Updated by Rob Defeo, 2-6-09

NATIONAL PARK SERVICE
SPECIFICATIONS
GROUNDS AND TURF MAINTENANCE

Note: The EXCEL Spread Sheet Bid Template should be used to develop a bid schedule and obtain actual unit prices specific to the work being contracted.

PART 1: SCOPE

A. The work to be performed under this contract shall consist of providing all materials, labor, equipment, tools and services necessary to perform prescribed grounds maintenance and all related incidental work in accordance with the bid schedule and specifications herein. Therefore, any items not specifically noted, but necessary for performance in accordance with accepted practices and industry standards, shall be furnished under this contract.

B. All areas in which work will be performed are under the jurisdiction of the National Park Service, National Capital Region, _____.

Specifically:

List the specific areas/reservation #'s, estimated quantities etc. (if applicable)

C. **This is a requirements-type contract. The National Park Service is contracting for the items listed on the bid schedule base year for Grounds Maintenance. The additional quantities of Grounds Maintenance work listed in the option years of the bid schedule and the Miscellaneous Grounds Maintenance Activities are strictly estimates. The exact quantity of work will depend upon soil test results and the vagaries of weather, visitor use impacts, in-house capabilities, and funding levels.**

D. Lawn areas shall be maintained at the specified finished height throughout the mowing season. Based on National Park Service experience, turf maintained at 3-3.5" will need to be mowed on a 4 (-5) day schedule (44-48 cuts/year). Turf maintained at 3-4" will need to be mowed on a 7 (-10) day schedule (24-30 cuts/year). Turf maintained at 3-6" height will need to be mowed on a 10 (-14) day schedule (15-18 cuts/year). **The exact number of cuts required will be dependant upon the vagaries of weather and will not be subject to compensation for additional cutting, or deductions for less cutting.**

E. Manpower and equipment shall be capable of completing an entire mowing and trimming cycle for each park within _____ working days. Therefore, any

items not specifically noted, but necessary for performance in accordance with industry standards and the specifications stated herein, shall be furnished under this contract. Note: The National Park Service estimates the production for Mowing and Line Trimming based on past experience as follows:

Mowing:

60" walk behind
1 acre/hour 7-8 acres/day

72" riding mower (1.5-2 mph)
2-2.5 acres/hour 16-20 acres/day

80" tractor pulled (3-4 mph)
2-3 acres/hour 16-24 acres/day

121" 455D riding mower (2-3 mph)
2.5-4 acres/hour 20-32 acres/day

192" 580D riding mower (2-3 mph)
4.5-6 acres/hour 36-48 acres/day

Line trimming/edging: 3,000-4,000 linear feet per day/man

F. **It is recommended that the Contractor visit and inspect each site to verify the estimated quantities provided by the NPS and the complexities of conducting turf maintenance activities in areas containing high densities of vehicles, pedestrians, and structures. This is considered to be a standard requirement for developing, implementing and executing efficient, cost-effective turf maintenance support services.**

G. Actual award of this Contract or Letter of Obligation is contingent upon NPS receiving routine, continuing appropriations from Congress for these services. In the event of a delay in appropriations, or a Continuing Resolution, resulting in a subsequent delay in the allotment of funds from the OMB, the award may be delayed or the solicitation modified accordingly.

H. Quantities and scope of work to be performed and time frame(s) for completion will be identified on individual delivery orders and will be subject to the specifications herein.

I. The amount of work to be performed under a single delivery order shall be no less than $2,500.

J. This contract will be effective for a period commencing with the date of contract award through December 31, 20___. The government has the option to extend the terms of this contract for _____ additional calendar years through the year

20____.

PART 2: GENERAL PROVISIONS

2.01 QUALITY ASSURANCE

A. All work shall be under the direction and general supervision of a grounds maintenance supervisor who possesses verifiable experience and technical competence in grounds maintenance and turf management. The supervisor shall have a working knowledge of the English language and shall be present on site at all times work is being performed. The supervisor shall be responsible for controlling the quality of work and inspecting all completed work to ensure that contract performance requirements are met. The fsupervisor will be the primary contact with the Contracting Officers Representative (COR).

B. All workers shall, through related training and on the job experience, be familiar with the technical aspects of grounds maintenance and turf management and equipment used in such operations. All workers shall abide by any code of ethics or professional conduct established by the Landscape Contractors Association MD-DC-VA.

C. The Contractor shall submit copies of all licenses and certificates necessary for complying with Federal, State, and Municipal laws, codes, and regulations.

D. Identification of Employees

1. All workers shall be recognizable as employees of the contractor by wearing distinctive clothing bearing the name of the company and by wearing appropriate patches which show the contractors company name and employee name.
2. Distinctive clothing shall be uniform in appearance and include long pants, shirts, hats, and seasonal outerwear.
3. Only approved clothing and/or uniforms shall be worn.

E. The contractor shall not subcontract any work required by this contract without the express written approval of the COR. If the COR approves the Contractor to subcontract any part of the work required under this contract, a copy of any such subcontract shall be provided to the COR.

F. If so requested by the COR, a list of all equipment and workers as well as their positions (i.e.: Foreman, tractor/mower operator, laborer, etc.), affiliation with the company, and related certifications, training and on the job experience shall be submitted for each delivery order.

G. The contractor shall comply with all federal, state, local, DOI, and NPS environmental laws, regulations, and policies. Specifically:

1. Spill Prevention, Containment, and Cleanup: The contractor shall submit a Spill Contingency Plan within thirty (30) days of performance start date to the COR for review. A contractor -developed plan shall be developed in accordance with the Oil Pollution Act of 1990 and the National Response Team's Integrated Contingency Plan Guidance and NPS directives. The contractor SP shall minimize the likelihood of spills by taking all precautions necessary when handling, storing, and transporting hazardous materials (HAZMAT) and hazardous waste (HAZWASTE). Spills are defined as the release of solids, liquids, or gases. When handling, storing, or transporting HAZMAT (to include HAZWASTE) the SP will comply with all applicable Department of Transportation (DOT), Environmental Protection Agency (EPA), and other federal, state, and local laws and regulations. The contractor shall contain, clean up, and report all spills on government property in a manner that complies with applicable federal, state, and local laws and regulations.

2. Spill Prevention Control and Countermeasure (SPCC): The contractor shall develop and implement a SPCC plan in accordance with Title 40 CFR 112 for the service area. The contractor shall submit the plan within five (5) days of performance start date.

3. Hazardous Material and Waste Minimization: Hazardous materials used in performing work under this contract shall be handled in accordance with applicable laws and regulations. All hazardous materials used shall be accompanied with appropriate Material Safety Data Sheets (MSDS). The contractor shall submit copies of MSDS(s) to the COR and retain a copy of each MSDS on-site. The contractor shall maintain a viable hazardous waste minimization program that includes making every effort to identify and use non-hazardous or less hazardous materials than those currently in use and to recycle consumable wastes.

4. Hazardous Material Management: The contractor shall remove all hazardous materials from individual job sites upon completion of the work on a daily basis. All hazardous waste generated by the contractor shall be accumulated at approved accumulation sites in containers approved by Title 49 CFR, part 173.

5. Restricted Use of Ozone Depleting Substance (ODS): Class I ODS is defined in Section 602 of the Clean Air Act. Except for work on existing equipment utilizing Class I ODS, the contractor shall not use Class I ODS in the performance of this contract, nor provide ODS as part of equipment. This prohibition shall be considered to prevail over any other provision, specification, drawing, or referenced document.

6. Restricted Use of Solvent Cleaners: The contractor shall not use halogenated cleaning solvents in the performance of work.

2.01.1 ADJUSTMENT FOR INADEQUATE PERFORMANCE:

A. Well maintained turf areas are the National Park Service's goals and while the deduction provision for work omitted or improperly performed is designed to protect the National Park Service's interests, it is not a desirable substitute for accomplishing the job through the normal process. It is designed only to assure that the Park Service pays only for services provided and is fairly compensated for damage(s) resulting from such operations.

B. Failure to perform the required services as indicated in the specifications herein shall constitute a deficiency. All work will be regularly inspected by the COR and deficiencies will be reported to the Contractor's Supervisor. Deficiencies in daily tasks shall be completed within the day the deficiency is noted. All other deficiencies shall be corrected within 24 hours or the period indicated by the COR. If such deficiencies are of a nature which precludes satisfactory re-accomplishment within the specified time frame, no further opportunity will be provided to the contractor to cure the deficiencies and the provisions for monetary adjustments will apply.

C. In the event the contractor, for any reason whatsoever, fails to successfully perform a task, the National Park Service has the right to:

1. Obtain performance of the deficient task from some other source or the in-house work forces. The costs of such performance, and any other additional costs incurred to the Park Service as a result of such actions shall be charged to the contractor: or

2. At the discretion of the COR, to terminate the contract upon ten (10) days notice in writing to the contractor.

D. It is mutually agreed that failure to satisfactorily accomplish work in accordance with the specifications and provisions stated herein when due to the fault of the contractor, shall constitute a deficiency under this contract. If deficiencies are not corrected in a satisfactory and timely manner, a monetary reduction will be made as follows:

1. Ten (10) percent of the mowing bid item price for each failure to perform each of the following:

   A. Not having the necessary equipment or labor to complete the mowing operations within the specified time frame.

   B. Using mowers, trimmers or other equipment that has not been approved by the COR.

C. Sharpening mower blades before each mowing.

D. Properly mowing/trimming to the specified height.

E. Properly cleaning up or removing (blowing) all grass clippings from paved surfaces within one hour after cutting.

F. Failure to direct grass clippings away from roadways

G. Working in areas during hours not approved for mowing operations as stated in the specifications herein without the approval of the COR. Noncompliance will result in a penalty of 10% of the bid item price per hour, for each hour or portion thereof.

H. Failure to have equipment fitted with required safety devices and/or failure of workers to wear required personnel safety gear.

I. Failure to maintain pre-established mow lines.

J. For each violation of a federal OSHA, state, and/or safety requirement stated herein.

2. Failure to initiate mowing operations within two (2) working days from notification - 10% of the bid item price for mowing for each day beyond two days.

