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SECTION 01010**SUMMARY OF WORK****PART 1 - GENERAL**

1.1 SUMMARY

- A. The Project consists of landscape, grading and irrigation improvements to 725 Main Street, Hyannis MA.
 - 1. The Work includes but shall not be limited to excavation, removal of onsite debris, grading, topsoil stripping, amending and replacement, seeding, sodding, landscaping, planting, installation of pathways and edging, establishment and 1 year maintenance of the property and new landscape.
- B. Contract Documents, dated April 23, 2007 were prepared for the Project by Kennen Landscape Architecture, 991 Massachusetts Ave, Unit 2, Cambridge, MA 02138.

1.2 WORK BY OWNER

- A. The Owner will perform the following in preparation for this project:
 - 1. Installation of Water Meter Pit
 - 2. Installation of Electric service to site.
- B. *The Contractor is responsible for providing all necessary connections to water meter pit, Installation of backflow preventer and connection to electric service to complete irrigation work in this contract.***

1.3 WORK SEQUENCE & PROJECT SCHEDULE

- A. No special phasing is required for this project. The Work, excluding maintenance, must be completed by June 22, 2007 at the latest. It is highly desirable that this work be completed before that date.
- B. The work shall be commenced at the time stated in the notice to the Contractor to proceed and the Work shall be completed by the times so stated in the Contract Agreement. It is understood and agreed that time is of the essence.

1.4 CONTRACTOR USE OF PREMISES

- A. General: During the construction period the Contractor shall have full use of the premises within the concrete retaining wall, for construction operations. Contractor shall not perform any work on the area outside of the concrete retaining wall other than invasive plant removal and treatment described on Drawing Sheet L2-01. Contractor shall not store any materials or equipment outside of the concrete retaining wall.

- B. Contractor shall assume full responsibility for safety and security of all his/her/and subcontractors materials and equipment stored at the site.

1.5 WORK RESTRICTIONS

- A. Wetlands: Wetlands are present on the site. The Owner has obtained the necessary permitting with the Conservation Commission to complete the work included on the drawings within the 50' and 100' buffer zones. Contractor shall request copy of permit and understand its conditions before proceeding with the Work. No work shall be undertaken outside of the existing concrete retaining wall unless explicitly directed in the Drawings and Specifications and verified with the Town of Barnstable Project Manager.

-END OF SECTION 01010-

SECTION 01170**SPECIAL PROVISIONS****PART 1 - GENERAL****1.1 GENERAL OBLIGATIONS OF THE CONTRACTOR**

- A. General obligations of the Contractor shall be as set forth in the Contract Documents. All incidental work and expense in connections with the completion of the Work under the Contract will be considered a subsidiary obligation of the Contractor.

1.2 SITE INVESTIGATION

- A. The Contractor shall satisfy himself as to the conditions existing within the project area, the type of equipment required to perform the work, the character, quality and quantity of the subsurface materials to be encountered. Any failure of the Contractor to acquaint himself with available information will not relieve him from the responsibility for estimating properly the difficulty of cost of successfully performing the work. The Owner assumes not responsibility for any conclusions or interpretation made by the Contractor on the basis of the information made available by the Owner.
- B. Existing Utilities and Equipment: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction.

1.3 COORDINATION WITH LOCAL AGENCIES, UTILITIES & PUBLIC

- A. Notify utility companies of any damage to their utilities resulting from construction operations. Provide immediate notification of any drain, gas, water main or other utility breaks.
- B. The Contractor shall make his own investigation to assure that no damage to existing structures, drainage lines, sewer, and other utilities will occur as a result of his operations.
- C. The Contractor shall notify "Mass. DIG SAFE" and procure a DIG SAFE number of each location prior to disturbing ground in any way. **"DIG-SAFE" Call Center: Telephone 1-800-344-7233**
- D. The Contractor, in constructing or installing improvements alongside or near sanitary sewers, storm drains, water or gas pipes, electric or telephone conduits, poles, sidewalks, walls, vaults or other structures shall, at his expense, sustain them securely in place, cooperating with the officers and agents of the various utility companies and municipal departments which control them if necessary, so that the services of these structures shall be maintained. The Contractor shall also be responsible for the repair or replacement, at his own expense, of any damage to such structures caused by his acts or neglect, and shall leave them in the same condition as they existed prior to commencement of the work. In case of damage to utilities, the Contractor shall promptly notify the utility owner and shall, if requested by the Owner, furnish labor and equipment to work temporarily under the utility owner's direction in providing access to the utility. Pipes or other structures damaged by the operation of the Contractor may be repaired by the Department or by the utility owner that suffers the loss. The cost of such repairs shall be borne by the Contractor, without compensation therefore.
- E. The work of this Contract shall be executed in such a manner that no damage or injury will occur to the public, to all properties and structures off or on the site which may be in any way affected by the operations under the Contract. Any damage to on-site structures, streets, paving, gas, water, electric, or any other pipes, mains, conduits overhead or underground utility wire, fences, and any and all other property should be corrected at no cost to the Owner. Should any damage or injury be caused by the Contractor or anyone in his employ, or by work under this Contract,

the Contractor shall, at his own expense, make good such damage and assume all responsibility for such damage and assume all responsibility for such injury without cost to the Owner.

1.4 GUARANTEE AFTER FINAL ACCEPTANCE

- A. The Contractor shall, at his own expense, replace any work and plant material performed under this Contract found to be defective in workmanship, material, or manner of functioning within twelve (12) months from date of final acceptance of all the installations under this Contract.
- B. The Contractor shall also supply the Owner with the manufacturer's warranties or guarantees on all irrigation equipment.
- C. The Contractor shall diagnose ("trouble-shoot") the irrigation system throughout the 1 year maintenance period and, at his own expense, replace any part of the system found to be defective in workmanship, material or manner of functioning within one year from date of final acceptance of all the installations under this Contract.

1.5 DISPOSAL OF SURPLUS MATERIALS

- A. All existing and other materials not required or needed for use on the project, and not required to be removed and stacked, shall become the property of the Contractor and shall be removed from the site during the construction period and legally disposed of. No separate payment will be made for this work, but all costs in connection therewith shall be included in the prices bid for various Contract items.

1.6 DRAINAGE

- A. The Contractor shall maintain the drainage system in the project areas to provide continual drainage of the roadway and construction area. No separate payment will be made for the maintenance of the existing drainage system, but all costs in connection therewith shall be included in the overall Contract price.

1.7 WATER FOR CONSTRUCTION

- A. Water for construction and maintenance shall be provided by contractor through means of water pumper truck or other equipment as needed at the expense of the contractor if Town water service is not available. Town will make every effort to install Water Meter pit on site before contract begins. Contractor however, is responsible for providing water if for any reason no water can be obtained on the site.

-END OF SECTION 01170-

SECTION 01200**PROJECT MEETINGS & SUBMITTALS****PART 1 - GENERAL****1.1 SUMMARY**

- A. This Section specifies administrative and procedural requirements for project meetings, including, but not limited to, the following:
1. Preconstruction meeting
 2. Progress meetings
 3. Submittals

1.2 PRECONSTRUCTION MEETING

- A. Schedule a preconstruction conference before starting construction, at a time convenient to the Owner, as soon as possible after execution of the Agreement. Hold the conference at the Project Site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments, and schedule.
- B. Attendees: Owner's Project Manager, Kate Kennen (also referred to as Landscape Architect and/or Architect), the Contractor and its superintendent; and other concerned parties such as irrigation sub consultant (if applicable) shall attend the meeting. All participants at the meeting shall be familiar with the Project and authorized to conclude matters relating to the Work.
- C. Agenda: Discuss items of significance that could affect progress, including, but not limited to, the following:
1. Construction schedule.
 2. Critical work sequencing and phasing.
 3. Designation of responsible personnel, project team directory, chain of command and communication.
 4. Procedures for project meetings, processing field decisions and Change Orders.
 5. Procedures for processing Applications for Payment.
 6. Distribution of Contract Documents.
 7. Submittal of Shop Drawings and request for Approvals.
 8. Safety Procedures. Security.
 9. Use of the premises.
 10. Parking availability.
 11. Work, and storage areas
 12. Housekeeping, cleaning and waste removal.
 13. Working hours and project constraints.
 14. Utility coordination.
 15. Testing, inspections and permits.
 16. Project signs, and other subjects as determined by the Contractor and Project Manager.

1.3 PROGRESS MEETINGS

- A. Conduct progress meetings at the Project Site at regular intervals and whenever necessary to proceed with work. Notify the Project Manager (Landscape Architect) of scheduled meeting dates.

- B. Agenda: Review and correct or approve any written documentation of the previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the status of the Project.
- C. Reporting: When necessary, minutes of meetings and decisions will be recorded by the Owner's Project Manager and distributed to each party present and to parties who should have been present.

1.4 SUBMITTAL PROCEDURES

- A. Submittals: Submittals are required to be made to Owners Project Manager for approval of, but not limited to, the following: Amended Topsoil (testing results), Aluminum Edging (product sheets), Shell Walkway Material (Sample), Irrigation System (shop drawings). Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.
 - 1. Coordinate each submittal with purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 - 3. Processing: To avoid the need to delay installation as a result of the time required to process submittals, allow sufficient time for submittal review, including time for resubmittals.
 - a. Allow 2 days for review of most submittals. Allow 5 days for review of irrigation shop drawings.
 - d. No extension of Contract Time will be authorized because of failure to transmit submittals to the Project Manager sufficiently in advance of the Work to permit processing.
- B. Submittal Preparation: Place a permanent label on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label and submittal date and project name.

1.5 PROJECT MANAGER'S ACTION

- A. Except for submittals for the record or information, where action and return is required, the Project Manager will review each submittal, mark to indicate action taken, and return promptly.
 - 1. Compliance with specified characteristics is the Contractor's responsibility.

-END OF SECTION 01200-

SECTION 02100
SITE PREPARATION

PART 1 - GENERAL

1.01 SCOPE OF WORK

1. Furnish all labor, materials equipment including incidentals required to perform the following: disposing of vegetation, including brush, trees, stumps, fallen timber, roots, rubbish, trash, and debris and stripping, stockpiling and screening of topsoil for use in areas as shown on the Drawings and as specified herein.

1.02 RELATED WORK UNDER OTHER SECTIONS

- A. Section 02200 – Earthwork
- B. Section 02920 – Soil Preparation
- C. Section 02930 – Lawns, Wildflower Meadow and Seeded Plantings
- D. Section 02950 - Planting

1.03 LAYOUT, LINES AND LEVELS

- A. The drawings indicate existing grade elevations in addition to new finished grade elevations. The existing elevations are given for the convenience of the Contractor to aid him in arriving at the quantities of excavations, grading, etc. However, neither the Owner nor the Landscape Architect/Engineer assumes any responsibility for the correctness of these existing elevations. The Contractor shall verify all elevations and satisfy himself as to their correctness by visiting the site of the proposed work and examining the actual condition prior to the bidding of the work.
- B. The layout shall be subject to possible modifications whether by inaccuracies in existing grades, by elements designated to remain or by other site conditions. Except in the case of substantial increase in the quantity of materials authorized in writing by the Landscape Architect/Engineer, these modifications shall not entitle the Contractor to additional compensation.
- C. When the Contractor submits his proposal, it will be interpreted to mean that he has examined the site, fully understands the existing and proposed conditions and he has made due allowance for them in his proposal.

