

Part 5: Non-Tidal Wetland Planting

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1.0 General Conditions

1.1 Scope of Work

- A. The landscape contractor shall provide all materials, labor, and equipment required to complete all wetland planting work as shown on the plans and specifications.
- B. Plant quantities, size, spacing, and condition shall be stated on the Wetland Planting Plan. The plant list submitted with the bid will automatically become part of the contract documents.
- C. The landscape contractor shall bid according to the plant list. It is the wetland designer's responsibility to be sure that the plant count is correct, and that each plant grouping is clearly labeled on the plan with the total number of plants per grouping shown.
- D. If applicable, the owner shall provide to the landscape contractor a copy of all wetland permits and an approved wetland mitigation plan or an approved letter together with the mitigation plan.

1.2 Standards

- A. All plant material should be indigenous to the eastern region of the United States and grown within the same USDA Hardiness Zone as the wetlands site.
- B. Container-grown, bare root, and seedling tree and shrub plant material shall conform to the current issue of the *American Standard for Nursery Stock*, published by AmericanHort (formerly ANLA).
- C. Collected material may be used only when approved by the wetland designer, owner, or owner's representative.
- D. Nomenclature will be accordance with the most recent edition of Reed, P.B. Jr., *National List of Plant Species that Occur in Wetlands: Northeast (Region 1)*. U.S. Fish and Wildlife Service. Biol. Re. 88 (26.1).
- E. It is the wetland designer's responsibility to specify the need for "wet-cultured" plant material. If "wet-cultured" plant material is specified by the wetland designer, the material shall be grown in a saturated soil condition for a minimum of three months during the growing season. Otherwise, wetland plant material is not required.

1.3 Wetland Plant Availability

Wetland plant species are not always readily available in quantity. It is the landscape contractor's responsibility to verify the availability of specified plant material for the appropriate planting season and construction schedule.

Often if large quantities of one wetland plant species are required, the material will have to be contract-grown. A list of potential plant suppliers may be provided by the wetland designer or listed on the Wetland Planting Plan for the landscape contractor's use.

If plant materials are to be collected from the wild, any requisite permits must be obtained from appropriate government agencies regulating such collection. Collection may not be acceptable in some areas due to the potential damage to the natural wetland environment. If circumstances exist where collection is appropriate, digging should be done by hand in such a way as to minimize visual and physical impact to the site, and be in a staggered fashion to avoid mutilation of large areas of wetland. See section 2.2 (Standards) in this guideline for details on handling and storage of collected plant material.

1.4 Approvals

All approvals shall be in writing.

1.5 Substitutions: Pre-Bid

It is the landscape contractor's responsibility to make every reasonable effort to find the material specified by the wetland designer. The landscape contractor is responsible for qualifying his/her proposal to document any plant suitability or availability problems. It is the landscape contractor's responsibility to provide a list of proposed plant substitutions in the bid response for the wetland designer's approval. The contractor shall submit a base bid as per plan, plus price clarifications for all recommended substitutions.

1.6 Substitutions: Post-Bid

If a substitute is selected, it must be approved by the owner's representative prior to award of contract.

It is the intent to eliminate post-bid plant substitutions. However, in the event that the contract material has become unavailable, the owner's representative must approve an appropriate substitution.

1.7 Utilities

- A. It is the landscape contractor's responsibility to notify utility companies and/or the general contractor in advance of construction to locate utilities (www.missutility.net for MD, DC, and DE or <http://va811.com> for VA).
- B. If there is a conflict with the utilities and the planting, the wetland designer shall be responsible for relocating plants prior to the planting process.

1.8 Concealed Contingencies

The landscape contractor shall not be liable for delays in planting, relocating plants, or damage to plants resulting from undisclosed, subsurface conditions such as, but not limited to, rock, clay pan, or soils contaminated with toxic substances or other obstacles encountered in excavation work that are not apparent at the time of estimating.

1.9 Unsuitable Conditions

If plants are specified to be planted in conditions that would be detrimental to growth and/or plant survivability as determined by the landscape contractor, the landscape contractor shall notify the wetland designer or owner's representative. If the wetland designer concurs with the landscape contractor's assessment, any associated costs due to the relocation of the plants or other site modifications will be at additional cost to the owner.