3. Failure to install and maintain proper advance warning, signing, and/or barricades during work operations as well as installing traffic control devices before rush hour is over, or failing to remove traffic control devices before rush hour begins will be considered noncompliance. Noncompliance will result in a penalty of $250 per hour, for each hour or portion thereof. Note: Use of this penalty does not waive the COR's right to suspend work in whole or in part.

4. Damage to existing trees from the careless operation of mowers or trimmers - damage shall be assessed at $200.00 dollars per caliper inch per occurrence. Irreversible damage to the tree(S) will be subject to liquidated damages in accordance with the *Guide for Plant Appraisal* (9th edition, 2000) authored by the Council of Tree and Landscape Appraisers and the Mid-Atlantic Tree Species Rating Guide developed by the Mid-Atlantic Chapter of International Society of Arboriculture. The 2000 value is $42.50 per cross sectional square inch putting a base value for a 32" "specimen" elm at $34,600.

5. Failure to repair damaged grounds and or tree mulch rings within <u>five</u> (5) working days - 10% of the bid item price for mowing for each day beyond

five days.

2.02 SCHEDULING AND COORDINATION:

A. Within 5 working days of receiving a delivery order, the contractor shall establish contact with the designated park representative indicated on the delivery order so that mutually agreeable time frames for scheduling and performing the prescribed work can be established. Note: It is the responsibility of the Contractor to determine when work is to begin and notify the COR of the date and locations. If the contractor has not initiated work and the COR determines that work is required per the specifications herein., the COR shall contact the Contractor and work shall begin within two (2) working days.

B. It is anticipated that tasks will take place within the following time frames; however, the time frames can be extended or reduced according to weather and soil conditions and/or visitor use impacts.

Grounds Maintenance Activities:

Litter Pick-up:	January – December
Spring Cleanup	March
Mulching	Spring/Fall
Mowing/Line trimming:	April-November
Mechanical Blade Edging	April-November
Weed Control	April-September
Leaf Removal	October - December
Shrub Maintenance	March-November
Tree Pruning	March-April
Ground Cover/Perennial Bed Maintenance	March-November
Tree/Shrub Fertilization	Per Soil Test Results/Recommendation
Insect/Disease Monitoring	January-December
Seasonal Floral Displays:	March – November
Tree and Shrub Planting:	October – April 15 weather permitting.

Miscellaneous Grounds Maintenance Activities

Mulching:	March - December
Aeration (Core/Shatter):	September 1 – May 15
Soil Modification:	September 1 – May 15
Fertilization:	March 15-April 1, September 1 – December 1
Liming:	September 1 – December 15
Fall Over-seeding:	September 15 – October 15
Spring Over-seeding:	March 15 – May 15
Summer Over-seeding:	May 15 - September 15
Sodding	March 15 - December 1
Selective, Non Selective Weed Control	April – November

C. The contractor, in consultation with the COR, shall be responsible for staking and layout of all reference points, elevations, planting locations and grades necessary to perform work in accordance with specifications herein.

D. No vehicular traffic not directly associated with the work shall be permitted into the areas once work has begun.

E. Work shall be scheduled and arranged so as not to interfere with the normal activities of the park. Advanced notice will be given to the contractor if a conflict is expected.

F. Once the time frames for performing the work are established, the contractor shall notify the designated park representative 48 hours prior to beginning any work on a delivery order. Work shall be performed between the hours of 6:00 a.m. and 6:00 p.m., Monday through Friday (--Saturday), Federal holidays excluded, unless directed and/or authorized otherwise in writing by the COR.

G. Work is permitted during rush hours; however, operations shall not interfere with the normal flow of traffic or result in any unusual traffic situations. Morning rush hours are 6:00 am to 10:00 am, and evening rush hours are from 2:45 pm to 7:15 pm, Monday through Friday, holidays excluded.

H. Once work begins the contractor is expected to be on the job site each day in which weather conditions are favorable as determined by the COR.

I. Work shall only be performed under favorable weather and soil conditions as determined by the COR.

J. All work within a designated area shall be completed, inspected, and accepted by the COR and/or Designated Park Representative in accordance with the procedures stated herein before beginning work in another area.

K. The time stated for completion shall include final cleanup of the premises.

L. The Contracting Officer's Representative will be responsible for acting on behalf of the Contracting Officer on all matters of work within the scope of the contract. Approval of work beyond the scope of the contract is reserved for the Contracting Officer. The contractor is responsible for notifying the COR in writing for all work that is beyond the scope of the contract. Notification shall include a proposal for performing the prescribed work that includes a breakdown with unit prices for labor, materials, equipment required and time frame(s) for completion. The COR will evaluate the proposal and if valid will seek approval from the Contracting Officer. Failure of the contractor to obtain the approval of the Contracting Officer for work beyond the scope of the contract will release the government from any obligation to pay for services claimed.

M. **If, at any time, the COR determines that the work is unsatisfactory or being conducted in an unsafe manner, the contractor will be notified and shall immediately cease all work activities.**

2.03 REPORTS:

A. The contractor shall maintain a daily work log recording the quantities of work performed and the locations. If requested a copy shall be filed with the COR on a daily or weekly basis.

B. The contractor shall report emergency situations, such as accidents involving property and/or personal injury or other unforeseen circumstances and shall follow required emergency reporting procedures. Emergency reporting procedures will be delineated in writing by the CO before any work awarded under the contract begins.

C. Within 5 calendar days prior to performance start date the contractor shall provide to the COR a written list of key Points of Contact (POC) responsible for responding to emergency operations.

D. The contractor shall note and report to the COR in writing the presence of any turf conditions that need to be addressed that cannot be corrected within the scope of work described herein. If so directed by the COR the contractor shall provide a proposal for performing the prescribed work that includes a breakdown with unit prices for labor, materials, and equipment required to perform the task(s). The COR will evaluate the proposal and if valid will seek approval from the Contracting Officer. Failure of the contractor to obtain the approval of the Contracting Officer for work beyond the scope of the contract will release the government from any obligation to pay for services claimed.

E. The use of Pesticides must be approved by the National Park Service. The National Park Service will supply, and the contractor shall maintain, a daily pesticide use log for all areas treated with a pesticide. A copy shall be filed with the COR within 24 hours of application.

F. The Contractor shall maintain a log of working days impacted by adverse weather. The COR will review adverse weather days incurred to determine weather the Contractor is entitled to a time extension.

2.04 SAFETY:

A. All equipment must meet all federal OSHA, state and local safety requirements and must be properly licensed. A list of the equipment anticipated for use shall be submitted and include the make and model, year manufactured, tag number if applicable, and date of last inspection. The name or logo of the contractor must be

clearly displayed on all trucks used on the job.

B. All operations shall be conducted in accordance with all national and local safety codes, laws, rules, regulations and OSHA safety requirements.

C. All workers shall wear OSHA required safety equipment.

D. Warning Signs: For roadside mowing and related work under this contract the contractor shall provide, erect, and maintain all necessary warning signs to insure the safe flow of traffic, protection of the work area, and the safety of the public. All traffic controls and safety devices shall meet and/or exceed current Federal Department of Highways and ANSI standards for working on or near roadways. The following shall be required when working adjacent to roadways. Specifically:

1. Warning Signs shall be 48" x 48", diamond shaped, with a black message on an orange background. Specifically:

   MOWING AHEAD or SHOULDER WORK AHEAD

   WATCH FOR SLOW MOVING VEHICLES

   END MOWING or END SHOULDER WORK

2. Warning signs shall be located on the right hand side of the roadway. On divided roadways with a median, both the left and right sides shall be signed.
3. The "Watch for Slow Moving Vehicles" warning sign shall be located 500 feet beyond the "Mowing/Shoulder Work Ahead" warning sign.
4. The MOWING AHEAD/SHOULDER WORK AHEAD signs shall be repeated every one mile.
5. The maximum length of the work zone shall be four miles.
6. The warning signs shall be mounted on temporary supports not less than 1 foot above the pavement or turf elevation.
7. Warning signs shall be removed when mowing/shoulder work operations have ceased.

E. When conducting services operations near or adjacent to roadways all employees shall wear reflective, bright orange or lime garment while conducting mowing operations in or adjacent to roadways. Garment shall be an orange or lime ANSI/ISEA (International Safety Equipment Association) Class 3 Garment (AVY725SC2) with a minimum of 201 square inches of reflectorized or high-visibility material.

F. No one except the operator shall be within 10 feet of an operating mower or trimmer, or edger.

G. All areas to be sprayed with a pesticide shall be posted 24 hours in advance. Notification signs shall be submitted and approved by the COR before posting.

The sign shall be legible from a distance of at least 25 feet and clearly state the pest targeted, the date(s), and time(s) application is scheduled. Signs shall be spaced as required by the laws under which jurisdiction falls.

2.05 WORK AREA:

Contractor shall confine his work, the storage of materials and equipment, the parking of vehicles, and all other operations in connection with this contract to the areas approved by the COR. The public ways shall not be encumbered with any of the above or any unusual traffic situations created by reason of operations under this contract without the approval of the COR.

2.06 RESPONSIBILITY REGARDING EXISTING PLANT MATERIAL AND OTHER LANDSCAPE FEATURES:

The Contractor shall preserve and protect all existing vegetation such as trees, shrubs, and grass on or adjacent to the work areas. The Contractor shall be responsible for all unauthorized cutting or damage to trees and shrubs, including damage resulting from careless operation of equipment, stockpiling of materials or tracking of grass and other surfaced areas by equipment. Such damaged areas or materials shall be restored, repaired or replaced by the Contractor, as directed by the COR, at no expense to the National Park Service (NPS) prior to Initial Acceptance. Irreparable damage to trees will be subject to liquidated damages at the current value for a cross sectional square inch of dbh in accordance with the guidelines provided by the Council of Tree and Landscape Appraisers and the International Society of Arboriculture. The most current value is $42.50 per cross sectional square inch putting a base value for a 32" elm at $23,919.

2.08 PATCHING OF PUBLIC SIDEWALKS, CURBS, GUTTERS, AND STREETS:

Contractor shall patch, repair or replace portions of sidewalks, curbs, gutters, streets, manholes, and other park features that are damaged in connection with work under this contract or as a result of operations thereunder. Materials and methods shall conform to the current standards for the area damaged, match existing on-site materials, shall meet the approval of all cognizant officials and the COR. All damaged areas shall make smooth, satisfactory, and imperceptible transitions to existing adjacent work, and shall be performed without additional expense to the NPS.

