

WESTERN AVENUE RECONSTRUCTION PREPARED FOR:  
TOWN OF HENNIKER, NEW HAMPSHIRE  
PATTERSON HILL EXTENSION TO COTE HILL

**DIVISION 1001 - SUBMITTAL AND SUBSTITUTIONS**

GENERAL

1.1 GENERAL REQUIREMENTS

- A. The General Conditions of the Contract are hereby made a part of this specification.

1.2 SUBMITTAL PROCEDURES

- A. General: Required submittals are as indicated within the individual sections.
- B. Processing Time: Submittals shall be processed with in 5 working days of being received.
- C. Identification: Place a permanent label or title block on each submittal for identification.
- D. All submittals shall clearly indicate material being requested for approval.
- E. Required copies of the submittal shall be one hard copy and one electronic copy.
- F. Submittals shall be made to the engineer.
- G. Approved or rejected submittals shall be returned to the general contractor.

1.3 SUBSTITUTIONS

- A. Whenever a material, article or piece of equipment is identified on the Drawings or Specifications by reference to brand name or model number, it shall be understood that this is referenced for the purpose of defining the performance or other salient requirements and that other products of equal capacities, quality and function shall be considered. The Contractor may recommend the substitution of material, article, or piece of equipment of equal substance and function for those referred to in model number, and if, in the opinion of the Engineer and/or Owner, such material, article, or piece of equipment is of equal substance and function to that specified, the Engineer and/or Owner may approve its substitution and use by the Contractor.
- B. An Item shall be considered equal to the Item named or described if (1) it is at least equal in quality, durability, appearance, strength, and design, (2) it will perform at least equally the specific function imposed by the general design for the Work being contracted for or the material being purchased, and (3) it conforms substantially, when with deviations, to the detailed requirements for the Item in the Specifications. The name and identification of all materials other than on specifically named shall be submitted to the Owner in writing for approval, prior to purchase, use or fabrication of such Items. Subject to the provisions of any applicable laws, approval shall be at the discretion of the Owner, shall be in writing to be effective, and the decision of the Owner shall be final. The Owner may require tests of all materials so submitted to establish quality standards at the Contractor's expense.

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- C. All directions, Specifications, and recommendations by manufacturers for installation, handling, storing, adjustment, and operation of their equipment shall be complied with; responsibility for proper performance shall continue to rest with the Contractor.
- D. For the use of material other than one specified, the Contractor shall assume the cost of, and responsibility for, satisfactorily accomplishing all changes (including engineering costs or redesign by the Engineer), in the Work as shown. If no manufacturer is named, the Contractor shall submit the product he intends to use for approval of the Owner.
- E. Except as otherwise provided for by provisions of any applicable laws, the Contractor shall not have any right of materials submitted if the Contractor fails to obtain the approval for substitution un this Article. Any additional cost incurred by an approved substitution shall be at the Contractor's expense.
- F. Some equipment and/or materials which are part of the Work, may have been defined in these specifications by the manufacturer' name and/or model number and identified as a standard adopted by the Owner, will not be considered except where such equipment or materials are no longer manufactured, are not available, or for some other unusual reasons. The consideration of substitutions in these circumstances shall be solely at the discretion of the Owner.
- G. Prior to the Awarding of the Project, substitutions of material or equipment, where requested or proposed by Contractor, shall be itemized and shall show cost to Owner whether it be a "deduction" or "no change in cost" to the Base Bid Price. It shall be held that no change in contract completion time will occur should Engineer elect to accept any alternates unless such time is specifically stated in the Contractor's Bid.
- H. After Awarding of the Project, any cost differential shall be deductible from the Contract Price and Contract Documents shall be appropriately modified by the Change Order. The Contractor warrants that if substitutes are approved, no major changes in the function or general design of the Project will result.

END OF DIVISION 1001

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**DIVISION 2010 – CLEARING, GRUBBING AND STRIPPING**

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- A. The General Conditions and Supplementary General Conditions of the Contract are hereby made a part of this specification.
- B. Contractor shall provide all items, articles, materials or methods listed, mentioned or scheduled, including all labor, materials, equipment and incidentals necessary and required for the completion of the project.

1.2 DRAWINGS AND SPECIFICATIONS

- A. Contract Drawings are in part diagrammatic, intended to convey scope of work and indicate the general arrangement of equipment. The Drawings shall be followed in laying out the work. DO NOT SCALE DRAWINGS

1.3 SCOPE OF WORK

- A. Protection, modification and/or installation of utilities as the project progresses paying particular attention to grade changes, any necessary staging of work, and compliance with permits, ordinances, and safety regulations.
- B. This section describes the work included in clearing, grubbing, stripping, and preparing the project site for construction operations.

C. CLEARING

- 1. Remove and dispose of trees, snags, stumps, shrubs, brush, limbs, and other vegetative growth. Remove all evidence of their presence from the surface including sticks and branches greater than 1-inch in diameter or thickness. Remove and dispose of trash pile and rubbish. Protect trees, shrubs, other vegetative growth and fencing which are not designated for removal.

D. GRUBBING

- 1. After clearing, remove and dispose of wood or root matter including stumps, trunks, roots, or root systems greater than 1-inch in diameter or thickness to a depth of 12 inches below the ground surface.

E. STRIPPING

- 1. Remove and dispose of all organic sod, topsoil, grass and grass roots, and other objectionable material remaining after clearing and grubbing from the areas designated to be stripped.

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1.4 WORK BY OTHER SECTIONS OF THIS CONTRACT

A. Work By Utilities

1. The utility serving this project is Eversource. The contractor shall coordinate with the utility and provide all work and materials in accordance with utility standards.

1.5 MATERIAL AND SUBSTITUTIONS

- A. Except where indicated otherwise, all materials shall be new and conform to standards established in Drawings and Specifications
- B. Substitute material and equipment shall be considered by the Owner in accordance with Section 1001.
- C. Materials and equipment not approved shall not be used in construction.

