress in a continuous manner until complete. All construction within these areas must progress in a continuous manner such that each phase is complete and areas permanently stabilized prior to beginning of next phase. Failure on the part of the Contractor to complete any phase of construction in a continuous manner in "Environmentally Sensitive Areas" as specified will be just cause for the Engineer to direct the suspension of work in accordance with Section 108-7 of the Standard Specifications.

Temporary Stream Crossings:

Any crossing of streams within the limits of this project must be accomplished in accordance with Section 107-13(b) of the Standard Specifications.

Seeding and Mulching:

Seeding and mulching shall be performed in accordance with Section 1660 of the Standard Specifications and vegetative cover sufficient to restrain erosion shall be installed immediately following grade establishment.

Seeding and mulching shall be performed on the areas disturbed by construction immediately following final grade establishment. No appreciable time shall lapse into the contract time without stabilization of slopes, ditches and other areas within the "Environmentally Sensitive Areas" as indicated on the E.C. Plans.

Stage Seeding:

The work covered by this section shall consist of the establishment of a vegetative cover on cut and fill slopes as grading progresses. Seeding and mulching shall be done in stages on cut and fill slopes which are greater than 20 feet (6 meters) in height or greater than 2 acres (0.8 hectares) in area. Each stage shall not exceed the limits stated above.

All work described above will be paid for at the contract unit prices established in the contract for the work involved. Additional payments will not be made for the requirements of this section as the cost for this work should be included in the contract unit prices for the work involved.

Permanent Soil Reinforcement Mat:

General:

This work shall consist of furnishing and placing "Permanent Soil Reinforcement Mat", of the type specified, over previously prepared areas as directed by the Engineer.

Materials:

The product shall be permanent erosion control reinforcement mat and shall be constructed of 100% coconut fiber stitch bonded between a heavy duty UV stabilized cuspated (crimped) netting overlaid with a heavy duty UV stabilized top net. The three nettings shall be stitched together on 1.5 inch (38 mm) centers UV stabilized polyester thread to form a permanent three dimensional structure. The mat shall have the following physical properties:

Property	Test Method	Value	Unit
Ground Cover	Image Analysis	93	%
Thickness	ASTM D1777	0.63 (16)	in (mm)
Mass Per Unit Area	ASTM D3776	0.92 (0.50)	lb/sy (kg/m2)
Tensile Strength	ASTM D5035	480 (714.2)	lb/ft (kg/m)
Elongation	ASTM D5035	49	%
Tensile Strength	ASTM D5035	960 (1428.5)	lb/ft (kg/m)
Elongation	ASTM D5035	31	%
Tensile Strength	ASTM D1682	177 (80.3)	lbs (kg)
Elongation	ASTM D1682	22	%
Resiliency	ASTM D1777	>80	%
UV Stability *	ASTM D4355	151 (68.5)	lbs (kg)
Color(Permanent Net)		UV Black	

Porosity (Permanent Net)	Calculated	>95	%
Minimum Filament Diameter (permanent net)	Measured	0.03 (0.8)	in (mm)

*ASTM D1682 Tensile Strength and % strength retention of material after 1000 hours of exposure in a Xenon-arc weatherometer.

A certification (Type 1, 2, or 3) from the manufacturer showing:

1) the chemical and physical properties of the mat used, and
2) conformance of the mat with this specification will be required.

Matting shall be installed according to section 1060-8 of the Standard Specifications.

Soil Preparation:

All areas to be protected with the mat shall be brought to final grade and seeded in accordance with Section 1660. The surface of the soil shall be smooth, firm, stable and free of rocks, clods, roots or other obstructions which would prevent the mat from lying in direct contact with the soil surface. Areas where the mat is to be placed will not need to be mulched.

Measurement:

The quantity of "Permanent Soil Reinforcement Mat" to be paid for shall be the actual number of square yards (square meters), surface measure, completed, and accepted. Overlaps will not be included in the measurement, and will be considered as incidental to the work.

Basis of Payment:

This work will be paid for at the contract unit price per square yard (square meter) for "Permanent Soil Reinforcement Mat" of the type specified, complete in place and accepted. Such payment shall be full compensation for furnishing and installing the mat in accordance with this specification, and for all required maintenance.

Payment will be made under:

Permanent Soil Reinforcement Mat..... SY (M2)

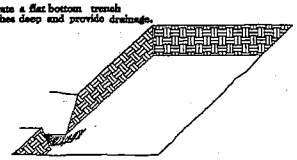
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-3157	RF-1	

PLANTING DETAILS

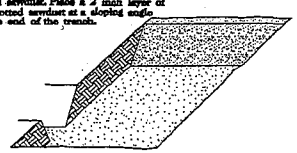
SEEDLING / LINER BAREROOT PLANTING DETAIL

HEALING IN

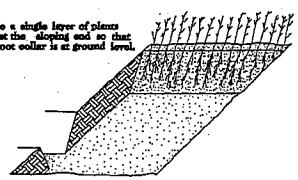
1. Locate a healing-in site in a shady, well protected area.
2. Excavate a flat bottom trench 12 inches deep and provide drainage.



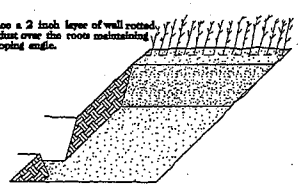
3. Backfill the trench with 2 inches of well rotted sawdust. Place a 2 inch layer of well rotted sawdust at a sloping angle at one end of the trench.



4. Place a single layer of plants against the sloping end so that the root collar is at ground level.

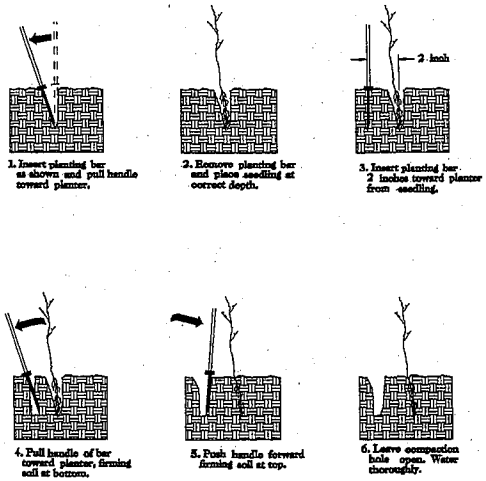


5. Place a 2 inch layer of well rotted sawdust over the roots maintaining a sloping angle.



6. Repeat layers of plants and sawdust as necessary and water thoroughly.

DIBBLE PLANTING METHOD
USING THE KBC PLANTING BAR



1. Insert planting bar as shown and pull handle toward planter.
2. Remove planting bar and place seedling at correct depth.
3. Insert planting bar 2 inches toward planter from seedling.
4. Pull handle of bar toward planter, firming soil at bottom.
5. Push handle forward firming soil at top.
6. Leave compaction hole open. Water thoroughly.

PLANTING NOTES:

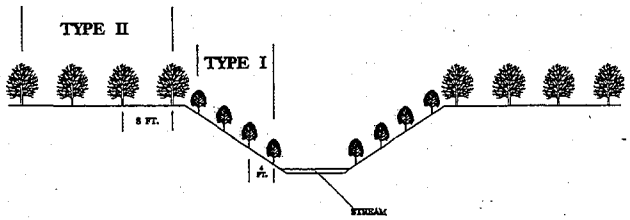
PLANTING BAG
During planting, seedlings shall be kept in a moist canvas bag or similar container to prevent the root systems from drying.

KBC PLANTING BAR
Planting bar shall have a blade with a triangular cross section, and shall be 12 inches long, 4 inches wide and 1 inch thick at center.

ROOT PRUNING
All seedlings shall be root pruned, if necessary, so that no roots extend more than 10 inches below the root collar.

- ☐ TYPE 1 STREAMBANK REFORESTATION SHALL BE PLANTED 3 FT. TO 5 FT. ON CENTER, RANDOM SPACING, AVERAGING 4 FT. ON CENTER, APPROXIMATELY 2724 PLANTS PER ACRE.
- ☐ TYPE 2 STREAMBANK REFORESTATION SHALL BE PLANTED 6 FT. TO 10 FT. ON CENTER, RANDOM SPACING, AVERAGING 8 FT. ON CENTER, APPROXIMATELY 680 PLANTS PER ACRE.
- ☐ NOTE: TYPE 1 AND TYPE 2 STREAMBANK REFORESTATION SHALL BE PAID FOR AS "STREAMBANK REFORESTATION"

STREAMBANK REFORESTATION TYPICAL



STREAMBANK REFORESTATION

MIXTURE, TYPE, SIZE, AND FURNISH SHALL CONFORM TO THE FOLLOWING:

TYPE 1			
50%	SALIX NIGRA	BLACK WILLOW	12 in - 18 in BR
50%	ALNUS SERRULATA	TAG ALDER	12 in - 18 in BR
TYPE 2			
25%	QUERCUS NIGRA	WATER OAK	12 in - 18 in BR
25%	PLATANUS OCCIDENTALIS	SYCAMORE	12 in - 18 in BR
25%	LIRIODENDRON TULIPIFERA	YELLOW POPLAR	12 in - 18 in BR
25%	FRAXINUS PENNSYLVANICA	GREEN ASH	12 in - 18 in BR