1.04 REQUIREMENTS OF REGULATORY AGENCIES

- A. All work shall conform to the drawings and specifications and shall comply with applicable codes and regulations.

PART 2 – PRODUCTS

- 2.01 HERBICIDES: Use an herbicide to treat stumps and cuts of invasive plant materials so they do not regrow as shown on Drawing L2-01. Do not use herbicides, which persist, in the ground longer than 30 days. Contractor shall obtain approval of herbicide from Landscape Architect before any work is begun.

PART 3 – EXECUTION

3.01 DEMOLITION & TRASH REMOVAL

- A. Demolish and remove all structures and grass as indicated on the drawings or as directed by the Owner.
- B. All trash on the entire property shall be removed by the Contractor. The Contractor shall perform a site cleanup to ensure all trash is removed. This includes any rubbish, bottles and cut vegetation found behind the concrete wall within the tree covered area of the site. All demolished materials and any found trash or debris on the entire property shall be removed from the site and disposed of in a legal manner, at no cost to the Owner. No asphalt, concrete, or brick materials are to be used for fill materials for on-site fill operations. Dispose of engine block located on site.

3.02 STRIPPING TOPSOIL

- A. Strip topsoil from all areas to be excavated or filled. **Do not strip topsoil in areas receiving phytoremediation plantings. Only strip grass in these areas.**
- B. Avoid mixing stripped topsoil with subsoil and stockpile topsoil for reuse (with amendments) as part of the Amended Topsoil required in the planting beds. Stripped topsoil shall be free from brush, trash, stone and other extraneous material and protected until it is placed as specified under Section 02920.

3.01 CLEARING, VEGETATION CUTTING & HERBICIDE

- A. General: Clearing of invasive species on site has already occurred. Contractor shall be responsible for making fresh cuts on all vegetation that has been cleared, and then shall immediately stump treat vegetation with an herbicide to kill the plant material. Location for this work is within a wetland buffer zone and shall be performed with extreme care not to spill herbicide or negatively impact any native plants.
- B. Herbicides: Apply carefully and limit to area of invasive species already cut on site as identified by Landscape Architect in the field. Do not use when winds exceed 10 mph.

- END OF SECTION -

SECTION 02200**SITE EARTHWORK****PART 1 - GENERAL**

1.02 SCOPE OF WORK

- A. The work of this section consists of all excavation, filling and grading and related items as indicated on the Drawings and/or as specified herein and includes, but is not limited to, the following:
1. Excavations for new walkways and planting beds including installation of base aggregate under walkways.
 2. Rock and underground obstruction excavation
 3. Providing, placing and compacting fill materials.
 4. Rough grading.
- B. Work under this Section shall include the removal of five (5) cubic yards of ledge or solid masonry and/or concrete foundation remains encountered or boulders over one (1) cubic yard in size. Such removals shall be measured by Contractor and verified by the Landscape Architect. This contract is based upon surface elevations and materials as shown on the drawings and that no known rock or other underground obstructions will need to be removed. Previously, this site had a building and it is possible that some previous foundations might be located underground. If foundations are hit during excavation for planting beds, Contractor shall contact Owner to be best determine how to deal with foundations; in some cases, obstructions may not be removed and design may be modified. If Owner decides to remove the obstructions, 5 cubic yards of ledge removal shall be included in this contract at not additional cost to the owner and any removal in excess of 5 cubic yards shall be charged at a unit price rate.

1.03 RELATED WORK UNDER OTHER SECTION

- A. The following items or related work are specified and included in other Section of the Specifications:
1. Site preparation, refer to Section 02100.
 2. Walkway Surfaces, refer to Section 02800
 3. Soil Preparation, refer to Section 02920.

1.04 DEFINITIONS

- A. The following related items are included herein and shall mean:
1. Standard Specifications: The Commonwealth of Massachusetts, Department of Public Works, Standard Specifications for Highways and Bridges, latest edition.
 2. ASTM: American Society for Testing and Materials.

3. AASHTO: American Society of State Highway and Transportation Officials.

1.05 BENCHMARKS, SURVEY AND LAYOUT WORK

- A. The Contractor shall maintain and/or re-establish benchmarks and survey monuments shown on the Drawings or found to exist on the site to provide a base reference for the construction. Replace any which may become destroyed or disturbed. The Contractor shall employ and pay all costs for a registered Civil Engineer or Surveyor to lay out all lines and grades in accordance with the Drawings and Specifications, necessary or required for the construction. If required by the Landscape Architect or Owner, the contractor's civil engineer or surveyor shall spot check layout, grades, slopes and elevations to confirm adherence to the Contract Documents.

1.06 PROTECTION

- A. Conduct earthwork operations to ensure minimum interference with streets, walks, and other adjacent facilities. Do not close or obstruct streets, walks, etc. without written permission from authorities having jurisdiction. Provide barricades, fences, signs and all other safety devices required for the protection of the public.

PART 2 - PRODUCTS

2.01 FILL MATERIALS

- A. Gravel borrow (Aggregate Base under walkways) shall be processed fill material consisting of inert material that is hard durable stone and coarse sand, free from loam and clay, surface coatings, and deleterious materials. Gradation requirements shall be determined by AASHTO T11 and T27 and shall conform to Section M1.03.0 of the Massachusetts Highway Department Standard Specifications:

<u>U.S. Sieve No.</u>	<u>Percent Passing By Weight</u>
1/2"	50-85
#4	40-75
#50	8-28
#200	0-8

- C. Ordinary borrow shall be well graded, natural inorganic soil, approved by the Landscape Architect and meeting the following requirements:
1. It shall be free of organic or other weak or compressible materials, of frozen materials, and of stones larger than 6 inches maximum dimension.
 2. It shall be of such nature and character that it can be compacted to the specified densities in a reasonable length of time.
 3. It shall be free from highly plastic clays, from all materials subject to decay, decomposition, or dissolution and free from cinders or other materials which will corrode piping or other metal.
 4. It shall have a maximum dry density of not less than 100 lbs. per cubic foot.
 5. Materials from excavation on the site may be used as ordinary fill if it meets the above requirements and is approved by the Landscape Architect.

- D. Compaction of Existing In-Place Material: After the existing grass and topsoil are removed in places to receive new walkways, excavation shall be made to create the appropriate grade to receive aggregate subbase. The Contractor shall rough grade and compact the existing in place material and/or to supplement it with additional material as required to bring the subbase to the proper grade before adding gravel Aggregate Base Course.

PART 3 - EXECUTION

3.01 ROCK MEASUREMENT & PAYMENT LINES FOR ROCK EXCAVATION

- A. When, during the process of excavation, rock is encountered, such material shall be uncovered and exposed, and the Landscape Architect shall be notified by the Contractor before proceeding further. The areas in question shall be cross sectioned as hereinafter specified.
- B. Payment lines for rock excavation under paved areas shall be 6 inches below grades shown on the grading plan.
- C. Payment lines for general lawn areas shall be two feet below finished grades.
- D. Payment lines for planting beds shall be three feet below finished grades.

3.02 GRADING AND ELEVATIONS

- A. The Drawing indicate, in general, the alignment and finished grade elevations. Establish the lines and grades in conformity with the Drawings. The Landscape Architect, however, may recommend adjustments in the field in grades and alignments as are found necessary in order to avoid interference with any special conditions encountered.
- B. Spot elevations shall govern over proposed contours. Where not otherwise indicated, project site areas shall be given uniform slopes between points for which finished grades are indicated, or between such points and existing established grades.
- C. Establish and maintain suitable stakes over all areas to be graded as specified. Maintain sufficient reference points at all times during construction to properly perform the contract installation.

3.03 EXCAVATION/GENERAL

- A. All material encountered during excavation shall be unclassified excavation and shall include the removal of boulders (less than 1 CY), earth, masonry rubble, and abandoned utilities and all material encountered as required for excavation. The sequence of all excavation operations shall be such as to ensure the most efficient reuse of excavated materials where suitable. **All suitable materials excavated for the preparation of planting beds and walkways shall be reused onsite to the maximum extent possible as ordinary borrow fill materials for new landforms.**
- B. The Contractor shall use power saws for cutting any pavements if necessary that will remove the materials to the neat lines as might be required in the field, with minimum damage to pavement, sidewalk, and curbs that are to remain.
- C. Excavation of all materials to the elevations, dimensions and form as shown on the Drawings and as specified for the construction of planting, lawn and walkway improvements necessary for the completion of the Work
- D. After completion of the excavation and prior to commencement of filling with Amended topsoil or walkway materials, the excavation will be reviewed by the Landscape Architect to ensure that proper depth for the planting beds has been reached.
- E. All excess and unsuitable material shall be removed from the limits of the work and be disposed of by the Contractor. The Contractor will be required to furnish his own disposal area.

3.04 FILLINGS, BACKFILLING AND COMPACTION

- A. Placing Fills and Compacting:
 - 1. The Contractor shall place material in horizontal layers not exceeding 6 inches. each layer shall be compacted to the percentage of maximum dry density specified for the particular type of fill and at a water content as specified herein.
 - 2. At the completion of excavation and before placing any fills, compact the entire subgrade. Compaction procedure shall be reviewed by the Landscape Architect.
 - 6. Compacted subgrade shall be the graded surface prior to any fills. Rough grade shall be the top surface of aggregate base gravel and ordinary fill ready to receive the final surface material application. Unless stated otherwise, all rough grades shall represent compacted material depths, as specified herein.
 - 7. The Contractor shall notify the Landscape Architect in advance when the rough grades are established and ready for formal review.
- B. Placing Fills:
 - 1. Compaction of each lift shall be as specified herein and as determined by ASTM Test, Designation D1556. Fill shall be placed in successive horizontal lifts no thicker than six inches and compacted to the required density as specified herein. Maximum dry density shall be determined in accordance with ASTM D1557, Method D. General compaction shall be accomplished by hand operated vibratory equipment. The following percentages of maximum dry densities shall be achieved for fill materials or prepared subgrades.