1.6 CLEANING

- A. Each Contractor shall clear away all debris, surplus materials, etc., resulting from his Work or operation, leaving the job and equipment furnished in a clean, first-class condition.
- B. Disposal of all stumps and debris shall be done in accordance with local, state and federal regulations.

1.7 INTERRUPTION OF SERVICES

- A. Where the Work requires interruption of existing services, shutdown at night or at times as directed by the Owner that do not interfere with established operating routines. Arrange to work continuously, including overtime if necessary, to ensure that service interruptions are as short as possible. Upon restoration of service, verify that all systems and equipment are operating normally.
- B. Existing services to remain shall be protected during construction. Repair services broken during the Work as soon as possible, at no additional cost to the Owner.

1.8 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified:
  1. New Hampshire Department of Transportation (NHDOT) "Standard Specification for Road and Bridge Construction"
  2. New Hampshire Department of Environmental Services (NHDES) Env-Sw 810.09

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1.9 TEMPORARY WORK

- A. When no longer required, remove all temporary work unless otherwise noted. All materials used for temporary construction shall remain the property of the installer.

PART 2 - PRODUCTS

2.1 EXISTING TREES, SHRUBS, AND OTHER VEGETATIVE GROWTH

- A. Existing trees, shrubs, and other vegetative growth may not be shown on the Drawings. Inspect the site as to the nature, location, size, and extent of vegetative growth to be removed or preserved, as specified herein. Preserve in place trees that are specifically shown on the Drawings and designated to be preserved.

2.2 PRESERVATION OF TREES, SHRUBS, AND OTHER VEGETATIVE GROWTH

- A. Save and protect all trees, shrubs, and other vegetative growth beyond the limits of clearing and grubbing from damage resulting from the work. No filling, excavating, trenching, or stockpiling of materials will be permitted within the drip line of these plant materials. The drip line is defined as a circle drawn by extending a line vertically to the ground from the outermost branches of a plant or group of plants. To prevent soil compaction within the drip line area, no equipment will be permitted within this area.
- B. When trees are close together, restrict entry to area within drip line by fencing. In areas where no fence is erected, protect the trunks of all trees 2 inches or greater in diameter by encircling the trunk entirely with boards held securely by 12-gage wire and staples. This protection shall extend from ground level to a height of 6 feet. Cut and remove tree branches where necessary for construction. Remove branches other than those required to affect the work to provide a balanced appearance of any tree. Treat cuts with a tree sealant.

PART 3 - EXECUTION

3.1 CLEARING AND GRUBBING LIMITS

- A. Clear and grub excavation and embankment areas associated with new structures, slabs, roadways, and conduit.

3.2 DISPOSAL OF CLEARING AND GRUBBING DEBRIS

- A. Do not burn combustible materials. Remove all cleared and grubbed material from the worksite and dispose of in accordance with all local laws, codes, and ordinances.

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3.3 AREAS TO BE STRIPPED

- A. Strip excavation and embankment areas associated with new structures, slabs, conduit, and roadways. Strip all stockpile areas.

3.4 DISPOSAL OF STRIPPINGS

- A. All topsoil to be stockpiled and the appropriate erosion control employed for later use.
- B. Stump grindings and wood chips shall be stock piled for later use.
- C. All strippings removed from site shall be disposed of in accordance with NHDES Env-Sw 810.09, and documentation shall be provided to the owner.

*END OF SECTION 2010*

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**DIVISION 2100 – EARTHWORK**

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- A. The General Conditions and Supplementary General Conditions of the Contract are hereby made a part of this specification.
- B. Contractor shall provide all items, articles, materials or methods listed, mentioned or scheduled, including all labor, materials, equipment and incidentals necessary and required for the completion of the project.

1.2 DRAWINGS AND SPECIFICATIONS

- A. Contract Drawings are in part diagrammatic, intended to convey scope of work and indicate the general arrangement of equipment. The Drawings shall be followed in laying out the work. DO NOT SCALE DRAWINGS

1.3 SCOPE OF WORK

- A. Protection, modification and/or installation of utilities as the project progresses paying particular attention to grade changes, any necessary staging of work, and compliance with permits, ordinances, and safety regulations.
- B. Cutting, filling, and grading to required lines, dimensions, contours and existing and proposed elevations for proposed improvements.
- C. Scarifying, compaction, drying, and removal of unsuitable material to ensure proper preparation of areas for fills or proposed improvements.
- D. Removal of boulders within the existing pavement area within 24" of the current finish grade and over 2 cubic feet.
- E. Excavate to line, grade and configuration as shown in the plans and specifications for proposed structures, utility pipelines, appurtenance structures, pavement sections, and miscellaneous site work.
- F. Removal and proper disposal of all utility pipelines and appurtenance structures.
- G. Backfilling trench with bedding materials as specified and indicated and finishing filling trench with suitable material to proposed subgrade.
- H. Fill to line, grade and configuration as shown in the plans and specifications for proposed structures, utility pipeline installations, and pavement sections.
- I. Compacting for materials in an acceptable manner as stated herein.

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1.4 WORK BY OTHER SECTIONS OF THIS CONTRACT

A. Work By Utilities

1. The utility serving this project is Eversource. The contractor shall coordinate with the utility and provide all work and materials in accordance with utility standards.

B. Slope Protection and Erosion Control

1. All work shall coordinate with the installation of all Slope Protection and Erosion Control as described in Section 2270.

C. Lawns and Grasses

1. All work shall coordinate with the work described in Division 2900.

1.5 MATERIAL AND SUBSTITUTIONS

A. Except where indicated otherwise, all materials shall be new and conform to standards established in Drawings and Specifications

B. Substitute material and equipment shall be considered by the Owner in accordance with Section 1001.

C. Materials and equipment not approved shall not be used in construction.

1.6 CLEANING

A. Each Contractor shall clear away all debris, surplus materials, etc., resulting from his Work or operation, leaving the job and equipment furnished in a clean, first-class condition.