1.10 Soil Testing

Unless otherwise noted in the plans or specifications, the wetland designer prior to plant selection should conduct a soil test, and if soil amendments are required, type and quantity shall be identified in the bid package. The soil test shall be performed for the soil that will be exposed following excavation, or for whatever soil will be used as the growing medium. See *Landscape Specification Guidelines Part 7: Soils*, section 1.7 (Soil Testing).

1.11 Workmanship

- A. During delivery and installation, the landscape contractor shall perform in a professional manner and leave the work areas clean of litter and debris at the close of each workday.
- B. During planting, all areas shall be kept neat and clean, and precautions shall be taken to avoid damage to existing plants, trees, erosion and control devices, and structures (e.g., water-control structures, headwalls, aprons). If a limit of disturbance boundary is delineated in the field, this line must be adhered to diligently.
- C. Upon completion of planting operations, the landscape contractor shall remove all debris and waste material resulting from planting from the project area, at his/her expense, and restore any areas damaged by his/her equipment and workers.

1.12 Water Supply

The owner shall supply water on site at no cost. If the landscape contractor has to supply the water or watering equipment to the site, it shall be at an additional cost to the owner.

1.13 Planting Seasons

The recommendations below are only general guidelines. There are many other factors that play a role in determining whether a plant will survive. Planting may need to be delayed to accommodate soil conditioning procedures or the removal of invasive species at the planting site. Wetland permits often contain planting windows.

- A. A Planting shall not occur if the ground is frozen.
- B. Tubers, sprigs, bulbs, and rhizomes must be transplanted before new growth emerges. Therefore, they are best planted in the fall after dormancy, or in the winter before dormancy breaks.
- C. Most of the sedges and grasses are best planted immediately after dormancy breaks in the spring.
- D. Woody and herbaceous peat-potted/container nursery stock may be planted at any time of the year, including plugs. All woody material shall be hardened off or fully dormant when planted.
- E. It is recommended that woody plant species be planted in the fall or early winter, after the onset of dormancy. However, if winter flooding is anticipated, species selection and water level management are crucial to seedling survival.
- F. Growing bare root and field-collected plugs shall be planted during the early growing season.
- G. Bare root trees and shrubs are to be installed while dormant when weather allows.

1.14 Inspection and Acceptance

- A. Inspection: An onsite inspection of the work identified in the contract documents is to be conducted by the wetland designer and owner or owner's representative in the presence of the landscape contractor for the purpose of acceptance. Inspection shall be made within two weeks of written notification from the landscape contractor. Failure of the owner to inspect the work shall void the landscape contractor's guarantee. During inspection for initial acceptance, the landscape contractor shall have an acceptance form to be signed by the owner or the owner's representative.
- B. Initial Acceptance: There should be an approval of the work inspected. Acceptance can be on partially completed work under the contract, if approved by the wetland designer or owner. If, for reasons beyond the landscape contractor's control, work has stopped, inspection shall be made on partially completed work. Warranty shall begin after landscape inspection and acceptance. Maintenance

after initial inspection and acceptance shall be the responsibility of the owner, unless an optional maintenance contract has been specified.

1. The landscape contractor shall periodically inspect the site during the warranty period and notify the owner in writing if proper maintenance is not being performed.

C. Final Inspection and Acceptance: The landscape contractor shall conduct a final inspection with the owner or owner's representative at the end of the warranty period.

1.15 Warranty

- A. The term and extent of the warranty for wetland plant material usually differs from that of upland balled and burlapped plant material, since site conditions are not as predictable. A warranty period shall be agreed upon between the owner and landscape contractor for each individual wetland planting project, and made a part of the contract documents.
- B. The warranty shall commence on the date of initial acceptance by the owner or owner's representative.
- C. All plants listed in the warranty shall be in satisfactory health at the end of the warranty period.
- D. Warranted plant material that is 25% dead or more shall be considered dead and must be replaced at no charge. A tree shall be considered dead when the main leader has died back, or if 25% or more of the crown is dead.

