

EMERGENCY WATERSHED PROTECTION

LU-21-001

18 NORTH MAIN STREET
SHAVERTOWN, PA 18708
LUZERNE COUNTY



BID PACKAGE

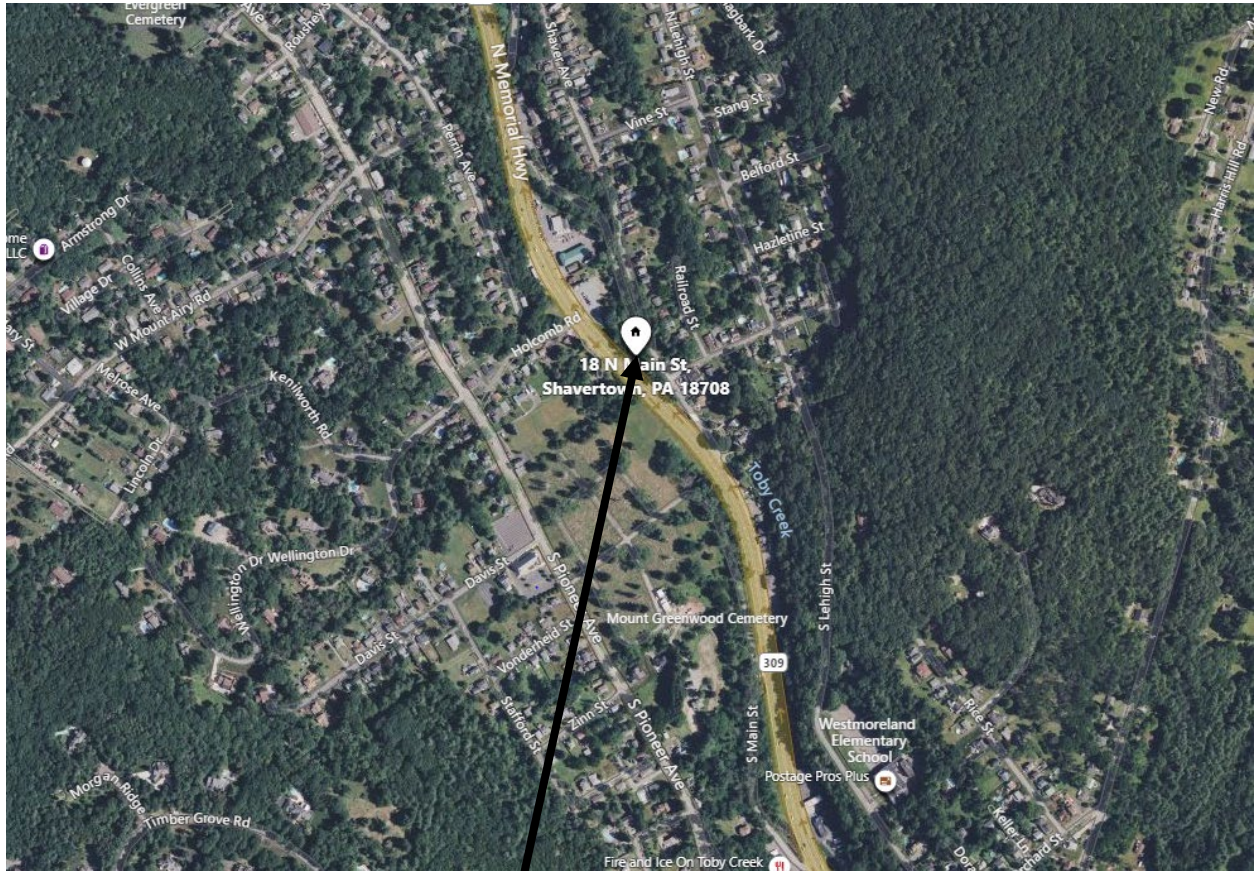
By: Justin Groshek

March 2022

Approved By: *Pamela Smith* Date: 3/31/22

LU-21-001

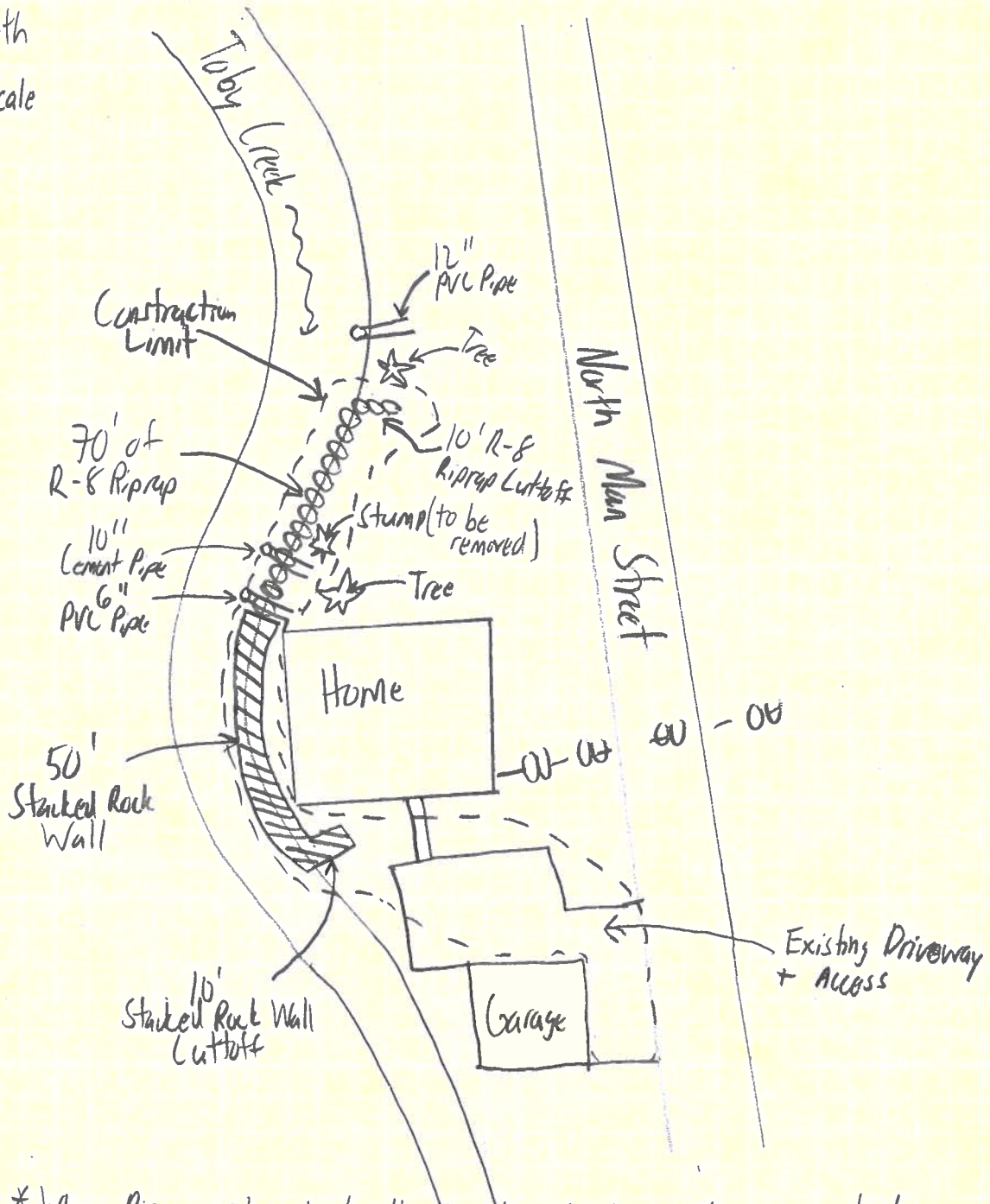
18 North Main Street,
Shavertown, PA 18708
Luzerne County