2.09 RESPONSIBILITY REGARDING EXISTING UTILITIES AND STRUCTURES:

The Contractor will be held liable for any damages to utilities, and will be responsible for the protection of existing utilities and related structures. The Contractor shall locate utilities in the field prior to engaging work that could damage utilities by contacting Miss Utility on 800-552-7001, forty eight (48) hours in advance of work. Work involving excavations such as aerating and rototilling shall not commence until the COR has confirmed the inspection and clearance by Miss Utility.

2.10 AIR AND WATER POLLUTION CONTROL:

The Contractor shall take all necessary measures to prevent runoff, soil erosion, air, and water pollution by any material and/or equipment used during construction. The Contractor shall keep the site clean and free of trash and debris.

2.11 PRE-EXISTING DAMAGE

In instances where the contractor finds pre-existing conditions or damage to park resources which may reflect upon the quality of his work or cause him undue liability, the contractor shall not start work until the contractor and COR have agreed on the responsibility for these pre-existing conditions.

2.12 PERSONAL PROPERTY DAMAGE

The contractor shall assume the responsibility for accidents or damage caused to property as a result of performing the required services. An example of damage may include damaged / broken building or vehicle windows from projectiles thrown from mowers.

2.13 CLEANUP AND RESTORATION:

The Contractor will be required to furnish all labor, materials, and equipment for daily cleanup and restoration of all disturbed areas or features which have been damaged during the course of work. If so directed by the COR, the Contractor shall be prepared to sweep and wash paved surfaces daily or as needed.

2.14 SUBMITTALS

A. **Personnel:** If so requested by the COR, a list of all workers as well as their positions (i.e., Supervisor, tractor/mower operator, vehicle operator, laborer, etc.), affiliation with the company, and related certifications, training and on the job experience shall be submitted by the Contractor for all activities under this PWS.

B. **Equipment:** A list of the equipment anticipated for use shall be submitted and include the make and model, year manufactured, tag number if applicable, and date of last inspection. Listed equipment must be on the job site when necessary during the execution of services.

C. **Soil Amendments/Mulch :** The Contractor shall submit a five (5) pound sample of all soil amendments and mulch that identifies the vendor and documentation and certification of composition and analysis within seven (7) working days prior to delivery. The sample shall be deemed representative of the material that is intended to be supplied.

D. **Pesticides:** The following shall be submitted five (5) working days prior to a pesticide application.

   1. *Pesticide/Herbicides:* Product label(s) and mixing and application rates.

2. *Applicator:* The individual(s) who will be applying the pesticide.
3. *Target Pest:* The pest or pests to be controlled.
4. *Method:* The method of application, e.g., by hand, power sprayer.
5. *Site:* The specific site where the pesticide will be applied.
6. *Posting Signage:* 1 sample of each sign specified for use. Posting signage is not required at all locations. Posting shall be in accordance with local regulations governing the specific areas.

E. **Seed:** The Contractor shall submit the seed vendor's certification of grass seed, indicating percentages of weight, purity and germination for each grass species within seven (7) working days before seed is delivered to the site.

F. **Sod:** Source(s) of sod shall be submitted to the COR within seven (7) working days before sod is delivered.

G. **Fertilizer/Lime:** The Contractor shall submit vendors, documentation and certification of chemical composition and analysis for all fertilizer applications. All fertilizer shall be approved by the COR before any fertilizer is delivered. The SP shall submit the information within thirty (30) days of performance start date.

H. **Plant Materials:** Sources for all plant materials and a confirming order within 7 days after receiving a delivery order.

I. **Certifications/Licenses:**

1. The Contractor shall submit copies of the Certifications / Registrations for all Pesticide Applicators to the COR. This shall include the Categories of Certification appropriate to the type of application being performed.
2. The Contractor shall submit copies of all licenses for the application and storage of pesticides for each state as necessary District of Columbia, Virginia, and Maryland (MD/VA/DC).
3. The SP shall submit certifications and licenses within thirty (30) days of performance start date.

J. **Uniforms:** The contractor shall submit samples of the pants, shirts, overcoats, hats, identification tags, etc. that will be worn by all employees working on lands under this PWS. The SP will submit samples within thirty (30) days of performance start date. Only submitted and approved clothing can be worn when performing services under this PWS.

K. **Safety Plan:** The Contactor shall provide a Safety Plan for review and approval by the NPS. The Contractor shall submit the plan within thirty (30) days of performance start date.

L. The Contractor shall maintain copies of all official submittals to the COR throughout the life of the Contract or Letter of Obligation. All proprietary information that the Contractor or the Government wishes to remain confidential shall be clearly marked. A

due date that falls on a Saturday or Sunday shall be due by close of business the following Monday, or close of business on the first workday following a holiday.

2.15 REFERENCE STANDARDS:

A. Seed:

1. Association of Official Seed Certifying Agencies

2. Extension Services of University of Maryland or Virginia Polytechnic Institute and State University.

B. Fertilizer:

1. Association of American Plant Food Control Officials

2. FS 0-F-241 - Fertilizers, Mixed, Commercial.

C. Lime:

1. Association of Official Agricultural Chemists.

2. Association of American Plant Food Control Officials.

2.13 APPROVALS: All approvals shall be in writing

2.14 DEFINITIONS:

A. Shall - As used in these specifications denotes a **mandatory** requirement.

B. Should - As used in these specifications denote an **advisory** recommendation.

C. Tree Caliper Measurement: The caliper measurement will be determined by taking the average of two trunk caliper measurements at right angles 6 inches above the root crown.

D. Tree Height Measurement: The tree height shall be measured beginning at the ground line and continue to where the main part of the plant ends, not to the tip of a thin shoot.

E. Shrub Height measurement: The height of each shrub shall be determined by taking the height above the "root crown" to the average growth on the main part of the plant top.

F. Shrub Width Measurement: The spread of each shrub shall be determined by taking

the average of two diameter measurements of the drip line at right angles.

PART 3: Grounds Maintenance

3.01 General: This section encompasses the performance requirements, workload, and performance standards necessary to perform the services required in support of the turf maintenance and related functions. Any proposed organization shall be structured in the most efficient and cost effective manner to meet the operational performance requirements, using processes that are clear, well documented, and auditable, with the intended outcome of producing high quality services. The contractor shall propose an organization, methodology, processes, and staffing that are cost-effective and structured in a manner to provide a seamless grounds/turf maintenance operation. The contractor shall provide:

3.02 Spring Clean up: During the month of March or as directed by the COR, one general landscape clean up will occur. This service will include the following:

A. Removal of landscape debris that has accumulated over the winter months within the designated work areas (i.e., branches twigs, leaves, dead vegetation etc.).

B. Clean up of snow removal residue from all paved surfaces (sand, gravel, etc.).

3.03 Trash Pickup: The contractor shall:

A. Remove litter and debris from mowed areas prior to each mowing and dispose of off-site.

B. Perform additional litter pick-ups as delineated in the bid schedule. Additional litter pickups shall include the removal and disposal off-site of all trash and debris from all hard surfaces, turf areas and wood lines. The wood line is defined as a 3 (-5) foot area that extends towards forested area from the mow line. The following quantities, frequencies and corresponding months shall apply:

300 picks/year:	1 pick per day, 7 days per week, May - September
	1 pick per day, 5 days per week, October – April
156 picks/year:	3 picks per week, Monday – Friday January - December
104 picks/year:	2 picks per week, Monday – Friday, January - December
52 picks/year:	1 pick per week, Monday – Friday, January - December

C. All trash shall be collected, stockpiled and transported in clear plastic bags.

3.04 Mowing, Line Trimming and Machine Edging

3.04.1 Mowing

A. Prior to commencing the first mowing cycle, the COR will indicate the mow lines by staking, flagging, painting or as otherwise required. Mowing patterns will be established and changed on a regular basis to present the most aesthetically pleasing appearance.

B. Lawn areas shall be maintained at the specified height indicated for each area during the mowing season as weather conditions dictate. The following are the approximate mowing frequencies as related to turf height based on NPS experience. **The actual number of mowing will depend upon the vagaries of weather.**

3-3.5"	4(-5) day schedule	44-48 cuts/year
3-4"	7(-10) day schedule	24-30 cuts/year
3-6"	10 (-14) day schedule	15-18 cuts/year

C. During the mowing season all lawn areas shall be mowed to maintain the specified height as weather conditions dictate.

E. To ensure a high quality cut, all mower blades shall be sharpened before each mowing and shall be adjusted to a height of 3 inches. Mowing heights may be adjusted at the discretion of the COR as necessary to adapt to seasonal conditions.

F. The turf shall be cut to a uniform height; skips and patches of uncut grass or windrowing shall not be permitted.

G. **All grass clippings and mower discharges shall be directed away from roadways, walkways, and mulched areas.**

H. Damaged mulch rings shall be re-mulched as directed by the COR within 5 working days of notification at no additional expense to the National Park Service.

I. Areas delineated in the bid schedule as being mowed 1(-2) times per year shall be flail mowed as directed by the COR. Areas may include but are not limited to meadows, stream Banks, areas behind guardrails and stone walls etc. and may require the use of an arm mower and/or cutting by hand.

J. Mower guard safety shields shall be operable and in place at all times.

3.04.2 Line Trimming

A. Line Trimming is considered to be part of the mowing task and shall be performed concurrent therewith.

B. Line trimming shall include:

1. Areas around trees, shrubs, signs, guardrails, retaining walls, utilities, the back side of the guard walls leaving a mow strip of 2 foot, and other obstructions or structures that cannot be cut with conventional mowing equipment. The height for line trimming shall be the same height at which the grass is cut.

2. The edge(s) of grass areas where such areas meet walks, curbs, or roadways and expansion Joints in curb and gutter and/or sidewalks. The height for line trimming shall be the grade of the paved surface.

3. Areas around individual trees and shrubs and/or shrub beds shall be neatly cut in such a manner as to leave a well defined edge between the lawn and the mulched areas. The line trimmer shall not come in contact with any tree trunk or shrub - no exceptions. Violations will be subjected to the monetary deduction clauses outlined in section 2.01.1, Item D.