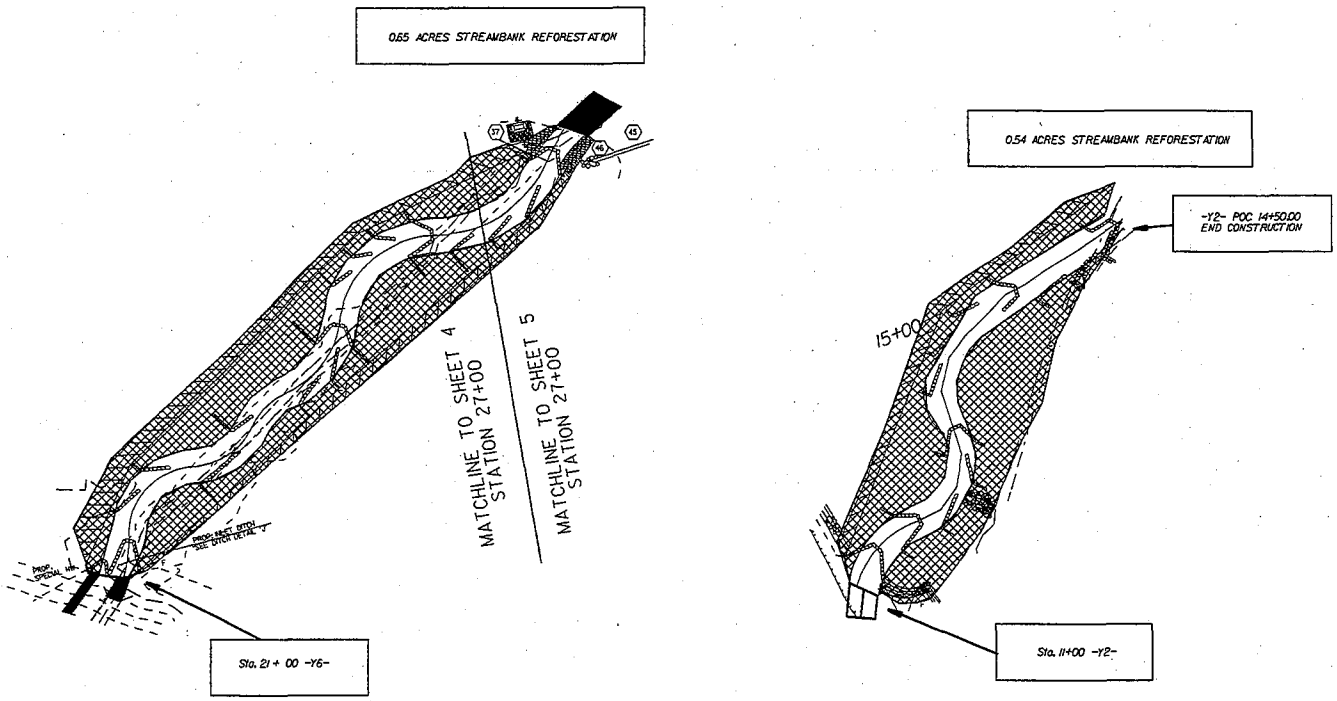
- ☐ SEE PLAN SHEETS FOR AREAS TO BE PLANTED

STREAMBANK REFORESTATION DETAIL SHEET

N.C.D.O.T.- ROADSIDE ENVIRONMENTAL UNIT

PROJECT REFERENCE NO.	SHEET NO.
B-3157	EC-9/CONST.5
HYDRAULICS ENGINEER	ROADWAY DESIGN ENGINEER

STREAMBANK REFORESTATION



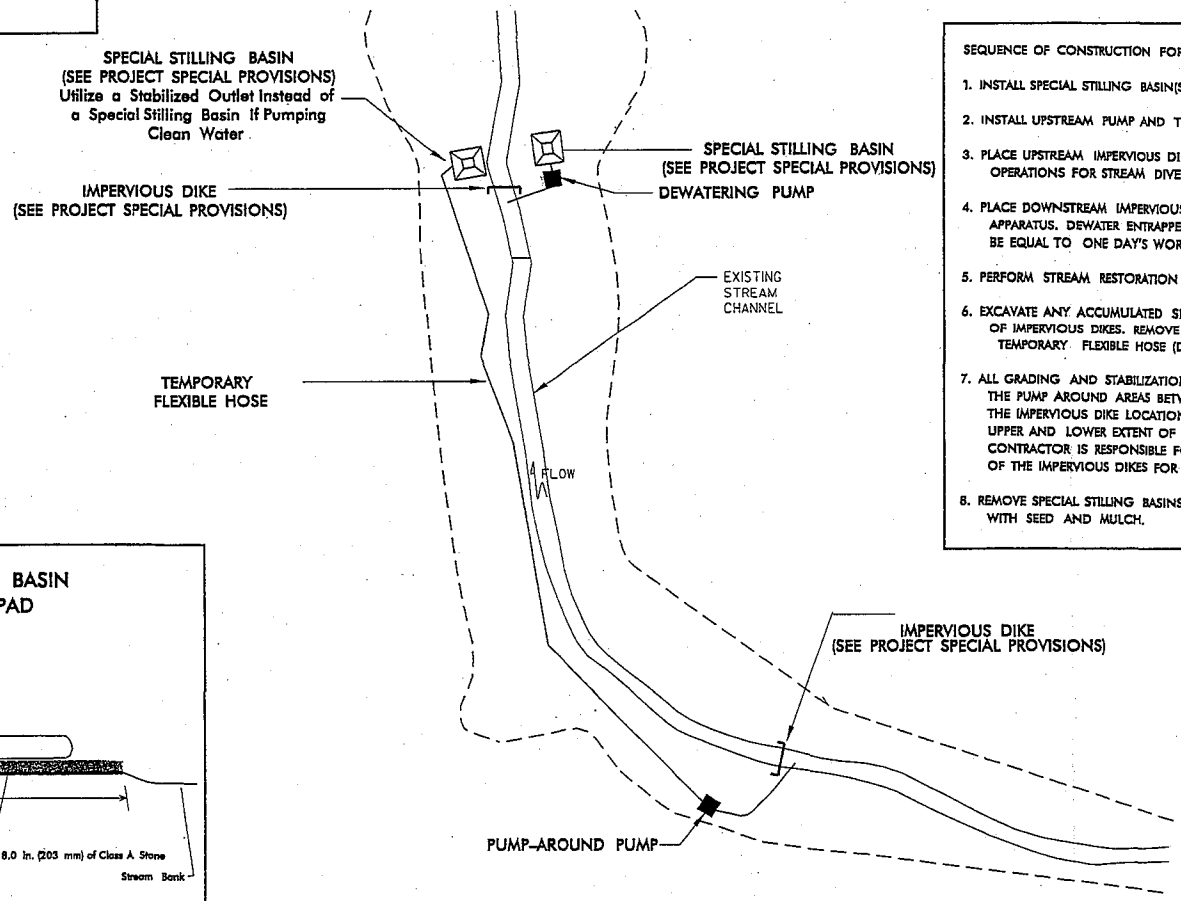
SEE RF-1 AND PROJECT SPECIAL PROVISIONS

PROJECT REFERENCE NO.	SHEET NO.
B-3157	EC-8A/CONST.8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

TEMPORARY STREAM DIVERSION

PUMP–AROUND OPERATION

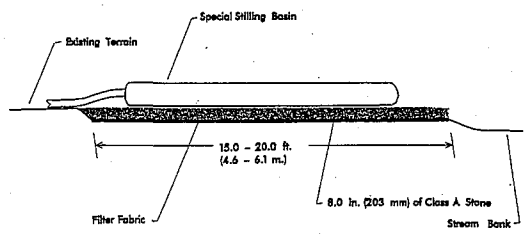
NOTES:
1) All excavation shall be performed in only dry or isolated sections of channel.
2) Impervious dikes are to be used to isolate work from stream flow when necessary.
3) All graded areas shall be stabilized within 24 hours.
4) Maintenance of stream flow operations shall be incidental to the work. This includes polyethylene sheeting, diversion pipes, pumps and hoses.
5) Pumps and hoses shall be of sufficicient size to dewater the work area.



SEQUENCE OF CONSTRUCTION FOR TYPICAL WORK AREA

1. INSTALL SPECIAL STILLING BASIN(S).
2. INSTALL UPSTREAM PUMP AND TEMPORARY FLEXIBLE HOSE.
3. PLACE UPSTREAM IMPERVIOUS DIKE AND BEGIN PUMPING OPERATIONS FOR STREAM DIVERSION.
4. PLACE DOWNSTREAM IMPERVIOUS DIKE AND PUMPING APPARATUS. DEWATER ENTRAPPED AREA. AREA TO BE DEWATERED SHALL BE EQUAL TO ONE DAY'S WORK.
5. PERFORM STREAM RESTORATION WORK IN ACCORDANCE WITH THE PLANS.
6. EXCAVATE ANY ACCUMULATED SILT AND DEWATER BEFORE REMOVAL OF IMPERVIOUS DIKES. REMOVE IMPERVIOUS DIKES, PUMPS, AND TEMPORARY FLEXIBLE HOSE (DOWNSTREAM IMPERVIOUS DIKES FIRST).
7. ALL GRADING AND STABILIZATION MUST BE COMPLETED IN ONE DAY WITHIN THE PUMP AROUND AREAS BETWEEN THE IMPERVIOUS DIKES. THE IMPERVIOUS DIKE LOCATIONS AS SHOWN ON THIS SHEET ONLY SHOW THE UPPER AND LOWER EXTENT OF WORK FOR EACH STREAM SEGMENT. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE LOCATION OF THE IMPERVIOUS DIKES FOR EACH DAY'S WORK.
8. REMOVE SPECIAL STILLING BASINS AND BACKFILL. STABILIZE DISTURBED AREA WITH SEED AND MULCH.