- a. Under structures, footings, paved surfaces, drainage piping, utilities and other improvements:
 - 1) All fills. 95%
 - 2) Top twelve inches of subgrades in cut. 95%
- b. Within lawn and planting areas:
 - 1) All fills to within eighteen inches of finished subgrade. 90%
 - 2) Top eighteen inches to finished subgrade. 88-90%

3.05 ROUGH GRADING

- A. Rough grading shall include the shaping, trimming, rolling and refinishing of all surfaces of the subbase and earth slopes, and the preparation of grades as shown in the Drawings. The grade of sloped areas may be done by machine methods. Up to 2 inches in 10'-0" tolerance will be permitted on slopes provided the slopes are uniform in appearance and without abrupt changes. All ruts shall be eliminated. Traffic of men and equipment across soil subgrade areas shall be prohibited following excavation to the required lines and grades.
- B. If, during the progress of the work, pipe, drain or other construction is damaged due to operations under this Contract, the Contractor shall repair all damage at no additional cost to the Owner and restore damaged areas to their original conditions.
- C. Do all other cuttings, filling and grading to the lines and grades indicated on the Drawings. Grade evenly to within the dimensions required for grades shown on Drawings and as specified herein. No stones larger than 4 inches in largest dimension shall be placed in upper 6 inches of fill. Fill shall be left in compacted state at the end of the work day and sloped to drain.
- D. The Contractor shall bring all areas to grades as shown on the Drawings and in the details. The Landscape Architect, however, may suggest such adjustments in grades and alignments as are found necessary.
- E. No rubbish of any description shall be allowed to enter fill material. Such material shall be removed from the site.
- F. Wherever streets, lawns sidewalks or other items contained within or outside the Limit of Contract lines have been excavated in fulfilling the work required under this Contract, the Contractor shall furnish and install all materials necessary to bring finish surfaces level with the existing adjacent surfaces. All work shall be installed to match the existing conditions.
- G. Places fill materials which become disturbed shall be regarded and recompact. Fill materials which become contaminated shall be removed and replaced.

3.18 CLEANUP

- A. At the end of all excavation, filling and grading operations and before acceptance of the work, the Contractor shall remove all debris, materials, rubbish, etc. from the site. The premises shall be left clean, presentable and satisfactory.

- END OF SECTION -

SECTION 02650
EXISTING SITE UTILITIES

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This Section specifies the protection and adjustment-to-grade of existing utilities affected by the construction work.

1.04 NOTIFICATION

- A. Notify the appropriate utility agencies and the Landscape Architect/Engineer at least 24 hours prior to starting any work involving or adjacent to utility service facilities.

PART 3 - EXECUTION

3.01 GENERAL

- A.. Unless otherwise indicated or authorized in writing by the Landscape Architect/Engineer, maintain all utility facilities complete in place.
- B. Abandoned Facilities
 - 1. Demolish and remove abandoned utility facilities.
 - 2. Where monitoring wells and other benchmarks are to be buried in the field because of an increase in grade, mark buried facilities with a stake and notify Landscape Architect.

3.03 RECONSTRUCTION AND ADJUSTMENT-TO-GRADE

- A. Adjust-to-grade manholes and inlets as indicated, by raising or lowering the upper portion thereof. Contractor shall contact Town Department of Public Works if unsure how to best raise manhole covers.

- END OF SECTION -

SECTION 02800**SITE IMPROVEMENTS & WALKWAY SURFACES****PART 1 - GENERAL**

1.01 SCOPE OF WORK

- B. The work of this section consists of all labor, material, equipment, appliances, and services necessary to provide the following work within the Contract Limit Line as required by the drawings and as specified herein.
1. Aluminum Edging
 2. Crushed Shell Walkway
 3. Stonedust Walkway
 4. Removal & Reinstallation of Existing Sign
 5. Plant Identification Signs

1.02 RELATED WORK UNDER OTHER SECTIONS

- A. Section 02100 - Site Preparation.
- B. Section 02200 - Earthwork.
- D. Section 02950 - Planting

1.03 ALUMINUM ADGING

A. Scope

Provide and install aluminum edging on perimeter of shell walkways as described in the drawings.

B. Materials

1. Heavy Duty Commercial Grade Straight Profile Edging: PermaLoc CleanLine or approved equal, 3/16 inch thick (4.8 mm) x 5 1/2 " high extruded aluminum, landscape edging for straight-line and curvilinear applications in corrugated straight profile, as manufactured by PermaLoc Corporation, Holland MI 49424, telephone (800) 356-9660 or approved equal. Section shall have loops on side of section to receive stakes spaced approximately 2 to 3 feet apart along its length.
2. Connection Method: Section ends shall splice together with an interlocking stakeless snap-down design.
3. Stake: 12 inch Heavy Duty Standard Stake, Stakes to interlock into section loops.
4. Finish: Black high Quality finish.

C. Construction Methods

1. Preparation: Ensure that all underground utility lines are located and will not interfere with the proposed edging installation before beginning work. Locate border line of edging with string or other means to assure border straightness as designed. Dig trench 1 inch (25 mm) deeper than set of edging bottom.

2. Set edging into trench with top at ½ inch above compacted finish grade on turf or planting bed side with side having loops for stakes placed on the shell walkway side. Drive stakes through edging loops until locked in place. Requires 5 stakes evenly spaced for each 16 feet section, or 3 stakes evenly spaced for each 8 feet section. Provide additional stakes at approximately 24 inches apart, longer stakes, heavier gage stakes, or any combination of previously mentioned as necessary to firmly secure edging for permanent intended use.
3. Where edging sections turn at corners and at angled runs, cut edging partially up through its height from bottom and turn back to desired angle to form rounded exposed radius.
4. Backfilling and Cleanup: Backfill both sides of edging, confirm and adjust if necessary that sections are securely held together, and compact backfill material along edging to provide top of edging at 1/2 inch above turf finish grade. Cleanup and remove excess material from site.

1.04 CRUSHED SEASHELL WALKWAY SURFACE

A. Scope

Provide and install crushed seashell walkway surface with weed prevention fabric and gravel aggregate base course underneath as described in the drawings.

B. Materials

1. Crushed Seashells

Crushed seashells obtained from a locally available source shall be provided. Color shall be primarily white. Shell pieces should be as large as possible; small pieces are less desirable. Contractor shall submit sample of shell walkway material for approval of Landscape Architect prior to purchase.

2. Weed Prevention Fabric – Provide professional grade, heavy duty weed protection fabric “Tyvar Professional Landscape Fabric”, as manufactured by Tyvar, Inc., or approved equal.

C. Construction Methods

1. Compaction of Existing In-Place Material & Placement of Base Course: After the existing grass and topsoil are removed and walkway areas are excavated to the proper elevation, the Landscape Architect will determine if the underlying base is satisfactory and the Contractor shall compact the existing subgrade in place. 3” of gravel aggregate base course shall then be added and compacted to bring the subbase to the proper grade.
2. Provide weed protection fabric on top of gravel aggregate base course throughout all areas where seashell walkways are required. Install landscape fabric directly on compacted gravel base, overlapping all edges by a minimum of 12”.
3. Place minimum 3” of seashell and compact to reach finished grade. The elevation shall be adjusted so that when the shells are placed, the top surface of the walkway will be at the required finish grade.

1.05 BLUESTONE STONEDUST WALKWAY SURFACE

A. Scope

Provide and install stonedust walkway surface with weed prevention fabric and gravel aggregate base course underneath as described in the drawings.

B. Materials

1. Bluestone Stonedust

Stonedust shall meet the following sieve analysis:

<u>Sieve</u>	<u>Percent Finer Than</u>
No. 4	100
No. 8	96
No. 28	61
No. 48	49
No. 100	38
No. 200	23

2. Weed Prevention Fabric – Provide professional grade, heavy duty weed protection fabric “Tyvar Professional Landscape Fabric”, as manufactured by Tyvar, Inc., or approved equal.

C. Construction Methods

1. Compaction of Existing In-Place Material & Placement of Base Course: After the existing grass and topsoil are removed and walkway areas are excavated to the proper elevation, the Landscape Architect will determine if the underlying base is satisfactory and the Contractor shall compact the existing gravel in place. 3” of gravel aggregate base course shall then be added and compacted to bring the subbase to the proper grade.
2. Provide weed protection fabric on top of gravel aggregate base course throughout all areas where stonedust walkways are required. Install landscape fabric directly on compacted gravel base, overlapping all edges by a minimum of 12”.
3. Place minimum 3” of stonedust and compact to reach finished grade. The elevation shall be adjusted so that when the stonedust is placed, the top surface of the walkway will be at the required finish grade.

1.06 REMOVE & RESTORE EXISTING SIGN

A. Scope

Includes all labor, material, equipment and incidental items necessary to remove and reinstall existing ‘Barnstable Open Space’ sign and sign post

B. Construction Methods

Install new sign post with a concrete footing that extends 3’-6” below grade. Place 6” of gravel aggregate base under concrete footing to allow for drainage.

1.07 PLANT IDENTIFICATION SIGNS

A. Scope

Includes all labor, material, equipment and incidental items necessary to install 72 (6” x 4”) custom engraved plant identification signs.

B. Construction Methods

1. Landscape Architect shall provide design of each different 4” x 6” sign. Signs will be line drawings and contain latin and common names of plants plus common

- care requirements. http://www.plaquemaker.com/Garden_Markers.html or approved equal.
2. Contractor shall order custom laser engraved face plates made of zinc sheeting, white text on a black background. The detail, quality and contrast shall be high. The stakes shall be non-rust metal, made from at minimum 13 gauge galvanized steel.
 3. Install in plant beds as directed by Landscape Architect in the field.

- END OF SECTION -

SECTION 02810**AUTOMATIC IRRIGATION SYSTEM****PART 1 - GENERAL****1.01 STATUTORY REQUIREMENTS**

- A. All work and storage of materials for installation of the irrigation system, as designed and specified shall be the responsibility of the Contractor.
- B. Unless otherwise specified, the plan and specifications are intended to include everything necessary for proper installation and completion of the work whether each item is mentioned herein or not. The plan and specifications are intended to be cooperative and any item called for in one and not the other shall be as if called for in both. If a discrepancy exists between the plan and the specifications, the plan takes precedence.

1.02 SCOPE OF WORK

- A. Furnish all labor, materials, equipment, storage, tools, services, transportation, delivery and removal, testing, maintenance and incidentals required to install a complete irrigation system with all equipment and materials including, but not necessarily limited to, electrical supply lines, water supply lines from water meter pit, automatic controller appurtenances and underground distribution system appurtenances as shown on the Drawings and as specified herein, to the complete satisfaction of the Owner upon final acceptance of the project. This includes, but is not limited to all permits and codes if and where applicable.
- B. The water supply for the irrigation system is from a new water meter pit to be installed on the site by the town. The Contractor shall install necessary Backflow Preventer and System Controller in a new Irrigation System Control Cabinet as shown on the Plan and Drawings. The connection to the irrigation system water supply shall be made by the Contractor approximately where indicated on the Plan.
- C. The Irrigation system shall be installed so that in the future if the park design completely changes, the irrigation system can be easily modified to the new design. The location of main water supply lines should be carefully considered to provide for maximum flexibility in the future.

1.03 SUBMITTALS

- A. Shop drawings and product data shall be submitted to the Owner prior to ordering the equipment, showing materials and layout of construction and details of installation for the irrigation distribution system. Submittal shall incorporate the following criteria to be incorporated in the final system:

New pipe, fittings, isolation valves, tapping sleeves, pipe line appurtenances, electrical control valve assemblies, sprinklers, quick coupling valves, swing joint assemblies, controller including electric components, Control Cabinet and water service connections at the domestic main line and backflow preventer.

1.04 QUALITY ASSURANCE

- A. The irrigation system shall consist of one complete installation of materials by the same manufacturer wherever possible. "Or equal" materials will be considered if supporting documents are provided that address performance criteria assuring an equal product to that which is specified.