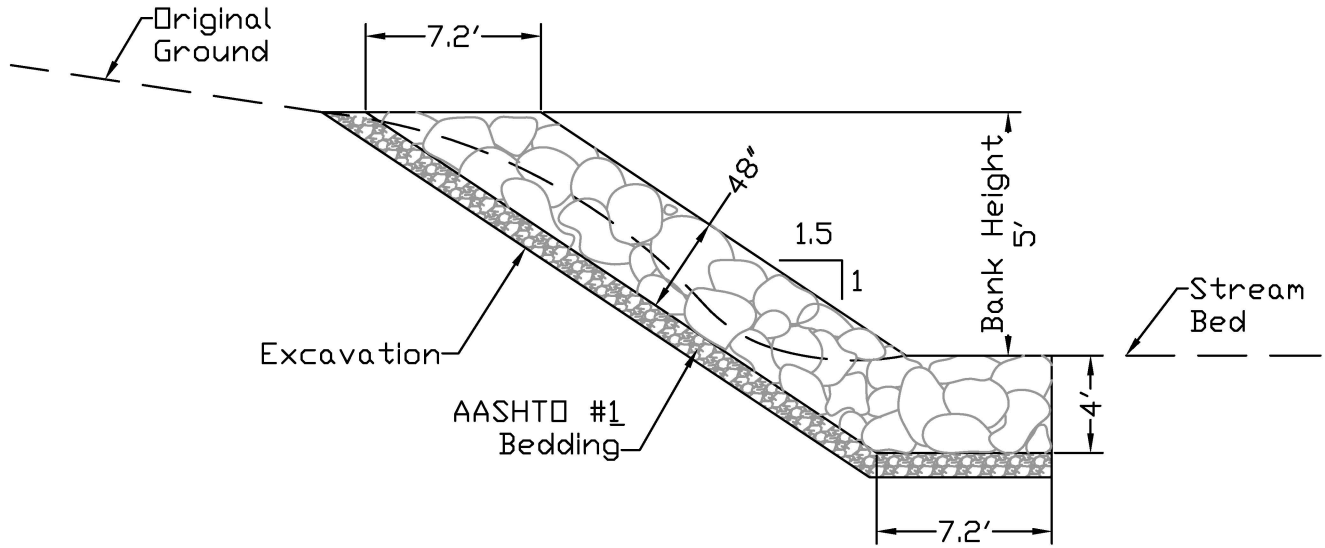
LU-21-001
18 North Main Street

Site Location: 18 North Main St., Shavertown, PA 18708

↑ North
Not to Scale



- Notes:
- * Where Pipes exist, extend all pipes through riprap allowing pipes to have a free Outlet
 - * The 70' of R-8 Riprap will have a 5' bank height
 - * The 50' of Stacked Rock Wall will have a total height of 10', 4' will be buried (3' rock, 1' concrete) and 6' exposed to act as a bank
 - * The 1' concrete will be a Class A Concrete Leveling Pad
 - * Safety Fence will be required on top of the Stacked Rock Wall
 - * The Overhead Utility goes from the house and cross North Main Street



Cross Section

Gradation Name	Riprap Gradations				Bedding	
	Size - Inches ^{1/} (sq. opening ^{2/})				Gradation	Thickness
	D ₁₀₀	D ₈₅	D ₅₀ ^{3/}	D ₁₅	AASHTO	(inches)
R-5	18	15	9	4	#57	5
R-6	24	20	12	6	#1	6
R-7	30	26	18	12	#1	6
R-8	42	36	24	15	#1	6

^{1/}The subscript number is the maximum percent, by weight, which may be smaller than the respective size.

^{2/}The nominal size of a rock is that dimension (middle or composite average) which passes through a square opening with the same side dimension; i.e. it is not the longest dimension.

^{3/}At least 15%, by weight of the gradation, must be smaller than the D₅₀ size.

Notes:

- Install R-8 Riprap along 80' of stream bank, including upstream cutoff
- Bank height is approximately 5' for Riprap section

(NOT TO SCALE)