4. Maintenance of the mulch ring and keeping these areas free of weeds and unwanted vegetation will be the responsibility of the National Park Service unless indicated otherwise within the specifications herein. In general, tree mulch rings will be maintained on trees less than 12" diameter at breast height and may be extended if the NPS so desires. The contractor is responsible for notifying the COR if proper maintenance is not being performed and hampering contract obligations. If so directed by the NPS the contractor shall be prepared to spray a park approved herbicide on an area around each tree extending 2.5 feet in all directions, mechanically edging the treated area and applying mulch to a loose measurement of 3" in accordance with the contract unit prices and section 3.05 below.

3.04.3 Machine Blade Edging

A. Machine blade edging shall be performed (#___ times per year) and shall require the use of a machine blade edger to define the edge(s) of grass areas where such areas meet walks, curbs, street, driveways and paved trails.

B. Conduct mechanical blade edging to maintain a defined edge for all areas delineated for this service.

3.04.4 Cleanup

The contractor shall furnish all labor, materials, and equipment for daily cleanup. The contractor shall sweep and/or blow paved surfaces within 1 hour following mowing, trimming and edging operations.

3.05 Shrub Maintenance

A. Shrubbery which requires shearing to maintain a formal appearance will be sheared two times per year, approximately in June (Spring Rejuvenation) and in early September (Summer Shearing) unless indicated otherwise by the COR.

B. Informal flowering shrubs shall be pruned one time per year after blooming.

C. Roses shall be pruned on time per year in early Spring and deadheaded as needed. Standard cultural and pruning practices shall be observed.

D. Pruning does not include restoration pruning on overgrown/neglected plants that have been improperly pruned or sheared in past years.

E. To supplement rainfall as measured at Reagan National Airport, all shrubs and roses shall be monitored for watering needs throughout the growing season. Plants shall be maintained in "Average Moist soil to a depth of 4 inches as measured utilizing a Lincoln Soil Moisture Meter or comparable measuring device. Roses shall be watered utilizing drip irrigation hoses. Shrubs shall be watered prior to 10:00 am or as directed by the COR. The contractor shall use existing NPS water source.

F. Hybrid Tea and Historic Roses.

1. The contractor shall apply the Triact 90 EC Broad Spectrum for insect and fungus control on a 7 day schedule (21 applications/year) in accordance with the product label for Roses.

2. Applications are to be made each Monday from May through September between the hours of 6:30am and 8:30 am.

3.06 Tree Pruning

3.06.1 Professional Qualifications: All work shall be under the direction and general supervision of an Arborist(s) certified by the International Society of Arboriculture (ISA) who posses verifiable experience as a full time direct supervisor of shade tree maintenance and climbing work crews. The Contractor shall possess technical competence in tree physiology, identification, diagnosis of disorders, and current tree care and safety practices in accordance with accepted industry standards.

3.06.2 Execution.

A. Pruning shall occur in the spring unless directed otherwise by the COR and include the removal of all deadwood from plant material up to a height that can be reached with a pole pruner.

B. All trees less than 6 inches in caliper shall be pruned to develop a sound scaffold branching system by selective thinning of branches and removal of dead, interfering,

split, broken, and large branches with narrow angles of attachment. Scaffold branches should be 1/2 (one half) or less of the diameter of the trunk or parent branch at its attachment. Permanent lateral branches along scaffold limbs should be at least 2 (two) ft. out from the trunk and less than half the diameter of the limb at its attachment. The objective of pruning shall be as follows.

1. Deciduous Shade Trees: The central leader system of training shall be followed unless directed otherwise by the COR. The recommended spacing between primary scaffold branches should be approximately 18 inches.

2. Flowering Trees: The modified leader system of training shall be followed unless directed otherwise by the COR. The recommended spacing between primary scaffold limbs should be approximately 6-8 inches.

C. Trees over walks, trails, and picnic areas shall have all lateral limbs and water sprouts removed from the main trunk of the tree to a minimum height of six (6) feet above the ground.

3.07 Ground Cover/Perennial Bed Maintenance:

A. All beds shall be edged and pruned as needed to contain them within their borders and all resulting debris will be removed.

B. For perennials, all industry standards for cultural and pruning practices shall be observed

C. To supplement rainfall as measured at Reagan National Airport, all bedding plants and perennials shall be monitored for watering needs throughout the growing season. Plants are to be maintained in "Average Moist soil to a depth of 4 inches as measured utilizing a Lincoln Soil Moisture Meter or comparable measuring device. Plants shall be watered prior to 8:30 am or as directed by the COR. The contractor shall use the existing water source and use portable sprinklers or perform hand watering.

3.08 Weed Control

3.08.1 General

A. All mulched beds, tree mulch rings, walks, curbs/expansion joints, drainage culverts and other hard surfaced areas will be kept free of weeds throughout the growing season to maintain a neat appearance at all times. This will be performed by hand weeding and the use of a non-selective herbicide (Roundup). Note: Parkways and roadbeds are not considered to be a part of this service.

B. All herbicide applications shall be approved by the COR and shall be under the direct supervision of a Certified Pesticide Applicator licensed to spray within the states of Virginia and Maryland and the District of Columbia. The Certified Pesticide Applicator must possess verifiable certification, experience and technical competence in applying herbicides to paved and mulched areas. The Certified Pesticide Applicator shall be the primary contact with the COR responsible for controlling the quality of work, inspecting all completed work to ensure that contract performance requirements are met, and maintaining the pesticide use log.

C. The National Park Service will supply, and the contractor shall maintain, a daily pesticide use log for all areas treated. A copy shall be filed with the COR within 24 hours of application.

D. All workers handling or applying herbicides shall, be registered as pesticide applicators in within the jurisdiction in which work is being performed and, through related training and on the job experience, be familiar with the safety and technical aspects of applying herbicides and equipment used in such operations.

E. A pre-herbicide application conference will be held prior to mixing or transporting any herbicides to the designated sites. The time, date, and location shall be agreeable to personnel of the Contractor and the National Park Service who are responsible for the contractual requirements of both parties. Topics for discussion, but not limited to, will be scheduling and areas to be treated, handling, mixing, application of herbicides, sprayer capabilities (i.e.: pressure and nozzle types) and , safety etc. Participation at this conference is mandatory prior to beginning any applications of herbicide. After the conference the contractor shall notify the COR 48 hours prior to beginning any work.

F. The contractor shall be responsible for procurement, handling, storage, and safeguarding of herbicides from the time of delivery through completion of applications. All operations will conform to manufacture's pesticide label instructions and the appropriate state requirements for storage, transportation, and application of pesticides.

G. Herbicide Spill Plan: The contractor shall develop and submit a Herbicide Spill Plan

to the National Park Service for approval before any herbicides are transported or applied. .

3.08.2 Materials and Equipment

A. Herbicide Shall be:

1. Roundup (Isopropylamine salt of Glyphosate), EPA Registration Number 524-308-AA.

2. Surflan A.S. (Oryzalin) EPA Registration Number 62719-112

B. Water: Shall be potable.

C Sprayer: Shall be a plastic low volume hand held/backpack, leak proof, equipped with proper nozzles and covers and free of rust, residues, and particulate matter such as grit and sand.

3.08.3 Execution

A. Mixing Herbicide:

1. All hoses for filling shall be equipped with anti-siphon valves to prevent back siphoning into water source.

2. Fill the spray tank with 1/2 the required amount of water. Mix Roundup at a rate of 2-2.5 ounces (4-5 tablespoons) per gallon. If Surflan A.S. is to be mixed with roundup add at a rate of 2-2.5 ounces (4-5 tablespoons) per gallon. After adding Herbicides mix well before adding the remaining portion of water. When filling place the hose below the surface of the solution to prevent excessive foaming.

B. Application of Herbicide:

1. All herbicide applications shall be conducted under favorable weather as determined by the COR. No applications shall be conducted when the winds are gusty or in excess of 10 miles per hour or when other conditions, including lesser wind velocities, will allow drift to occur. Avoid combinations of pressure and nozzle type that will result in fine particles (mist) which are more likely to drift.

2. All applications shall be properly directed to avoid drift and contact with non-target vegetation.

3. **Do not spray vegetation to the point of runoff**.

4. Resulting dead vegetation shall be trimmed to the grade of the paved and/or mulched surface.

3.09 Leaf Removal

A. The contractor shall collect, remove, and dispose of leaves from all turf, paved surfaces, drainage culverts, and retaining walls. Leaves shall be removed such that turf will not be damaged and/or mulch displaced from a bed and/or tree ring.

B. Leaf removal will be dependant upon the canopied character of the area(s) and/or adjacent natural surrounding areas and the vagaries of weather. When approved by the COR, leaves may be blown into adjacent natural areas as opposed to complete removal.

C. The contractor shall remove piled or windrowed leaves the same day unless approved otherwise by the COR. The disposal of leaves shall be conducted off-site and is the responsibility of the contractor.

3.10 Mulching

3.10.1 General:

A. The objective of mulching is to maintain no more than 3" (loose measurement) of organic material.

B. Mulch from the previous season shall be turned and up to 2" before new mulch is added.

C. All beds and tree mulch rings shall be edged and mulched with shredded hardwood mulch two (2) times per year (time of spring cleanup and following fall leaf removal or as directed by the COR).

D. Generally shade trees up to 10" in diameter at breast height (dbh) and flowering tree up to 6" dbh and/or tall shrubs will be maintained with a mulch ring.

3.10.2 Materials:

A. Mulch: Shall be a shredded hardwood mulch shall be derived from recycled wood products and yard waste, aged; dark brown to black in color; have a particle size less than 2 inches; be neutral Ph; and free of sticks, stones, clay or any other matter injurious to plant growth. **Note:** On occasion the Contractor will be directed to use mulch derived from the NPS recycling efforts. Such mulch will be maintained and stockpiled on NPS property and will be made available to the Contractor as necessary. When mulch is provided by the NPS the Contactor is responsible for loading, transport and placement. Use of NPS supplied mulch shall not be subject to additional compensation.