- B. The Contractor shall be responsible for providing all testing and training of Town personnel to ensure a properly functioning system at time of project acceptance as determined by the Owner.
- C. Include a complete fall winterization blow-out in 2007 and a complete spring startup in 2008 after acceptance of the complete irrigation system for the new park.
- E. Owner retains the right to require alterations and deductions from the work shown on the Plan and Drawings or described in the Specifications without rendering void the Contract- All such changes shall be in the form of a Change Order. Contractor shall compute the value of the work and submit in proposal form, but shall not proceed with changes until signed authorization has been given by the Owner. In each case the price agreed to be paid for work under the Contract shall be increased or decreased for work added or omitted. In the event the value of the work or cost adjustment furnished by the Contractor is unacceptable to the Owner, the Contract shall be without reference to said Change Order.

1.05 SYSTEM DESCRIPTION

- A. The alignment and location of water lines, wiring, water supply as shown on the plan is only approximate and may be changed at the time of construction in order to avoid obstacles as approved by the Landscape Architect. However, no hidden bends or bowing arcs shall be permitted.
- B. The Contractor installing this system must, in order to be accepted by the Landscape Architect and the Town, be engaged primarily in the business of commercial irrigation system construction with a minimum of five (5) years experience and have successfully completed five (5) or more irrigation installation project of similar nature and size in the past three (3) years, If requested by the Landscape Architect, the irrigation installation contractor shall supply for review by the Landscape and Owner, a list of all irrigation systems completed in the last three (3) years.

PART 2 - METHODS SPECIFICATIONS

2.01 INTENT OF SPECIFICATIONS

- A. It is the intent of these Method Specifications to define the work of installing an irrigation system, which upon completion, will operate in an efficient and satisfactory manner according to the workmanship standards established for sprinkler operation. It shall be the responsibility of the Irrigation Contractor to install this system in the manner as set forth in the specifications so that the system shall not only be installed correctly and according to manufacturer's instructions, but that shall also operate efficiently.
- B. Throughout this section, all references to the "Owner" shall mean the Town of Barnstable, Structures and Grounds Department head.

2.02 STAKING

- A. The Contractor, Landscape Architect and the Owner's Representative are to agree upon and stake out the locations of all sprinkler heads, valve locations, control enclosure and main line paths prior to the commencement of work in any area of the installation. In the event of a discrepancy in the specified dimensions between the drawings and the actual stake out, the Contractor will verify the dimensions with the Landscape Architect before commencement of work.

2.03 PIPE ROUTING

- A. Routing of the pipe shall be constructed to follow the most efficient layout and accommodate future changes to the park. In no event shall field changes due to found obstructions affect the cost of the work except where those changes may significantly alter the quantity of materials and/or labor required to be provided according to the contract, or where excess depth of trench and backfill is required. In cases where the overall cost is affected by change above, the Quality Assurance provision Paragraph E., shall apply.

2.04 GENERAL PIPING REQUIREMENTS

- A. Contractor shall research irrigation systems typically used by the Town of Barnstable, and shall install a new system adequate to the requirements of the Structures and Grounds department with zones and irrigation type as indicated in the drawings.
- B. Pipe lines shall be installed of the sizes to adequately construct the irrigation system diagrammed in the drawings. . All main line piping, beyond the transition fitting on the discharge side of the backflow preventer, under constant pressure while the system is operating or nonoperating, shall be unplasticized polyvinyl chloride (PVC) conforming to ASTM Type 1 Grade 1, unplasticized resin meeting CS256-63 with "o" ring and/or Solvent Weld connections unless otherwise specified. The pressure rating shall be acceptable for commercial use.
- B. All lateral piping, on the discharge side of the backflow preventer, not under constant pressure while system in operation shall be unplasticized polyvinyl chloride (PVC) conforming to ASTM-Type I Grade 1, unplasticized resin meeting CS256-63.
- C. All main line pipe shall be installed in trenches. Minimum depth of cover over pipe shall be as follows: zone or lateral line piping (downstream of the automatic control valve) up through 2" shall be a minimum of 18", main line piping up through 2-1/2" shall be a minimum of 24".
- D. In all cases where plastic pipe cannot be supported or covered adequately, the Contractor shall notify the Owner to decide how to best proceed with the work.

2.05 INSTALLING BURIED PIPE AND FITTINGS

- A. The Contractor is to do all trenching, excavating and backfilling required for the proper installation of the work with pipe installed at depths as specified in Section 2.04c, METHODS SPECIFICATIONS.
- B. Pipe shall be installed strictly in accordance with the printed recommendations of the manufacturer, including bedding of pipe in bottom of trench and securely thrusting main line fittings at changes in direction of the pipe.
- C. Mechanical trench diggers used on the site shall be of an approved type providing trenches with straight sides. Trenches shall be no wider at any point than is necessary to lay and bed the installed pipe properly.
- D. Vibratory plows used on the site shall be of an approved type capable of vibraplowing lateral pipe line to depths as specified in Section 4c.
- E. Backfill shall be free from rock, large stones or other unsuitable substances to prevent damage to pipe and wire during and after completion of backfilling operation.

- F. Deleterious material shall be dug and hauled to a dump site off of the Owner's property. Deleterious material shall refer to any ledge, rock, shale, stones, organic matter or trash not suitable for use as backfill. Determination of deleterious material shall be made jointly by the Owner's Authorized Representative and the Contractor. The extra cost of deleterious material removal and replacement shall be included in this contract as described in Section 02300 Earthwork.
- G. All replacement backfill material necessary because of the removal of deleterious material and/or shortages of backfill material to be supplied by the Contractor in quantities required. All excess backfill material of a deleterious nature will be removed by the Contractor.
- H. If within two (2) years from the date of acceptance of the work, settlement occurs due to improper compaction and an adjustment in pipe, valves, sprinkler heads, sod or paving is necessary to bring the system, sod or paving to the level of the permanent grades, the Contractor, as part of his work under this Contract, shall make said adjustments without extra cost to the Owner.
- I. Throughout the entire work period, it shall be the responsibility of the Contractor to refill any trenches that have settled due to incomplete compaction.
- J. All main line piping shall be thrust in accordance with the manufacturer's recommendations. On all main line piping, thrust blocks of poured concrete will be used with size and description of thrust blocks as per manufacturer's recommendations. In no case will field stone or wood of any form be acceptable for thrusting.
- K. All PVC pipe and wire shall be installed in PVC sleeves where pipes and/or wires cross walking paths and roadways. A separate sleeve is required for each pipe and for the wires. Sleeves shall be Schedule 40 PVC. The Contractor shall be responsible for repairing all walking paths and roadways to their original condition. Where pavement is to be crossed, pavement shall be saw cut before trenching. Backfill material and pavement thickness shall match the original conditions.
- L. The Contractor shall continuously clean and restore trenches as the work progresses.

2.10 BACKFLOW PREVENTER and CONTROL CABINET

- A. Install a backflow preventer and Control Cabinet as required- The backflow preventer shall be installed in accordance with manufacturer's specifications and State and local standards. The Control Cabinet location and size shall be submitted to the Landscape Architect for approval prior to construction. The Control Enclosure shall be of vandal and weather resistant nature, and lockable. The cabinet shall be mounted on a reinforced base plate installed on a concrete base pad to be provided by the Contractor. The concrete base shall have a minimum calculated compressive strength of 13.8 MPa (2000 psi). The complete installation shall be in accordance with manufacturer's specification. Paint control enclosure two coats of dark grey or black enamel paint.

2.15 ELECTRICAL SERVICES

- A. The Contractor shall furnish the electrical services necessary for supplying required electrical voltages to the electrical control systems at the Control Cabinet.
- B. All equipment, materials and installation shall comply with the requirement of the National, State and local Electric Codes.

- C. The Contractor shall obtain all necessary permits and pay all fees required for permits and inspections if applicable.

2.16 TESTING

- A. The Contractor shall be responsible for all hydraulic pressure testing of mainlines and lateral lines. The testing shall be on a continuous basis commencing when the first section of the system is complete and if ready for testing. Final testing of the whole system under full operating conditions to be done following complete installation of all main and lateral piping, valves and sprinkler heads.
- B. Testing for the main lines shall consist of a continuous application of water at the 60 psi designed operating pressure level to the piping for a four hour period without visible evidence of leaks. If a leak is discovered within this period, the Contractor shall immediately expose and repair the break and the system then retested for the period described above.

2.17 ADJUSTING THE SYSTEM

- A. The Contractor shall make the adjustment of the sprinkler heads, remote control valves and automatic equipment prior to completion of the installation to provide optimum performance and balance throughout the irrigation system. Minor adjustments (cleaning around sprinklers, valve boxes and markers etc. including protection from vandalism) will be made by the Owner after acceptance of the system and during the warranty period.

2.18 DRAWINGS ON RECORD

- A. The Contractor shall provide and keep up to date a complete "As-Constructed" record set of blue line prints that shall be corrected as the work progresses, and show actual "As-Constructed" dimensions, lines and kinds of equipment. These sets of drawings shall be given to the owner upon completion of the work. Final payment will not be made until these plans are delivered to the Owner.

2.19 INSTRUCTIONS

- A. Upon completion of the work and acceptance by the Owner, the Contractor shall be responsible for the training of the Owner's maintenance personnel in the operation, maintenance and repair of the system. The Contractor shall furnish, in addition to the "As-Constructed" plans, operational manuals, copies of all available parts lists, trouble shooting lists, specification and catalog sheets to the Owner's personnel responsible for the operation and maintenance of the irrigation system.

2.20 MAINTENANCE AND SERVICE

- A. The Contractor shall keep and maintain the whole of the work in good repair for a period of not less than one year from the date of completion of the entire work. The Contractor shall repair promptly all failures in the construction and operation of such project and appurtenances which may occur before the expiration of such period, and all defects, settlements, and irregularities of the project and appurtenances, other projects and drains, pipes, mains or conduits, curbs, sidewalks, street surfacing, land, turfing, or of any structures on the line of the project, or adjacent thereto, occurring before the expiration of such period, and caused or affected by work under this contract.
- B. Whenever, before the expiration of the above specified maintenance period, the Owner shall give written notice, postage prepaid, to the business address of the Contractor, to make such repairs so required and the Contractor shall fail to make any repairs to the satisfaction of the Owner, the Owner shall have the right to employ such other person or

persons as he may deem proper, to make the same, and the Owner shall pay the expense thereof out of any money otherwise due to the Contractor, It is however, mutually agreed that the Owner at his discretion, and at the Contractor's expense, may make repairs without notice to the Contractor, in cases where, in his opinion, public safety requires such work to be done at once.

2.21 WINTER BLOW OUT

- A. The system shall be drained by purging with compressed air. The Contractor shall be responsible for winterizing the irrigation system in Fall 2007 and starting up the system the following Spring 2008.

PART 3 - TECHNICAL SPECIFICATIONS

3.01 DESCRIPTION OF THE SYSTEM

- A. The design of the system shall be as shown on the plans and a combination of spray and drip irrigation in the number of separate zones indicated on the plans.
- B. The water supply for the irrigation system will be provided from the an existing water line and a new water meter pit provided by the Owner.

3.02 MATERIALS

- A. The irrigation material specifications are of an open nature. The Contractor shall bid the project using the materials best suited to complete the commercial grade irrigation shown on the plants. Once one manufacturer's product is chosen, all products specified for that manufacturer will be used.