SHEET NO. _____ OF _____

DRAWING NO. _____

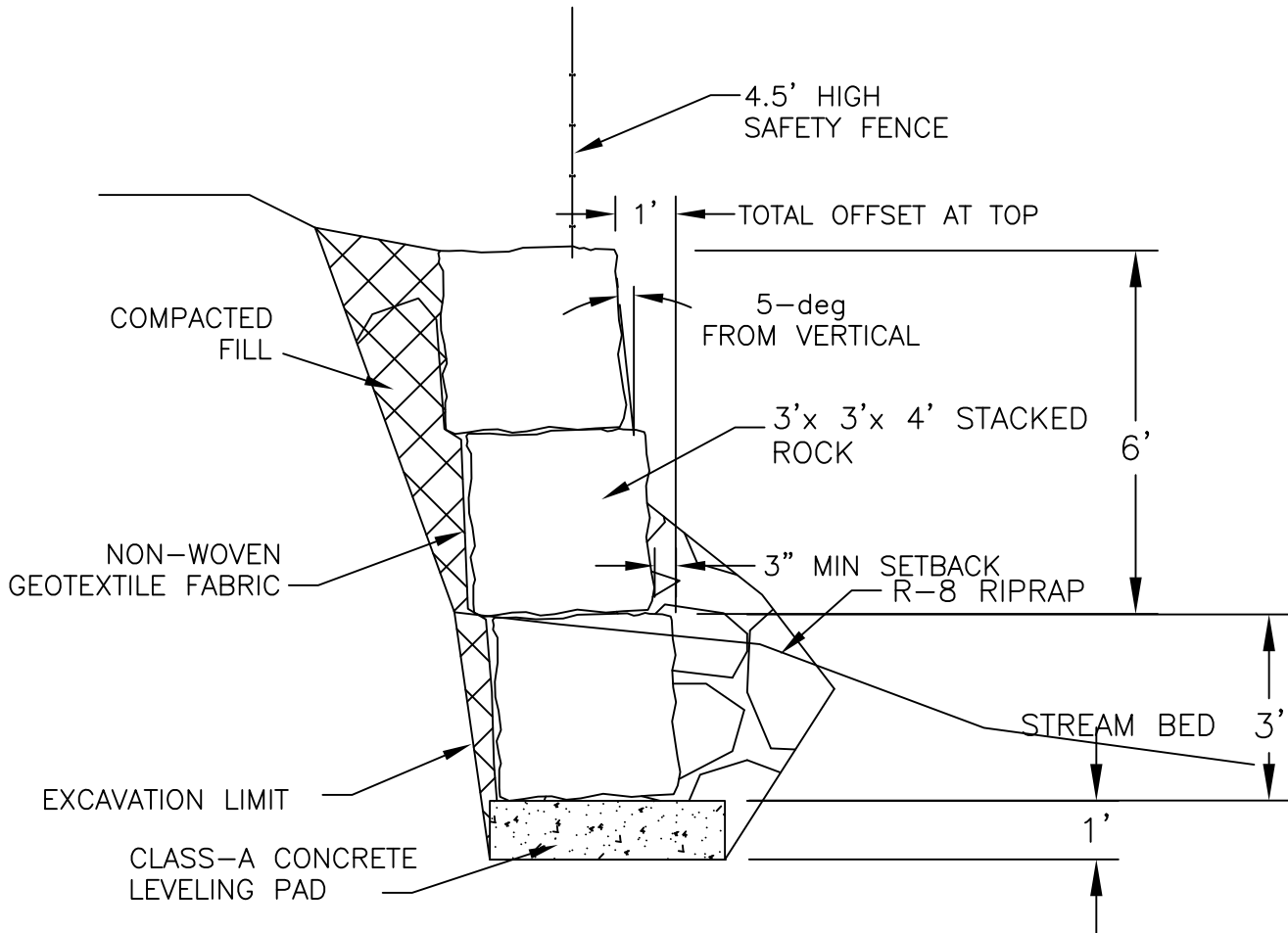
CAD FILE NAME _____



LUZERNE COUNTY, PENNSYLVANIA

Riprap Detail

DESIGNED _____ DATE _____
 DRAWN _____
 CHECKED _____
 APPROVED _____
 TITLE _____



NOTES:

- STAGGER ALL VERTICAL JOINTS BETWEEN ROCKS IN ADJACENT ROWS.
- SETBACK SHALL BE UNIFORM ON EACH ROW OF ROCKS.
- INSTALL ROCK FACE TO MATCH UPSTREAM AND DOWNSTREAM STONE WALLS.
- USE CLASS A CONCRETE LEVELING PAD IF BEDROCK IS LESS THAN 2.5' BELOW INVERT OF STREAM.
- INSTALL 60' OF STACKED ROCK WALL, INCLUDING DOWNSTREAM CUTOFF.

SHEET NO. _____ OF _____

DRAWING NO. _____

CAD FILE NAME _____

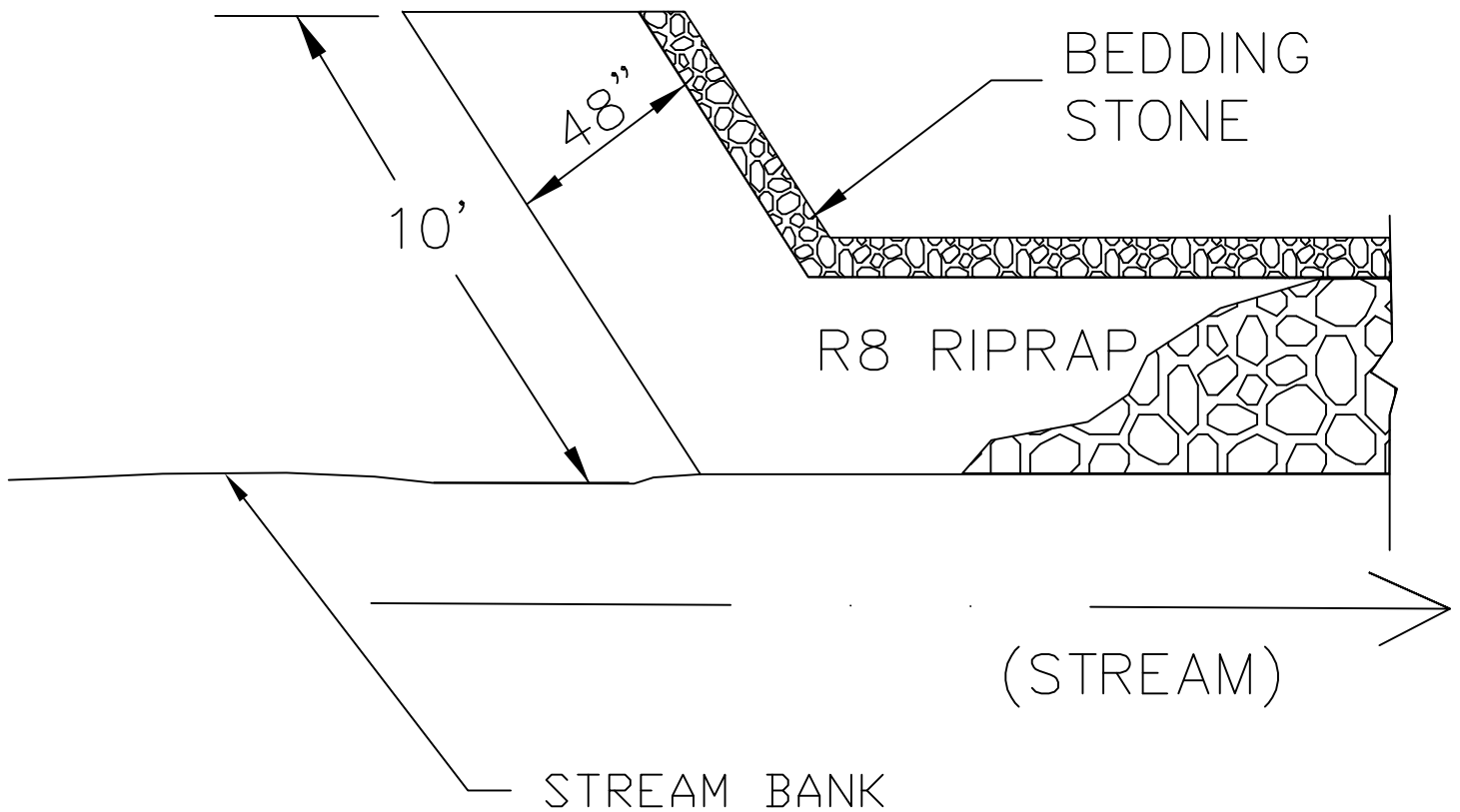


LUZERNE COUNTY, PENNSYLVANIA

Stacked Rock Detail

DESIGNED	JEG	DATE	03/22
DRAWN	_____		_____
CHECKED	_____		_____
APPROVED	_____		_____
TITLE	_____		_____

RIPRAP CUTOFF DETAIL



NOTE:

INSTALL THE RIPRAP CUTOFF
ON THE UPSTREAM
END OF THE RIPRAP.