B. Edger: Shall be specifically designed for edging tree rings and/or shrub beds

3.10.3 Execution

A. Individual Tree Rings:

1. Using a Mechanical Tree Edger approved by the COR clearly define an edge not to exceed 2" in depth, 2 ½ feet from the trunk in all directions. Hand edging is permitted if approved by the COR.

2. All vegetation within the mulch ring shall be cut and sprayed with Roundup per Section 3.07 before mulch is applied.

3. Mulch shall be placed to uniformly cover the entire prepared area. The depth of mulch within 3-6" of the trunk/stem of a woody plant shall not exceed a loose measurement of ½".

4. No mulch shall be applied around the trunk and/or stem of any trees, shrubs or groundcovers.

B. Tree, Shrub, and Groundcover Beds:

1. All beds shall be edged and mulched with shredded hardwood mulch two as directed by the COR.

2. Using a Mechanical Tree Edger approved by the COR clearly define an edge not to exceed 4" in depth along all edges.

3. Mulch shall be placed to uniformly cover the entire prepared area to a loose measurement of 3". The depth of mulch within 3-6" of the trunk/stem of a woody plant shall not exceed a loose measurement of ½".

4. No mulch shall be applied around the trunk and/or stem of any trees, shrubs or groundcovers .

3.11 Tree/Shrub Fertilization:

A. All ornamental trees up to 6" caliper will be fertilized with 10-6-4 analysis fertilizers at the rate of 1 pound per inch of trunk caliper.

B. Shrubs, groundcover and perennial beds shall be fertilized with 10-6-4 analysis fertilizers at the rate of 4 pounds per 100 square feet of bed area once in the spring. Acid loving plant material shall be fertilized with an ericaceous fertilizer, i.e., Hollytone, at the manufacturer's recommended rate.

3.12 Insect/Disease Monitoring

A. The Contractor shall be responsible for monitoring and control of plant/turf damaging insects and diseases. The Contractor shall be aware of the potential pests and shall make regular inspections of the plant material and inform the NPS of existing or potential problems.

B Treatment will pesticides will be an additional cost per 2.02 Item L. All applications of pesticide will be made in accordance with Federal and State requirements under the supervision of a Certified Pesticide Applicator.

3.13 Seasonal Floral Displays

3.13.1 Scope

A. The contractor shall furnish, deliver, plant, and maintain the seasonal floral display beds throughout the growing season. Therefore, any items not specifically noted, but necessary to maintain the displays in a healthy aesthetically appealing condition in accordance with accepted practices and industry standards, shall be furnished under this section.

B. Specific beds to be maintained are as follows:

List each bed location, square footage, display rotation desired (ie: Summer annuals/tulips; summer annuals/Pansies; summer annuals/chrysanthemums tulips etc.), on-center spacings and total amounts of plants/bulbs to be installed in each bed.

3.13.2 Materials

A Summer Annuals

1. Annuals for spring shall be one of the following selected by the NPS no later than November 15 the previous year: French Marigolds, African Marigolds, Begonias, Ageratum, Petunias, Salvia, Impatiens, Dusty Miller, and Cannas.

2. Annuals shall be grown in 4" pots and shall be symmetrical, well branched, well placed in pots (ie: plant should be roughly twice the size of the pot) and uniform in size by variety, and free of insects and diseases.

B. Fall/Spring Pansies

1. Pansies for a fall or spring planting shall be selected by the NPS no later than May 1.

2. Plants for fall shall be grown in standard 1020 (11" x 21") flats with no more than 18 plants per flat (C/18 cell pack). Plants shall be exposed to outside temperatures for at least two (2) weeks prior to delivery.

3. Plants for spring shall be grown in 4" pots.

4. Plants will be delivered at a time specified by the COR.

5. Plants shall be exposed to outside temperatures for at least two (2) weeks prior to delivery.

C. Fall Chrysanthemums

1. Chrysanthemums for fall shall be selected by the NPS no later than April 15 of the previous spring.

2. Chrysanthemums shall be started as rooted cuttings. Rooted cuttings shall be potted in 8" x 5" Mum Pans by June 15. Cuttings shall be potted (one cutting per pot).

3. Chrysanthemums shall be properly spaced and pinched to allow for the development of mounded plants that are well branched and budded.

4. Chrysanthemeums shall have a minimum head size (width) of 15 inches at the time of delivery.

5. Plants shall be delivered from mid September to early October depending on the variety when the buds begin to show color.

D. Fall Bulbs

1. Bulbs for fall planting shall be selected by the NPS no later than June 15.

2. Bulbs sizes shall be as follow:
   Tulips: Bulbs shall be Topsize – 12cm and up.
   Muscari: Bulbs shall be 9 cm and up.
   Narcissus: RDII: 12-14 cm.

3. Bulbs shall be shipped in covered plastic trays that are securely covered and slotted or otherwise ventilated over the entire length, width, and bottom. All varieties shall be packed separately in quantities no greater than 600 bulbs per tray. Note: Bulbs in quantities of 200 or less may be packed I n bags and boxes that afford the plant material adequate ventilation.

4. Bulbs shall be delivered in the month of October.

E. Mulch: Shall be a fine pine mulch, dark brown in color; have a particle size less than ½" inche; and be free of sticks, stones, clay or any other matter injurious to plant growth.

3.13.3 Submitalls

A. Sources (Confirming orders) within 14 days of receiving an order shall be submitted. The order shall clearly identify the vendor, # of plants ordered and delivery dates. The National Park Service reserves the right to review the progress of growth and production at the growing site and conduct any testing or inspection it may deem necessary to assure that all plants are grown in accordance with the specifications stated herein.

B. Mulch - Source and a 5 pound sample within 14 days of receiving an order shall submitted.

3.13.4 Execution

A. Preperation for Planting

1. General: Prior to each planting (unless noted otherwise) the bed shall have all mulch and existing plant material removed. The bed shall then be fertilized per spec below, rototilled to a depth of 8" and graded. to a smoothness comparable to results obtained by hand raking. The final grade shall be blended with existing adjacent grades leaving the entire area drainable and free from abrupt changes in slope.

2. Summer Annuals

A. Prior to rototilling the bed shall be fertilized with a 10-6-4 analysis fertilizer at the rate of 40 pounds per 1,000 square feet of bed area.

B. After grading the bed shall be treated with a pre-emergent herbicide. The herbicide, formulation, and rates of application shall be submitted and approved by the COR before any application is performed.

3. Fall/Spring Pansies

A. Prior to rototilling the bed shall be fertilized with a 6-2-0 analysis fertilizer at the rate of 25 pounds per 1,000 square feet of bed area.

B. After grading the bed shall be treated with a pre-emergent herbicide. The herbicide, formulation, and rates of application shall be submitted and approved by the COR before any application is performed.

4. Fall Chrysanthemums

A. Floral Display Beds receiving Chrysanthemeums do not need to be rototilled or fertilized prior to planting. Instead the bed shall be hand raked and graded.

5. Fall Bulbs

A. Prior to rototilling the bed shall be fertilized with a Bulb Booster

with an analysis of 9-9-6 at a rate of 40 lbs of fertilizer per 1,000 square feet.

B. Protection: All beds shall be protected from pedestrian and vehicular traffic until the time of planting.

C. Planting

1. Summer Annuals/Chrysanthemums/Pansies

A. Floral display beds shall be planted in the following time frames unless directed otherwise by the COR.

1. Summer Annuals: between May 15 and June 1
2. Fall Chrysanthemums: between between September 15 and October 15 (depending on bloom date of variety selected)
3. Fall Pansies: Fall: Between October 15 and November 1
4. Spring Pansies: Between March 1 and March 30

B. After grading, plant beds shall be marked for the specified on center on center spacings for the type of plant selected. Generally the on center spacings will be as follows unless directed otherwise by the COR:

8" on center spacings for:
Fall Pansies

10" on center spacings for:
Begonias, French Marigolds, Petunias, Impatiens, Dusty Miller, Spring Pansies

12" on center spacings for:
African Marigolds, Salvia

18" on center spacings for:
Cannas, Chrysanthemums

C.. Plants shall then be set on the marks and planted. When transplanting the plants from the containers to the display bed, gently knock the plant from the pot, place in the hole, and making sure that the top of the root ball is even with the soil level in the bed. Then cover the root ball with a thin layer of soil and gently tamp down on alls sides.

D. Upon completion of planting the beds shall be mulched to a loose

measurement of 1 inch.

2. Fall Bulbs

A. Floral display beds shall be planted with Bulbs between November 1 and December 1, unless directed otherwise by the COR.

B. After grading, plant beds shall be marked for the center on spacings. The on center spacings shall be as follows:

4" on center for Grape Hyacinth
8" on center for Tulips, Daffodils, and Hyacinth

C. Bulbs shall then be set on the marks and planted using a bulb planter to the following depths:

Grape Hyacinth: plant to a depth of 4-5"
Tulips and Daffodils: Plant to a depth of 7-8 "

D. Bulbs shall be placed in the hole with the pointed end up and then covered with soil and hand tamped.

E. Upon completion of planting the beds shall be mulched to a loose measurement of 1 inch.

D. Maintenance After Planting

1. Watering

A. The NPS will provide a water source within reasonable distance from the plants to be monitored and watered.

B. To supplement rainfall as measured at Reagan National Airport, all seasonal floral displays shall be monitored throughout the growing season. Plants shall be maintained in "Average Moist" soil to a depth of 10 inches as measured utilizing a calibrated Lincoln Soil Moisture Meter or an approved equal. This generally means watering a minimum of two (2) times per week during the growing season.

C. All plants be properly watered during all the entire season as necessary to maintain healthy growth. During the dry summer months watering will be required a minimum of two (2) times per week, depending on rainfall. Over-watering shall be avoided.

D. Plants are to be watered prior to 10:00 am using portable sprinklers or hand held hoses with water breakers.

E. All irrigation equipment and hoses shall be in proper working condition and free of leaks.

2. Weed Control: Flower beds shall be kept free of weeds at all times. The method of control shall be hand weeding. If the COR approves the use of a herbicide in leau of hand weeding this shall be at no additional cost to the NPS.

3. Supplemental Fertilization

A. During mid June, July, and August when directed by the COR the floral bed shall be fertilized with Peters General Purpose 20-10-20 fertilizer or an approved equal.