1.16 Replacements and Conditions

- A. Plant replacements shall be made during the next appropriate planting season unless the landscape contractor agrees to an earlier date.
- B. The landscape contractor shall be responsible for a one-time replacement only.
- C. Replacement plants shall be of the same size and species as the original, and fertilizer and backfill mixture the same as originally used, unless specified otherwise by the wetland designer. If replacement plant material is not identical to the original material at the request of the wetland designer or owner, the difference in cost will be borne by the owner.
- D. The landscape contractor will not be responsible for plant material that has been damaged by vandalism, fire, removal, relocation, animal predation, or other activities beyond the landscape contractor's control.

E. Collected and transplanted materials are not guaranteed, unless agreed to otherwise in contract documents.

F. The landscape contractor will not be responsible for plant losses due to abnormal weather conditions such as floods, excessive wind damage, drought, severe freezing, or abnormal rains.

1.17 Maintenance

If the owner or wetland designer desires maintenance, the details should be outlined in separate specifications and made a part of the contract documents.

2.0 Plant Materials

2.1 Scope of Work

The landscape contractor shall be responsible for supplying and installing all plant material represented on the Wetland Plant Schedule as submitted with the contract. The landscape contractor shall have investigated the sources of supply and satisfied himself/herself that he/she can supply all the plants specified in the Plant Schedule in the size, variety, quality, quantity and condition stated or as specified in the contract. Failure to take this precaution will not relieve the successful bidder from the responsibility for furnishing and installing all the plant material in strict accordance with the contract requirements and without additional expense to the owner.

2.2 Standards

All material shall be nursery-grown unless otherwise specified.

- A. Bare root seedlings and older plants (woody)
 1. Bare root trees and shrubs shall be dug with adequate, well-developed fibrous roots, pruned to a length of approximately 8" to ease planting, if the pruning does not result in more than 25% of the root system being removed.
 2. Seedlings shall have a minimum top length of 18".
 3. The diameter of the root-collar shall be at least 3/8".
 4. Plants shall have an abundance of well-developed terminal buds on the leaders and branches.
 5. The stems and branches of all plants shall be turgid and the cambium healthy.
 6. Plants that are in leaf or that show signs of leafing out shall not be acceptable.
- B. Growing bare root plants (herbaceous)

1. Plants shall show new roots that are clean and white in coloration.
2. Plants shall appear healthy with no foliage spots, discolorations, wilting, or other evidence of the presence of disease or insect damage.

C. Container-grown stock (woody and herbaceous)

1. Plants shall be in accordance with the current issue of *American Standard for Nursery Stock*, published by the AmericanHort (formerly ANLA).
2. The root system of container-grown plants shall be well-developed and well-distributed throughout the container, such that the roots visibly extend to the inside face of the growing container.
3. If in leaf, the plants shall appear healthy with no leaf spots, leaf damage, leaf discoloration, leaf wilting or evidence of insects on the plant.

D. Peat-potted nursery stock (herbaceous)

1. Peat-potted nursery stock shall be contained in 1¾" to 2¼" pots.
2. Each pot shall contain at least four stems having a minimum of 6" of active growth.
3. Roots shall be sufficiently well-developed through the peat-pot surfaces so that plants are firmly contained in the pot.
4. If growing, the plants shall appear healthy with no leaf spots, leaf damage, leaf discoloration, leaf wilting, or evidence of insects on the plant.

E. Plugs (herbaceous, woody seedling, or rooted cutting)

1. The width and depth of plugs shall be at least 4" for grasses, rushes, and sedges.
2. Plugs shall have a solid soil/root mass with the soil in place. Roots shall appear clean and white in coloration.
3. If growing, the plants shall appear healthy with no leaf spots, leaf damage, leaf discoloration, leaf wilting, or evidence of insects on the plant.
4. If dormant, new healthy shoots (herbaceous) shall be apparent, or stems (woody) shall be supple and exhibit a healthy cambium.
5. Plugs (herbaceous) containing shoots that are soft or mushy or otherwise appear rotten and plugs (woody) containing brittle stems or having unhealthy cambium shall not be accepted.