1.7 INTERRUPTION OF SERVICES

A. Where the Work requires interruption of existing services, shutdown at night or at times as directed by the Owner that do not interfere with established operating routines. Arrange to work continuously, including overtime if necessary, to ensure that service interruptions are as short as possible. Upon restoration of service, verify that all systems and equipment are operating normally.

B. Existing services to remain shall be protected during construction. Repair services broken during the Work as soon as possible, at no additional cost to the Owner.

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1.9 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified:
  - 1. New Hampshire Department of Transportation (NHDOT) "Standard Specification for Road and Bridge Construction"
  - 2. American Society for Testing and Materials (ASTM), Latest Edition:
    - a. D422 Method for Particle Size Analysis of Soils
    - b. D1557 Test for Moisture-Density Relations of Soils using 10-lb (4.5 kg) Rammer and 18-inch (457mm) Drop (**Modified Proctor**)
    - c. D2216 Laboratory Determination of Moisture content of Soil
    - d. D2922 Tests for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
    - e. D3017 Test for Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
- B. Independent Testing Laboratory selected and paid by Contractor and approved by the Town, shall be retained to perform construction testing on site for fill areas, not less than one compaction test every 5,000 square feet, but not less than one per footing trench per 8" lift.

1.10 SUBMITTALS

- A. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated.
  - 1. Classification according to ASTM D 2487 of each on-site and borrow soil material proposed for fill and backfill.
  - 2. Laboratory compaction curve according to ASTM D 1557 for each on-site and borrow material proposed for fill and backfill.

1.11 TEMPORARY WORK

- A. When no longer required, remove all temporary work unless otherwise noted. All materials used for temporary construction shall remain the property of the installer.

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PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. Excavated material may be used as common fill material in conformance with NHDOT 209.1
- B. Sand Bedding shall be in conformance with NHDOT 304.1
- C. Crushed Gravel shall be in conformance with NHDOT 304.3
- D. Gravel shall be in conformance with NHDOT 304.2

PART 3 - EXECUTION

3.1 PREPARATION

- A. Locate and identify existing utilities that are to remain and protect them from damage
- B. Protect structures, utilities, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
- B. Preparation of sub-grade for earthwork operations including removal of vegetation, topsoil, debris, obstructions, and deleterious materials from ground surface.
- C. Furnish and install erosion and sedimentation controls.
- D. Provide protective insulating materials to protect sub-grades and foundation soils against freezing temperatures or frost.

3.2 DEWATERING

- A. Prevent surface water and ground water from entering excavations, from ponding on prepared sub-grades, and from flooding Project site and surrounding area.
- B. Protect sub-grades from softening, undermining, washout, and damage by rain or water accumulation.
  - 1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

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3.3 EXPLOSIVES

- A. All other methods shall be explored prior to the use of explosives. Other methods include use of a larger excavator and use of a rock hammer.
- B. When the use of explosives is necessary for the prosecution of the work, the Contractor shall exercise the utmost care not to endanger life or property, including new work. The Contractor shall be responsible for all damage resulting from the use of explosives. The transport, storage, and use of all explosives shall be in compliance with all local, state and federal laws and ordinances. Where no local laws or ordinances apply, storage shall be provided satisfactory to the Engineer and in general not closer than 1,000 feet from any road or from any building or camping area or place of human occupancy.
- C. The Contractor shall notify the property owner and each public utility company having facilities in proximity to the site of the work of the intent to use explosives. Such notice shall be given sufficiently in advance to enable the companies to take steps necessary to protect the facilities.

3.4 EXCAVATION GENERAL

- A. Unclassified Excavation: Excavate to sub-grade elevations regardless of the character of surface and sub-surface conditions encountered. Unclassified excavated materials shall consist of all materials of whatever character encountered in the work.
  - 1. If excavated materials intended for fill and backfill include unsatisfactory soil materials or unsuitable materials, replace with satisfactory soil materials.
  - 2. Remove rock to lines and grades indicated to permit installation of permanent construction without exceeding a depth of 12 inches below the top of sub-grade.

3.5 EXCAVATION FOR UTILITY TRENCHES

- A. Excavate trenches to indicated gradients, lines, depths, and elevations.
- B. Remove and dispose of all utility piping and associative structures.
- C. Excavate trenches for drainage lines excavate trenches to uniform widths to allow installation of the pipe. Excavate trench walls vertically from trench bottom to 12 inches higher than top of conduit, unless otherwise indicated.
- D. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of conduit. Shape sub-grade to provide continuous support for joints, fittings, and bodies of conduit. Remove projecting stones and sharp objects along trench sub-grade.
  - 1. Shape trench bottom to support bottom 90 degrees of pipe circumference, fill depressions with tamped sand backfill.

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2. Excavate trenches 6 inches deeper than bottom of pipe elevation to allow for bedding course. Hand excavate for pipe joints, valves or fittings.
3. Excavate trenches 12 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

3.6 UNAUTHORIZED EXCAVATION

- A. Fill unauthorized excavation with suitable soils in 8 inch lifts.
  1. Fill unauthorized excavations under other construction or utility pipe as directed by Engineer.

3.7 STORAGE OF SOIL MATERIALS

- A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
  1. Stockpile soil materials away from edges of excavations and outside drip line of remaining trees.

3.9 BACKFILL

- A. Place and compact backfill in excavations promptly.
- B. Place backfill on sub-grades free of mud, frost, snow, or ice.