3.03 SUBMITTALS

- A. Submit the following for approval of the Owner and Landscape Architect prior to ordering or start of any work
- Shop Drawings showing system layout
- Data sheets or descriptions for the following:
- Valves, Automatic
 - Sprinkler Heads
 - Automatic Controller
 - Backflow Preventer
 - Control Wiring, 220, 115 and 24 Volt
 - Control Cabinet
 - Wire conduit

3.04 AUTOMATIC CONTROLLER

- A. The control system for the irrigation system shall be automatic. B. The controller shall be installed in the Control Cabinet located adjacent to the point of connection. The Control Cabinet shall be supplied and installed by the Contractor.
- B. All controllers shall contain factory installed and factory recommended lightning protection. The controller are to be grounded per electrical code. The maximum resistance to ground shall be 10 ohms, obtain as recommended by the manufacturer.

3.05 SPRINKLERS

- A. All sprinklers shall be located to allow for proper watering of the plant materials indicated on the plans.
- B. The spacing for all sprinkler heads shall be as needed to adequately water the plant material on the plans without overspray into hardscape and pathway areas.

3.11 DRIP IRRIGATION

- A. All drip irrigation lines shall be located to allow for proper watering of the plant materials indicated on the plans.
- B. The spacing for all drip irrigation lines shall be as needed to adequately water the plant material on the plans.

3.16 PRODUCT SUPPLIER LIST

- A. The selection and specification of the products for this project are heavily influenced by after installation service and individual manufacturer's warranty coverage. As part of the product approval process, the Contractor will be required to submit a list of the product supplier or distributors that he intends to have supply the components for this project. Authority to institute and/or provide factory warranties and/or replacements for any defective products that the Contractor chosen suppliers will be supplying for this project should be stated on the list. If any purchases for components for this project are made through a factory representative and not direct from the manufacturer, the factory representative's name should also be submitted on the supplier's list.

- END OF SECTION -

SECTION 02920
SOIL PREPARATION

PART 1 - GENERAL

1.01 SUMMARY

A Work Included: Provide soil and soil amendment products, including imported topsoil for all new areas of planting on site.

B Related Work:

Earthwork - Section 02100

Irrigation System - Section 02810

Lawns, Wildflower Meadow & Seeded Plantings- Section 02930

Planting - Section 02950

Landscape Maintenance - Section 02970

1.02 DEFINITIONS

A Existing Soil: Area of undisturbed native soil where no rough grading is to be done. No topsoil is to be placed. Only surface cultivation are included in this Section.

B Subgrade: Soil level resulting from rough grading.

C Topsoil: Soil stockpiled or imported.

1. Stockpiled Native Topsoil: Topsoil stripped from site prior to rough grading. This must be amended before it is spread.

2. Imported Topsoil: Off site topsoil imported and stockpiled. This must be amended before it is spread.

D. Amended Topsoil: Topsoil that has been amended and is ready for spreading over prepared subgrade. Amended topsoil must be amended to below specified mixes before spreading.

1.03 SUBMITTALS

B Quality Control Submittals:

1. Testing Agency: Umass Extension Service, or equal.

2. Test Reports:

a. Existing Topsoil: Test for nutrient content, organic matter and pH levels. Provide list of suggested amendments.

Imported Topsoil: Test for nutrient content, organic matter and pH levels. Provide list of suggested amendments.

- 1.05 SEQUENCING AND SCHEDULING: Do not install amended topsoil in any new planting areas without prior acceptance of depth of excavation by Landscape Architect.

PART 2 - PRODUCTS

2.01 MATERIALS

A Stockpiled Native Topsoil:

1. Stockpiling: Stripped topsoil will have been stockpiled on site under earthmoving work.
2. Composition: Fertile, friable, well-drained soil, of uniform quality, free of stones over 1 in. diameter (screen as needed), sticks, oils, chemicals, plaster, concrete and other deleterious materials.
3. Analysis: Obtain an agricultural suitability analysis of proposed topsoil from an accepted, accredited Testing Agency at Contractor's cost.
4. Test Results: Request Testing Agency to send one (1) copy of test results direct to Landscape Architect and one (1) copy to the Owner. Amend per soil analysis report for it to be approved as AMENDED TOPSOIL.

B Imported Topsoil:

1. Quantity: Import as soon as an insufficient quantity of native soil is verified. Quantity to complete work will be calculated by Contractor.
2. Quality: Fertile, friable, well-drained soil, of uniform quality, free of stones over 1 in. diameter (screen as needed), sticks, oils, chemicals, plaster, concrete and other deleterious materials.
3. Composition: To match or exceed in quality accepted native stockpiled topsoil, as determined by analysis similar to that described above.
4. Samples: Landscape Architect reserves right to take samples of imported topsoil delivered to site for conformance to Specifications.
5. Rejected Topsoil: Immediately remove rejected topsoil off the site at Contractor's expense.

2.02 SOIL MIXES

- A AMENDED TOPSOIL: To be used in all areas of lawn, tree, shrub, meadow grass and perennial planting to depths specified on plan.

Amended topsoil shall be a mix of Stockpiled Native Topsoil and Imported Topsoil. It shall have a minimum organic content of 33%. Amendments must be added to meet recommendation of soils test report for perennial plants.

2.03 ACCESSORIES

- A Water: Clean, fresh and potable, provided by Contractor if not available from Owner. Transport as required.
- B Peat Moss: (Use as needed as an amendment to increase organic content of soil if recommended by soil tests)
1. Type: Finely-shredded, brown in color, suitable for horticultural purposes and frequently referred to in the trade as "greenhouse" or "coarse grind".
 2. Measurement: Measure peat in air dry condition, containing not more than 35% moisture by weight on an "as-received" basis. Ash content shall not exceed 10%.
 3. Physical Properties:

Percent Passing	Sieve Size
95-100	9.51 mm (3/8 in.)
0- 40	500 micron (#35, 32 mesh)
 4. Organic Content (dry weight basis): 90-100%
 5. Chemical Properties:

Nitrogen (dry weight basis): 0.6-3.0%
 Salinity/Soluble Salts: Saturation extract conductivity 0.0-3.0 millimhos/cm @ 25 degrees C.
 pH: 3.0-4.5
 6. Acceptable Substitute: Ground redwood bark by Lindauer Products, Santa Rosa, CA, per specifications for peat moss.
- B Manure: (if additional organic content is recommended by soils test)
1. Type: Well-rotted cow, horse or sheep manure, free from sawdust, shavings or refuse.
 2. Straw Content: Maximum 25% straw by volume.

2.04 COMMERCIAL FERTILIZERS

- A Pre-Plant Fertilizer:
1. **Use organic fertilizers** to amend topsoil as recommended by soil test.

PART 3 - EXECUTION

3.01 SOIL MOISTURE CONTENT

- A General: Do not work soil when moisture content is so that excessive compaction will occur, nor when it is so dry that dust will form in air or that clods

will not break readily. Apply water, if necessary, to bring soil to an optimum moisture content for spreading and planting.

3.02 AREAS TO RECEIVE PHYTOREMEDIATION PLANTING, CULTIVATE EXISTING SOIL ONLY- **Do not amend**

A Cultivation of Existing Soil:

1. For areas to received Phytoremediation planting as shown on drawings, on the grass shall be removed and existing topsoil shall remain. Do not amend this topsoil. These areas are to be used as research areas therefore the existing topsoil should not be amended in ANY WAY besides tilling.
2. Cultivation: Till or Rip areas of existing soil to receive Phytoremediation planting to a depth of 12 in. below the depth of required amended topsoil immediately prior to planting. Final finished grades in these areas t shall remain the same as existing finish grade. No amended topsoil or existing native topsoil shall be added.

3.03 SPREADING OF TOPSOIL

- A Thoroughly bulk blend Amended Topsoil in stockpiles on site. Do not blend in individual planters or plant pits. Spread Amended Topsoil over accepted subgrade.
- B Restrictions: Do not commence spreading of topsoil prior to acceptance of depth of excavation and rough grade. Do not place topsoil under muddy or frozen conditions. Do not spread topsoil till all test results are received and amendment plan is accepted by Landscape Architect.
- C. Amended Topsoil Depth: As specified in the Drawings.

3.04 FIELD QUALITY CONTROL

- A Tests: Right is reserved to take samples of soil mixes for testing for conformity to Specifications.
- B Rejected Materials: Remove off site at Contractor's cost. Pay cost of testing of materials, not meeting Specifications.

-END OF SECTION 02920-

SECTION 02930**LAWNS, WILDFLOWER MEADOW & SEEDED PLANTINGS****PART 1 - GENERAL**

1.01 SUMMARY

A Work Included: Provide lawns, wildflower, and seeded plantings complete as shown and as specified.

B Related Work:

Earthwork - Section 02300

Irrigation System - Section 02810

Soil Preparation - Section 02920

Planting - Section 02950

Landscape Maintenance - Section 02970

1.03 SUBMITTALS

A Product Data: Wildflower Seed Mix. Submit wildflower seed mix with percentages of species and supplier before seed is purchased for approval by Landscape Architect.

1.04 DELIVERY, STORAGE, AND HANDLING

A Wildflower Seed:

1. Delivery: Furnish in unopened manufacturer's standard containers bearing original certification labels showing quantity, and analysis.
2. Storage: Protect from weather or other conditions, which would damage or impair the seed.

B Lawn Sod:

1. Harvest and Delivery: Harvest and deliver to site within 24 hours. Deliver only as much sod as can be installed in one day's work.
2. Review: Sod not transplanted within this time period will be reviewed prior to installation.

C Hydroseeding Mulch:

1. Labeling: Each package of cellulose fiber must be marked by manufacturer to show the air dry weight content.
2. Storage: Protect from weather or other conditions which would damage or impair the effectiveness of the product.

1.05 TIMING OF INSTALLATION**A Hydroseeding:**

1. Hydroseeds of Wildflower mix shall be completed within fourteen (14) calendar days after completion and acceptance of finish grading and irrigation.

B Sod

1. Immediately after finish grading and irrigation installation are accepted.

1.06 WARRANTY

A Time Period: Warrant that lawns, wildflower seed and seeded plantings are in a healthy and flourishing condition of active growth one year from date of Final Acceptance.

B Appearance During Warranty: Lawns, wildflower seed, and seeded plantings must be free of dead or dying patches, and areas must show foliage of a normal density, size and color.

C Coverage: Warrant growth and coverage of hydroseeded planting to the effect that a minimum of 95% of the area planted must be covered with specified planting after one growing season with no bare spots.

D Exceptions: Contractor will not be held responsible for failures due to vandalism, or Acts of God during Warranty Period. Report such conditions in writing.

1.07 MAINTENANCE: See Section 02970 - Landscape Maintenance.

PART 2 - PRODUCTS**2.01 SUPPLIERS**

A Lawn Sod: Supplier to be suggested by Contractor and approved by Landscape Architect.

B Wildflower Seed Mix: Supplier to be suggested by Contractor and approved by Landscape Architect prior to ordering.

C Seeded Plantings: Supplier to be suggested by Contractor and approved by Landscape Architect prior to ordering.

