

AGREEMENT EXHIBIT 18

TOPSOIL PLACEMENT, SEEDING AND PLANTINGS

PART 1 GENERAL

1.1 CONTRACT REFERENCES

- A. Attention is directed to the CONTRACT DOCUMENTS which are hereby made a part of this Section of the Specifications.

1.2 WORK DESCRIPTION

- A. The Contractor shall furnish all materials, labor, supervision, tools and equipment necessary to place and prepare the topsoil for seeding and permanent vegetative covers in all areas disturbed by the Work, to also include planting trees and shrubs as indicated in this specification.

1.3 SECTION INCLUDES

- A. Clearing and grubbing.
- B. Preparation of subsoil.
- C. Placing topsoil.
- D. Seeding and mulching.

1.4 RELATED SECTIONS

- A. Exhibit 15: Site Preparation
- B. Exhibit 16: Earthwork.

1.5 DEFINITIONS

- A. Invasive species: Include Cattails, Common Reed, Purple Loosestrife, Reed Canary Grass, Buckthorn, Japanese berberry, Common reed, Purple loosestrife, Russian and Autumn olive, Buckthorn, Japanese knotweed, Oriental bittersweet, and/or Multiflora rose.

1.6 SUBMITTALS

- A. Submittals shall be provided under provisions of Exhibit 12.
- B. Prior to application, a manufacturer's Certificate of Compliance to the Specifications shall be supplied with each shipment of seed. These certificates shall include the percentages of purity, weed content, germination of the seed, and

also the net weight and date of shipment. If the Contractor is unable to obtain a certificate, the specification information from the seed container shall be submitted.

- C. A copy of certificates of analysis for each type of fertilizer shall be submitted prior to application.

1.7 QUALITY ASSURANCE

- A. Seed mixtures shall be supplied in containers showing percentage of seed mix, year of production, net weight, date of packaging, and location of packaging.

1.8 REGULATORY REQUIREMENTS

- A. Seed shall be labeled in accordance with USDA rules and regulations under the Federal Seed Act and applicable State Seed Laws.
- B. The Contractor shall comply with regulatory agencies for fertilizer composition.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Seed mixtures shall be delivered and stored in sealed containers. Seed in damaged packaging will not be acceptable.

1.10 SCHEDULING AND SEQUENCING

- A. Application of permanent seed shall be performed between April 1 to May 31. The actual work shall be done, however, only during periods within these seasons which are normal for such work as determined by weather conditions and by accepted practice in this locality.
- B. Planting of permanent seed shall commence within 10 days of soil preparation. Once started, the planting operation shall continue until all exposed areas have been planted, except for periods when the soil is too wet to continue the operation. If downtime occurs because of soil conditions, planting shall resume as soon as the soil is suitable for planting.

PART 2 PRODUCTS

2.1 SEED MIXTURE

- A. Seed shall be of the New England Control/Restoration Mix for Detention Basins and Moist Sites type available from New England Wetland Plants and be a clear, fresh, new crop composted of Sensitive fern, New England Aster and Little bluestem amongst others. The manufacturers recommended application rate of 35lbs/acre should be followed.

- B. Seed Mixture: Seed to be delivered in unopened bags with labels attached. Furnish supplier’s guarantee statement of mixture composition, percentages of purity and germination. Submit tags to Owners Representative for approval.

2.2 TREES AND SHRUBS

- A. Native woody tree and shrub species are to be planted within the remediated area to include: red maple saplings and shrubs such as serviceberry and gray dogwood. The number, spacing and height requirements are shown in the table below.

Species	Height	Spacing	Number	Light Requirements	Habitat Preference
Red Maple (Acer rubrum)	3'-4'	10' on center	29	Full sun to full shade	Shore edges, wet meadows, forests
Serviceberry (Amelanchier canadensis)	3'-4'	10' on center	15	Partial shade	Shores, forests, drier sites
Gray dogwood (Cornus racemosa)	3'-4'	10' on center	14	Full sun to full shade	Forested areas, drier sites

2.3 SOIL MATERIALS

- A. A layer of topsoil approximately 0.5 feet in thickness, is to dress the site and be graded by hand to match the existing conditions.
- B. The created topsoil is to consist of a mixture of equal volumes of organic and mineral materials, ideally consisting of a well-decomposed clean leaf compost. Constructed soils used in the remediated areas are to possess approximately 12% organic carbon and may be tested for organic carbon content before use in the mitigated area.

PART 3 EXECUTION

3.1 EXAMINATION

- A. The Contractor shall be deemed to have inspected the site and satisfied himself as to actual grades and levels and true conditions under which the work will be performed.
- B. The Contractor shall verify that existing plant life designated to remain is tagged or identified. Trees, plant growth, and features designated to remain as final landscaping shall be protected.

- C. Utilities that remain shall be located, identified, and protected from damage.
- D. Bench marks, survey control points, and existing structures shall be protected from damage or displacement.
- E. The work area shall be free of standing water and shall be dry.

3.2 PREPARATION OF SUBSOIL

- A. Subsoil shall be graded to eliminate uneven areas and low spots. Lines, levels, profiles and contours shall be maintained. Changes in grade shall be gradual and slopes shall be blended into level areas.
- B. Foreign materials, weeds and undesirable plants and their roots shall be removed.