3.10 UTILITY TRENCH BACKFILL

- A. Place backfill on sub-grades free of mud, frost, snow, or ice.
- B. Place and compact bedding course on trench bottoms where indicated. Shape bedding course to provide continuous support for pipe joints, barrels of pipes, fittings, valves, bodies of conduit, and other appurtenances.
- C. Place and compact initial backfill of satisfactory soil, free of particles larger than 1 inch in any dimension, to a height of 12 inches over the utility pipe or conduit.
  1. Carefully compact initial backfill under pipe haunches and compact evenly up both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Backfill is to be coordinated with any required utility testing.
- D. Backfill voids with satisfactory soil while installing and removing shoring and bracing.
- E. Place and compact final backfill of satisfactory soil to final sub-grade elevation.

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3.11 SOIL BACKFILLS AND FILL

- A. Plow scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- B. Place backfill and fill soil materials generally parallel to the finished grade in layers not exceeding 8 inches in loose depth. Each layer shall be spread to a uniform thickness and compacted to the required density prior to placement of the next layer. Continuous grading or shaping shall be carried out concurrently with the compaction to ensure uniform density throughout each layer.
- C. Place backfill and fill soil materials on sub-grades free of mud, frost, snow, or ice.

3.12 SOIL MOISTURE CONTROL

- A. Uniformly moisten or aerate sub-grade and each subsequent lift before compaction to within 2 percent of optimum moisture content.
  - 1. Remove and replace, or scarify and air dry otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.13 COMPACTION OF SOIL BACKFILLS AND FILLS

- A. Compact soil materials to not less than the following percentages of maximum dry unit weight in accordance with ASTM D 1557:
  - 1. Under pavements and foundations, scarify and re-compact the top 12 inches of existing sub-grade and compact each layer of backfill or fill soil material at 95 percent.
  - 2. Under lawn or unpaved areas, scarify and re-compact the top 6 inches below sub-grade and compact each layer of backfill or fill soil material at 92 percent.
  - 3. For utility trenches, compact each layer of initial and final backfill soil material at 92 percent.

3.14 GRADING

- A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade lines and elevations indicated.
  - 1. Provide a smooth transition between adjacent existing grades and new grades.
- B. Site Grading: Slope grades to direct water away from ROADWAY and to prevent ponding.

3.15 SUB-BASE COURSES

- A. Place sub-base course on sub-grades free of mud, frost, snow, or ice.

*END OF SECTION 2100*

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**DIVISION 2270 – SLOPE PROTECTION AND EROSION CONTROL**

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- A. The General Conditions and Supplementary General Conditions of the Contract are hereby made a part of this specification.
- B. Contractor shall provide all items, articles, materials or methods listed, mentioned or scheduled, including all labor, materials, equipment and incidentals necessary and required for the completion of the project.

1.2 DRAWINGS AND SPECIFICATIONS

- A. Contract Drawings are in part diagrammatic, intended to convey scope of work and indicate the general arrangement of equipment. The Drawings shall be followed in laying out the work. DO NOT SCALE DRAWINGS

1.3 SCOPE OF WORK

- A. The Contractor shall protect adjacent properties and water resources from erosion and sediment damage throughout the life of the contract in accordance with NHDES Best Management Practices. Work shall include installation of any and all slope protection and erosion control devices.
- B. Inspection of the project work site on a weekly basis and after a 0.25 in rainfall event, with the repair of existing erosion control measures, or installation of added erosion control measures in areas which appear vulnerable to erosion.
- C. Inspect areas for catch of grass.

1.4 WORK BY OTHER SECTIONS OF THIS CONTRACT

- A. Work By Utilities
  - 1. The utility serving this project is Eversource. The contractor shall coordinate with the utility and provide all work and materials in accordance with utility standards.

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B. Earthwork

1. All work shall coordinate with work described in Division 2100

C. Lawns and Grasses

1. All work shall coordinate with the work described in Division 2900.

1.5 MATERIAL AND SUBSTITUTIONS

A. Except where indicated otherwise, all materials shall be new and conform to standards established in Drawings and Specifications

B. Substitute material and equipment shall be considered by the Owner in accordance with Section 1001.

C. Materials and equipment not approved shall not be used in construction.

1.6 CLEANING

A. Each Contractor shall clear away all debris, surplus materials, etc., resulting from his Work or operation, leaving the job and equipment furnished in a clean, first-class condition.

1.7 INTERRUPTION OF SERVICES

A. Where the Work requires interruption of existing services, shutdown at night or at times as directed by the Owner that do not interfere with established operating routines. Arrange to work continuously, including overtime if necessary, to ensure that service interruptions are as short as possible. Upon restoration of service, verify that all systems and equipment are operating normally.

B. Existing services to remain shall be protected during construction. Repair services broken during the Work as soon as possible, at no additional cost to the Owner.

1.8 QUALITY ASSURANCE

A. Codes and Standards: Comply with provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified:

1. New Hampshire Department of Environmental Services (NHDES)  
Alteration of Terrain Best Management Practices.

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1.9 TEMPORARY WORK

- A. When no longer required, remove all temporary work unless otherwise noted. All materials used for temporary construction shall remain the property of the installer.
- B. A minimum catch of 85 percent is required prior to removal of erosion control measures.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Temporary grass seed mixture shall consist of an annual rye grass mixture.
- B. Hay or straw bales and bale stakes
- C. Fencing for siltation control.
- D. Jute Matting shall be Curlex blankets by American Excelsior Company or approved equal.
- E. Temporary mulches such as loose hay, straw, netting, or wood.
- F. Stone check dams as needed shall be constructed and spaced according to the Erosion Control Detail or as determined by site conditions.
- G. Stump grindings for slope stabilization and/or woodwaste filter berm.
- H. Water for dust control.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Review site erosion control details attached to this section of the specifications.
- B. Deficiencies or changes in the erosion control details as it is applied to current conditions will be brought to the attention of the Engineer for remedial action