2.02 WILDFLOWER MEADOW

A Wildflower Seed Mix Composition: Fresh, clean, certified, new crop seed of following varieties mixed in the following proportions:

Mulch

Seed Mix
 Incorporated Organic Fertilizer (per manufacturers
 recommendations)
 Hydroseed nutrient activator additive
 (apply per manufacturer's recommendations)

- B Seed Composition
 1. Wildflower Seed Mix- Mix should be mostly perennial with some annuals
 for increased first year color.

MIX FOR SUN

Centaurea cyanus	Cornflower
Cheiranthus allionii	Siberian Wallflower
Chrysanthemum leucanthemum	Ox-Eye Daisy
Chrysanthemum maximum	Shasta Daisy
Coreopsis lanceolata	Lance-Leaf Coreopsis
Coreopsis tinctoria	Plains Coreopsis
Cosmos sulphureus	Sulphur Cosmos
Cosmos bipinnatus	Wild Cosmos
Delphinium ajacis	Wild Larkspur
Dianthus barbatus	Sweet William
Echinacea purpurea	Purple Coneflower
Eschscholzia californica	California Poppy
Gaillardia aristata	Perennial Gaillardia
Gypsophila elegans	Baby's Breath
Helianthus annuus	Wild Annual Sunflower
Hesperis matronalis	Dame's Rocket
Lavatera trimestris	Rose Mallow
Linum grandiflorum rubrum	Scarlet Flax
Linum perenne lewisii	Blue Flax
Lupinus perennis	Perennial Lupine
Nemophila menziesii	Baby Blue Eyes
Papaver rhoeas	Red Poppy
Ratibida columnaris	Mexican Hat
Rudbeckia hirta gloriosa	Gloriosa Daisy
Rudbeckia hirta	Black Eye Susan
Silene armeria	None-so-Pretty

MIX FOR PARTIAL SHADE

Aquilegia caerulea	Wild Columbine
Centaurea cyanus	Cornflower
Cheiranthus allionii	Siberian Wallflower
Collinsia heterophylla	Chinese Houses
Coreopsis lanceolata	Lance-Leaf Coreopsis
Coreopsis tinctoria	Plains Coreopsis
Dianthus barbatus	Sweet William
Digitalis purpurea	Foxglove
Echinacea purpurea	Purple Coneflower
Eschscholzia californica	California Poppy
Gypsophila elegans	Baby's Breath
Hesperis matronalis	Dame's Rocket
Lathyrus latifolius	Sweet Pea
Lavatera trimestris	Rose Mallow
Linaria maroccana	Baby Snapdragon
Linum grandiflorum rubrum	Scarlet Flax
Lobularia maritima	Sweet Alyssum

Mirabilis jalapa	Four O'Clock
Monarda citriodora	Lemon Mint
Myosotis sylvatica	Forget-Me-Not
Nemophila maculata	Five Spot
Nemophila menziesii	Baby Blue Eyes
Oenothera lamarckiana	Evening Primrose
Papaver rhoeas	Red Poppy
Phlox drommondii	Drummond Phlox
Silene armeria	None-so-Pretty
Viola tricolor	Johnny-Jump-Up

B. Application Rates

Per Manufacturer's recommendations

Weed Seed: No more than 0.25%.

2.03 LAWN SOD

- A Two years old nursery-grown sod grown.
- B Sod: dense, healthy, field-grown on fumigated soil, having been mowed at 1 in. height before lifting from field.
- C Sod: dark green in color, free of thatch, free from diseases, weeds and harmful insects.
- D Sod: reasonably free of objectionable grassy and broadleaf weeds. Sod will be considered weed free if no more than ten (10) such weeds are found per 100 sqft. of sod.
- E Sod will be rejected if found to contain the following weeds: (common bermudagrass), quackgrass, johnsongrass, poison ivy, nimbleweed, thistle, bindweed, bentgrass, perennial sorrel, brome grass.
- F Sod to be cut 1 1/2 in. deep.

2.04 SEEDED PLANTINGS:

- A Annual Seeds of varieties specified on plan list: High quality, purchased in bulk.

2.05 ACCESSORIES

- A Water: Potable water as furnished by Contractor. Transport as required.
- B Hydroseed Mulch:
1. Composition: Green-colored, fibrous, 100% virgin wood fiber mulch containing no growth or germination-inhibiting factors.
 2. Weight: Weight specification refers only to air dry weight of the fiber material. Absolute air dry weight is considered equivalent to 10% moisture.
 3. Dispersion in Slurry: Mulch must be manufactured in such manner that after addition to and agitation in slurry tanks with fertilizer, seed, water and other approved additives, fibers in the material will become uniformly suspended to form a homogeneous slurry.
 4. Absorption Capacity: When hydraulically sprayed on ground, material will form a blotter-like groundcover impregnated uniformly with seed, which will allow the absorption of moisture and allow rainfall to percolate to the underlying soil.
- C Pre-plant Fertilizer: See Soil Preparation - Section 02920
- D. Hydroseed Additives: "Nature's Bio" Biological Activator, Organic Technology Inc., Albuquerque, NM 505-291-1100, or equal, providing stimulating microbial activity, accelerates absorption of water/ improves water-holding capabilities and accelerates translocation of nutrients.
- E. Lawn and Garden Security Blanket: To be used over all seeded planting areas to give plants a head start and protect from birds and other animals as manufactured by Reemay (a division of Typar) or approved equal.

2.06 HYDROSEEDING EQUIPMENT

- A Type: Commercial hydro-seeder with built-in agitation system and an operating capacity sufficient to agitate, suspend and homogeneously mix slurry.
- B Distribution Lines: Sufficient to prevent stoppage and provide even distribution of the slurry over the ground.

PART 3 - EXECUTION**3.01 EXAMINATION**

- A Verification of Conditions:

1. Grades: Verify that grades are within 1 in. plus or minus of required finished grades. Verify that amended topsoil has been installed.
2. Stones, Weeds, Debris: Verify that areas to receive sod or seed are clear of stones larger than 1/2 in. diameter, weeds, debris and other extraneous materials.

3.02 PREPARATION

- A Excessive Soil Moisture: Do not commence work of this section when soil moisture content is so great that excessive compaction will occur.
- B Inadequate Soil Moisture: Apply water, as necessary, to bring soil to an optimum moisture content for planting. Do not work soil when it is so dry that dust will form in air or that clods will not break readily.

3.03 HYDROSEEDED WILDFLOWER MEADOW

- A Preparation: Do slurry preparation at job site.
1. Water: Add water to tank when engine is at half throttle. When the water level has reached height of agitator shaft, establish good re-circulation and add seed.
 2. Seed: Do not allow seed to remain more than 30 min. in slurry.
 3. Fertilizer: Add fertilizer, followed by mulch per manufactures recommendations.
 4. Mixing: Open engines throttle to full speed when tank is half-filled with water and add mulch. Add nutrient activator. Commence spraying immediately when tank is full.
- B Application:
1. General: Apply specified slurry mix in a sweeping motion to form a uniform mat at the specified rate. Keep hydroseeding within designated areas and keep from contact with other plant materials.
 2. Unused Mix: Do not use slurry mixture, which has not been applied within four (4) hours of mixing. Promptly remove from site.
 3. Protection: do not operate any equipment over hydroseeded areas.
 4. Reseeding: Reseed areas and parts of areas which fail to show a uniform stand until areas comply with Warranty above.

3.04 SODDED LAWN INSTALLATION

- A Sod Bed Preparation:
1. Rolling: Roll amended soil with 200-pound water-ballast roller.
 2. Moistening: After unevenness in soil surface has been corrected, lightly moisten soil immediately prior to laying the sod.
 3. Timing: Sod immediately thereafter, provided sodbed has remained in friable condition.
- B Sodding Operations:

1. Starter Strip: Lay first row of sod in a straight line, with subsequent rows parallel to and tightly against each other. Stagger lateral joints. Do not stretch or overlap sod. Butt joints tightly to eliminate voids.
2. Cutting: Use a sharp knife to cut sod to fit curves and voids in paving.
3. Tamping and Rolling: Thoroughly tamp and roll sod to make contact with sod bed. Roll entire section of completed sod.
5. Watering: Thoroughly water sod immediately after installation to wet underside of new sod pad and soil immediately below to a depth of 6 in.
6. Top-Dress Fertilizer: **Apply organic fertilizer per manufacturer's recommendations** at 25 days and at 50 days after sodding.

3.05 SEEDED PLANTINGS

- A Prepare soil to be planted as described in Drawings and Specification Section 02920.
- B. Plant seed shown on drawings per manufacturers recommendations.
- C. Thoroughly water seed after planting.
- D. Cover all seeded areas with Lawn and Garden Security Blanket and secure with pins. Remove security blanket once plant material becomes established.

3.06 FIELD QUALITY CONTROL

- A Tests: Samples of materials may be taken and tested for conformity to Specifications.
- B Rejected Materials: Remove rejected materials immediately from site at Contractor's expense. Pay cost of testing of materials not meeting Specifications.

3.07 CLEANING

- A Hydroseed Overspray: Immediately after application, thoroughly wash off slurry from materials, and areas not designated to receive slurry mix.
- B Erosion: Immediately restore eroded areas. Keep adjacent paved surfaces cleaned of dirt, mud or stains and organic debris.

-END OF SECTION 02930-

**SECTION 02950
PLANTING****PART 1 - GENERAL**

1.01 SUMMARY

- A Work Included: Provide planting complete, as shown and as specified.
- B Notification: Notify Landscape Architect at least one week in advance of date when plants will be picked up and transported to place of installation.
Inspection: Landscape Architect shall tag all trees and review all materials at source prior to purchase and shipping of plant material. Contractor shall take risk that some plant materials will be rejected if plants are delivered to site without Landscape Architect's approval at the source.
- C Related Work:
- Earthwork – Section 02300
 - Irrigation System – Section 02810
 - Soil Preparation – Section 02920
 - Lawns, Wildflower Meadow, and Seeded Planting – Section 02930
 - Landscape Maintenance – Section 02970
- D Allowances:
1. Amount: Include in Base Bid a cash allowance in amount of \$5,000. Use this allowance for furnishing and installing additional plant materials and related items directed by Landscape Architect. Contractor shall remove this amount from the final contract price if it is not used during the project. Contractor shall document with receipts and invoices any money of the allowance that is spent.
 2. Procedure: Submit a written change order for expenditures of cash allowance (in accordance with Section 01020). Credit to Owner unexpended portion of cash allowance in final project cost accounting.

1.02 REFERENCES

- A "American Standard for Nursery Stock", 2006 Edition, American Association of Nurserymen, Inc.

1.03 SUBMITTALS

- A Samples:
1. Mulch: One (1) pint if substitutions are made other than type specified

1.04 DELIVERY, STORAGE, AND HANDLING

- A Delivery: Do not deliver disease-infected plant materials.
- B Storage: Protect all plant material from sun, vandalism and stealing. It is Contractors responsibility to keep plants that cannot be planted immediately upon delivery in shade,

well protected and well watered, and stolen uninstalled plant materials shall be replaced by the contractor at no additional expense to the Owner.