F. Unrooted cutting

1. Hardwood cuttings (whips) shall be 30–55 cm long and between 8 and 13 mm in diameter.
2. The cuttings must be alive, fresh, and with bark intact.
3. Cuttings should have at least two bud scars near the top to facilitate development of branches.
4. The larger or thicker butt ends should be cleanly cut at a 45-degree angle for easy insertion into the soil, and the top should be cut square or blunt.

G. Dormant propagule (herbaceous): These may be bulbs, tubers, or rhizomes.

1. Propagule shall be a single stem (culm) of grasses or sedges and associated roots, basal shoots, and any short rhizome sections left intact. Old or new top growth should be clipped to a length of 6 to 12".
2. Bulbs and tubers shall be hard.
3. Rhizomes shall be resilient.

H. Collected plant material

Excavated material shall meet the above requirements for the appropriate condition, at a minimum. Plants should be transported and replanted within 24 hours. The plants must be kept moist and protected from the wind during transport.

2.3 Inspection

- A. Plants may be subject to inspection and approval by the owner or owner's representative at the place of the growth for conformity to specification requirements as to quality, size and variety. It is the landscape contractor's responsibility to know his/her sources. Costs of inspection visits shall be borne by each individual party.
- B. Plants damaged during handling or transportation or if improperly stored may be rejected by the owner or owner's representative on site.
- C. Plants with excessive soil above the root flair may be rejected by the owner or owner's representative on site.
- D. Any plant material inspected at the place of growth (accepted and sealed by the owner's representative), which has not been damaged during transportation or handling or has not been improperly stored, cannot be rejected at the site.

2.4 Plant Transport, Handling, and Storage

- A. Plants shall be transported in a covered vehicle, and if the weather is very hot, protected from the heat.
- B. Plant material shall not be exposed to high winds.
- C. Large quantities of plant material shall be shipped by express packing source, picked up by the landscape contractor, or delivered by the supplier.
- D. Large quantities of plant material shall be shipped as several partial shipments in quantities that match planting rates to reduce onsite storage requirements and limit plant mortality.
- E. All plants shall be stored in a cool, shaded environment and watered routinely so that the soil and roots are kept moist at all times until planting.
- F. Preferably, bare root seedlings shall be planted immediately. Otherwise, bare root seedlings shall be stored, still wrapped, in a cool, dark place, ideally a cold-storage unit set at 34 to 39 degrees Fahrenheit. However, an enclosed structure will suffice for a few days if the roots are not allowed to dry out or freeze.
- G. Cuttings shall be fresh and must be kept moist. Cuttings should not be stored more than one day before planting; to increase the rate of survival, they should be planted the same day.
- H. The root system of emergent species shall be kept in water or in contact with a saturated mulch material.
- I. If plugs are not shipped in a growing container, and will not be planted immediately, root masses shall be protected by covering them with straw, compost, or other suitable material.
- J. Floating-leaved and submerged aquatics must be kept continuously wet and are best transported in water. They shall not be stored more than a day or two. The wetland designer shall specify if frequent water changes are necessary.

3.0 Products

3.1 Quality Assurance

Manufacturers' certified analyses shall accompany packaged standard products.

3.2 Organic Matter

- A. Leaf mold – thoroughly shredded, well-composted leaf material, free of trash.
- B. Pine bark – potting-grade pine bark screened through a 3/4" screen and containing less than 10% sap wood fibers. Any pine bark containing more

than 10% sapwood must be composted through the first heat stage.

- C. Peat Moss – Type 1 sphagnum peat moss; finely divided with a pH of 3.1 to 5.0.

3.3 Topsoil

The practice of over-excavation and then backfilling with topsoil for wetland creation projects are usually not necessary. Most substrates will support the establishment of vegetation. Exceptions to this would be gravel or bedrock and dense clays, as well as soils that contain toxic materials or high or low pH readings. A medium texture soil, with 20% to 35% clay or organic matter is considered an ideal soil medium.

If wetland soils are to be used for topsoiling—"mucking"—then the wetland designer shall provide separate specifications for the procedure of stripping, storing, or stockpiling; maintaining; and spreading of the wetland soil. If this method is specified, the host soil should be tested before stripping to evaluate the species in the seed bank, in order to check for the presence of invasives.