**ITEMS OF WORK RELATED TO
THE TECHNICAL SPECIFICATIONS AND DRAWINGS
EWP SITE: LU-21-001**

1. Data concerning the utilities at this site has been obtained from Pennsylvania One-Call System, Serial No. [20220760711](#). Accuracy of this data is not guaranteed. The Contractor must contact the PA One-Call System (1-800-242-1776) at least 3, but not more than 10, working days prior to the commencement of construction for utility information.
2. The Contractor is responsible for the protection of any private or public facilities in the work area for the duration of the contract. The Contractor will be responsible for repairing any of their damages to a condition equal to or better than before work condition. No additional compensation will be made for damaged facility repair.
3. The primary scope of work for this project includes installation shaping the streambank and installation of a total of approximately 60' of Stacked Rock and 80' of R-8 riprap as shown on the site plan map. There is a bank height of 5' to 6' and Stacked Rock and riprap shall be installed to top of bank. A 4' key into the streambed will be installed for a total stacked wall height of 10'. The key will be composed of a 1' Class A Leveling Pad as the bottom layer of the stacked rock wall and (1) course of stacked rock. For riprap, the streambank shall be prepared to achieve the desired 1.5:1 slope. Cutoffs shall be installed on each end of the work. Eroded streambank areas shall be provided with fill before the stacked rock or riprap placement, as a first use of excavated material.
4. In Technical Specification R-8 RIPRAP the following changes shall apply:
 - a. Materials and Storage Change
 - i. In lieu of **B-Geotextile** change to **B-Bedding**-bedding shall consist of a uniform layer of AASHTO #1 stone between the prepared sideslope and the R-8 rock riprap. No bedding stone is required in the locations that receive coarse grained backfill (typical of deposition and material that has the fines removed by flowing water). Bedding material shall come from an approved source listed in the current copy of the Commonwealth of Pennsylvania Department of Transportation Bulletin #14, "Aggregate Producers".
 - b. Procedure Change
 - i. In lieu of **C-Geotextile** change to **C-Bedding**-use AASHTO #1 course aggregate. Place the bedding on the prepared area in a uniform layer. No compaction is required. Long slopes may require working the lower portion, complete with riprap, and progressing up the slope in segments.
 - ii. The upstream and downstream end of the riprap shall be protected with a rock filled cutoff trench. The trench shall be excavated to a depth similar to the base of riprap slope protection. Rock of the same gradation, as the riprap slope protection, shall be used to fill the trench.
5. The streambank shall be sloped as indicated on the detail drawings for the stacked rock. A uniform bank alignment is expected with no abrupt bulges or indents. Excavated material, that cannot be used as bedding stone, shall be removed from the site and

disposed of at a location off site chosen by the contractor. Compensation for the streambank preparation shall be included in the payment for Stacked Rock. The work covered in the specification excavation, for the stacked rock is subsidiary to the Stacked Rock specifications and compensation for that work shall be considered part of the Stacked Rock payment. Compensation for the placement of the chain link safety fence is subsidiary to the Stacked Rock specifications and shall be considered part of the Stacked Rock payment.

6. The streambank shall be sloped as indicated on the detail drawing. A uniform bank alignment is expected with no abrupt bulges or indents. Excavated material, that can not be used as bedding stone, shall be removed from the site and disposed of at a location off site chosen by the contractor; this shall include removing and disposing of the stumps on the streambank where the riprap is to be installed. Compensation for the streambank preparation and the removal of excess material and stumps shall be included in the applicable payment for riprap. The work covered in the specification excavation, is subsidiary to the Riprap specifications and compensation for that work shall be considered a part of Riprap payment. Riprap to be placed at the toe of the Stacked Rock to be subsidiary to the Riprap specifications and compensation for that work shall be considered a part of the Riprap payment.
7. Access development shall be considered a component of Mobilization - Demobilization. Compensation for the development of access to the work site, including repair to blacktop driveway shall be included in the payment for Mobilization - Demobilization. The proposed access area is the existing driveway and yard. Access area and yard shall be repaired to original or better conditions after construction is complete. A staging area will be required for the stacked rocks.
8. Implement the erosion control practices as described in the Erosion & Sedimentation Control Guidelines. Erosion and Sedimentation Control shall be subsidiary to the R-8 Riprap item.
9. Work shall be performed from the top of bank as much as possible. When necessary for equipment to work in the stream, effort shall be made to divert the stream flow to the opposite side of channel in comparison to the work. Refer to E&S specification. Stream Diversion shall be subsidiary to the R-8 specifications.
10. All disturbed areas shall be promptly seeded and mulched in accordance with the technical specification, Seeding.

Erosion and Sediment Control Guidelines

The guidelines presented below, which address erosion and sediment control, will be included as a condition of all emergency permits. These guidelines must also be followed when work is conducted under an existing permit or when work is undertaken that does not require a permit.

1. Maps and plans show the location of the project with respect to municipalities, access roads, existing structures or other landmarks. The maps and plans show details of the specific work site(s) including limits of disturbance, stream width, depth, extent of debris and deposition removal, and placement details for bank stabilization materials.
2. Staging areas and construction entrances, including those used for equipment maintenance and servicing should be located away from flowing streams, and shall be stabilized with AASHTO No. 1 rock.
3. All work should be done as quickly as possible, with bank stabilization to occur as segments of debris and deposition removal are completed.
4. Work should be performed from stream banks, as opposed to equipment operating in flowing streams, whenever possible.
5. Rock riprap used to stabilize stream banks or other areas shall be clean, dense, angular, blocky material. Minimum rock size shall be R-8, as rated by the National Stone Association.
6. All disturbed areas not stabilized with rock riprap, other materials, or seeded and mulched, shall be graded to avoid ponding water or concentrated flow. Standard seed mixtures and their specifications should be used. Hay and straw mulch shall be applied to such disturbed areas at a rate of approximately 3 tons to the acre (a loose layer 3/4 to 1 inch thick). Compost may be applied at a rate of 270-540 cubic yards per acre (2 to 4 inch thick uniform layer). Erosion control blankets should be installed/applied according to the manufacturer's specifications.
7. Only clean, non-polluting materials shall be used as fill. Exposed fill surfaces are to be stabilized.
8. Any sediment, trees, brush, or similar material excavated during debris removal shall be deposited in a suitable site away from the areas affected by flooding or wetlands, and stabilized with permanent vegetative cover. Other debris containing harmful or potentially hazardous materials should be disposed of in approved landfills.

These guidelines, and the maps and plans mentioned in item 1, along with any required contract specifications undertaken in cooperation with the Department of Environmental Protection (DEP) and the Natural Resources Conservation Service (NRCS), are considered to be the Erosion and Sedimentation Control Plan for Emergency Watershed Restoration projects.

TECHNICAL SPECIFICATIONS

MOBILIZATION AND DEMOBILIZATION

SCOPE

The work consists of the mobilization and demobilization of the contractor's forces and equipment necessary for performing the work required under the contract. Mobilization will not be considered as work in fulfilling the contract requirements for commencement of work.

PROCEDURE

Mobilization shall include all activities and associated costs for transportation of contractor's personnel, equipment, and operating supplies to the site; establishment of offices, buildings, and other necessary general facilities for the contractor's operations at the site; permits, premiums paid for performance and payment bonds including coinsurance and reinsurance agreements as applicable; and other items specified in Items of Work.

Demobilization shall include all activities and costs for transportation of personnel, equipment, and supplies not required or included in the contract from the site; including the disassembly, removal, and site cleanup of offices, buildings, and other facilities assembled on the site specifically for this contract.