- C Digging: Dig B & B plants with firm, natural balls of earth of diameter not less than USDA Standard for Nursery Stock, and of depth to include fibrous and feeding roots. Wrap and tie to prevent cracking or loss of soil from rootball.

1.05 PROJECT/ SITE CONDITIONS

- A Protection of Existing Plants to Remain:

1. Operations: Do not store materials or equipment, permit burning, or operate or park equipment under branches of existing plants to remain.

1.06 SEQUENCING AND SCHEDULING

- A Acceptance: Do not install plant materials prior to acceptance of finish grades and main installation of irrigation system.

- B Coordination: Coordinate with work of other sections to insure the following sequence of events:

1. General: Irrigation system to be installed and operable prior to installation of plant materials. Schedule hand watering in addition to irrigation system for first 2 weeks after plants are installed.

1.07 WARRANTY

- A Warrant that plants will be healthy and in flourishing condition of active growth one (1) year from date of Final Acceptance.

- B Correct Species: Warrant that plant materials are true to species and variety. Substitutions will be accepted only as approved by Landscape Architect.

- C Condition of Plants: Free of dead or dying branches and branch tips, with foliage of normal density, size and color.

- D Replacements: As soon as weather conditions permit, replace, without cost to Owner dead plants and plants not in a vigorous, thriving condition, as determined by Landscape Architect during and at end of Warranty Period.

- E Exclusions: Contractor will not be held responsible for failures due to vandalism, and acts of God, during Warranty Period. Report such conditions in writing.

1.08 MAINTENANCE PERIOD AND FINAL ACCEPTANCE: See Section 02970 - Landscape Maintenance

1.09 REPLACEMENTS

- A Failed Materials:

1. Repair and/or replace at no cost to Owner plant materials exhibiting conditions which are determined as unacceptable due to workmanship by Contractor or unacceptable since materials do not meet nursery standards specified herein.

2. Closely match replacements to adjacent specimens of same species. Apply requirements of this Specification to replacements.

PART 2 - PRODUCTS

2.01 MATERIALS

- A Plant Materials: Verify that container stock has been grown in containers in which delivered for at least one growing season, but not over two (2) years.
1. Growing Conditions: Nursery-grown in accordance with good horticultural practices under climatic conditions similar to those of project.
 2. Appearance: Trees must be exceptionally heavy, symmetrical, tightly knit, and so trained or favored in development and appearance as to be superior in form for their species, with regard to number of branches, compactness and symmetry. All trees shall have lower branches a minimum of 7' clear above finish grade. If branch clear height is unacceptable by Landscape Architect, contractor shall replace trees at no additional cost to the owner.
 3. Vigor: Sound, healthy and vigorous, well branched and densely foliated when in leaf, free of disease, insect pests, eggs, or larvae, healthy, well-developed root systems, free from physical damage or adverse conditions which would prevent thriving growth.
 4. Unavailable Material: If a specified plant is not obtainable, a proposal will be considered for use of nearest equivalent size or variety with corresponding adjustment of Contract price.
- B Condition of Root System: Completely free of circling, kinked or girdling trunk surface and center roots and show no evidence of a pot-bound condition. Upon inspection by Landscape Architect at job site, if five (5) percent or more of plants of each species are found to contain kinked, circling or girdling roots, plants of that species will be rejected.
- C Measurements:
1. General: Caliper is measured at a point on trunk 6 in. above natural ground line for trees up to 4 in. in caliper and at a point 12 in. above the natural ground line for trees over 4 in. in caliper.
 - a. Measure foliage across mean foliage dimension when branches are in their normal upright position. Foliage origin along main trunk will be measured from soil line.
 - b. Height and spread dimensions specified refer to main body of plant and not branch tip to tip. Properly trimmed plants must measure the same in any direction. If a plant is unevenly grown, it will be classified in the size category of smallest dimension.
 2. Size Range: If a range of size is given, do not use plant materials less than minimum size. The measurements specified are minimum size acceptable and are measurements after pruning, where pruning is required. Plants that meet measurements specified, but do not possess a normal balance between height and spread will be rejected.
 3. Substitutions: Substituted plants must be true to species and variety and conform to measurements specified except that plants larger than specified may be used if accepted. Use of such plants will not increase Contract price.
- D Unacceptable Trees: Trees which have damaged or crooked leaders, will be rejected. Trees having a main leader must not have been headed back. Trees with abrasions of

the bark, sunscalds, disfiguring knots, or fresh cuts of limbs over 3/4 in. which have not completely callused, will be rejected. All limbs of trees must be 7' clear from finish grade or they will be rejected.

- E Pruning: Do not prune plants before delivery. Consult Landscape Architect for pruning if necessary after installation.
- F Amended Topsoil and backfill for Planting Beds: See Section 02920 - Soil Preparation.
- G WATER : The Contractor shall be responsible for furnishing his/her own supply of water to the site at no extra cost if irrigation use is restricted, banned, or water is not available on site. All plant materials injured or damaged due to the lack of water, or the use of too much water, shall be the Contractor's responsibility to correct. Water shall be potable.

2.02 ACCESSORIES

- C Pine Bark Mulch:
 - 1. Type: Shredded black hardwood bark as provided by Cape Cod Resources 'Black Forest' or approved equal.
 - 2. Size: Not exceeding 1/2 in width and 3" in length.

PART 3 - EXECUTION

3.01 EXAMINATION

- A Verification of Conditions:
 - 1. Finish Grades: Finish grades for planting areas must have been established. Verify that grades are within 1 in. plus or minus of required finish grade.
 - 2. Soil Preparation: Do not commence planting work prior to completion and acceptance of soil preparation.
 - 3. Irrigation: Verify that irrigation system has been installed and accepted.

3.02 PREPARATION

- A Layout and Staking: Lay out plants at locations shown on Drawings. Stake each tree, not specifically located by dimension or alignment. Shrubs and perennials shall be placed in their locations within their containers for review by Landscape Architect on same day plants are to be installed.
- B Review: Locations of plants will be checked in field and will be adjusted to exact position before planting begins. If Landscape Architect adjusts locations of plant material there shall be no additional cost to the Owner. Landscape Architect may reject installed plant material and plants will be moved by Contractor at no additional cost to the Owner if plants are installed without location review by Landscape Architect.

3.03 DRAINAGE TEST OF PLANT PITS/OBSTRUCTIONS

- A Testing: Immediately after completion of excavation, test drainage of plant pits by filling with water twice in succession. Give written notification of conditions permitting retention of water in plant pits for more than twenty-four (24) hours.

- B Correction: Submit for acceptance a written proposal and cost estimate for correction of poor drainage conditions before proceeding with planting.
- C Obstructions: If rock, underground construction work, tree roots or other obstructions are encountered in excavation of plant pits, acceptable alternate locations may be used at direction of Landscape Architect.

3.04 TREE, SHRUB AND PERENNIAL PLANTING

A Handling and De-potting of Plant Materials:

1. Damage: Avoid damage to containers, wrappings, and rootballs. If rootball is cracked or broken during handling and de-potting, plant will be rejected. Do not remove plant from container prior to completion of plant pit preparation.
2. Balled and Burlapped Plants: Lift and carry by bottom of ball only. Do not remove wrapping until plant is set in plant pit. Cut wire and peel wire and burlap away from upper 1/3 of rootball prior to backfilling.

B Installation:

1. Scarification:
 - a. Plant Rootball: After removing plant from container, scarify sides of rootball to a depth of 1 in. at four to six equally-spaced locations around the perimeter of ball or at 12 in. intervals on sides of boxed materials. Cut and remove circling roots over 3/8 in. diameter.
2. Positioning: Backfill plant pit to allow setting crown of tree 2 in. above new finish grade and crown of shrub 1 in. above finish grade. Thoroughly foot tamp backfill. Position plant in planting pit, maintaining plumb condition. Maintain throughout planting operations.
3. Backfilling:
 - a. Use amended topsoil backfill mix to backfill plant pits as shown on Drawings. Use soil mix and depth in continuous planting beds as specified in soil type drawings. Brace each plant plumb and rigidly in position until planting soil has been tamped solidly around the ball and roots.
 - b. When plant pits have been backfilled approximately 2/3 full, water thoroughly and saturate rootball, before installing remainder of backfill mix to top of pit, eliminating air pockets.

C Watering: Immediately water plants after completion of planting operations.

3.05 PRUNING: See Section 02970 - Landscape Maintenance.

3.06 MULCHING

- A Install 3 in. deep layer of mulch over shrub, perennial, and tree planting areas. Do not install mulch in areas to receive seed or sod.

-END OF SECTION 02950-

**SECTION 02970
LANDSCAPE MAINTENANCE**

PART 1 - GENERAL

1.01 SUMMARY

- A Work Included: Provide continuous Landscape Maintenance, complete as specified during progress of work, after installation, and **for a period of one full year (365 days) after Final Acceptance.**
- B Related Work:
Irrigation System - Section 02810
Soil Preparation - Section 02920
Lawns, Wildflower Meadow, & Seeded Plantings - Section 02930
Planting - Section 02950

1.02 SUBMITTALS

- A Quality Control Submittals:
1. Schedule of maintenance operations and seasonal report including list of equipment, materials proposed for job and watering schedule.
 2. Yearly record of herbicides, insecticides and disease control chemicals and organic fertilizer used
 3. Documentation of planting, replaced or altered.
- B Project Close-out Submittal: Include in a single, 3-ring binder a landscape maintenance manual containing an indexed collection of irrigation schedules, maintenance records as well as a documentation of accepted condition of planting and irrigation after conclusion of one year maintenance period.

1.03 QUALITY ASSURANCE

- A Qualifications:
1. Experience: The landscape contractor or maintenance subcontractor must have a full-time employee assigned to job as foreman for duration of contract. He/she will have a minimum of four (4) years experience in landscape maintenance supervision, with experience or training in turf management, entomology, pest control, soils, fertilizers and plant identification.
 2. Labor Force: must be thoroughly familiar with, and trained in, work to be accomplished and will perform the task in a competent, efficient manner acceptable to Owner.
- B Requirements:
1. Supervision: The foreman must directly supervise work force. Notify Owner of changes in supervision.
 2. Identification: Provide proper identification for landscape maintenance firm's vehicles and labor force. Be uniformly dressed in a manner satisfactory to Owner.

1.05 PROJECT/SITE CONDITIONS

- A Site Visit: At beginning of maintenance period, visit and walk site with Town Structures and Grounds Director and Landscape Architect to clarify scope of work and understand existing project/site conditions.
- B Documentation of Conditions: Document general condition of existing trees, shrubs, perennials and lawn recording plant materials which are healthy, thriving, damaged, dead or dying.
- C Irrigation System: Document general condition of existing irrigation system, making sure that faulty electrical controllers, broken or inoperable sprinkler heads or emitters are reported.

1.06 SEQUENCING AND SCHEDULING

- A Perform maintenance during hours mutually agreed upon between Owner and Contractor.
- B Work force must be present at site once a week and as often as necessary to perform specified maintenance in accordance with approved maintenance schedule.