3.4 Fertilizer

Perform a soil test to determine nutrient requirements. Apply fertilizer based on soil test results and recommendations in accordance with current U.S. Department of Agriculture regulations or applicable jurisdictions.

3.5 Backfill Mixture

- A. The planting of herbaceous plant material does not normally require soil amendments.
- B. Backfill mixture for trees and shrubs shall be equal parts of existing soil and organic material, plus fertilizer. Assuming that the planting hole is approximately twice the size of the plant container, the following equation may be used to estimate the amount of compost required: $(\# \text{ of plants})(\text{Ctr. size in gal.})(0.005) = \# \text{ of cubic yards of compost}$
- C. If any other additives are found to be necessary at the time of planting, it shall be with the approval of the landscape contractor, wetland designer, and owner or owner's representative at an additional negotiated cost.

3.6 Stakes

Stakes shall be 2"x 2" hardwood or acceptable equivalent. See *Landscape Specification Guidelines Part I: Exterior Landscape Installation*, section 5.7 (Tree Support Schedule) for proper stake length.

3.7 Guying Material

- A. Wire: Wire shall be 12 or 14 gauge galvanized steel or acceptable equal, depending on size of tree. See section 5.7, Tree Support Schedule of the Exterior Landscape Installation Specification.
- B. Non-wire tie: Flat, woven, smooth, elastic tie material (e.g., ArborTie®)

3.8 Hose

Hose shall be corded rubber, uniform in color, and either 1/2" or 3/4", depending on the size of the tree. Other methods such as straps or plastic chain locks may be used where acceptable. See *Landscape Specification Guidelines Part 1: Exterior Landscape Installation*, section 5.7 (Tree Support Schedule).

4.0 Soil Preparation

4.1 General Conditions

If the planting area is covered with a temporary cover crop of invasives, this growth must be eliminated at the expense of the grading contractor or owner. Work shall proceed only after rough grading has been completed and the sub grade is within the specified grading tolerances in the contract documents or plan.

4.2 Topsoil Installation

If topsoil installation is necessary, the wetland designer shall provide separate specifications.

4.3 Tilling

After the planting area has been brought to grade, the substrate shall be deconsolidated by disking, ripping, plowing, or tilling to a depth of 4" to 6". If deeper deconsolidation is required by the wetland designer (e.g., for woody areas), it shall be specified on the plans or in the contract documents.

4.4 Acceptance

Acceptance for soil preparation shall be given by the wetland designer upon satisfactory completion of each section or area as indicated on the drawings or as otherwise specified in the field. Installation by the landscape contractor prior to said acceptance by the wetland designer indicates acceptance of soil by contractor.

5.0 Final Grading

5.1 General Conditions

The landscape contractor shall proceed only after the topsoil or subsoil has been prepared uniformly in

the designated areas to within the specified grading tolerances in the contract documents or plan. Any undulations or irregularities in the surface resulting from fertilizing, tilling or other causes shall remain to provide a beneficial micro-topography throughout the site. Flooded, washed out or areas otherwise damaged shall be reconstructed and all grades re-established by the landscape contractor in accordance with the drawings and/or as specified by the construction supervisor in the field.

5.2 Cleanup

Prior to planting and/or seeding, the surface shall be cleared of all trash, debris, and stones larger than 1½" in diameter or length, and of all roots, brush, wire, grade stakes, and other objects that would interfere with planting or seeding operations.

5.3 Acceptance

The onsite construction supervisor, upon completion of each planting section, shall give acceptance for final grading or area as indicated on the plan or as otherwise specified. Final grade shall be within the specified grading tolerances in the contract documents or plan.

5.4 Maintaining the Final Grade

The grading contractor shall be responsible for maintaining the final grade in the accepted areas that are to be planted or seeded until the effective date to begin planting or seeding operations. The effective planting or seeding date shall be specified in a written notice from the grading contractor or owner.