B. The rate of application shall be 473 parts per million of nitrogen applied using a Hozon proportioner (1:15) with fertilizer mixed at a rate of 4.8 ounces in one gallon as the concentrate. If the fertilizer is to be applied without a proportioner (ie: water truck or spray tank), the mixing rate shall be 1 pound of fertilizer in 50 gallons of water.

C. Fertilizer shall be watered in thoroughly using a hose with a water breaker.

4. **Dead-Heading: Summer annuals shall be routinely dead-headed to remove faded or spent blooms to promote better flowers and extend the blooming season.**

E. Replanting

1. Plants that have declined and/or died shall be replaced by the contractor at no additional cost to the NPS.

Part 4: MISCELLANEOUS GROUNDS MAINTENANCE ACTIVITIES

4.01 Additional Mulching

4.01.1 General:

A. All additional requests for mulching shall be in accordance with Section 3.09

B. Additonal areas/trees to be mulched shall be identified by the COR.

4.02 **SOIL AMENDMENT**

4.02.1 Materials

A. Imported Topsoil:

1. Shall be a screened, natural, surface soil, in a friable condition and contain less than 3 percent subsoil. The topsoil shall be free of hardpan material, stones and clods larger than 1/2 inch in diameter, sticks, tree or shrub roots, debris, toxic substances (i.e.. residual herbicides) and other material detrimental to plant growth. The area and the topsoil shall be free of plant or plant parts of undesirable plants such as, but not limited to, bermudagrass, nut sedge, mugwort, johnson grass, quack grass, Canada thistle or noxious weeds as set forth in the Federal Seed Act.

2. Contractor shall notify NPS of location of all sources of the topsoil and furnish the NPS a certified report from the agricultural experiment station or approved agricultural laboratory of an analysis performed not more than 60 days prior to the date of submission. The topsoil shall be certified to meet the following requirements:

   A. Shall be a natural, original surface soil of a **sandy loam** texture with a mechanical analysis of 60-65% sand, 15-25% silt and 10-15% clay.

   B. Shall have at least 2%, but not more than 5%, organic matter.

   C. Soil pH shall 5.5 to pH 6.5 inclusive unless otherwise specified.

   D. Soil salinity by electrical conductivity measurement shall not exceed 600 parts per million (ppm) as determined by Black, Editor "Method of Soil Analysis", Part 2, published by the American Society of Agronomy, 1965.

   E. The soil nutrient level shall be between 70-265 lbs./acre of magnesium, 65-205 lbs./acre of phosphorous (P2O5), and 85-320 lbs./acre of potassium (K2O).

3. Agricultural limestone at not more than 5 pounds per cubic yard of topsoil may be used to adjust an acidic condition and shall be thoroughly mixed by volume.

4. Topsoil which has been synthesized by blending materials which individually do not meet the requirements of this specification will not be accepted even though the resulting blend meets the organic matter, mechanical analysis, Ph and soluble salts requirements.

5. Topsoil shall be approved by the NPS before mixing. The NPS reserves the right to inspect and sample all topsoil before mixing. These inspections will be made without cost to the Contractor.

6. Topsoil shall not be delivered or handled in a frozen or muddy condition.

B. Compost: Shall be made from yard trimmings such as leaves, grass clippings and prunings that have been properly composted and sieved through a 3/8"screen such as screened leaf mold (Leafgro)as available through Maryland Environmental Services, 2011 Commerce Park Drive, Annapolis, MD 21401, (301/261-8596), or approved equal, completely composted and free from all materials such as glass, paper, plastics, and shall meet the following specifications:

1.	pH	7.3-7.8
2.	Soluble Salts	4.3-9.9 mmhos/cm
3.	Nitrogen	1.5-2.7%
4.	Phosphorous	.2-.5%
5.	Potassium	.10-2%
6.	Water holding Capacity	110-140%
7.	Bulk Density	1,100-1,200 lbs./cu. yd.
8.	Moisture content	50-70%
9.	Organic Matter	38-46%
10.	Particle Size	100% passage through 3/8" meshA.

C. Lightweight Aggregate: Shall be a 3/8" to No 8(5/16") rotary kiln structural grade Lightweight Aggregate as manufactured by Carolina Stalite Company, Drawer 1037, Salisbury, N.C. 28145-1037 (704-637-1515 or an approved equal. Aggregate shall be derived from expanded shale or slate, be free of by-product slags or cinders and meet all the requirements of the American Society of Testing Materials ASTM-C300, and meet the following physical and chemical properties:

1. Gradation: Shall meet the following gradation requirements:

Sieve Size	% Passing
1/2"	100
3/8"	80-100
No.4	5-40
No.8	0-20
No.16	0-10

2. Density: Shall have a compacted moist density of less than 62.4 pounds per cubic foot (1000 kg/cubic meter) when measured by a point test conducted in accordance with ASTM D-698 "The Standard Test method for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures using 5.5 lb. Hammer and 12 inch Drop" (AASHTO T-99).

3. Bulk Loose Unit Weight: Shall be 45-60 pounds per cubic foot (70-1120 kg/cubic meter).

4. Toughness: The maximum Los Angels Abrasion loss when tested in accordance with ASTM C-131 (B grading) shall be 50%.

5. Physical Stability: Shall have an angle of internal friction greater than 40 when measured in a triaxial compression test on a laboratory sample with a minimum diameter of 10 inches.

6. Chemical Stability: Shall be totally inert, insensitive to moisture, with all organic materials burned out at 1090 degrees centigrade during the expansion process.

7. Corrosiveness: Shall be non-corrosive with less than 100-ppm chloride when measured by FHWA-RD-77.

8. Free Draining: Shall have a coefficient of permeability greater than 1 cm/sec.

4.02.2 Submittals:

A. The contractor shall submit a sample of the topsoil/compost/aggregate that identifies the vendor and documentation and certification of composition and analysis. The sample shall be deemed representative of the material that is intended to be supplied on any resultant order.

4.02.3 Execution

A. Soil amendments shall be evenly placed over the entire area as directed by the COR.

B. When soil amendments are added, the following shall apply:

1. Soil amendments shall not be placed when either the sub-grade or the topsoil is wet or frozen enough to cause clodding.

2. Soil amendments shall be applied to fill depressions and/or blend final grades to the compaction depth. The contractor shall take appropriate precautions to provide firmness of the soil without compaction to avoid differential settlement after final.

3. Compaction shall be performed with an approved lawn roller weighing from 150-200 lbs. per foot. Rolling shall not be performed when moisture due to precipitation causes such rolling to be detrimental to the areas to be seeded.

4. Placement of soil amendments shall be deemed complete when the finished grade of the compacted surface is free from stones ticks or other material and be smooth and true to the specified grade.

5. The contractor shall receive approval from the COR of grade surface for all topsoiling before commencing with turf grass establishment procedures.

4.03 SOIL PREPARATION (Rototilling)/GRADE FINISHING

4.03.1 Materials and Equipment

A. Rototiller: Shall be a walk behind or tractor mounted rotary capable of rototilling the soil to a depth of 8" tiller such as a John Deer 66 or an approved equal.

B. Grader: Shall be a York Rake or a T-6 Harley Box Rake capable of creating a grade finish surface comparable to the results obtained by hand raking.

C. Tractor: Shall be a medium sized (minimum power take off of 40 horse power), hydraulically equipped tractor with turf tires to prevent compaction.

4.03.2 Execution

A. Rototilling:

1. Rototilling shall only be performed when the soil moisture is such that the structure of the soil will not be significantly impacted as determined by the COR.

2. Rototill all areas to a depth of 8" so that the furrow is thoroughly mixed from top-to-bottom.

B. Grading: Grade finish surface of the sod bed to the specified grade to a smoothness comparable to results obtained by hand raking, leaving it clean and free of stones, debris, and depressions. The final grade shall be blended with existing adjacent grades leaving the entire area drainable and free from abrupt changes in slope.

C. Protection: All areas shall be protected from pedestrian and vehicular traffic until the time of seeding/sodding.

4.04 AERATION

4.04.1 Materials and Equipment

A. Rolling Tine Aerator: Shall be a heavy duty, ground driven, rolling tined

aerator/cultivator capable of soil displacement to a depth of 8-12" such as a Taylor-Way Aerator, or an approved equal (i.e.: 9" solid tines mounted on adjustable axles that can be angled to increase soil displacement). The aerator shall be weighted with 2,000 lbs. of added weights on the frame.

B. Shatter: Shall be shatter aerator capable of extensively fracturing the soil to a depth of 3" at a density of 6 holes per square foot such as a AERA-vator Model AE-60 or Model AE-80, or an approved equal.

C. Core Aerator: Shall be a heavy duty tubular steel aerator with ¾" coring tines/spoons capable of soil coring to a depth of 6 (-8) inches such as a Toro Turf Aerator 686 or 687 or an approved equal.

D. Tractor(s): Shall be a medium sized (minimum power take off of 40 horse power), hydraulically equipped tractor with turf tires to preclude compaction.

E. Walk behind aerators capable of achieving the same results described above shall be submitted for approval in areas that are not accessible to tractor mounted aerators.

4.04.2 Execution

A.. Rolling Tine aerification

1. Shall only be performed when the soil is slightly moist to relatively dry as determined by the COR (i.e.: below field capacity but soft enough to permit penetration). Under no circumstances shall rolling tine aeration be conducted when the soil is at or above field capacity.

2. The axles shall be angled 0-10 degrees as determined by the COR to increase soil displacement.

B. Shatter aerification

1. Shall only be performed when the soil is relatively dry as determined by the COR (i.e.: below field capacity and dry enough to allow fracturing of the soil). Under no circumstances shall shatter aeration be conducted when the soil is at or above field capacity.

2. The tractor PTO and ground speeds shall be determined by the COR to control tine aggressiveness and ensure that the turf root zone is thoroughly pulverized.

C. Core aerification

1. Shall only be performed when the soil is moist as determined by the COR (i.e.: soft enough to permit deep penetration). Under no circumstances shall

aeration be conducted when the soil is above field capacity).