1.07 WARRANTY

- A Specific Requirements: Refer to the following sections:
 - 1. Lawns, Wildflower Meadow, & Seed Plantings - Section 02930.
 - 2. Planting - Section 02950.

PART 2 - PRODUCTS

2.01 MATERIALS

- A General: Materials and equipment, will be provided by Contractor, except as specified below.
- B Water: Clean, potable and fresh, as available, if water shortage exists and/or town bans irrigation, Contractor must transport water to site at a cost to Contractor.
- C Fertilizers:
 - 1. **Organic fertilizers are required for both lawns and all plantings.** Contractor shall fertilize lawns and planting beds two times during the year at rates per manufacturer's recommendations.
- D Herbicides, Insecticides, and Fungicides:
 - 1. Use sparingly on when absolutely required to maintain high level of park maintenance. Products to be approved by Owner prior to use.
- E BULBS: Nursery-grown, highest quality Langaveld bulbs or approved equal.

- F Wildflower Seed for Reseeding: Match mix in Section – 02930
- G Lawn Sod for Resodding: Match mix in Section – 02930
- H Replacement Plants Match originally accepted existing materials on site.

2.02 EQUIPMENT

- A General: Use only proper tools for job. Maintain tools in sharp, properly functioning condition. Clean and sterilize pruning tools prior to usage.
- B Insect/Disease Prevention: Take measures to prevent introduction of insect or disease-laden materials onto the site.

PART 3 - EXECUTION

3.01 ESTABLISHING THE MAINTENANCE PERIOD

- A Preliminary Review: As soon as planting is substantially completed per documents, hold a preliminary review to determine the condition of work.
- B Date of Review: Notify Landscape Architect at least three (3) working days prior to anticipated date of review.
- C Beginning of the Maintenance Period: The date on which Owner's Representative issues a letter of Final Acceptance to Contractor. Owner retains ability to provide Final Acceptance of completed portions of project and to commence maintenance work at their sole discretion.

3.02 PREPARATION

- A Protection:
 - 1. Protect new planting areas from damage from beginning of work until sufficiently established.
 - 2. Provide temporary protection fences, barriers and signs as required for protection.
- B Replacements:
 - 1. Immediately treat or replace plants which become damaged or injured as a result of Contractor's operations or negligence, as directed by Landscape Architect, at no cost to Owner.
 - 2. Replacement plants must match size, condition and variety of plants replaced even if plants have grown in size from original planting schedules.

3.03 PLANTING

- A Resetting: Reset plants to proper grades and upright position
- B Weed Control:

1. Areas between plants, must be weed free. Hand weed all beds atleast one time every two weeks.
2. Avoid frequent soil cultivation that destroys shallow roots.

C Pruning:

1. Prune trees to select and develop permanent scaffold branches that are smaller in diameter than trunk or branch to which they are attached, and which have vertical spacing of 18 in. to 48 in. and radial orientation so as not to overlay one another.
2. Prune trees to eliminate diseased or damaged growth, and narrow V-shaped branch forks that lack strength. Reduce toppling and wind damage by thinning out crowns.
3. Prune trees to maintain growth within space limitations, maintaining a natural appearance and balancing crown with roots.
4. Prune damaged trees or those that constitute health or safety hazards at any time of year.
5. Make cuts clean and close to trunk, without cutting into branch collar. "Stubbing" is not permitted. Cut smaller branches flush with trunk or lateral branch. Make larger cuts (1 in. in diameter or larger) parallel to shoulder rings, with top edge of cut at trunk or lateral branch.
6. Do not prune or clip shrubs into balled or boxed forms. Let grow in natural shape.
7. Take extreme care to avoid transmitting disease from one infected plant to another. Properly sterilize pruning tools before going from one infected plant to other plants.

D Maintenance of Existing Vegetated Areas within Property Line, Outside of Concrete Wall.

1. Once in Spring 2007, once in fall 2007 and Once in Spring 2008, cut back invasive vegetation within 50'-100' wetland buffer and stump cut treat with herbicide as described in Section 02100. This work is within the Wetland buffer and must be approved by the Conservation Commission before any work is completed. Contact Owner to review existing Conservation Commission permit and conditions prior to completing any work, and have owner resubmit application for work if required before and work is completed.

E Planting of Bulbs in Fall for Spring Flowering

1. In Fall 2007, Bulbs shall be planted as indicated on Drawings. Purchase, planting and Installation of Bulbs should be included in the price for annual maintenance. Plant bulbs to depth recommended by grower. Amend soil with Bone Meal at rates per manufacturer's recommendations when planting bulbs.

3.04 WILDFLOWER MEADOW

A Watering:

1. Check for moisture penetration throughout root zone at least twice a month.

- B Weed Control: Wildflower Meadow plantings must be kept weed-free by hand-pulling methods.
- C Mowing
 - 1. Wildflower Meadow can be mowed to specified height above finished grade in order to renew growth, improve density and attractiveness. This should be completed once annually.
- E Reseed dead and missing areas of Wildflower Meadow whenever necessary.

3.05 LAWNS

- A Watering:
 - 1. Water lawns at such frequency as weather conditions require, to replenish soil moisture to 6 in. below root zone.
 - 2. Provide a total of 1-1/2 in. of water weekly during hot summer weather, in three (3) applications per week.
 - 3. Set irrigation controls to water during early mornings.
- B Weed Control:
 - 1. Control broadleaf weeds with selective herbicides.
 - 2. In areas where crabgrass has infested the lawn, apply a selective post-emergent herbicide as soon as possible, and prior to flowering.
 - 3. Apply pre-emergent herbicides such as Dacthal, Balan, or Betasan prior to crabgrass germination.
 - 4. Do not irrigate for 48 hours after application of herbicidal sprays.
 - 5. Coordinate application of herbicides with thatch control and reseeding schedule as described below.
 - 6. Use organic herbicides wherever possible. Consult with Owner prior to applying herbicides.
- C Mowing and Edging:
 - 1. Mow lawns when they reach 2- ½ in. high.
 - 2. Trim edges twice a month or as needed for neat appearance.
 - 3. Remove all grass clippings.
- D Resodding of Lawn Areas: Match existing sod mix of adjacent areas.
- E Fertilizers:
 - 1. Apply a **slow release organic fertilizer** once in spring and again in the fall to all lawn areas at rates according to manufacturer's recommendations.
 - 2. Apply fertilizer when grass is dry and preferably after mowing. Do not apply during hot weather or when grass is under stress. Water immediately after application.
 - 3. If soil pH gets below 6.0, then a basic fertilizer such as calcium nitrate may be preferable to an acidic fertilizer. Follow the soil chemist's recommendation when deficiencies appear.

3.07 PERENNIALS AND SHRUBS

A Watering:

1. Check for moisture penetration throughout root zone at least twice a month.
2. Water as frequently as necessary to maintain healthy growth of all plants. Handwater in addition to irrigation system if necessary. Adjust irrigation system to adequately water all plant species.
3. Species, sizes of plants, container sizes and orientation shall dictate frequency of watering. Submit to Landscape Architect a watering schedule for different seasonal requirements.

B Weed Control: All planting beds must be kept weed-free.

C Pruning:

1. Limit pruning to removal of damaged or dead twigs and foliage.
2. Remove spent flowers on a weekly basis.

D Fertilization: Incorporate **slow release organic fertilizers** per manufacturer's current specifications once in spring 2008, and rake smooth.

3.08 SEEDED AREAS

A Watering:

1. Check for moisture penetration throughout root zone at least twice a month.

B Weed Control: Seeded areas must be kept weed-free by top cultivation and hand-pulling methods.

C Reseed dead and missing areas of Seeded Plantings whenever necessary.

D Some areas of Seeded Plantings are Annuals. Remove all annual debris at end of season in Fall 2007. Recultivate and Reseed annual areas of seeded planting in Spring 2008.

3.09 INSECTS, PESTS, AND DISEASE CONTROL

A Inspection: Inspect plant materials for signs of stress, damage and potential trouble from the following:

1. Presence of insects, moles, gophers, ground squirrels, snails and slugs in planting areas.
2. Discolored or blotching leaves or needles.
3. Unusually light green or yellowish green color inconsistent with normal green color of leaves.

- B Personnel: Only licensed, qualified, trained personnel must perform spraying for insect, pest and disease control
- C Application: Spray with extreme care to avoid hazards to any person or pet in area or adjacent areas. Use organic means whenever possible.

3.10 IRRIGATION SYSTEM

A General:

1. Repair without additional charge to Owner damages to system caused by Contractor's operations. Perform repairs to ensure plant material does not suffer from lack or over watering.
2. Report promptly to Owner accidental damage not resulting from Contractor's negligence or operations.
3. Do not run the irrigation system during rainy weather. Set and program automatic controllers for varying water requirements.
4. Twice a month, use a probe or other acceptable tool to check rootball moisture of representative plants as well as surrounding soil.

B Cleaning and Monitoring the System:

1. Continually monitor the irrigation systems to verify that they are functioning properly as designed. Make program adjustments required by changing field conditions.
2. Clean pump filter and strainer at least once a year and as often as necessary to keep the irrigation systems free of sand and other debris.
3. Prevent spraying on walkways and hardscape areas by balancing throttle control on the remote control valves and the adjustment screws on sprinkler heads. Do not allow water to atomize and drift.

- C Winterization: The irrigation system is designed to be completely drained to protect pipe from bursting prior to freezing temperatures. Adequately drain, winterize and blowout the system in late fall to prevent winter damage..

3.11 TERMINATION OF THE MAINTENANCE PERIOD

A Contract Closeout Procedure:

1. Work will be accepted by Landscape Architect upon satisfactory completion of work, including maintenance period, but exclusive of replacement of materials under Warranty Period.
2. Submit a written request to Landscape Architect for review for Final Project Closeout at least five (5) working days prior to anticipated Final Review date, which is at the end of Maintenance Period.

B Corrective Work:

1. Work requiring corrective action or replacement must be performed within ten (10) calendar days after Final Review.

2. Perform corrective work and materials replacement in accordance with Drawings and Specifications, and will be made by Contractor at no cost to Owner.
3. After corrective work is completed, the Contractor will again request a Final Review for Final Acceptance as outlined above.
4. Continue maintenance of landscaped areas until such time as corrective measures have been completed and accepted.

C Conditions for Acceptance of Work at End of Maintenance Period:

1. Each plant must be alive and thriving, showing signs of growth and no signs of stress, disease, or any other weaknesses.
2. Replace plants not meeting these conditions. An additional Warranty Period equal in length to the original will be commenced for such plants and planted areas.

D Contract Closeout Date After Maintenance Period: The date on which Landscape Architect issues a Letter of Final Contract Closeout. Upon Contract Closeout, Owner will assume responsibility for maintenance of work.

3.12 CLEANING

- A Dispose of pruned materials, lawn clippings and leaves, sweep walkways and rake smooth mulched areas.
- B Remove from site containers and evidence of maintenance activities.
- C Remove all trash and debris on site found within Concrete wall area. Keep site free of trash and debris.

3.13 CLOSE OUT

- A Landscape Maintenance Record: Submit binder to Owner with documentation and records required and utilized during maintenance period.
- B Keys: Return keys to irrigation to Owner.

-END OF SECTION 02970-