6.0 Planting Procedures

6.1 Planting Procedures for Container-Grown Material

- A. Remove the plant either by cutting or inverting the container.
- B. Use a knife or sharp blade to make four to five 1" cuts the length of the root ball; loosen the roots from the outside of the root ball.
- C. A pit shall be dug large enough for the proper setting of the root ball (1' wider than the root ball) and deep enough to allow 1" to 2" of the root ball to set above existing grade. Plants from flat-bottomed containers shall not be planted in V-shaped pits, such as produced by a dibble bar or pointed spade.
- D. Set the plant straight and in the center of the pit.
- E. Use a backfill mixture and fertilizer as specified in sections 3.5 and 3.4 in this guideline, respectively.

- F. Backfill the sides of the pit with soil mixture and tamp firmly as the pit is being filled.
- G. Make sure the plant remains erect during the backfilling procedure. Trees shall not have more than a 10% lean following backfilling.
- H. Leftover soil from the planting pit excavation shall be raked around the plant, being careful not to alter the existing grade significantly. A saucer shall not be formed around the plant.
- I. Water the plant thoroughly until the soil is saturated, even if it is raining.
- J. Remove all tags, labels, strings, etc. from the plant.

6.2 Planting Procedures for Bare Root Material

- A. The pit shall be only broad enough to accommodate the roots fully extended and only deep enough so that the uppermost roots will be just below the original grade.
- B. Set the plant in the pit so that all roots, when fully extended, will not touch the walls of the planting pit and the uppermost roots are just below the original grade. Seedlings should be planted erect.
- C. Spread out the roots properly and work backfill mix among them. Prune off broken roots in a natural position. Water thoroughly while backfilling.
- D. The plant shall be heeled into the ground, firmly packing the soil around the roots.
- E. Complete the planting process as outlined above in section 6.1, E through J, in this guideline.

6.3 Planting Procedures for Unrooted Cuttings

- A. Tamp the cutting into the soil in an upright position, with buds up, and no more than half of the total length of the cutting above ground.
- B. Soil shall be firmly packed around the cutting.
- C. Do not split the cutting during tamping.
- D. An iron bar can be used to make the hole; tamping is best accomplished with a dead-blow hammer (i.e., a hammer with a hollow head filled with shot).

6.4 Planting Procedures for Propagules

- A. Whole plants shall be installed with the root down.
- B. Plant to a depth that allows the root collar, evidenced by a dark line or a line dividing two color zones, to be flush or slightly above existing grade.
- C. Either hand planting or a tree planting bar or tile spade may be used to make a slit in the substrate,

insert the propagule, and firmly pack the soil around the propagule.

6.5 Planting Procedures for Peat-Potted Plant

- A. Using a trowel or similar digging equipment, dig a hole large enough to accommodate the potted plant, while allowing space to backfill around it.
- B. Crush, crumble, slice, or otherwise attempt to disjoin the peat pot before planting in order to speed up decomposition of the peat pot.
- C. Place the plant in the hole so that the top of the soil ball is even or slightly higher than the surrounding grade.
- D. Complete the planting process as outlined above in section 6.1, E through J, in this guideline.

7.0 Seeding Procedures

7.1 Products

- A. For purposes of stabilizing and establishing side slopes or areas where standing water or moving water are not to occur, the following may be applicable:
 1. Mulching materials
 - a. Straw shall be bright in color, free of rot and mildew, small-grained, free of all noxious weeds.
 - b. Cellulose fiber: Recovered cardboard or recovered newspaper are preferred for hydro-seeding because of ease of incorporation into slurry.
 2. Stabilizing materials
 - a. Chemical tacking
 - b. Twine: binder twine used for small areas.
 - c. Netting: nylon netting used with metal staples or wooden pegs.
 - d. Crimping: mechanical, tractor-drawn implement for stabilizing mulch.
 - e. Cellulose fiber: as detailed above in paragraph 1b.

7.2 Standards

- A. Collected seed should only be used when approved by the owner's representative and wetland designer.
- B. The supplier of the seeds shall supply the germination test results (within the last three months) and the percent purity of the seeds upon

delivery to the site. Specifications should indicate seeding rates using pure viable seed. All seed must be cleaned, processed, analyzed for purity, stored, and germination tested before being used. Every seed variety contains different germination rates and requirements, and it is the wetland designer's responsibility to specify the germination requirements of the seed variety specified.