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3.2 EROSION CONTROL AND SLOPE PROTECTION IMPLEMENTATION

- A. Place erosion control systems in accordance with the erosion control plan and in accordance with approved installation procedures.
- B. The Engineer has the authority to limit the surface area of erodible earth material exposed by clearing and grubbing, excavation, borrow and embankment operations. The Engineer has the authority to direct the Contractor to provide immediate permanent or temporary pollution control measures. The Contractor will be required to incorporate all permanent erosion control features into the project at the earliest practical time to minimize the need for temporary controls. Cut slopes shall be permanently seeded and mulched as the excavation proceeds to the extent considered desirable and practical.
- C. The temporary erosion control systems installed by the Contractor shall be maintained as directed by the Engineer to control siltation at all times during the life of the Contract. The Contractor must respond to any maintenance or additional work ordered by the Engineer within a 48 hour period.
- D. All temporary erosion control systems shall be removed once 85 percent vegetation is achieved.

*END OF SECTION 2270*

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**DIVISION 2400 – STORM DRAINAGE**

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- A. The General Conditions and Supplementary General Conditions of the Contract are hereby made a part of this specification.
- B. Contractor shall provide all items, articles, materials or methods listed, mentioned or scheduled, including all labor, materials, equipment and incidentals necessary and required for the completion of the project.

1.2 DRAWINGS AND SPECIFICATIONS

- A. Contract Drawings are in part diagrammatic, intended to convey scope of work and indicate the general arrangement of equipment. The Drawings shall be followed in laying out the work. DO NOT SCALE DRAWINGS

1.3 SCOPE OF WORK

- A. Provide all labor, equipment, and materials to fully and properly complete installation of Storm Drainage and Underdrain facilities as identified on Drawings.
- B. Provide all work for adjusting, abandoning, and capping existing Storm Drainage and Underdrain structures, inlets, and clean-outs where required by the Drawings. Adjust inlets to positions and elevations shown or otherwise required by the Drawings and Project Conditions.

1.4 WORK BY OTHER SECTIONS OF THIS CONTRACT

- A. Work By Utilities
  - 1. The utility serving this project is the Eversource. The contractor shall coordinate the utility and provide all work and materials in accordance with utility standards.
- B. Trench Work
  - 1. All work shall coordinate with the work described in Section 2100.
- C. Slope Protection and Erosion Control
  - 1. All work shall coordinate and be in accordance with the work described in Section 2270.

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1.5 MATERIAL AND SUBSTITUTIONS

- A. Except where indicated otherwise, all materials shall be new and conform to standards established in Drawings and Specifications
- B. Substitute material and equipment, where requested or proposed by Contractor, shall be itemized and shall show cost to Owner whether it be an "addition" or "deduction" or "no change in cost" to the Base Bid Price. It shall be held that no change in contract completion time will occur should Engineer elect to accept any alternates unless such time is specifically stated in the Contractor's Bid.
- C. Materials and equipment not approved shall not be used in construction.

1.6 CLEANING

- A. Each Contractor shall clear away all debris, surplus materials, etc., resulting from his Work or operation, leaving the job and equipment furnished in a clean, first-class condition.

1.7 INTERRUPTION OF SERVICES

- A. Where the Work requires interruption of existing services, shutdown at night or at times as directed by the Owner that do not interfere with established operating routines. Arrange to work continuously, including overtime if necessary, to ensure that service interruptions are as short as possible. Upon restoration of service, verify that all systems and equipment are operating normally.
- B. Existing services to remain shall be protected during construction. Repair services broken during the Work as soon as possible, at no additional cost to the Owner.

1.8 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified:
  - 1. New Hampshire Department of Transportation (NHDOT) "Standard Specification for Road and Bridge Construction"
  - 2. American Association of State Highway and Transportation Officials, (AASHTO) Latest Edition:

1.9 SUBMITTALS

- A. Submit design, manufacturer's data and/or shop drawings for each type of product provided.

1.10 TEMPORARY WORK

- A. When no longer required, remove all temporary work unless otherwise noted. All materials used for temporary construction shall remain the property of the installer.

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PART 2 - PRODUCTS

2.1. MATERIALS

- A. Storm Drainage Pipes and Fittings:
  - 1. Corrugated PE Pipe and Fittings:
    - a. Pipe meeting AASHTO M294.Type S and shall have a smooth interior and annular exterior corrugations.
    - b. Pipe fittings shall be soil tight
- B. Precast Concrete Headwalls shall be as indicated on the DRAWINGS and conform to NHDOT Standard Plans Headwalls for Pipes other than R.C. Plate 1 Standard HW-1.
- C. Polyethylene pipe to be smooth interior walls perforated or non-perforated, as indicated on DRAWINGS and conform to NHDOT 605.2.4
- D. Molded pull boxes for underdrain flushing basins shall conform to NHDOT 614.2.6
- E. Filter Fabric shall be Mirafi 140N or equal
- F. Common fill material in conformance with NHDOT 209.1
- G. Sand Bedding shall be in conformance with NHDOT 304.1
- H. Aggregate shall be in conformance with NHDOT Table 703-1 #4

PART 3 - EXECUTION

3.1. GENERAL

- A. Excavating, trenching, backfilling, and identification materials and their installation are specified in Section 2100.

3.2. EXECUTION

- A. Pipe Installation: Layout and Install as indicate on DRAWINGS.
  - 1. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets according to manufacturer's written instructions for use of lubricants and other installation requirements.
- B. Install Headwall as indicted on DRAWINGS
- C. Install Flushing Basins as indicated on DRAWINGS

*END OF DIVISION 2400*

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PATTERSON HILL EXTENSION TO COTE HILL

**DIVISION 2510 - BITUMINOUS PAVEMENT**

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- A. The General Conditions and Supplementary General Conditions of the Contract are hereby made a part of this specification.
- B. Contractor shall provide all items, articles, materials or methods listed, mentioned or scheduled, including all labor, materials, equipment and incidentals necessary and required for the completion of the project.