This work includes mobilization and demobilization required by the contract at the time of award. If additional mobilization and demobilization activities and costs are required during the performance of the contract as a result of changed, deleted, or added items of work for which the contractor is entitled to an adjustment in contract price, compensation for such costs will be included in the price adjustment for the item or items of work changed or added.

TECHNICAL SPECIFICATIONS

EXCAVATION

SCOPE

This work is the removal, hauling, and disposal of all materials encountered, as shown on the Drawings.

PROCEDURE

- A. General** – Follow all guidelines set forth in the Construction Industry Standards, OSHA 2207, of the Occupational Safety and Health Administration, U.S. Department of Labor.

Maintain stable slopes. In case of a slide as a result of negligence or carelessness on the Contractor's part, it shall remove and replace material in the slide at no extra cost.

Protect the work, adjacent buildings, and property.

During excavation, keep the top surface graded for drainage. Replace overexcavated work with materials designated by the Inspector.

- B. Excavation** – Remove all materials to the limits shown on the Drawings. During excavation of a channel, keep erosion and interference with the flow of the stream to a minimum.
- C. Disposal** – Incorporate suitable materials from required excavation into the work, providing they meet the requirements of the appropriate sections of these Technical Specifications. If necessary, stockpile suitable materials for later use. Dispose of unsuitable, or excess, materials in spoil area. The Contractor is responsible for securing spoil areas.

TECHNICAL SPECIFICATIONS

R-8 RIPRAP

SCOPE

This work is riprap, as shown on the Drawings, or as directed by the Inspector.

APPLICABLE PUBLICATIONS

Pub.408 - Specifications; Pennsylvania Department of Transportation.

Bulletin 15 - Approved Construction Materials; Pennsylvania Department of Transportation

MATERIALS AND STORAGE

A - General - Obtain materials from sources approved by the Inspector, but the approval of any source shall not be construed as approval of all materials from that source. Materials from required excavation may be used, provided they meet the requirements of these Technical Specifications.

B - Geotextile - Provide Class 4, Type A Geotextile, conforming with the requirements of Section 735 of Pub.408. Obtain geotextiles from a manufacturer listed in Bulletin 15.

During the periods of shipment and storage, protect geotextiles from direct sunlight, ultraviolet rays, temperatures greater than 140°F, mud, dirt, dust, and debris. To the extent possible, maintain geotextiles wrapped in a heavy-duty covering or shield from direct sunlight.

Geotextiles will be rejected at the time of installation if any defects, deterioration, or damage has occurred during manufacture, transportation, or storage.

C - Securing Pins for Geotextiles - Provide steel securing pins, 18 inches long x 3/16 inches in diameter, pointed at one end; and with a 1½-inch washer head at the other end. Alternate securing devices, approved by the Inspector, may be used.

D - Riprap - Obtain riprap from a source approved by the Inspector. Riprap shall consist of sound durable rock, insoluble in water. Friable, stratified rocks such as shales, and rocks liable to decompose in water, such as claystones, will not be approved. The Inspector shall reject localized areas, strata, or channels within an approved area or zone when, in its opinion, the material has disintegrated, weathered badly, or is otherwise unsatisfactory for the intended use. The materials shall be free of objectionable amounts of earth, quarry dust, or other materials; however, washing will not be required.

Stone for riprap shall be block shaped with a specific gravity of at least 2.5. Smooth rounded stone or boulders; flat, thin, elongated, and slab-shaped stone shall not be acceptable. Not more than 25 percent of the stones reasonably well distributed throughout the gradation shall have a length more than two and one-half (2.5) times the breadth or thickness. No stone shall have a length exceeding three (3) times its breadth or thickness.

Riprap shall be R-8 gradation, conforming to Section 850 of Pub.408, except as noted above. The riprap shall be certified as to size and gradation and the Inspector shall accept the onsite riprap based on a visual inspection.

PROCEDURE

A - General - Thicknesses indicated on the Drawings are the placement thicknesses of riprap layers.

B - Foundation Preparation - Prepare the areas on which riprap is to be placed by excavating, trimming, and dressing to conform to cross sections and slopes shown on the Drawings. Bring up the low areas to grade by filling and compacting in accordance with the "Unclassified Fill" Specification, with materials comparable to adjacent foundation materials.

C - Geotextile - Use Class 4, Type A Geotextile.

Place the fabric on the prepared area in a loose, unstretched condition to minimize shifting, puncturing, or tearing the fabric. For stream slope protection, lay the fabric with the long dimension parallel to stream flow, and for protection of the entire stream, lay the fabric with the long dimension perpendicular to the centerline of the channel. Provide a minimum overlap of twelve (12) inches at the joints, with the upstream fabric over the downstream fabric and the upslope fabric over the downslope fabric. Anchor the fabrics in place by inserting securing pins through both fabrics at the overlaps at the spacing shown on the following table:

	STEEPER THAN		FLATTER THAN
SLOPE	3 : 1	4 : 1	4 : 1
SECURING PIN PACING ALONG OVERLAPS	2 FEET	3 FEET	5 FEET

Install additional pins as necessary to prevent any slippage of the fabrics.

Protect the fabrics at all times during construction from contamination by surface runoff. Place riprap or cover the fabric with approved covering material as soon as possible, so that Type A fabric is not exposed for more than two (2) weeks.

Do not drop rocks, two (2) feet or larger in any dimension directly on the fabric from a height greater than one (1) foot. Do not allow the riprap placement procedure to puncture or damage the fabric.

Repair and/or replace all damaged fabric to the satisfaction of, and at no additional cost.

D - Riprap - Place stones for riprap on the geotextiles, in the dry, and conforming to the lines and grades shown on the Drawings or as directed by the Inspector. Place the stones in such manner as to produce a reasonably well-graded and uniform surface providing the full thickness shown on the Drawings. A tolerance of plus or minus three inches will be allowed in the finished surface except that either extreme of such tolerance shall not be continuous over an area greater than 200 square feet. Place stones to the full course thickness in one operation and without displacing the underlying material. Do not place stones in layers. The finished work shall be free from objectionable pockets of small stones and clusters of larger stones, and the entire mass of stones shall be roughly graded to conform to the gradation specified. Smaller stones shall be well distributed in order to chink the voids between larger stones, insofar as practicable. Do not place riprap by dumping stones into chutes or by similar methods, likely to cause segregation of the various sizes. Do not use a tractor equipped with bulldozer blade, stone rake, or any similar equipment. The desired distribution of the various sizes of stones throughout the mass shall be obtained by selective loading of the material at the quarry, by controlled dumping of successive loads during final placing, or by other approved methods. Rearrange individual stones by hand or mechanical means only to the extent necessary to break down bridging and to obtain a reasonably well-graded mass.

Provide cutoff at the upstream and downstream ends of riprap as shown on the Drawings, and do not allow any equipment to pass over the finished riprap surface.

MAINTENANCE - Make all necessary repairs to riprap for the duration of the Contract.

TECHNICAL SPECIFICATIONS

CLASS A CONCRETE

SCOPE

This work is construction of concrete structures as shown on the Drawings and as directed by the Inspector. The work generally conforms to PennDOT Specifications 408, Section 704 and 1001. Protect all concrete against injury until final inspection and acceptance by the Inspector. Repair any concrete that is damaged during the course of construction to the satisfaction of the Inspector.