SPECIAL STILLING BASIN WITH ROCK PAD



Not To Scale

Note: Provide Stabilized Outlet to Streambank

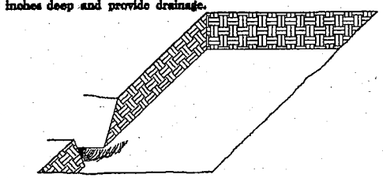
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-3157	RF-1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	

PLANTING DETAILS

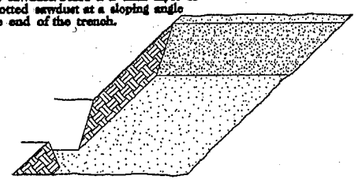
SEEDLING / LINER BAREROOT PLANTING DETAIL

HEALING IN

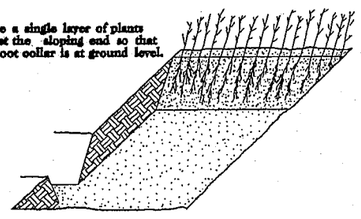
1. Locate a healing-in site in a shady, well protected area.
2. Excavate a flat bottom trench 12 inches deep and provide drainage.



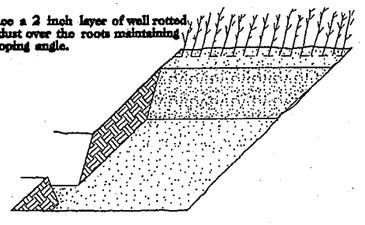
3. Backfill the trench with 2 inches of well rotted sawdust. Place a 2 inch layer of well rotted sawdust at a sloping angle at one end of the trench.



4. Place a single layer of plants against the sloping end so that the root collar is at ground level.

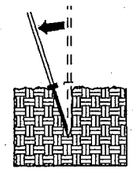


5. Place a 2 inch layer of well rotted sawdust over the roots maintaining a sloping angle.

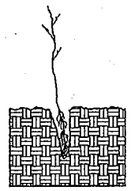


6. Repeat layers of plants and sawdust as necessary and water thoroughly.

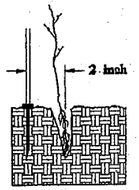
DIBBLE PLANTING METHOD
USING THE KBC PLANTING BAR



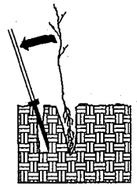
1. Insert planting bar as shown and pull handle toward planter.



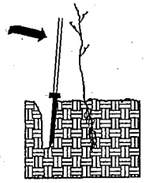
2. Remove planting bar and place seedling at correct depth.



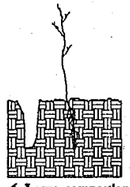
3. Insert planting bar 2 inches toward planter from seedling.



4. Pull handle of bar toward planter, firming soil at bottom.



5. Push handle forward firming soil at top.



6. Leave compaction hole open. Water thoroughly.

PLANTING NOTES:

PLANTING BAG
During planting, seedlings shall be kept in a moist canvas bag or similar container to prevent the root systems from drying.

KBC PLANTING BAR
Planting bar shall have a blade with a triangular cross section, and shall be 12 inches long, 4 inches wide and 1 inch thick at center.

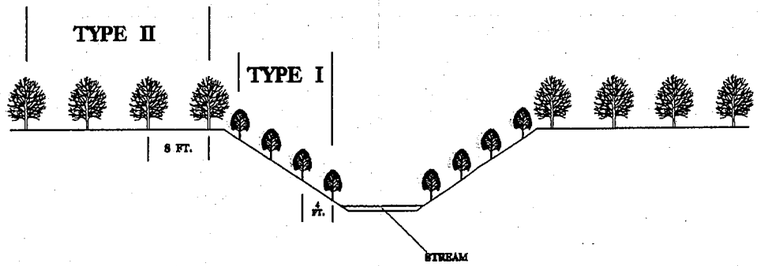
ROOT PRUNING
All seedlings shall be root pruned, if necessary, so that no roots extend more than 10 inches below the root collar.

☐ TYPE 1 STREAMBANK REFORESTATION SHALL BE PLANTED 3 FT. TO 5 FT. ON CENTER, RANDOM SPACING, AVERAGING 4 FT. ON CENTER, APPROXIMATELY 2724 PLANTS PER ACRE.

☐ TYPE 2 STREAMBANK REFORESTATION SHALL BE PLANTED 6 FT. TO 10 FT. ON CENTER, RANDOM SPACING, AVERAGING 8 FT. ON CENTER, APPROXIMATELY 680 PLANTS PER ACRE.

☐ NOTE: TYPE 1 AND TYPE 2 STREAMBANK REFORESTATION SHALL BE PAID FOR AS "STREAMBANK REFORESTATION"

STREAMBANK REFORESTATION TYPICAL



STREAMBANK REFORESTATION

MIXTURE, TYPE, SIZE, AND FURNISH SHALL CONFORM TO THE FOLLOWING:

TYPE 1		
50% SALIX NIGRA	BLACK WILLOW	12 in - 18 in BR
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25% PLATANUS OCCIDENTALIS	SYCAMORE	12 in - 18 in BR
25% LIRIODENDRON TULIPIFERA	YELLOW POPLAR	12 in - 18 in BR
25% FRAXINUS PENNSYLVANICA	GREEN ASH	12 in - 18 in BR

☐ SEE PLAN SHEETS FOR AREAS TO BE PLANTED

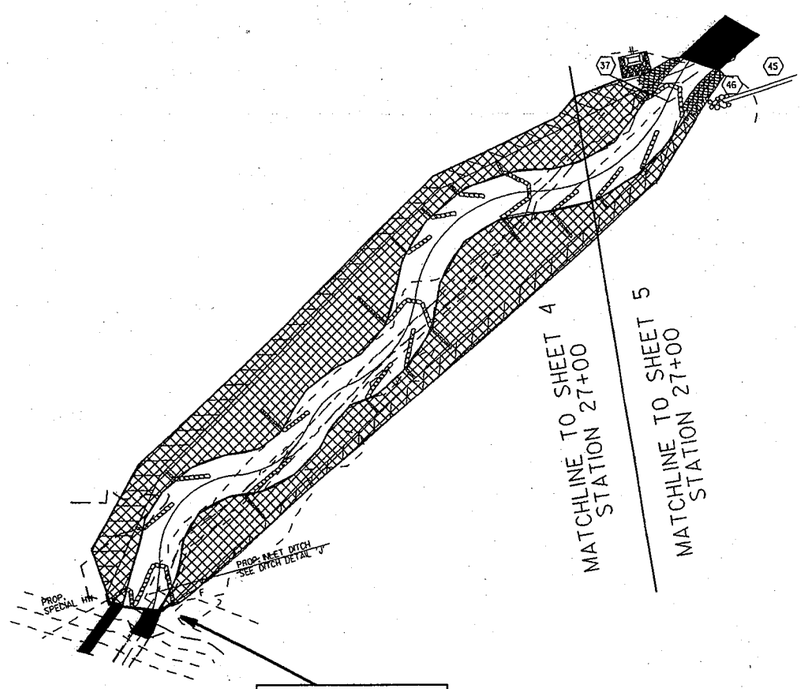
STREAMBANK REFORESTATION DETAIL SHEET

N.C.D.O.T. - ROADSIDE ENVIRONMENTAL UNIT

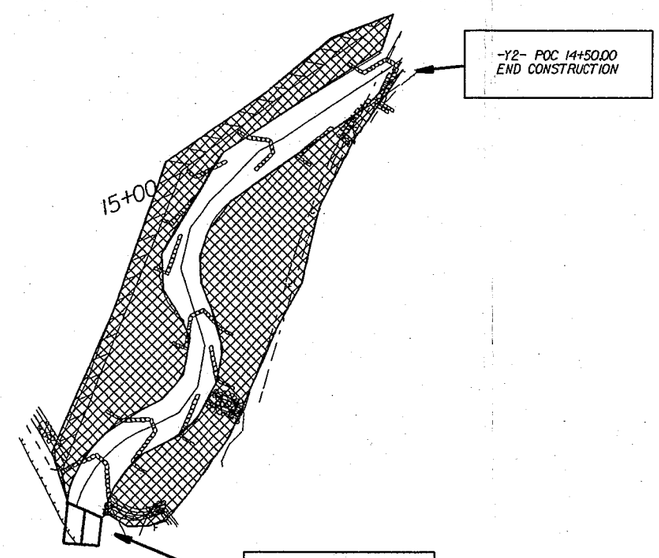
PROJECT REFERENCE NO.	SHEET NO.
B-3157	EC-9/CONST.5
HYDRAULICS ENGINEER	ROADWAY DESIGN ENGINEER