1.2 DRAWINGS AND SPECIFICATIONS

- A. Contract Drawings are in part diagrammatic, intended to convey scope of work and indicate the general arrangement of equipment. The Drawings shall be followed in laying out the work. DO NOT SCALE DRAWINGS

1.3 SCOPE OF WORK

- A. Furnish all labor, materials, tools and equipment necessary to construct one or more courses of bituminous mixture constructed on the prepared foundation in accordance with these Specifications and the specific requirements of the type under contract, and in reasonably close conformity with the lines, grades, thicknesses, and typical cross sections of the existing road, within the tolerances specified.
  - 1. All pavement thickness specified herein shall be the thickness required after compaction.
- B. Crushed gravel base course.
- C. Furnish all labor, materials, tools and equipment necessary to scarify, if necessary, and pulverizing the existing pavement together with base course material. It may require removal and rehandling and the addition of other materials as shown on the plans or as ordered.

1.4 WORK BY OTHER SECTIONS OF THIS CONTRACT

- A. Work By Utilities
  - 1. The utility serving this project is Eversource. The contractor shall coordinate with the utility and provide all work and materials in accordance with utility standards.
- B. Trench Work
  - 1. All work shall coordinate with the work described in Section 2100.
- C. Slope Protection and Erosion Control
  - 1. All work shall coordinate with the installation of all Slope Protection and Erosion Control as described in Section 2270.

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- D. Storm Drainage Work
  - 1. All work shall coordinate with the removal of existing structures and installation of all storm drainage facilities as described in Section 2400

1.5 MATERIAL AND SUBSTITUTIONS

- A. Except where indicated otherwise, all materials shall be new and conform to standards established in Drawings and Specifications
- B. Substitute material and equipment shall be considered by the Owner in accordance with Section 1001.
- C. Materials and equipment not approved shall not be used in construction.

1.6 CLEANING

- A. Each Contractor shall clear away all debris, surplus materials, etc., resulting from his Work or operation, leaving the job and equipment furnished in a clean, first-class condition.

1.7 INTERRUPTION OF SERVICES

- A. Where the Work requires interruption of existing services, shutdown at night or at times as directed by the Owner that do not interfere with established operating routines. Arrange to work continuously, including overtime if necessary, to ensure that service interruptions are as short as possible. Upon restoration of service, verify that all systems and equipment are operating normally.
- B. Existing services to remain shall be protected during construction. Repair services broken during the Work as soon as possible, at no additional cost to the Owner.

1.8 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified:
  - 1. New Hampshire Department of Transportation (NHDOT) "Standard Specification for Road and Bridge Construction"
- B. Independent Testing Laboratory selected and paid by Contractor, shall be retained to perform construction testing on site for fill areas, not less than one compaction test every 100 ton, but not less than one per project.

1.9 SUBMITTALS

- A. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:
  - 1. Laboratory compaction curve according to ASTM D 1557.

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1.10 TEMPORARY WORK

- A. When no longer required, remove all temporary work unless otherwise noted. All materials used for temporary construction shall remain the property of the installer.

PART 2 - PRODUCTS

2.1. MATERIALS

- A. Base courses shall be as shown on the Drawings and as specified in Section 02100.
- B. Bituminous base course shall be Type B as per NHDOT Specification Section 401.
- C. Bituminous wearing course shall be Type E as per NHDOT Specification Section 401.
- D. Reclaimed stabilized base shall be per NHDOT Specification Section 306.

PART 3 - EXECUTION

3.1. GENERAL

- A. Areas to receive bituminous paving shall be as shown on the Drawings or as specified herein.
- B. Pavement restoration shall be as shown on the Drawings or as specified herein.

3.2. EXECUTION

- A. In the areas where Existing Pavement is to be removed for either regrading or trenching operations, it will be pulverized and stock piled on site for use as Reclaimed Stabilized Base
- B. Existing pavement shall be pulverized to full depths within the limits of work as shown on the Drawings and in accordance with NHDOT Specification 306 Construction Requirements.

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- C. Base course shall be constructed in the areas and to the depths shown on the Drawings and in accordance with NHDOT Specification 304 Construction Requirements except as herein modified.
1. Gravel and crushed gravel base courses shall be placed in 6-inch lifts compacted to 95% maximum density, unless otherwise directed by the Engineer.
  2. Crushed gravel shall be fine graded with a power grader or other approved equipment. Tolerance shall be within 1/2" or less.
- D. Bituminous wearing course shall be constructed as per NHDOT Specification 401 Construction Requirements except as herein modified.
1. Pavement shall only be placed when the underlying surface is dry, frost-free and the surface temperature is above 40 F.
  2. Pavement shall only be placed during daylight hours.
  3. Material delivered to the paver shall not have a temperature lower than 250 F.
  4. Compacting shall be performed by an 8-ton minimum static steel wheel roller.
  5. The wearing course shall be rolled until all roller marks are eliminated.

*END OF DIVISION 2510*

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PATTERSON HILL EXTENSION TO COTE HILL

**DIVISION 2708 – GUARDRAIL**

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- A. The General Conditions and Supplementary General Conditions of the Contract are hereby made a part of this specification.
- B. Contractor shall provide all items, articles, materials or methods listed, mentioned or scheduled, including all labor, materials, equipment and incidentals necessary and required for the completion of the project.

1.2 DRAWINGS AND SPECIFICATIONS

- A. Contract Drawings are in part diagrammatic, intended to convey scope of work and indicate the general arrangement of equipment. The Drawings shall be followed in laying out the work. DO NOT SCALE DRAWINGS

1.3 SCOPE OF WORK

- A. Provide all labor, equipment, and materials to fully and properly complete installation of Guardrail facilities as identified on Drawings.
- B. Provide all work for removal, and abandoning existing Guardrail posts, rails and accessories where required by the Drawings.