CODES AND REGULATIONS

Unless otherwise specified, work pertaining to measuring, mixing, placing, and testing of concrete shall be governed by the following codes and regulations:

PennDOT 408 - Specifications - Pennsylvania Department of Transportation

PennDOT Bulletin #14, #15 - Pennsylvania Department of Transportation.

ASTM - American Society for Testing and Materials Section 4 Construction, Volume 04.02, concrete and aggregates.

AASHTO - American Association of State Highway and Transportation Officials.

MATERIALS

Obtain all concrete from a PennDOT approved source. Cement concrete shall be Class A in accordance with PennDOT 408, Section 1001.2(a). Supplier shall follow PennDOT's policy regarding mix designs using potentially reactive aggregate.

Forms shall meet the requirements of PennDOT Specifications 408, Section 1001.2(h).

Curing materials and compounds shall meet the requirements of PennDOT Specifications 408, Section 1001.2(b).

PROCEDURE

Construct concrete as directed in PennDOT Specifications 408, Section 1001.3, and appropriate subsections, including, but not limited to, forms, placing and finishing concrete, curing and applying loads to concrete.

Replace defective work as directed in PennDOT Specifications 408, Section 1001.3(u).

MAINTENANCE - Make all necessary repairs to the concrete for the duration of the Contract.

TECHNICAL SPECIFICATIONS

STACKED ROCK

SCOPE

This work is stacked rock, as shown on the Drawings, or as directed by the Inspector.

MATERIALS AND STORAGE

A General - Obtain materials from sources approved by the Inspector, but the approval of any source shall not be construed as approval of all materials from that source. Materials from required excavation may be used, provided they meet the requirements of these Technical Specifications.

B Geotextile - Provide Class 4, Type A Geotextile, conforming with the requirements of Section 735 of Pub.408. Obtain geotextiles from a manufacturer listed in Bulletin 15.

During the periods of shipment and storage, protect geotextiles from direct sunlight, ultraviolet rays, temperatures greater than 140°F, mud, dirt, dust, and debris. To the extent possible, maintain geotextiles wrapped in a heavy-duty covering or shield from direct sunlight.

Geotextiles will be rejected at the time of installation if any defects, deterioration, or damage has occurred during manufacture, transportation, or storage.

C Securing Pins for Geotextiles - Provide steel securing pins, 18 inches long x 3/16 inches in diameter, pointed at one end; and with a 1½-inch washer head at the other end. Alternate securing devices, approved by the Inspector, may be used.

D Stacked Rock - Obtain Stacked Rock from a source approved by the Inspector. The stacked rocks shall be durable limestone or sandstone, approximately 3' X 3' X 4' and cubical.

PROCEDURE

A - General - Dimensions indicated on the Drawings are the placement dimensions of stacked rock.

B - Foundation Preparation - Prepare the areas on which the stacked rock is to be placed by excavating, trimming, and dressing to conform to cross sections and slopes shown on the Drawings. Bring up the low areas to grade by filling and compacting in accordance with the "Unclassified Fill" Specification, with materials comparable to adjacent foundation materials.

C - Geotextile - Use Class 4, Type A Geotextile.

Place the fabric on the prepared area in a loose, unstretched condition to minimize shifting, puncturing, or tearing the fabric. For stream slope protection, lay the fabric with the long dimension parallel to stream flow, and for protection of the entire stream, lay the fabric with the long dimension perpendicular to the centerline of the channel. Provide a minimum overlap of twelve (12) inches at the joints, with the upstream fabric over the downstream fabric and the upslope fabric over the downslope fabric. Anchor the fabrics in place by inserting securing pins through both fabrics at the overlaps at the spacing shown on the following table:

	STEEPER THAN		FLATTER THAN
SLOPE	3 : 1	4 : 1	4 : 1
SECURING PIN PACING ALONG OVERLAPS	2 FEET	3 FEET	5 FEET

Install additional pins as necessary to prevent any slippage of the fabrics.

Protect the fabrics at all times during construction from contamination by surface runoff. Place stacked rock or cover the fabric with approved covering material as soon as possible, so that Type A fabric is not exposed for more than two (2) weeks.

Do not drop rocks, two (2) feet or larger in any dimension directly on the fabric from a height greater than one (1) foot. Do not allow the stacked rock placement procedure to puncture or damage the fabric. Repair and/or replace all damaged fabric to the satisfaction of, and at no additional cost.

D – Stacked Rock – Place the stacked rocks neatly as shown on the Typical Stacked Rock Repair Section drawing. Smaller rock shall be used to fill voids so that each rock rests solidly on the lower layer without movement. Vertical joints between rocks in the top layer shall be offset from those in the bottom layer and laterally, each rock shall be shingled outward 3” from the next downstream rock. Place R-7 riprap at the toe of the stacked rock wall as shown on the Typical Stacked Rock Repair Section drawing.

TECHNICAL SPECIFICATIONS

CHAIN LINK FENCE

SCOPE

This work is furnishing and installing chain link fence of height shown on the Drawings.

APPLICABLE PUBLICATIONS

AASHTO M 232 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

AASHTO M 280 - Standard Specification for Zinc-Coated (Galvanized) Steel Barbed Wire.

ANSI B 18.22.1 - Standard Specification for Plain Washers.

ASTM A 6 - Standard Specification for General Requirements for Rolled Steel Plates, Shapes, Sheet Piling and Bars for Structural Use.

ASTM A 36 - Standard Specification for Structural Steel.

ASTM A 53 - Standard Specification for Pipe Steel, Black and Hot-Dipped, Zinc Coated Welded Seamless.

ASTM A 276 - Standard Specification Stainless Steel Bars and Shapes.

ASTM A 582 - Standard Specification Free-Machining Stainless Steel Bars.

ASTM C 387 - Standard Specification for Packaged, Dry, Combined Materials for Mortar and Concrete.

ASTM F 593 - Standard Specification for Stainless Steel Bolts, Hex Cap Screws and Studs.

ASTM F 594 - Standard Specification Stainless Steel Nuts.

ASTM F 626 - Standard Specification for Fence Fittings.

ASTM F 668 - Standard Specification for Poly (Vinyl Chloride) (PVC)-Coated Steel Chain Link Fence Fabric

- ASTM F 1043 - Standard Specification for Strength and Protective Coatings on Metal Industrial Chain Link Fence Framework.
- ASTM F 1083 - Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures.

MATERIALS

A. Fence - Fabric, posts, gates, and necessary hardware shall meet the following requirements:

- 1. Fabric** - Fabric shall be Class 2b, PVC-coated wire consisting of a PVC coating fused and adhered to a zinc-coated, aluminum-coated, or zinc-5% aluminum-mischmetal alloy-coated steel wire, conforming to the requirements of ASTM F 668 with the following additions and/or modifications. Fabric shall be not less than No. 9 gage wire with 2-inch mesh sizes. The vinyl coating shall be of color approved by the Inspector. The selvage shall be knuckle-knuckle (top-bottom). All wire ends shall be coated.
- 2. Posts** - Use posts of galvanized steel and that will be referred to as "terminal" or "line". Terminal posts include corner, angle, pull, and end posts. Line posts are also known as "intermediate" posts. Pipes for posts shall conform with the requirements of ASTM F 1083, Schedule S-40, or the requirements of SS-40 of Allied Tube and Conduit Fence Division, 16100 South Lathrop Ave., Harvey, IL 60426, except that the weight of zinc coating shall not be less than 2 ounces per square foot.