STREAMBANK REFORESTATION

0.65 ACRES STREAMBANK REFORESTATION



0.54 ACRES STREAMBANK REFORESTATION



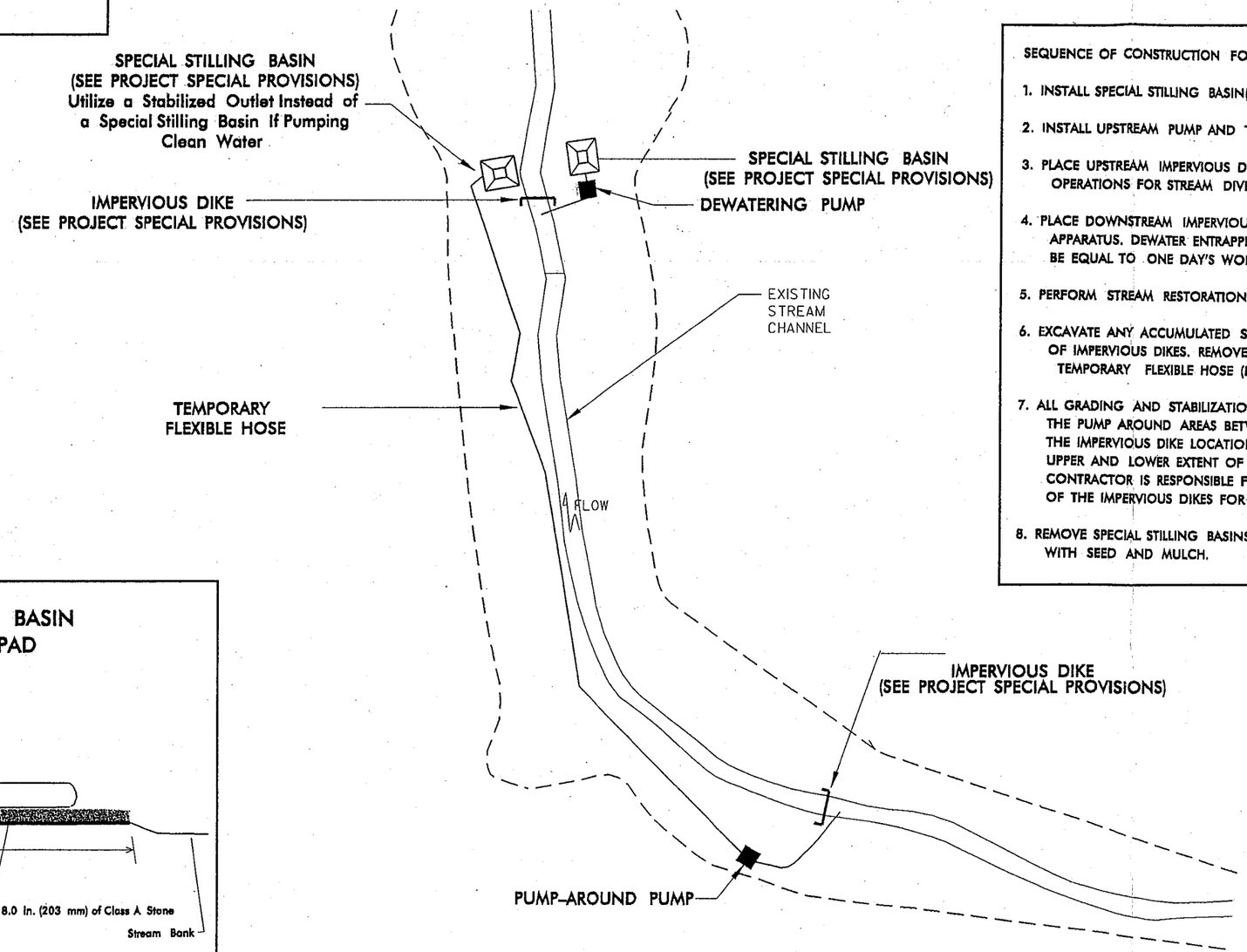
SEE RF-1 AND PROJECT SPECIAL PROVISIONS

PROJECT REFERENCE NO.	SHEET NO.
B-3157	EC-8A/CONST.8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

TEMPORARY STREAM DIVERSION

PUMP-AROUND OPERATION

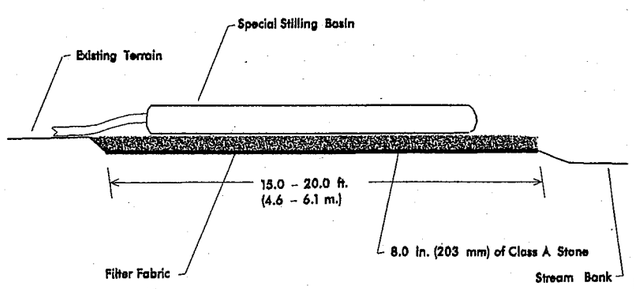
NOTES:
1) All excavation shall be performed in only dry or isolated sections of channel.
2) Impervious dikes are to be used to isolate work from stream flow when necessary.
3) All graded areas shall be stabilized within 24 hours.
4) Maintenance of stream flow operations shall be incidental to the work. This includes polyethylene sheeting, diversion pipes, pumps and hoses.
5) Pumps and hoses shall be of sufficicient size to dewater the work area.



SEQUENCE OF CONSTRUCTION FOR TYPICAL WORK AREA

1. INSTALL SPECIAL STILLING BASIN(S).
2. INSTALL UPSTREAM PUMP AND TEMPORARY FLEXIBLE HOSE.
3. PLACE UPSTREAM IMPERVIOUS DIKE AND BEGIN PUMPING OPERATIONS FOR STREAM DIVERSION.
4. PLACE DOWNSTREAM IMPERVIOUS DIKE AND PUMPING APPARATUS. DEWATER ENTRAPPED AREA. AREA TO BE DEWATERED SHALL BE EQUAL TO ONE DAY'S WORK.
5. PERFORM STREAM RESTORATION WORK IN ACCORDANCE WITH THE PLANS.
6. EXCAVATE ANY ACCUMULATED SILT AND DEWATER BEFORE REMOVAL OF IMPERVIOUS DIKES. REMOVE IMPERVIOUS DIKES, PUMPS, AND TEMPORARY FLEXIBLE HOSE (DOWNSTREAM IMPERVIOUS DIKES FIRST).
7. ALL GRADING AND STABILIZATION MUST BE COMPLETED IN ONE DAY WITHIN THE PUMP AROUND AREAS BETWEEN THE IMPERVIOUS DIKES. THE IMPERVIOUS DIKE LOCATIONS AS SHOWN ON THIS SHEET ONLY SHOW THE UPPER AND LOWER EXTENT OF WORK FOR EACH STREAM SEGMENT. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE LOCATION OF THE IMPERVIOUS DIKES FOR EACH DAY'S WORK.
8. REMOVE SPECIAL STILLING BASINS AND BACKFILL. STABILIZE DISTURBED AREA WITH SEED AND MULCH.

SPECIAL STILLING BASIN WITH ROCK PAD



Not To Scale

Note: Provide Stabilized Outlet to Streambank

 new mixture

Stream Relocation Seeding And Mulching (6)

Seeding and mulching shall be performed on the disturbed areas adjacent to the Stream Relocation construction within a 50 foot (16 meter) zone on both sides of the stream(or depression), measured from top of streambank, (or center of depression).

The kinds of seed and fertilizer, and the rates of application of seed, fertilizer, and limestone, shall be as stated below. During periods of overlapping dates, the kind of seed to be used shall be determined by the Engineer. All rates are in pounds per acre (kilograms per hectare).

August 1 - June 1		May 1 - September 1	
25# (28kg)	Kentucky Bluegrass	25# (28kg)	Kentucky Bluegrass
10# (12kg)	Side Oats Grama	10# (12kg)	Side Oats Grama
10# (12kg)	Weeping Love Grass	10# (12kg)	Weeping Love Grass
30#(34kg)	Switchgrass	30#(34kg)	Switchgrass
35#(39kg)	Rye Grain	25#(28kg)	Browntop Millet
500# (560kg)	Fertilizer	500# (560kg)	Fertilizer
4000# (4500kg)	Limestone	4000# (4500kg)	Limestone

Approved Kentucky Bluegrass Cultivars:

Adelphi	Baron	Bristol	Challenger
Columbia	Fylking	Glade	Kenblue
Merit	Plush	Ram I	Rugby
Sydsport	Touchdown	Vantage	

Fertilizer shall be 10-20-20 analysis. Upon written approval of the Engineer, a different analysis of fertilizer may be used provided the 1-2-2 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as a 10-20-20 analysis.

Temporary Seeding:

Fertilizer shall be the same analysis as specified for "Seeding and Mulching" and applied at the rate of 400 pounds (450kg) and seeded at the rate of 50 pounds per acre (55kg per hectare). German Millet or Browntop Millet shall be used in summer months and rye grain during the remainder of the year. The Engineer will determine the exact dates for using each kind of seed.

Fertilizer Topdressing:

Fertilizer used for topdressing shall be 16-8-8 grade and shall be applied at the rate of 500 pounds per acre (560 kg per hectare). Upon written approval of the Engineer, a different analysis of fertilizer may be used provided the 2-1-1 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as 16-8-8 analysis.

Supplemental Seeding:

The kinds of seed and proportions shall be the same as specified for "Seeding and Mulching", and the rate of application may vary from 25# to 75# per acre (28kg to 85kg per hectare). The actual rate per acre (hectare) will be determined by the Engineer prior to the time of topdressing and the Contractor will be notified in writing of the rate per acre (hectare), total quantity needed, and areas on which to apply the supplemental seed. Minimum tillage equipment, consisting of a sod seeder shall be used for incorporating seed into the soil as to prevent disturbance of existing vegetation. A clodbuster (ball and chain) may be used where degree of slope prevents the use of a sod seeder.

Seeding and mulching shall be performed in accordance with Section 1660 of the Standard Specifications and vegetative cover sufficient to restrain erosion shall be installed immediately following grade establishment.