1.4 WORK BY OTHER SECTIONS OF THIS CONTRACT

- A. Work By Utilities
  - 1. The utility serving this project is the Eversource. The contractor shall coordinate the utility and provide all work and materials in accordance with utility standards.
- B. Earthwork
  - 1. All work shall coordinate with the work described in Section 2100.
- C. Slope Protection and Erosion Control
  - 1. All work shall coordinate and be in accordance with the work described in Section 2270.
- D. Bituminous Pavement
  - 1. All work shall coordinate with the work described in Section 2510.

WESTERN AVENUE RECONSTRUCTION PREPARED FOR:  
TOWN OF HENNIKER, NEW HAMPSHIRE  
PATTERSON HILL EXTENSION TO COTE HILL

1.5 MATERIAL AND SUBSTITUTIONS

- A. Except where indicated otherwise, all materials shall be new and conform to standards established in Drawings and Specifications
- B. Substitute material and equipment, where requested or proposed by Contractor, shall be itemized and shall show cost to Owner whether it be an "addition" or "deduction" or "no change in cost" to the Base Bid Price. It shall be held that no change in contract completion time will occur should Engineer elect to accept any alternates unless such time is specifically stated in the Contractor's Bid.
- C. Materials and equipment not approved shall not be used in construction.

1.6 CLEANING

- A. Each Contractor shall clear away all debris, surplus materials, etc., resulting from his Work or operation, leaving the job and equipment furnished in a clean, first-class condition.

1.7 INTERRUPTION OF SERVICES

- A. Where the Work requires interruption of existing services, shutdown at night or at times as directed by the Owner that do not interfere with established operating routines. Arrange to work continuously, including overtime if necessary, to ensure that service interruptions are as short as possible. Upon restoration of service, verify that all systems and equipment are operating normally.
- B. Existing services to remain shall be protected during construction. Repair services broken during the Work as soon as possible, at no additional cost to the Owner.

1.8 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of the following codes, specifications, and standards, except where more stringent requirements are shown or specified:
  - 1. New Hampshire Department of Transportation (NHDOT) "Standard Specification for Road and Bridge Construction"
  - 2. American Association of State Highway and Transportation Officials, (AASHTO) Latest Edition:

1.9 SUBMITTALS

- A. Submit design, manufacturer's data and/or shop drawings for each type of product provided.

1.10 TEMPORARY WORK

- A. When no longer required, remove all temporary work unless otherwise noted. All materials used for temporary construction shall remain the property of the installer.

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PART 2 - PRODUCTS

2.1. MATERIALS

- A. Rail elements shall conform to AASHTO M 180, Class A, Type II, unless otherwise specified on the Drawings.
- B. Bolts and nuts shall be galvanized steel conforming to ASTM A 153, Class C and ASTM A 307.
- C. Wooden guardrail posts and off set blocks shall be in accordance with NHDOT 606.2
- D. Steel guardrail posts and off set blocks shall be in accordance with NHDOT 606.2.3
- E. All rails, fittings, bolts, washers and other accessories shall be in accordance with NHDOT 606.2.4
- F. Terminal units to be either Type E-3 Modified for 40 MPH or EAGRT 25 foot platform as indicated on the Drawings and in Accordance with NH DOT standards.

PART 3 - EXECUTION

3.1. GENERAL

- A. Excavating, trenching, backfilling, and identification materials and their installation are specified in Section 2100.

3.2. EXECUTION

- A. Guardrail Installation: Layout and Install as indicate on DRAWINGS.
  - 1. Posts, rails, fittings, bolts washers, other accessories and end sections shall be installed per NH DOT 606

*END OF DIVISION 2708*

WESTERN AVENUE RECONSTRUCTION PREPARED FOR:  
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**DIVISION 2900 - LAWNS AND GRASSES**

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- A. The General Conditions and Supplementary General Conditions of the Contract are hereby made a part of this specification.
- B. Contractor shall provide all items, articles, materials or methods listed, mentioned or scheduled, including all labor, materials, equipment and incidentals necessary and required for the completion of the project.

1.2 DRAWINGS AND SPECIFICATIONS

- A. Contract Drawings are in part diagrammatic, intended to convey scope of work and indicate the general arrangement of equipment. The Drawings shall be followed in laying out the work. DO NOT SCALE DRAWINGS

1.3 SCOPE OF WORK

- A. Fine grading and preparing lawn areas.
- B. Furnishing and applying new topsoil.
- C. Furnishing and applying soil amendments.
- D. Seeding, fertilizing and growing new lawns.
- E. Replanting unsatisfactory or damaged lawns.

1.4 WORK BY OTHER SECTIONS OF THIS CONTRACT

- A. Work By Utilities
  - 1. The utility serving this project is Eversource. The contractor shall coordinate with the utility and provide all work and materials in accordance with utility standards.
- B. Earthwork
  - 1. All work shall coordinate with work described in Division 2100

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1.5 MATERIAL AND SUBSTITUTIONS

- A. Except where indicated otherwise, all materials shall be new and conform to standards established in Drawings and Specifications
- B. Substitute material and equipment, where requested or proposed by Contractor, shall be itemized and shall show cost to Owner whether it be an "addition" or "deduction" or "no change in cost" to the Base Bid Price. It shall be held that no change in contract completion time will occur should Engineer elect to accept any alternates unless such time is specifically stated in the Contractor's Bid.
- C. Materials and equipment not approved shall not be used in construction.

1.6 CLEANING

- A. Each Contractor shall clear away all debris, surplus materials, etc., resulting from his Work or operation, leaving the job and equipment furnished in a clean, first-class condition.