For fence heights of less than 5 feet, the nominal sizes of terminal and line posts shall not be less than 2 inches and 1-1/2 inches, respectively. For fence heights of 5 feet or more, the nominal sizes of terminal and line posts shall not be less than 2-1/2 inches and 2 inches, respectively.

- 3. Anchorage** – Either type specified below may be used. The Inspector must approve the anchorage system and installation method. Submit manufacturer's product specifications and installation recommendations for Inspector approval prior to installation.
 - a. Wedged Anchorage** – Anchorage shall be stainless steel. Bolts shall conform to ASTM A 276, Type 304, or ASTM A 582, Type 303. Bolts shall be 3/8-inch diameter and factory fitted with wedged shields that expand to securely anchor the bolts in place when the anchoring nut is fully tightened to the manufacturer's specification.
 - b. Adhesive Anchorage** – Anchorage shall be stainless steel adhesive anchor system. Bolts shall conform to ASTM F 593. Nuts shall conform to ASTM F 594. Washers shall conform to ANSI B18.22.1, Type A Plain. Bolts shall be 3/8-inch diameter and each anchor shall develop minimum tensile bond strength of 4,000 lbs. per anchor .

4. **Top Rail** - Top rail shall not be less than 1-1/4 inch nominal size galvanized steel pipe conforming with the requirements of ASTM F 1083, Schedule S-40, or the requirements of SS-40 of Allied Tube and Conduit Fence Division, 16100 South Lathrop Ave., Harvey, IL 60426, except that the weight of zinc coating shall not be less than 2 ounces per square foot.
5. **Bottom Wire** - Bottom wire shall be galvanized and vinyl-coated coil spring tension wire. The galvanized core wire shall not be less than 7 gage in size, and it shall be vinyl coated conforming to the same requirements as those of the fabric mentioned above.
6. **Braces** - When required, braces shall not be less than 1-1/4 inch nominal size galvanized steel pipe conforming with the requirements of ASTM F 626, Schedule S-40, or the requirements of SS-40 of Allied Tube and Conduit Fence Division, 16100 South Lathrop Ave., Harvey, IL 60426, except that the weight of zinc coating shall not be less than 2 ounces per square foot.
7. **Truss Rods** - When required, truss rods shall not be less than 3/8-inch diameter steel rods conforming with the requirements of ASTM F 626, except that the weight of the zinc coating shall not be less than 2 ounces per square foot. Truss rods shall be provided with suitable turnbuckles.
8. **Gates** - When required, gates shall be of types and widths shown on the Drawings. Frames shall be of round pipes of not less than 2 inches in diameter conforming with the requirements of ASTM F 1083, Schedule S-40, or the requirements of SS-40 of Allied Tube and Conduit Fence Division, 16100 South Lathrop Ave., Harvey, IL 60426, except that the thickness of zinc coating shall be as specified for the posts mentioned above. All joints shall be securely welded, and the gates shall be galvanized after fabrication. The fabric for the gates shall be the same as the fence.
9. **Fittings** - All fittings shall conform with the requirements of ASTM F 626. Terminal post caps shall be fitted with recessed allen wrench head set screws for anchoring the cap to the post.
10. **Hardware** - All hardware (bolts, nuts, washers, etc.) shall be of commercial quality or better, and shall be galvanized in accordance with the requirements of AASHTO M 232.
11. **Locks and Keys** - Provide a waterproof lock for each gate and a set of 3 brass keys for each lock. Key all locks on the project alike.

B. Anchoring Grout - Use either hydraulic cementitious grout or epoxy resin mortar.

PROCEDURE

For installing fence on concrete or masonry structures, furnish and install anchor plates as shown on the drawings titled, "Anchor Plate Details", or as recommended by the precast modular wall

manufacturer. Drill holes with a rotary bit with no damage to the surrounding materials. Percussion drilling will not be permitted. Drilling of core holes to place posts will not be permitted.

Install posts plumb, in proper horizontal alignment with the top of the posts in proper vertical alignment, and in equal spacing not exceeding 10 feet. Install corner posts at changes in direction where the deflection angle so requires in the opinion of the manufacturer, as approved by the Inspector.

Install pull posts at changes in grade of 10 percent or more. Also, install pull posts at intervals not exceeding 500 feet and at closer equal spacing on curves, as recommended by the manufacturer, so that the strain of the fence shall not bend the line posts. Space pull posts evenly between corner, gate and/or end posts.

Insert top rails through the base of the line post caps, with expansion couplings joining the rails to form a continuous brace for each stretch of fence between terminal posts. Outside sleeve type expansion couplings shall be at least 6 inches long and shall be installed at spacings recommended by the manufacturer. Securely fasten the top rails to the terminal and gate posts by rail ends and brace bands. Install bottom wire as shown on the Drawings.

For fences 4 feet in height, braces will be required only when recommended by the manufacturer. Follow manufacturer's instructions for installing braces.

Securely fasten the fabric to all posts, top rail, and bottom wire at intervals of not more than 14 inches. Fasten fabric to the outside or most commonly seen side of the posts. Place fabric parallel to the base surface. The nominal distance between the base surface and the fabric shall be 2 inches and shall not exceed 3 inches. In case of irregular ground surfaces, grade the area at no additional cost.

If necessary, install gates in accordance with the recommendations of the manufacturer and as directed by the Inspector, at locations shown on the Drawings.

Close gaps between terminal posts and adjoining features with extensions of fencing, as approved by the Inspector.

At no additional cost, repair or replace any damaged component of the fence for the duration of the Contract.

TECHNICAL SPECIFICATIONS

SEEDING

SCOPE

This work is securing a satisfactory stand of grass on all disturbed areas or where directed by the Inspector. This work includes preparing the seedbed, furnishing and applying lime and fertilizer, furnishing and sowing seed, furnishing and placing mulch, and maintaining the seeded areas.