TIP PROJECT: B-3157

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	B-3157	EC-1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION

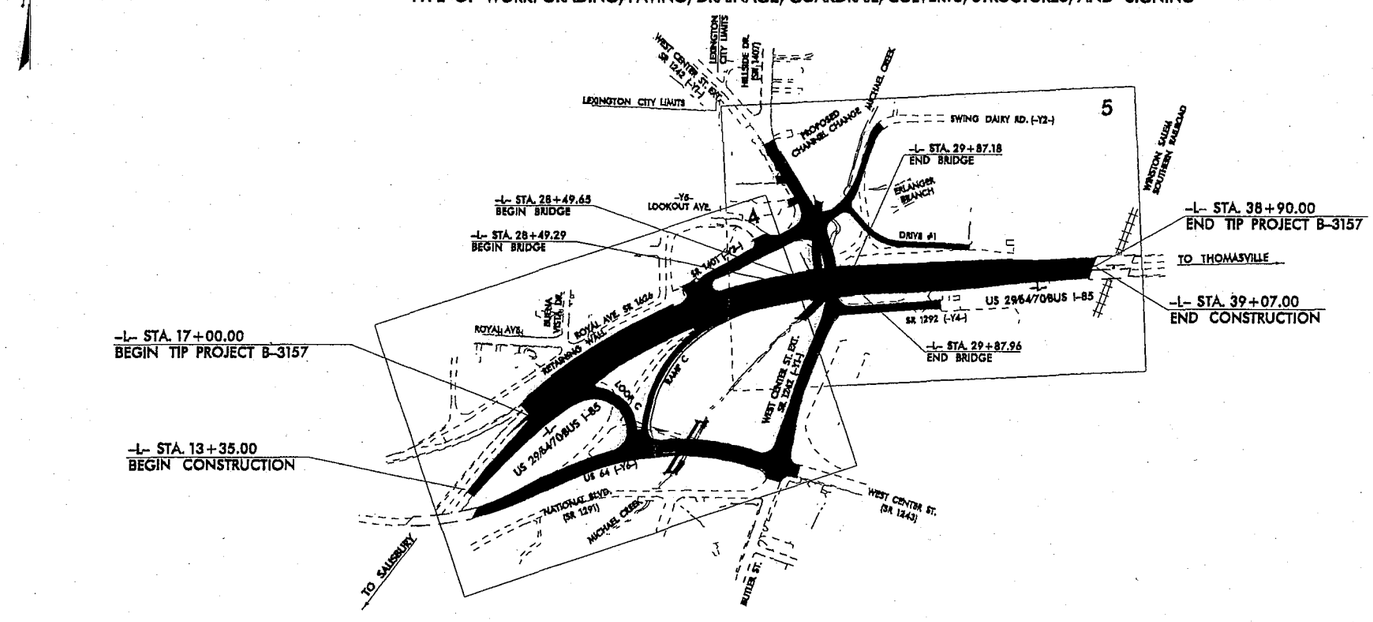
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PLAN FOR PROPOSED
HIGHWAY EROSION CONTROL

DAVIDSON COUNTY

LOCATION: BRIDGE NOS. 74 AND 76 OVER SR 1242 AND MICHAEL CREEK AND APPROACHES ON US 29/64/70 & I-85 BUSINESS

TYPE OF WORK: GRADING, PAVING, DRAINAGE, GUARDRAIL, CULVERTS, STRUCTURES, AND SIGNING



EROSION AND SEDIMENT CONTROL MEASURES

Std. #	Description	Symbol
	Reforestation	
1630.03	Temporary Silt Ditch	TSD
1630.05	Temporary Diversion	TD
1605.01	Temporary Silt Fence	
1606.01	Special Sediment Control Fence	
1622.01	Temporary Berms and Slope Drains	
1630.01	Riser Basin	
1630.02	Silt Basin Type B	
1633.01	Temporary Rock Silt Check Type-A	
1633.02	Temporary Rock Silt Check Type-B	
1634.01	Temporary Rock Sediment Dam Type-A	
1634.02	Temporary Rock Sediment Dam Type-B	
1635.01	Rock Pipe Inlet Sediment Trap Type-A	
1635.02	Rock Pipe Inlet Sediment Trap Type-B	
1636.01	Rock Silt Screen	
1630.04	Stilling Basin	
	Rock Inlet Sediment Trap:	
1632.01	Type A	A -OR- A
1632.02	Type B	B -OR- B
1632.03	Type C	C -OR- C

THIS PROJECT CONTAINS EROSION CONTROL PLANS FOR CLEARING AND GRUBBING PHASE OF CONSTRUCTION.

ENVIRONMENTALLY SENSITIVE AREA(S) EXIST ON THIS PROJECT

Refer To E. C. Special Provisions for Special Considerations.

GRAPHIC SCALE

0
PLANS

0
PROFILE (HORIZONTAL)

0
PROFILE (VERTICAL)

ROADSIDE ENVIRONMENTAL UNIT
DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

Prepared in the Office of:

ROADSIDE ENVIRONMENTAL UNIT

1 South Wilmington St.
Raleigh, NC 27611

2002 STANDARD SPECIFICATIONS

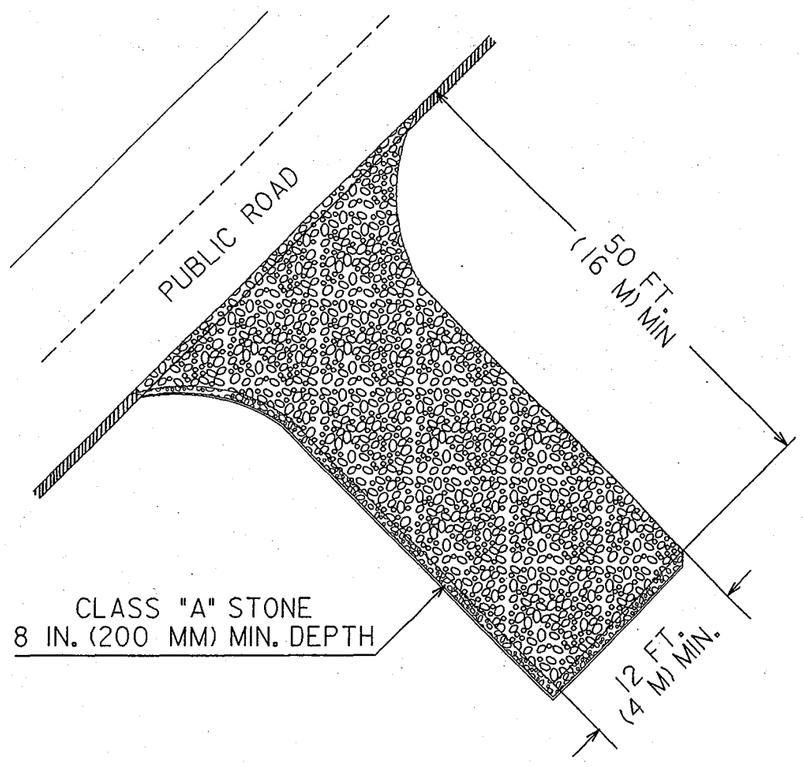
Roadway Standard Drawings

The following roadway english standards as appear in "Roadway Standard Drawings"– Roadway Design Unit – N. C. Department of Transportation – Raleigh, N. C., dated January 20, 2002 and the latest revison thereto are applicable to this project and by reference hereby are considered a part of these plans.

1605.01 Temporary Silt Fence
1622.01 Temporary Berms and Slope Drains
1630.02 Silt Basin Type B
1630.03 Temporary Silt Ditch
1630.04 Stilling Basin
1630.05 Temporary Diversion
1632.03 Rock Inlet Sediment Trap Type C
1633.01 Temporary Rock Silt Check Type A
1634.02 Temporary Rock Sediment Dam Type B

PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
B-3157	EC-2	
STATE PROJECT NO.	F.A. PROJ. NO.	DESCRIPTION

TEMPORARY GRAVEL CONSTRUCTION ENTRANCE



NOTES:

1. TURNING RADIUS SUFFICIENT TO ACCOMODATE LARGE TRUCKS SHALL BE PROVIDED.
2. ENTRANCE(S) SHOULD BE LOCATED TO PROVIDE FOR UTILIZATION BY ALL CONSTRUCTION VEHICLES.
3. MUST BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR DIRECT FLOW OF MUD ONTO STREETS. PERIODIC TOPDRESSING WITH STONE WILL BE NECESSARY.
4. ANY MATERIAL TRACKED ONTO THE ROADWAY MUST BE CLEANED UP IMMEDIATELY.
5. GRAVEL CONSTRUCTION ENTRANCE SHALL BE LOCATED AT ALL POINTS OF INGRESS AND EGRESS UNTIL SITE IS STABILIZED. FREQUENT CHECKS OF THE DEVICE AND TIMELY MAINTENANCE MUST BE PROVIDED.
6. NUMBER AND LOCATION OF CONSTRUCTION ENTRANCES TO BE DETERMINED BY THE ENGINEER

NOTE: FILTER FABRIC TO BE PLACED BENEATH STONE

PROJECT REFERENCE NO.	SHEET NO.
B-3157	EC-3/CONST. 4
HYDRAULICS ENGINEER	ROADWAY DESIGN ENGINEER

NOTE:
PLACE TEMPORARY ROCK SEDIMENT DAMS TYPE- B AND TEMPORARY ROCK SILT CHECKS TYPE-A AT DRAINAGE OUTLETS.