3.3 PLACING TOPSOIL

- A. Topsoil shall be placed during dry weather and on dry unfrozen subgrade to a minimum depth of 0.5 feet. During spreading, vegetable matter and foreign non-organic material shall be removed.
- B. The topsoil shall be graded to eliminate rough, low or soft areas, and to ensure positive drainage and shall be raked until smooth.
- C. In disturbed wetland areas, add top soil as necessary to establish wetlands seeding and support growth.
- D. Topsoil shall be placed in 6-inch lifts to finish grade, proof-rolled with two passes.

3.4 SEEDING

- A. Seeding shall not occur immediately following rain, when ground is too dry, or during windy periods.
- B. Wetland seed shall be sowed in accordance with the manufacturers recommendations at a rate of 35 lbs. per acre.
- C. Seeding shall occur between April 1 and May 31.
- D. Where applicable, a thin layer of leaf litter shall be applied immediately following seeding and scattered on exposed soils by hand.
- E. Water shall be applied to the seeded areas with a fine spray immediately after the appropriate areas have been covered with leaf litter. Contractor to supply water.

3.5 PROTECTION OF FINISHED WORK

- A. Finished work shall be protected upon completion.

3.7 FIELD QUALITY CONTROL

- A. Eight weeks after seeding is complete and on written notice from the Contractor, the Engineer will determine if a satisfactory stand has been established. The Engineer shall make this determination within 15 days from receipt of notice.
- B. If a satisfactory stand has not been established, the Contractor shall immediately replant areas that do not meet satisfactory stand requirements. Should additional replanting be required to meet coverage requirements specified herein, OWNER may elect to withhold a portion of the Contractor's payment necessary to replant those remaining areas. The cost of this replanting shall be based on cost estimates from two independent contractors.

3.8 FOREST SUBSTRATE TREATMENT

- A. Where applicable, a thin layer of leaf litter will be obtained from adjacent areas and scattered on exposed soils by hand. Branches and other coarse woody debris will be placed back in the wetland once the leaf litter has been applied.

3.9 MAINTENANCE

- A. Specific Operations:
 1. Maintenance shall consist of the following elements:
 2. Watering, invasive species control, and other operations such as regrading, replanting, as required to restore the remediated area.
 3. After the vegetation has appeared, all areas and parts of areas which fail to show a uniform stand of vegetation, for any reason whatsoever, shall be reseeded and such areas and parts of areas shall be seeded repeatedly until all areas are covered with a satisfactory growth of vegetation.
 4. Watering: The Contractor shall be responsible for the watering of all seeded areas, which shall be kept moist. The Engineer's opinion will prevail in the event that a dispute develops with the Contractor as to whether or not the seeded and vegetated areas are moist. Seeded areas on which growth has started shall be watered to a minimum depth of 2 inches to assure continuing growth. Watering shall be done in a manner which will provide uniform coverage, prevent erosion due to application of excessive quantities over small areas, and prevent damage to the finished surfaces due to the watering equipment. The Contractor shall furnish sufficient watering equipment to apply one complete coverage to the seeded areas in an 8 hour period.
 5. The Contractor shall care for all of the seeded areas until the work has been accepted. Care shall include any re-grading, re-seeding and invasive species control, which may be necessary.

6. The Contractor shall control invasive species, where applicable and as approved by the Conservation Commission, with either basal applications of herbicides or by mechanical methods such as a Weed Wrench or hoe.

3.10 ACCEPTANCE OF PLANTINGS AND VEGETATION

A. General:

1. In order to receive a Certificate of Substantial Completion, the Contractor must establish an acceptable and satisfactory stand of vegetation at all seeded areas. Liquidated Damages as specified in the Bid Form will apply if Substantial Completion is not obtained by the specified dates.
2. The Engineer shall have final authority on the acceptance of seeded areas and the determination of an acceptable and satisfactory stand of vegetation. To be acceptable, all areas of vegetation shall be well-rooted, thick in growth, uniformly healthy in color, texture, and growth pattern, and shall meet the following criteria:
 - a. Remediated areas shall have at least 80% cover by noninvasive species.
 - b. No bare spots larger than one foot (1') square with less than 75% germination shall be evident,
 - c. Slopes, soils and substrates within and adjacent to the remediation areas are stable.
3. Plantings will be acceptable provided requirements, including maintenance, have been complied with.

B. Post- Restoration Monitoring:

1. Performance Standards:
 - a. Prior to granting acceptance, and for two growing seasons, monitoring will occur in the late summer/early fall following the completion of the remediation. The monitoring efforts will address performance criteria such that slopes, soils and substrates within and adjacent to the remediated areas are stable and the remediated areas have at least 80% cover by noninvasive species.
 - b. For the purpose of monitoring, at least ten, three foot by three foot square plot will be used to sample the herbaceous layer. The information recorded from each plot will be reported and submitted to the Conservation Commission and to include: species richness, percent cover, relative dominance, relative frequency and importance value.

- c. Tree and shrub species will be assessed by placing each individual into one of the three following survival classes: alive, stressed or dead. The number of individuals in each of the three survival classes will be reported for each species. Acceptance will be made by the Engineer to determine that all grass and plantings and all other required and related work is in place and that it has been installed in accordance with the Plans and specifications.

3.11 REMOVAL AND FINAL CLEANUP

- A. Once the site has been fully stabilized against erosion, remove sediment control devices and all accumulated silt. Dispose of silt and waste materials in proper manner. Regrade all areas disturbed during this process and stabilize against erosion with surfacing materials.