APPLICABLE ACTS AND PUBLICATIONS

Pennsylvania Seed Act of 1965 (Act No. 187), as amended

Rules For Testing Seed, Association of Official Seed Analysts

Regulations of the Pennsylvania Department of Agriculture, Bureau of Plant Industry

Pennsylvania Agricultural Liming Materials Act of 1978, P.L.15, No.9, as amended

Specification No. L-36 (current issue), Pennsylvania Department of General Services, Bureau of Purchases, Division of Standards and Specifications

Agricultural Liming Materials Rules & Regulations (7 Pa. Code, Part V, Chapter 108)

Pennsylvania Soil Conditioner and Plant Growth Substance Law, Act of December 1, 1977, P.L.258, No.86 (3P.S.68.2) as amended

Bulletin 15 - Approved Construction Materials,
Pennsylvania Department of Transportation

MATERIALS

A. Grass Seed - Grass seed shall conform to the applicable acts and regulations specified above in these Technical Specifications, and shall consist of the following seed types and mixtures:

PERMANENT SEEDING (for all areas – including levees, channels, lawns,
and parks)

Formula & Species	% Of Total Weight	Minimum Purity %	Minimum Germination %	Maximum Weed Seed %	Seed Application Rate Lbs./1000 SF
<p>Kentucky Bluegrass Mix (poa pratensis) A blend of improved certified varieties, such as Victa, Baron, Fortuna, & Gnome, with no one variety exceeding 40% of total bluegrass component.</p>	40	98	80	0.20	2.8
<p>Strong Creeping Red Fescue or Chewings Fescue (festuca rubra). An improved certified variety, such as Pennlawn.</p>	30	98	85	0.15	2.1
<p>Fine Perennial Ryegrass Mix (lolium perenne) A blend of improved certified varieties, such as Pennefine, Regal, Manhattan, and Citation, with no one variety exceeding 50% of total ryegrass component.</p>	30	98	90	0.15	2.1
Total Lbs./1000 SF					7.0

TEMPORARY SEEDING (for borrow and spoil areas, and uncompleted areas where work will be delayed by 20 days or more)				
Formula & Species	Minimum Purity %	Minimum Germination %	Maximum Weed Seed %	Seed Application Rate Lbs./1000 SF
Annual Ryegrass (<i>lolium multiflorum</i>)	98	90	0.15	2.0

No seed shall contain Canada Thistle, Field Bindweed, Johnson Grass, Perennial Sowthistle, Quackgrass, Horse Nettle, Bedstraw, Corncockle, Brassica Kaber, Brassica Nigra, Wild Onion, or Wild Garlic.

Each variety of specified seed shall be separately packaged and fully tagged. Seed shall be mixed in the presence of a representative of the Department. Premixed seed is acceptable, provided an inspection tag stamped, dated, and signed by the Pennsylvania Department of Agriculture inspector is sewn or stapled to the outside of each bag.

Seed which has become wet, moldy, or otherwise damaged in transit or storage, or has a mix date older than 9 months prior to sowing, or has a test date older than 6 months prior to sowing shall not be used.

B. Fertilizer - Fertilizer shall conform to the applicable acts specified in the section of these Technical Specifications titled, "Applicable Acts and Publications". Use dry formulation of 10-20-20-analysis.

Fertilizers shall be delivered in bags or other suitable containers, each fully labeled and bearing the name, trademark, and warranty of the producer.

C. Lime - Lime shall be pulverized agricultural limestone conforming to the applicable acts specified in the section of these Technical Specifications titled, "Applicable Acts and Publications". Lime shall conform to the requirements of Specification No. L-36, Group 1, Class B, Type MO and have an effective neutralizing power of not less than 64 when calculated, using the guaranteed chemical analysis and fineness, in accordance with the Agricultural Liming Materials Rules and Regulations.

D. Mulches - Mulches shall be free of foreign materials, coarse or woody materials such as tobacco and soybean stems, substances toxic to plant growth, and mature seed bearing stalks or roots of prohibited and noxious weeds as defined by law. Mulches shall be cut into lengths of not less than 6 inches and cured to less than 20 percent moisture content by weight.

Mulches shall be hay, straw, or a combination both. Hay shall be timothy hay, mixed clover and timothy hay, or other approved native or forage grasses. Straw shall be either wheat or oat straw, reasonably free of viable seeds.

E. Mulch Binders - Mulch binders shall be nonasphaltic emulsions, of either a water soluble natural vegetable gum blended with gelling and hardening agents or a water soluble blend of hydrophylic polymers, viscosifiers, sticking aids, and gums. Obtain binders from a producer listed in Bulletin 15.

F. Water - Water shall be fresh and free from injurious amounts of oil, acid, alkali, salts, and any other materials that may be harmful to the growth of grass.

PROCEDURE

General - The application rates specified for seed, lime, fertilizer and mulch are minimum acceptable rates. The Department may, at its own expense, test the soils to determine if the specified lime and fertilizer application rates are appropriate. If the test results indicate a need for adjustment, do so at no additional cost to the Department and accept full responsibility for obtaining a satisfactory stand of grass.

A. Prepare Seed Bed by Shallow Tilling - After the Department has approved the final grading of areas to be seeded, thoroughly till the surface to a depth of 3 inches by discing, harrowing, or other approved means. Apply fertilizer at a rate of 750 pounds per acre. Apply lime at a rate of 5,000 pounds per acre. Work both thoroughly into the soil to a depth of 3 inches, to ensure satisfactory soil conditions conducive to sowing seed. Bring the surface to a smooth and even final grade. Immediately prior to sowing, rake the soil to a depth of 3/4 inch. Rake parallel to contour lines, not uphill or downhill. On lawn areas, remove all sticks, stones, weeds, roots, and other objectionable materials larger than 5/8 inches in any dimension. On all other areas to be seeded, remove sticks, stones, weeds, roots, and other objectionable materials larger than 2 inches in any dimension. Maintain the surface in a true and even condition while sowing the seed. If hydroseeding or grain drilling is employed, apply limestone and fertilizer as specified in the section of these Technical Specifications titled, "Materials". On areas that are steeper than 3:1, till the surface in the cross slope (horizontal) direction. Sufficiently scarify so as to break up surface crust and eliminate irregularities that may have been caused by soil erosion. Remove all objectionable materials from the surface.

B. Sow Seed - Sow the seed mixture on a still day at the minimum rate specified in the section of these Technical Specifications titled, "Materials". Do not sow seed on frozen or partially frozen ground. For best results, sow permanent seed from March 15 to June 15 for spring establishment or from August 15 to October 15 for fall establishment. Sow by hand or by approved sowing equipment in 2 applications. Sow one-half the seed while traveling in one direction and the other half while traveling at a right angle to the first direction. After seeding is complete, lightly rake, cultipack, or brush drag the surface, just deep enough to cover the seeds. Rake parallel to contour lines, not uphill or downhill.

Hydroseeding or grain drilling is acceptable, provided the Department approves all methods and equipment used. If hydroseeding is employed, fertilizer and limestone may be applied at the time of sowing. If grain drilling is employed, only fertilizer may be applied at the time of sowing, provided it does not come in contact with the seed. Drill parallel to contour lines, not uphill or downhill.

C. Apply Mulch – Immediately after seeding, or within 6 hours after seeding is completed, spread mulch uniformly over the entire seeded area at a rate of 6,000 pounds (dry weight) per acre. The mulch shall be moist at the time of placement. To prevent the mulch from being blown away or bunched by the wind and to ensure the mulch cover holds the soil and seed in place, anchor the moist mulch to the soil by an approved means. On slopes where machinery cannot be used, hold the mulch in place by a means that will not be detrimental to subsequent operations. Nonasphaltic mulch binders may be applied uniformly over and through the mulch at the manufacturer's recommended rate.

MAINTENANCE

At no additional cost, maintain the seeded areas until all work under the Contract has been completed and accepted. Maintenance shall include refilling rain-washed gullies, reseeding, reapplying fertilizer, lime and mulch, and removal of large and noxious weeds, as directed by the Inspector.