CLEARING AND GRUBBING EROSION CONTROL FOR CONSTRUCTION SHEET 4

VERTICAL DATUM USED IS NGVD 29

ENVIRONMENTALLY SENSITIVE AREA SEE PROJECT SPECIAL PROVISIONS

25' 0 50'

-L-

PI Sta 22+22.47
Δ = 34° 52' 55.7" (RT)
D = 03°01'53.5"
L = 1,150.65'
T = 593.78'
R = 1,890.00'
Se = 0.06

PIs Sta 29+39.58
θs = 7° 16' 32.4"
Ls = 480.00'
ST = 160.25'
LT = 320.27'

-Y3-

PI Sta 11+92.38
Δ = 25° 58' 44.3" (RT)
D = 81°51'04.0"
L = 31.74'
T = 16.15'
R = 70.00'
Se = NC

PI Sta 14+26.76
Δ = 02° 45' 33.6" (RT)
D = 04°00'00"
L = 68.98'
T = 34.50'
R = 1432.39'
Se = NC

-Y1-

PI Sta 24+55.50
Δ = 10° 23' 06.6" (LT)
D = 2°15' 00"
L = 461.56'
T = 231.42'
R = 2,546.48'
Se = EXIST.

PI Sta 27+66.75
Δ = 8° 05' 50.0" (RT)
D = 5° 00' 00"
L = 161.94'
T = 81.11'
R = 1,145.92'
R = EXIST.

RAMP C

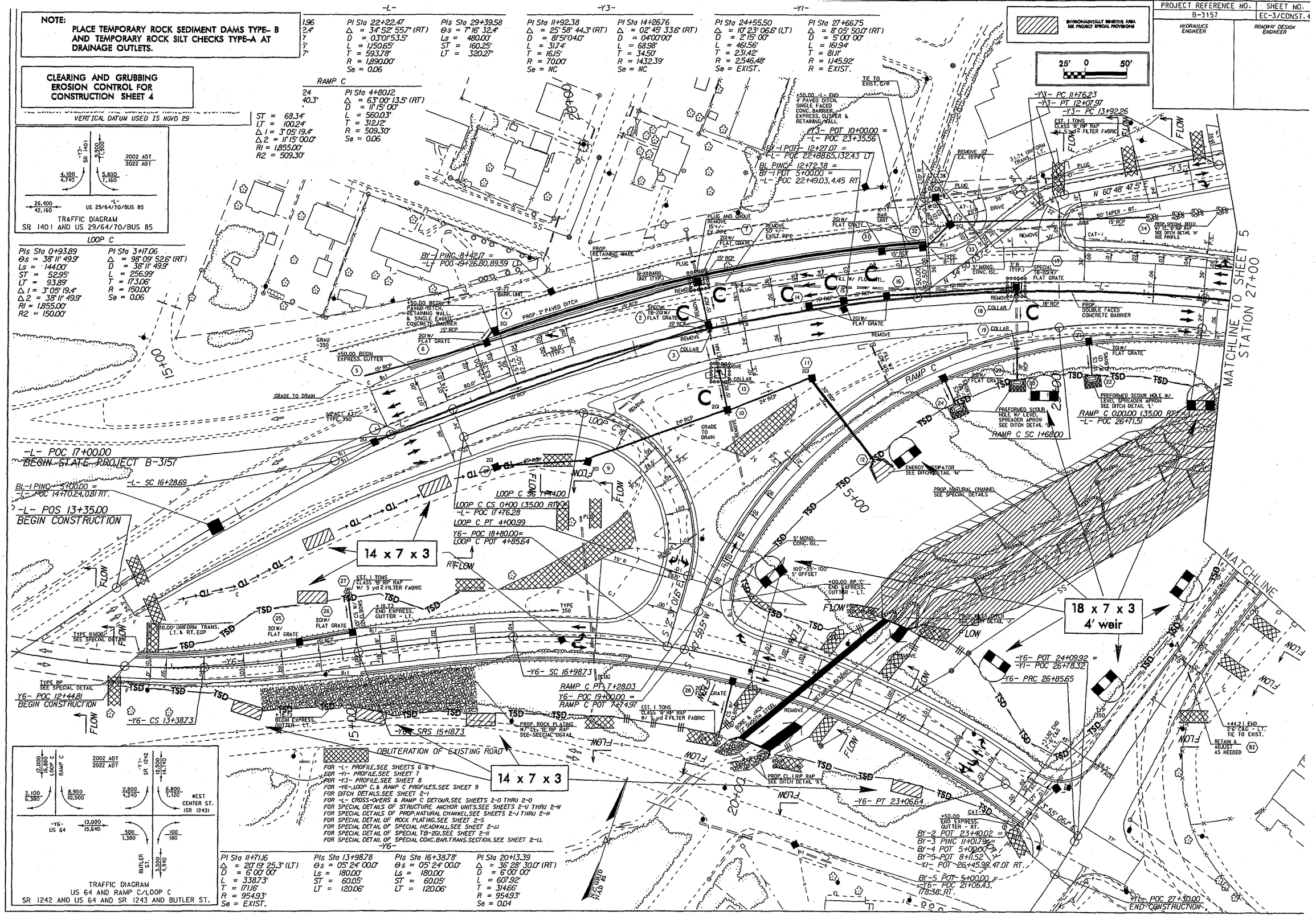
PI Sta 4+80.12
Δ = 63° 00' 13.5" (RT)
D = 11° 15' 00"
L = 560.03'
T = 312.12'
R = 509.30'
Se = 0.06

ST = 68.34'
LT = 100.24'
Δ 1 = 3° 05' 19.4"
Δ 2 = 11° 15' 00.0"
RI = 1,855.00'
R2 = 509.30'

LOOP C

PIs Sta 0+93.89
θs = 38° 11' 49.9"
Ls = 144.00'
ST = 52.95'
LT = 93.89'
Δ 1 = 3° 05' 19.4"
Δ 2 = 38° 11' 49.9"
RI = 1,855.00'
R2 = 150.00'

PI Sta 3+17.06
Δ = 98° 09' 52.6" (RT)
D = 38° 11' 49.9"
L = 256.99'
T = 173.06'
R = 150.00'
Se = 0.06

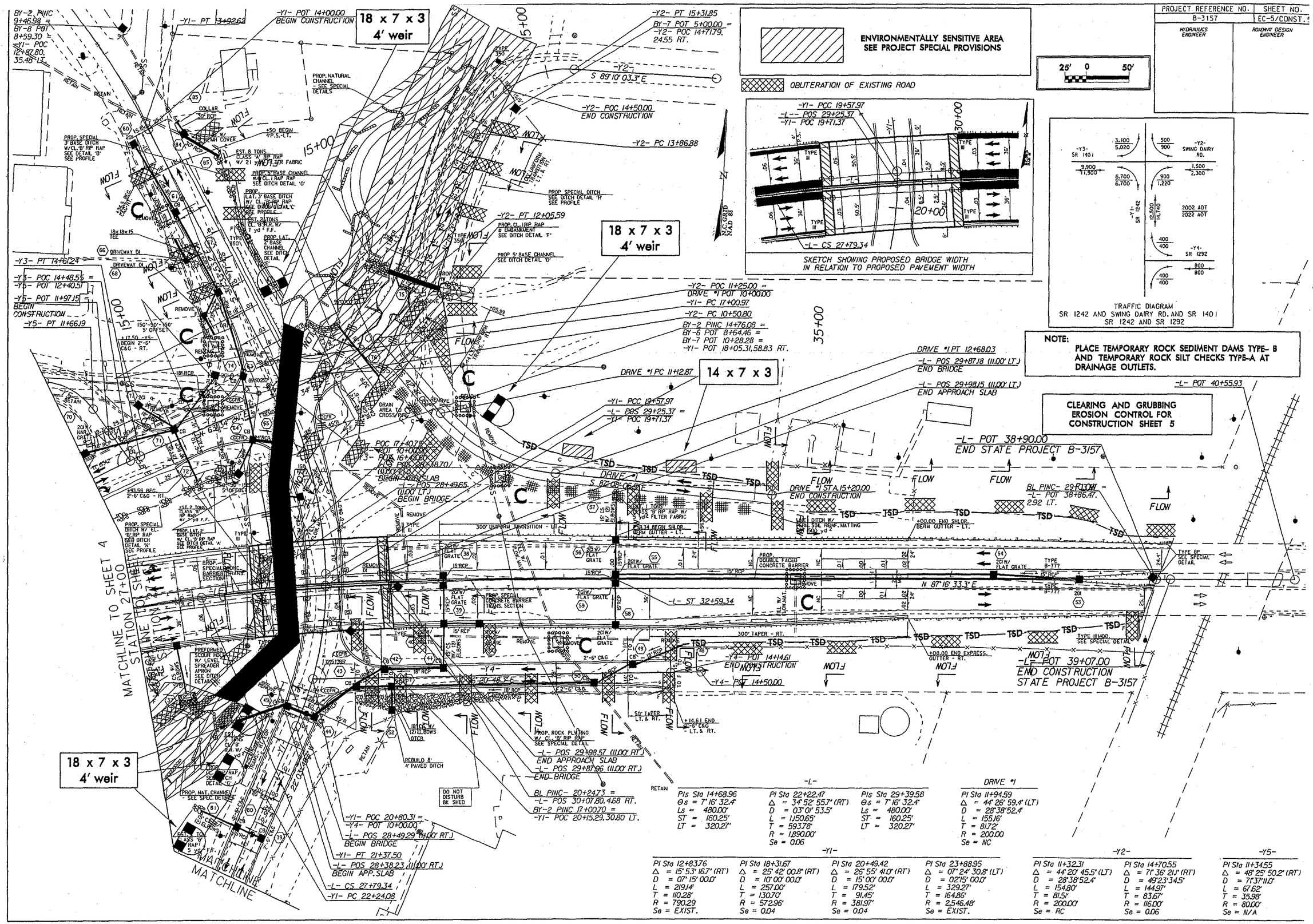


PROJECT REFERENCE NO.	SHEET NO.
B-3157	EC-5/CONST. 5
HYDRAULICS ENGINEER	ROADWAY DESIGN ENGINEER

ENVIRONMENTALLY SENSITIVE AREA
SEE PROJECT SPECIAL PROVISIONS

OBLITERATION OF EXISTING ROAD

25' 0 50'



SKETCH SHOWING PROPOSED BRIDGE WIDTH
IN RELATION TO PROPOSED PAVEMENT WIDTH

TRAFFIC DIAGRAM
SR 1242 AND SWING DAIRY RD. AND SR 1401
SR 1242 AND SR 1292

NOTE:
PLACE TEMPORARY ROCK SEDIMENT DAMS TYPE- B AND TEMPORARY ROCK SILT CHECKS TYPE-A AT DRAINAGE OUTLETS.