7.3 Seed Availability

Large quantities of various native seed species may not be available commercially unless they are collected from the wild. If specifications require the collection of seed from native (local) plant communities, caution should be taken not to exhaust the seed supply of that native plant community. Authorization from the appropriate agencies and property owners should be granted prior to collecting native seeds.

7.4 Related Work

In this guideline:

- 1.10 Soil Testing
- 3.3 Topsoil
- 4.0 Soil Preparation
- 5.0 Final Grading

7.5 Planting Season

Herbaceous seeds will have the best germination rate if planted in the fall or very early spring. Based on the seed requirements for germination, the seed may need to be planted in the late fall for stratification to occur. The seed may be manually stratified and planted in the beginning of the growing season if the wetland designer feels it is appropriate. The wetland designer shall specify the appropriate planting season for each individual seed species.

7.6 Seeding Procedures

- A. The following are various seed applications that may be applied when sowing seed in the wetland mitigation areas. The wetland designer shall determine the method of seed application appropriate for the site.
- B. It is important to evaluate the terms of suitability of the seeded wetland species to the site conditions. Before specifying the seed, the designer should consider the capability of performing a successful seeding and the suitability of the species for the site.
 - 1. Aerial Seeding: Generally useful when applying seed to a very large area.
 - 2. Broadcast Seeding: May be applied by hand or using equipment from the ground or boat.

- 3. Drill Seeding: For fine seeds, firm conditions are needed to attain the correct seeding depth. Plant the seed at the depth four times the diameter of the seed or based on seed requirements. Mulching or stabilizing is not necessary for this procedure.
- 4. Hydro-seeding: Often a slurry mix and useful when seeding steep slopes. Consideration should be given when applying within wetland areas, which may receive frequent water flow or experience ponding, as the water flow may wash the seed away or the seed and slurry may float away.
- 5. Wet Seeding: Seeds are soaked until they sink and then are broadcast. This process is only suitable for seeds that absorb water and can tolerate standing water to germinate and survive.

7.7 General Seeding Application

- A. When seeding a cover crop for wooded or scrub shrub sites, if the planting of the woody species occurs first, care should be taken not to disturb the root mass of the tree or shrub. Otherwise, time should be given, if practical, for the cover crop to germinate and begin growth.
- B. Prior to sowing, the finished grade shall be of a friable, noncompacted nature to ensure good soil to seed contact. The area may be deconsolidated through disking, roto-tilling, or ripping to a depth of at least 4" to 6".
- C. Planting rows should traverse the narrow axis of the wetland mitigation area rather than the longer axis of the wetland mitigation area.
- D. For smaller seeds (greater than 500,000 seeds per pound), dilute and mix with sand or cat litter to provide an even seeding distribution. Press the seed into contact with the final grade and cover with a thin film of silt or mud 1/8" thick.
- E. Wet-stored seeds should be mixed with clay-based cat litter, dry sand, or other active dry agents to provide de-clumping of the seeds and suitable flow of the seed during distribution.
- F. Larger seeds (less than 500,000 seeds per pound) should be subsurface sown to various depths depending on the size of the seed, unless the wetlands designer allows hydro-seeding. Larger seeds should not be pre-dried.
- G. Apply 8- to 9-month release, 18-6-12, or comparable fertilizer at a rate of 300 pounds per acre.
- H. Seeding applications shall occur using one of the methods specified above in this section, ensuring that even coverage has been achieved.

- I. If site conditions allow, seeding may be accomplished with a tractor and cultipacker. The cultipacker should be set to just scarify the sediments in order to avoid the placement of the seeds more than 1/8" deep. Traverse the site three times with the tractor using different patterns to ensure soil to seed contact.
- J. Mitigation areas with water control structures should be maintained in a moist condition with less than 1" of standing water until seed germination is complete and the seedlings are 2" to 3" tall. Based on seed requirements, standing water deeper than 1" may be acceptable during the germination process.
- K. Return the designed hydrology to the site that is appropriate for the seeding species.