1.7 INTERRUPTION OF SERVICES

- A. Where the Work requires interruption of existing services, shutdown at night or at times as directed by the Owner that do not interfere with established operating routines. Arrange to work continuously, including overtime if necessary, to ensure that service interruptions are as short as possible. Upon restoration of service, verify that all systems and equipment are operating normally.
- B. Existing services to remain shall be protected during construction. Repair services broken during the Work as soon as possible, at no additional cost to the Owner.

1.8 SUBMITTALS

- A. Certification of grass seed from seed vendor for each grass-seed mixture stating the botanical and common name and percentage by weight of each species and variety, and percentage of purity, and germination. There shall be 0% weed content in the seed mix. Include the year of production and date of packaging.

1.9 TEMPORARY WORK

- A. When no longer required, remove all temporary work unless otherwise noted. All materials used for temporary construction shall remain the property of the installer.

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1.10 COORDINATION AND SCHEDULING

- A. Planting Season: Sow lawn seed and install sod during normal planting seasons for type of lawn work required. Correlate planting with specified maintenance periods to provide required maintenance from date of Substantial Completion
- B. Weather Limitations: Proceed with planting only when existing and forecast weather conditions are suitable for work.

PART 2 - PRODUCTS

2.1. SEED

- A. Grass Seed: Fresh, clean, dry, new-crop seed complying with the Association of Official Seed Analysts "Rules for Testing Seeds" for purity and germination tolerances.
  - 1. Permanent Seed Mixture: Provide seed mixture, 10% annual ryegrass, 60% perennial ryegrass and 40% Kentucky bluegrass, by weight, and minimum percentages of purity, germination, and 0% weed content.

2.2. TOPSOIL

- 1. Topsoil: ASTM D 5268, pH range of 5.5 to 7, 4 percent organic material minimum, free of stones 1 inch (25 mm) or larger in any dimension, and other extraneous materials harmful to plant growth.
  - 1. Characteristics: The soil content shall not exceed the following characteristics, Clay content 10-15%, Silt content 30-35% and Sand content 50-60%, and shall be adjusted to provide these characteristics.
  - 2. Topsoil Source: Reuse surface soil stockpiled on the site. Verify suitability of surface soil to produce topsoil meeting requirements and amend when necessary. Supplement with imported topsoil when quantities are insufficient. Clean topsoil of roots, plants, sods, stones, clay lumps, and other extraneous materials harmful to plant growth.
  - 3. Amend existing surface soil to produce topsoil. Supplement with imported topsoil when required.

2.3. SOIL AMENDMENTS

- A. Lime: ASTM C 602, Class T agricultural limestone containing a minimum 80 percent calcium carbonate equivalent, with a minimum 99 percent passing a No.8 (2.36 mm) sieve and a minimum 75 percent passing a No.60 (250 micrometer) sieve.
  - 1. Provide lime in the form of dolomitic limestone.

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2.4. FERTILIZER

- A. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of slow release nitrogen, low phosphorous, and potassium in the following composition:
  - 1. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing agency and as allowed with in the NH DES Shoreland Protection area.

PART 3 - EXECUTION

3.1. EXAMINATION

- A. Examine areas to receive lawns and grass for compliance with requirements and for conditions affecting performance of work of this Section. Do not proceed with installation until unsatisfactory conditions are corrected.

3.2. PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations.
  - 1. Protect adjacent and adjoining areas from hydroseed overspraying.

3.3. PLANTING SOIL PREPARATION

- A. Limit subgrade preparation to areas that will be planted in the immediate future.
- B. Fertilizer will only be used 25 feet or greater from the Contoocook River Reference line.
- C. Mix soil amendments and fertilizers with topsoil at rates indicated. Delay mixing fertilizer if planting does not follow placing of planting soil within a few days. Either mix soil before spreading or apply soil amendments on surface of spread topsoil and mix thoroughly into top 4 inches (100 mm) of topsoil before planting.
- D. Grade lawn and grass areas to a smooth, even surface with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit fine grading to areas that can be planted in the immediate future. Remove trash, debris, stones larger than 1 inch in any dimension, and other objects that may interfere with planting or maintenance operations.
- E. Moisten prepared lawn areas before planting when soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

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- F. Restore prepared areas if eroded or otherwise disturbed after fine grading and before planting.

### 3.4 SEEDING NEW LAWNS

- A. Sow seed with a drop spreader or a Brillion seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph (8 krn/h). Evenly distribute seed by sowing equal quantities in 2 directions at right angles to each other.
  - 1. Do not use wet seed or seed that is moldy or otherwise damaged in transit or storage.
- B. Sow seed at the following rates:
  - 1. Seeding Rate: 3 to 4 lb per 1000 sq. ft. (1.5 to 2 kg per 100 sq. m.).
- C. Rake seed lightly into top 1/8 inch (3 mm) of topsoil, roll lightly, and water with fine spray.

### 3.5 HYDROSEEDING NEW LAWNS

- A. Hydroseeding: Mix specified seed, fertilizer, and fiber mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogenous slurry suitable for hydraulic application.
  - 1. Mix slurry with nonasphaltic tackifier.
  - 2. Apply slurry uniformly to all areas to be seeded in a 1-step process. Apply mulch at the minimum rate of 1500 lb per acre (16.5 kg per 100 sq. m.) dry weight but not less than the rate required to obtain specified seed-sowing rate.
  - 3. Plug Spacing: 12 inches (300 mm) apart in both directions.
  - 4. Plug Spacing: 18 inches (450 mm) apart in both directions.

### 3.6 SATISFACTORY LAWN

- A. Seeded lawns will be satisfactory provided requirements, including maintenance, have been met and a healthy, uniform, close stand of grass is established, free of weeds, bare spots exceeding 5 by 5 inches (125 by 125 mm), and surface irregularities.
- B. Replant lawns that do not meet requirements and continue maintenance until lawns are satisfactory.

*END OF SECTION 2900*