-L-

PI Sta 14+68.96	PI Sta 22+22.47	PI Sta 29+39.58
θs = 7° 16' 32.4"	Δ = 34° 52' 55.7" (RT)	θs = 7° 16' 32.4"
Ls = 480.00'	D = 03° 01' 53.5"	Ls = 480.00'
ST = 160.25'	L = 1,150.65'	ST = 160.25'
LT = 320.27'	T = 593.78'	LT = 320.27'
	R = 1,890.00'	
	Se = 0.06	

DRIVE *1

PI Sta 11+94.59
Δ = 44° 26' 59.4" (LT)
D = 28° 38' 52.4"
L = 155.16'
T = 81.72'
R = 200.00
Se = NC

-Y1-

PI Sta 12+83.76	PI Sta 18+31.67	PI Sta 20+49.42	PI Sta 23+88.95
Δ = 15° 53' 16.7" (RT)	Δ = 25° 42' 00.8" (RT)	Δ = 26° 55' 41.0" (RT)	Δ = 07° 24' 30.8" (LT)
D = 07° 15' 00.0"	D = 10° 00' 00.0"	D = 15° 00' 00.0"	D = 02° 15' 00.0"
L = 219.14'	L = 257.00'	L = 179.52'	L = 329.27'
T = 110.28'	T = 130.70'	T = 91.45'	T = 164.86'
R = 790.29	R = 572.96'	R = 381.97'	R = 2,546.48'
Se = EXIST.	Se = 0.04	Se = 0.04	Se = EXIST.

-Y2-

PI Sta 11+32.31	PI Sta 14+70.55
Δ = 44° 20' 45.5" (LT)	Δ = 71° 36' 21.1" (RT)
D = 28° 38' 52.4"	D = 49° 23' 34.5"
L = 154.80'	L = 144.97'
T = 81.51'	T = 83.67'
R = 200.00'	R = 116.00'
Se = RC	Se = 0.06

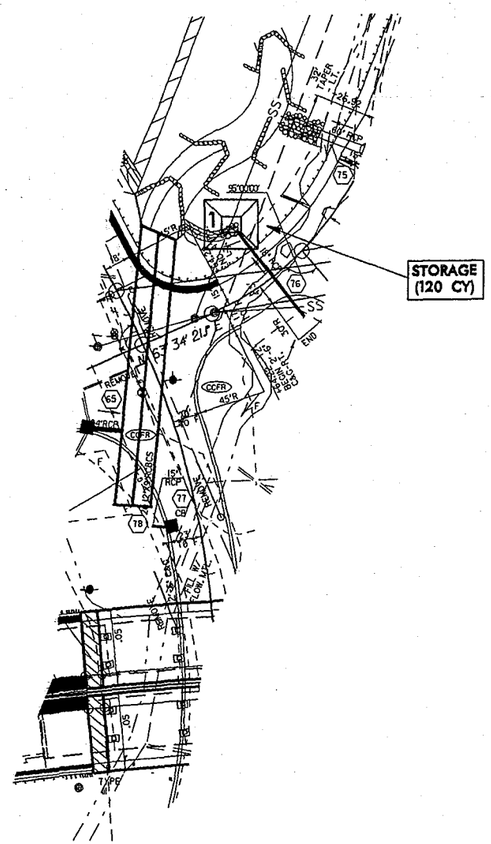
-Y5-

PI Sta 11+34.55
Δ = 48° 25' 50.2" (RT)
D = 71° 37' 11.0"
L = 67.62'
T = 35.98'
R = 80.00'
Se = N/A

PROJECT REFERENCE NO.	SHEET NO.
B-3157	EC-6/CONST.5
HYDRAULICS ENGINEER	ROADWAY DESIGN ENGINEER

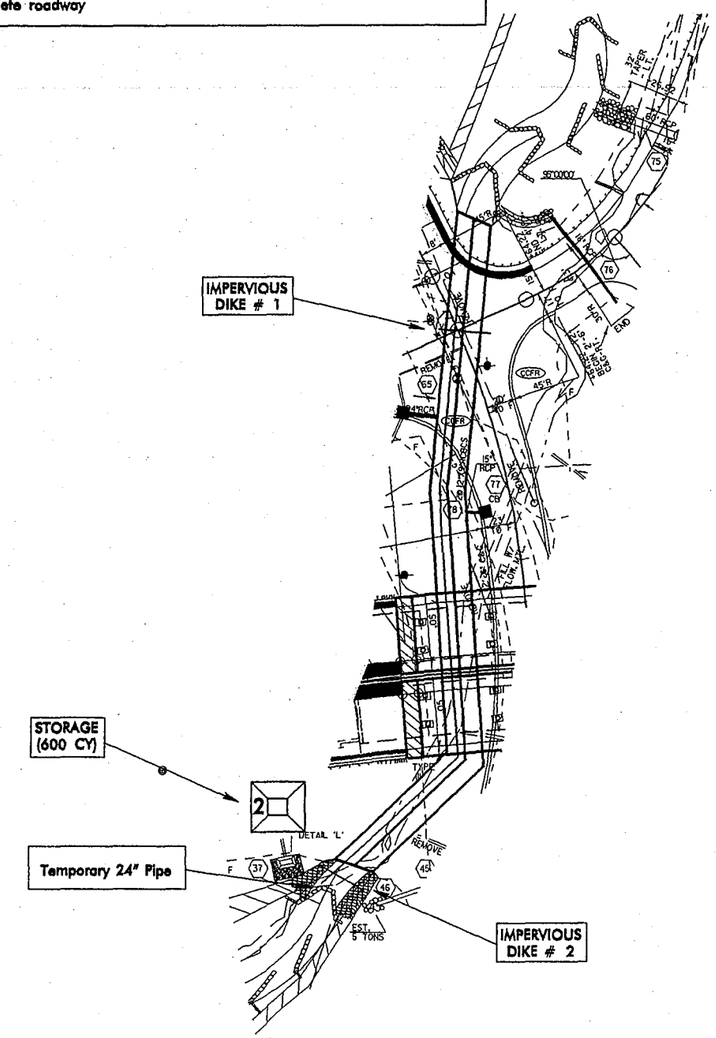
CULVERT PHASE I
CONSTRUCTION SEQUENCE (-Y-1 STA. 17 +48)

1. Construct channel relocation upstream of culvert, including all vanes and cross vanes, and install vegetation
2. Construct stilling basin #1 (120 CY volume)
3. Construct upstream most 94 feet of culvert