D. All areas shall be aerated **a minimum of two times** with the second aeration at a 90 degree angle to the first. Note: Each acre unit price requires 2 passes. If additional passes are required as determined by the COR, each pass will be paid at 1/2 the acre unit price.

4.05 SEEDING

4.05.1 Materials and Equipment

A. Seed - Lawn and Sports/Recreational Areas:

1. All varieties or cultivars shall be on the current Maryland Department of Agriculture Agronomy Mimeo 77 or the current Virginia Turfgrass Variety Recommendation List as published by Virginia Polytechnic Institute and State University.

2. All seed shall have: a minimum purity of 98%, and a minimum germination of 85% and be certified free of *Poa trivialis*, timothy, bentgrass, Canada bluegrass, tall fescue, dock, cheat, chess, chickweed, plantain, crabgrass, Bermuda-grass and black medic. Fluorescence for perennial ryegrass shall not exceed three (3) percent.

3. Certification for each seed type shall be conducted by an approved testing laboratory prior to the mixing of seed. The results of the seed certification shall be submitted to the COR for approval prior to delivery of seed to the site.

4. Seed shall be delivered in original containers showing analysis of seed mixture, percentage of pure seed, year of production, net weight, date of packaging and location of packaging. Damaged packages are not acceptable.

5. Seed shall be stored in a manner to prevent wetting and deterioration in rodent proof containers by the until placement in the seeder. Seed which has become wet, moldy, or otherwise damaged in transit or storage will not be accepted.

6. Seed shall be one of the following mixes as determined by the COR:

A. Turf Type Tall Fescue Mixture: Shall be a 90% certified mixture of certified Turf-type Tall Fescue (*Festuca arundinacea*) consisting of 3 varieties of which no variety exceeds 40% or is less than 20%, and 10% Kentucky Bluegrass (*Poa pratensis*).

Recommended Seeding Dates: 4/1-5/15, 9/1-11/1

B. Bermuda Grass Blend: Shall be a certified blend of 3 hybrid Bermuda grasses (*Cynodon dactylon*) of which no variety exceeds 40% or is less than 20%.

Recommended Seeding Dates: 3/15-8/15

C. Perennial Ryegrass Blend: Shall be a certified blend of certified Perennial Ryegrass (*Lolium perenne*) consisting of 3 varieties of which no one variety should exceeds 40% or is less than 20%.

Recommended Seeding Dates: 4/1-12/15

D. Perennial Ryegrass Kentucky Bluegrass Mixture: Shall be a certified mixture containing 60% Kentucky Bluegrass (*Poa pratensis*) consisting of three varieties in which no one variety exceeds 25%. and 40% Perennial Ryegrass (*Lolium perenne*) consisting of two varieties of which no one variety should exceeds 25%.

Recommended Seeding Dates: 4/1-4/30, 8/16-10/15

C. Seeders

1. Power Seeder: Shall be a Slit-Seeder and/or Seeder/Thatcher/Aerator capable of calibrating and dispensing grass seed mixtures at controlled depths through existing or dead vegetation to ensure good soil seed contact such as a Truax, or Befco seeder or an approved equal (i.e.: slices through existing or dead vegetation with minimal damage, seed boxes with fluted or agitating dispensers for precise metering of seed, and tickler tines and/or rollers that covers/presses seed to ensure good seed soil contact. Note: If approved by the COR, the AERA-vator equipped with seeder, roller, rake and brush attachments can be used as a power seeder provided the same soil seed contact and soil end result can be achieved. Drop box, centrifugal force (spinners), and hydro seeders are not acceptable substitutes for a power seeder.

2. Broadcast Seeder: Shall be a tractor mounted, 3 point hitch single disc spinner spreader with a minimum spread width of 10 ft. and capable of being calibrated to dispense seed and/or fertilizer at controlled rates such as a Lely H/l1250/L1500/L2010, Lesco, ScottsR8A or an approved equal.

D. Tractor(s): Shall be a medium sized (minimum power take off of 40 horse power), hydraulically equipped tractor with turf tires to preclude compaction.

4.05.2 Submittals

The Contractor shall submit make and model # of all equipment and the seed vendor's certification of grass seed mixture, indicating percentages of weight, purity and germination for each grass species. All equipment and seed shall be approved by the COR before any seeding is conducted.

4.05.3 Execution

A. General

1. No seeding shall take place during drought, high winds, when ground is frozen, temperatures lower than 32 degrees Fahrenheit, excessive moisture or other conditions as determined by the COR which are likely to damage the seed.

B. Power Slit-Seeding

1. Calibration: Prior to seeding each seed box shall be calibrated to control the seed mixing and ensure seeding at **1/2 of the seeding rate at a controlled depth**. Calibration rates and controlled depths shall be approved by the COR before seeding. Seed shall be sown at the following rates unless indicated otherwise by the designated park representative:

A.	Turf Type Tall Fescue Blend:	300lbs/acre
B.	Bermuda Grass Blend:	200lbs/acre
C.	Perennial Ryegrass Blend:	300lbs/acre
D.	Perennial Ryegrass Kentucky Bluegrass Mixture	200lbs/acre

2. Seeding: Drill seed the entire area. Upon completion seed the remaining 1/2 of seed shall be seeded at a 90 degree angle to the first seeding.

3. Areas not accessible to a drill seeder (adjacent to paved surfaces) shall be sown by hand and scarified using a hand rake to ensure good soil/seed contact.

C. Broadcast Seeding

1. Calibration: Before seeding the spreader shall be calibrated during a calibration and characterization trial to apply the seed at the specified rate. Setting shall be approved by the COR before seeding. All seeding shall be in accordance with the settings and established during this trial.

2. Seeding: Seed shall be evenly spread over the target areas so that bands do not overlap.

3. Seed applied to non target areas (i.e.: paved walks and roadways) shall be blown into adjacent grass areas.

4.06 **SODDING**

4.06.1 Materials and Equipment

A. Sod: Shall be one of the following as determined by the COR.

1. Certified Turf Type Tall Fescue Sod: Shall be grown from a 90% mixture of one or more varieties of tall fescue seed, and 10% Kentucky bluegrass seed.

2. Certified Bermudagrass Sod: Shall be grown from 100% Bermudagrass.

3. Certified Kentucky Bluegrass Sod: Shall be grown from a 85%-100% mixture of three or more cultivars of Kentucky Bluegrass and 0-15% perennial ryegrass.

B. Sod shall meet the certification requirements published by the extension services of the University of Maryland or Virginia Polytechnic Institute and State University.

C. Each load of "Certified Sod" or "Certified Turf" shall be accompanied by, in the same vehicle, an official certification label and that label shall be attached to a dated invoice, bill of lading or labeling information document.

D. Sod shall be harvested and delivered within a period of 24 hours and kept moist until placement.

D. Sod shall be machine cut at uniform soil thickness of 3/4 inch, +/- 1/4 inch, excluding top growth and thatch. Individual pieces shall be at least 12 inches wide and of length such that each piece is at least 1/2 square yard. Maximum allowable deviation from standard width is 5 percent.

E. Each piece of sod must be strong enough to support its own weight and retain its size and shape when suspended vertically from a firm grasp on the upper 10 percent of the piece.

F. Broken pieces and torn or uneven ends will not be accepted.

4.06.2 Submittals

Source(s) of sod shall be submitted to the COR within 7 days after receiving a delivery order.

4.06.3 Execution

A. Laying the Sod

1. Sod shall not be layed until the prepared sod bed has been approved by Contracting Officer.

2. Sod shall be layed within 12 hours after delivery to prevent deterioration.

3. Sod shall not be layed during freezing weather, when the sod or ground is frozen, or when the sodding areas are too wet or too dry.

4. Sod shall be placed by hand with close joints and not overlapping. Plug all gaps between sections of sod and openings at angles with pieces of sod cut to fit.

5. Sod shall be installed smooth and flush with adjoining paving and transition smoothly to existing grass areas.

6. Sod shall be thoroughly watered immediately after installation to a depth of 4 inches.

7. After sod and soil have dried sufficiently to prevent damage, sod shall be rolled to ensure good bondage between sod and soil and remove minor depressions and irregularities.

8. Sod shall be taken up and relayed if sod workmanship is not satisfactory, as directed by the COR.

4.07 FERTILIZATION

4.07.1 Materials and Equipment

A. Fertilizers:

1. Shall be blended from standard commercial products and shall conform to all State and Federal laws.

2. Shall be granulated in accordance with Term T-16, Association of American Plant Food Control Officials. Specifically:

T-16. Granular Fertilizer - One in which 95 percent or more of the product is retained on a series of sieves within the range of U.S. No. 4 (4.75 mm opening) to and including U.S. No. 20 (0.850 mm opening), and in which the largest particle passes through a sieve having an opening not larger than four (4) times that of the sieve which retains 95 percent or more of the product.

3. Shall be delivered in unopened waterproof bags showing weight, chemical analysis and name of manufacturer. Bulk fertilizer may be approved by the Contracting Officer provided the same information is included on the bill of lading.

4. Shall be stored in a manner to prevent wetting and deterioration.

5. Shall be chemical inorganic and organic fertilizers as follows:

   A. Chemical Inorganic Fertilizers:

      1. Starter Fertilizer: Shall have an analysis of 10-20-10, and shall be blended from: urea, ammoniacal, and water insoluble nitrogen; diamonium phosphate; and sulfate of potash. If the contractor requests, and the COR approves, a fertilizer with an analysis other than the analysis stated above, the contractor shall be responsible for applying the fertilizer so that not less than 45 pounds of nitrogen per acre per application at no additional cost to the government

      2. Established Turf Fertilizer: Shall have an analysis of 18-2-18, and shall be blended from: urea, ammoniacal, and water insoluble nitrogen; diamonim phosphate; and sulfate of potash. Note: Of the 18% total nitrogen, a minimum of 40% shall be polymer coated (slowly available) nitrogen. If the contractor requests, and the COR approves, a fertilizer with an analysis other than the analysis stated above, the contractor shall be responsible for applying the fertilizer so that not less than 45 pounds of nitrogen per acre per application at no additional cost to the government.