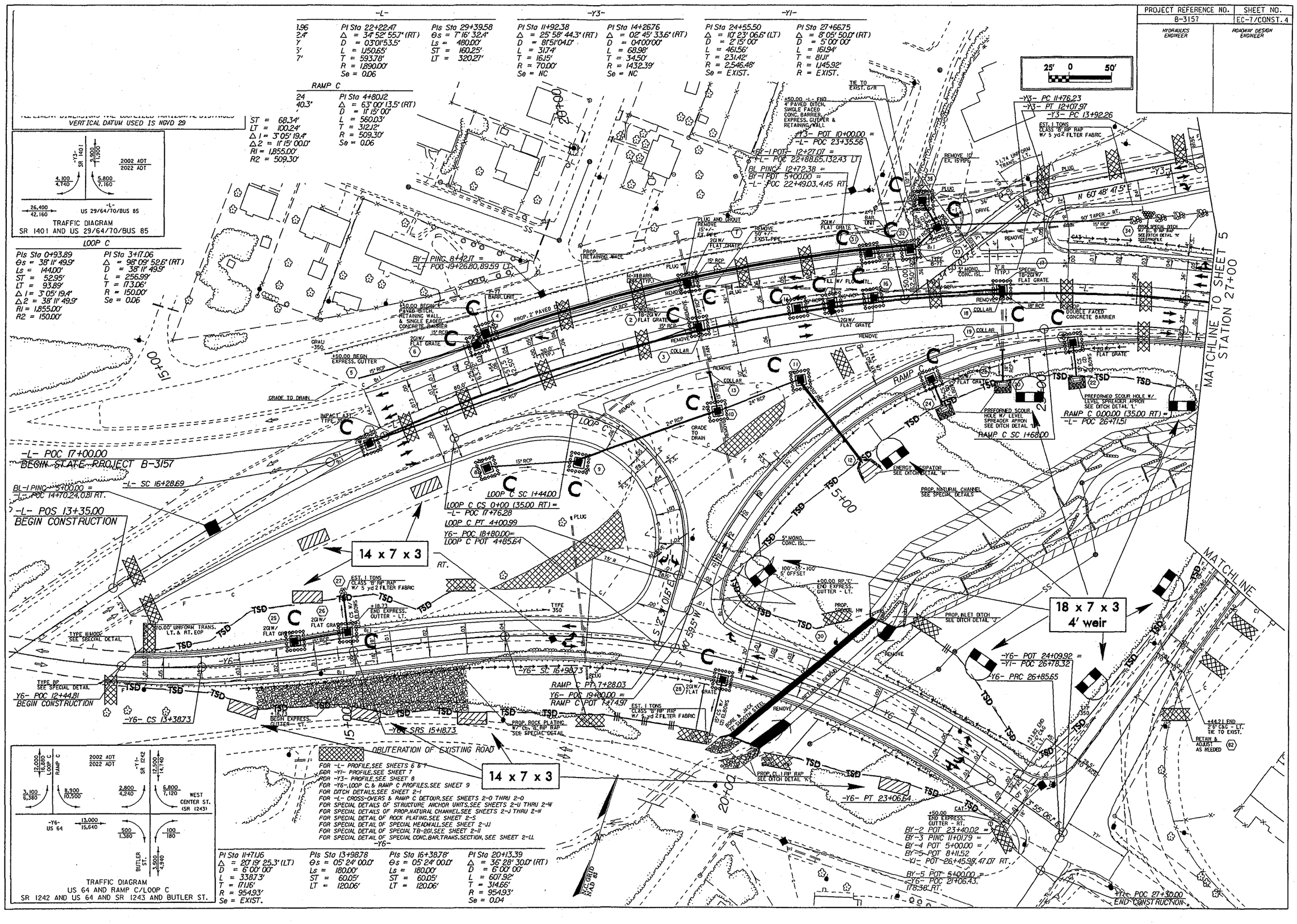


CULVERT PHASE I
CONSTRUCTION SEQUENCE (-Y-1 STA. 17 +48)

1. Install impervious dikes #1 and # 2
2. Install temporary 24" pipe
3. Once vegetation is established in channel relocation, divert water through the new channel and the newly constructed portion of the culvert
4. Construct temporary detour over new culvert
5. Construct stilling basin # 2 (600 CY volume)
6. Construct remainder of culvert
7. Complete roadway



PROJECT REFERENCE NO.	SHEET NO.
B-3157	EC-7/CONST. 4
HYDRAULICS ENGINEER	ROADWAY DESIGN ENGINEER

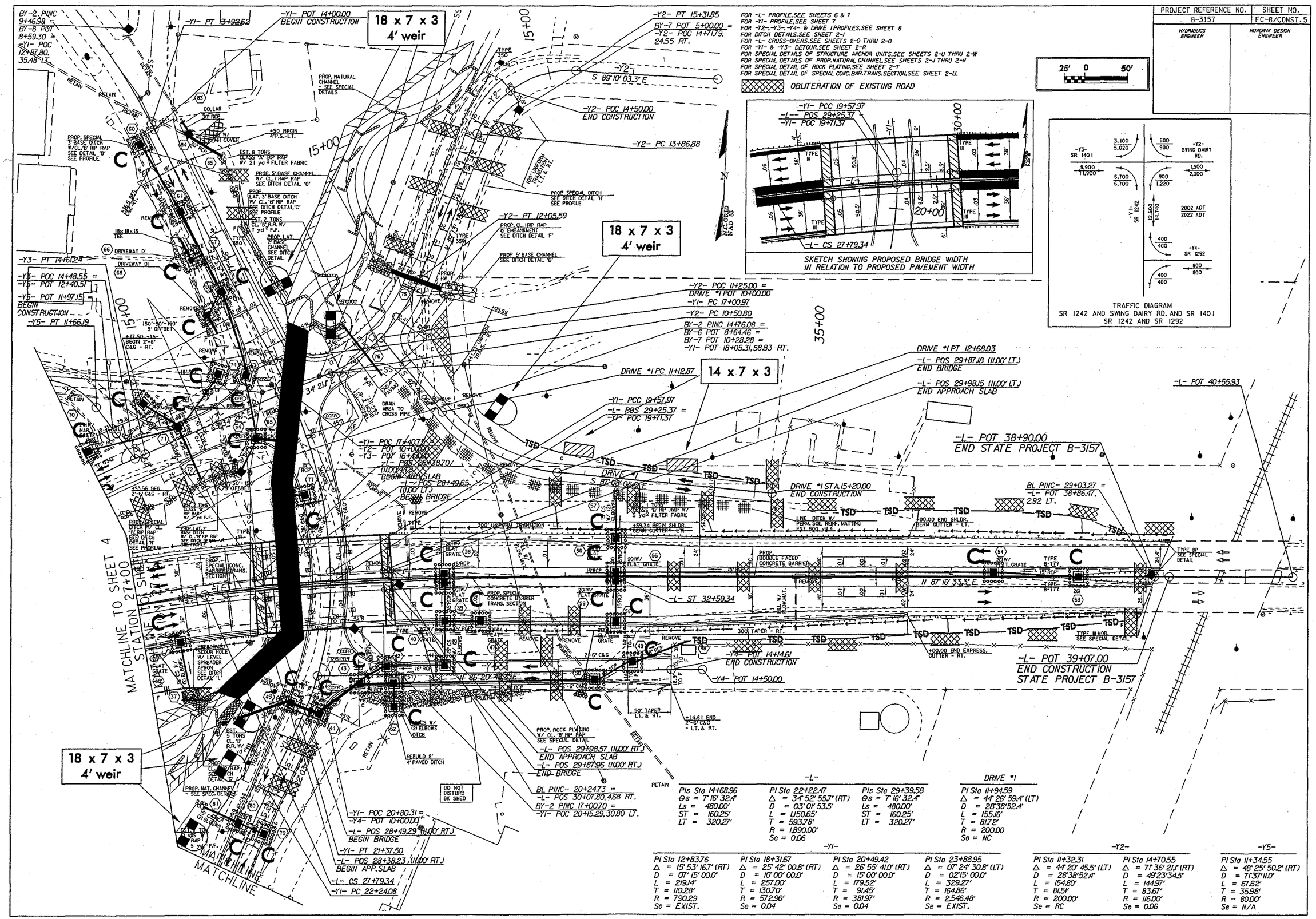


PROJECT REFERENCE NO.	SHEET NO.
B-3157	EC-8/CONST.5
HYDRAULICS ENGINEER	ROADWAY DESIGN ENGINEER

FOR -L- PROFILE, SEE SHEETS 6 & 7
FOR -Y1- PROFILE, SEE SHEET 7
FOR -Y2-, -Y3-, -Y4- & DRIVE 1 PROFILES, SEE SHEET 8
FOR DITCH DETAILS, SEE SHEET 2-I
FOR -L- CROSS-OVERS, SEE SHEETS 2-O THRU 2-O
FOR -Y1- & -Y3- DETOUR, SEE SHEET 2-R
FOR SPECIAL DETAILS OF STRUCTURE ANCHOR UNITS, SEE SHEETS 2-U THRU 2-W
FOR SPECIAL DETAILS OF PROP. NATURAL CHANNEL, SEE SHEETS 2-J THRU 2-N
FOR SPECIAL DETAIL OF ROCK PLATING, SEE SHEET 2-T
FOR SPECIAL DETAIL OF SPECIAL CONC. BAR. TRANS. SECTION, SEE SHEET 2-LL

OBLITERATION OF EXISTING ROAD

25' 0 50'



-L-		
PIs Sta 14+68.96	PI Sta 22+22.47	PIs Sta 29+39.58
Θs = 7° 16' 32.4"	Δ = 34° 52' 55.7" (RT)	Θs = 7° 16' 32.4"
Ls = 480.00'	D = 03° 01' 53.5'	Ls = 480.00'
ST = 160.25'	L = 1,150.65'	ST = 160.25'
LT = 320.27'	T = 593.78'	LT = 320.27'
	R = 1,890.00'	
	Se = 0.06	

DRIVE #1
PI Sta 11+94.59
Δ = 44° 26' 59.4" (LT)
D = 28° 38' 52.4"
L = 155.16'
T = 81.72'
R = 200.00
Se = NC

-Y1-			
PI Sta 12+83.76	PI Sta 18+31.67	PI Sta 20+49.42	PI Sta 23+88.95
Δ = 15° 53' 16.7" (RT)	Δ = 25° 42' 00.8" (RT)	Δ = 26° 55' 41.0" (RT)	Δ = 07° 24' 30.8" (LT)
D = 07° 15' 00.0"	D = 10° 00' 00.0"	D = 15° 00' 00.0"	D = 02° 15' 00.0"
L = 219.14'	L = 257.00'	L = 179.52'	L = 329.27'
T = 110.28'	T = 130.70'	T = 91.45'	T = 164.86'
R = 790.29	R = 572.96'	R = 381.97'	R = 2,546.48'
Se = EXIST.	Se = 0.04	Se = 0.04	Se = EXIST.

-Y2-		-Y5-
PI Sta 11+32.31	PI Sta 14+70.55	PI Sta 11+34.55
Δ = 44° 20' 45.5" (LT)	Δ = 71° 36' 21.1" (RT)	Δ = 48° 25' 50.2" (RT)
D = 28° 38' 52.4"	D = 49° 23' 34.5"	D = 71° 37' 11.0"
L = 154.80'	L = 144.97'	L = 67.62'
T = 81.51'	T = 83.67'	T = 35.98'
R = 200.00'	R = 116.00'	R = 80.00'
Se = RC	Se = 0.06	Se = N/A