   B. Organic Fertilizers:

      1. Derived From Sewage Sludge: Shall have an analysis of 6-2-0 and be derived from activated sewage sludge with a minimum of 90% of the total nitrogen as water insoluble nitrogen (WIN) such Milorganite, developed by the Milwaukee Metropolitan Sewage District, 260 West Seeboth Street, Milwaukee, Wisconsin (414-221-6810) or an approved equal.

      2. Derived From Chicken Litter: Shall have an analysis of 4-3-3 and be derived from chicken litter with a minimum of 75% of the total nitrogen as water insoluble nitrogen (WIN)

such as Fertile-Gro developed by Maryland Environmental Service, 2011 Commerce Park Drive, Annapolis, Maryland 21401 (1-888-214-8687).

C. Granular Fertilizer Spreader: Shall be a tractor mounted single disc spreader with a minimum spread width of 10 ft. and capable of being calibrated to dispense fertilizer, pelletized compost, and lime at controlled rates such as a Lely H/l1250/L1500/L2010, Lesco, ScottsR8A or an approved equal.

D. Tractor: Shall be a medium sized (minimum power take off of 40 horse power), hydraulically equipped tractor with turf tires to preclude compaction.

4.07.2 Submittals:

The Contractor shall submit vendors, documentation and certification of chemical composition and analysis for all fertilizers requested on each delivery order. All equipment and fertilizer shall be approved by the COR before any fertilization is conducted.

4.07.3 Execution

A. General: No application of fertilizer/compost shall be performed when, in the opinion of the Contracting Officer, the soil or grass is so wet that application will be detrimental.

B. Calibration: Before application begins the spreader shall be calibrated during a calibration and characterization trial to apply fertilizer/compost at the specified rates. Setting shall be approved by the COR before application. All applications shall be in accordance with the settings and established during this trial.

C. Application: Fertilizer Compost shall be applied at the following rates. Note: If the COR approves a fertilizer with a slightly different analysis than that which is specified, the rate shall be adjusted to equal the pounds of Nitrogen/acre specified at no additional cost to the government.

1. 10-20-10 (Starter Fertilizer): Apply at a rate of 400 lbs./acre (40 lbs. of Nitrogen per acre).

2. 18-2-18: Apply at a rate of 250 lbs./acre (45 lbs. of Nitrogen/acre).

3. 6-2-0 (Milorganite): Apply at rate of 750 lbs./acre (45 lbs. of Nitrogen/acre).

4. 4-3-3 (Fertile-Gro): Apply at a rate of 1000 lbs./acre (40 lbs. of Nitrogen/acre).

D. Fertilizer shall be evenly spread over the target areas so that bands do not overlap.

E. Fertilizer applied to non target areas (i.e.: paved walks and roadways) shall be blown into adjacent grass areas.

F. **When 2 fertilizer applications are requested under a single delivery order, there shall be a minimum of 8 weeks between applications.**

4.08 LIMING

4.08.1 Materials and Equipment

A. Pelletized Limestone

1. Shall be pulverized dolomitic limestone that has been formed into pellets with a water soluble binder containing at least 85% of total calcium and magnesium carbonates.

2. Shall be delivered in unopened waterproof bags showing weight, composition, texture, and name of manufacturer. Bulk lime may be approved by the Contracting Officer provided the same information is included on the bill of lading. Store in a manner to prevent wetting and deterioration.

3. **Pulverized burnt or hydrated lime shall not be used**.

B. Tractor(s): Shall be a medium sized (minimum power take off of 40 horse power), hydraulically equipped tractor with turf tires to preclude compaction.

C. Spreader: Shall be a tractor mounted, 3 point hitch single disc spinner spreader with a minimum spread width of 10 ft. and capable of being calibrated to dispense seed and/or fertilizer at controlled rates such as a Lely H/l1250/L1500/L2010, Lesco, ScottsR8A or an approved equal.

4.08.2 Submittals: Vendor, documentation and certification of chemical composition and analysis.

4.08.3 Execution

A. No application of Lime shall be performed when, in the opinion of the Contracting Officer, the soil or grass is so wet that application will be detrimental.

B. Calibration: Before application begins the spreader shall be calibrated during a calibration and characterization trial to apply lime at **a rate of 1 ton (2,000 lbs.)/acre.** Setting shall be approved by the COR before application. All applications shall be in accordance with this setting. Lime shall not be applied at a rate greater than 1 ton/acre unless directed otherwise by the COR.

C. Application: Lime shall be evenly spread over the target areas so that bands do not overlap.

D. Lime applied to non-target areas (i.e.: paved walks and roadways) shall be blown into adjacent grass areas.

4.09 THATCHING

4.09.1 Materials and Equipment

A. Thatcher: Shall be a thatcher sweeper capable of loosening and removing by vacuum thatch and/or dead vegetation such as an Olathe Model 54 L or an approved equal.

4.09.2 Execution: Run the thatcher sweeper over all areas one time to remove all lose thatch and/or dead vegetation

4.10 NON-SELECTIVE HERBICIDE APPLICATION - TURF AREAS

4.10.1 Materials and Equipment

A. Herbicides: Shall be Roundup (Isopropylamine salt of Glyphosate), EPA Registration Number 524-308-AA or an approved equal.

B. Marker Dye/Colorant: Shall be Blazon or an approved equal.

C. Water: Shall be potable.

D Sprayers

1. Low Volume Hand Held/Backpack Sprayers: Shall be plastic, leak proof, equipped with proper nozzles and covers and free of rust, residues, and particulate matter such as grit and sand.

2. High Volume Boom Sprayers:

A. Shall be corrosion resistant. Galvanized (zinc coated) spray equipment shall not be used.

B. Shall be thoroughly cleaned and free of rust, residues, and particulate matter such as grit and sand.

C. Shall be equipped with properly fitting covers or hatch plates and a hand valve at the bottom of the tank for shut off in the event of a hose leak.

D. Shall be equipped with standard hoses and nozzles of the type most commonly used in applications of herbicides to plant surfaces.

E. Shall not have mechanical agitators and all bypass lines shall terminate at the bottom of the tank.

E. Tractor(s): Shall be a medium sized (minimum power take off of 40-horse power), hydraulically equipped tractor with turf tires to preclude compaction.

4.08.2 Submittals: The following shall be submitted within 5 working days after receiving a delivery order.

A. Herbicides: Product label(s) and mixing and application rates.

B. Posting Signage: 1 sample of each sign specified for use.

4.10.3 Execution

A. General:

1. All herbicide applications shall take place between August 15 – September 30 unless directed otherwise by the COR.

2. All herbicide applications shall be approved by the COR and shall be under the direct supervision of a Certified Pesticide Applicator licensed to spray within the states of Virginia and Maryland and the District of Columbia. The Certified Pesticide Applicator must possess verifiable certification, experience and technical competence in applying herbicides to turf areas. The Certified Pesticide Applicator shall be the primary contact with the COR responsible for controlling the quality of work, inspecting all completed work to ensure that contract performance requirements are met, and maintaining the pesticide use log.

3. All workers handling or applying herbicides shall, be registered as pesticide applicators and, through related training and on the job experience, be familiar with the safety and technical aspects of applying herbicides and equipment used in such operations.

4. A pre-herbicide application conference will be held prior to mixing or transporting any herbicides to the designated sites. The time, date, and location shall be agreeable to personnel of the Contractor and the Park Service who are responsible for the contractual requirements of both parties. Topics for discussion, but not limited to, will be scheduling and areas to be treated, handling, mixing, application of herbicides, sprayer capabilities (i.e.: pressure and nozzle types) and , safety etc. Participation at this conference is mandatory prior to beginning any applications of herbicide. After the conference the contractor shall notify the COR 48 hours prior to beginning

any work.

5. The contractor shall be responsible for the calibration during calibration and characterization trials at a mutually agreed upon time and place before spraying begins. All applications shall be in accordance with the pressures and flow rates established during these trials.

6. The contractor shall be responsible for procurement, handling, storage, and safeguarding of herbicides from the time of delivery through completion of applications. All operations will conform to manufacture's pesticide label instructions and the appropriate state requirements for storage, transportation, and application of insecticides.

7. Herbicide Spill Plan: The contractor shall develop and submit a Herbicide spill plan to the National Park Service for approval before any herbicides are transported to a site.

8. Tanks shall be inspected by the COR and/or Designated Park Representative before filling with water or herbicide.

9. All hoses for filling shall be equipped with anti-siphon valves to prevent back siphoning into water source.

10. An approved dye shall be added so that sprayed areas can easily be delineated. Dye and rate shall be approved by the COR. **Do not add additional surfactant or mix with any materials other than water, dye and/or specified fertilizer**.

11. All herbicide applications shall be conducted under favorable weather as determined by the COR.

12. No applications shall be conducted when the winds are gusty or in excess of 10 miles per hour or when other conditions, including lesser wind velocities, will allow drift to occur. Avoid combinations of pressure and nozzle type that will result in fine particles (mist) which are more likely to drift.

13. Spray valves shall be open only while sprayer is over target. The spray valve shall be closed at the end of each pass and for turning, loading, and site to site movement.

14. All applications shall be properly directed to avoid drift and contact with non-target adjacent turf areas or desirable plants.

15. During spray applications it may be necessary to flush the spray system with water when the operation is delayed because of inclement weather or other factors. All flush water shall sprayed on a treatment site identified by the

COR at the contractor's expense.

16. The contractor shall provide all routine maintenance to the spray system(s) at times that will not interfere with he scheduled spraying. Only emergency repairs are to be performed during scheduled spray hours.

17. Upon completion of herbicide application, post all treated areas at 30 foot intervals with signs at least 4x5" and printed in easy to read lettering. The sign shall include the phrase "Keep Off" with appropriate symbol. It must also include a phrase "Pesticide Application", "Herbicide Application" or similar statement and include the date and time of application. The National Park Service will be responsible for removing the signs.

B. Spot Treatments (Hand Held or Backpack Sprayers):

1. Mixing: Fill the spray tank with 1/2 the required amount of water. Mix Roundup at a rate of 2-2.5 ounces (4-5 tablespoons) per gallon. After adding Roundup mix well before adding the remaining portion of water. When filling place the hose below the surface of the solution to prevent excessive foaming.

2. Application: Apply herbicide to weed foliage so that the coverage is uniform and complete. **Do not spray weed foliage to the point of runoff**.

C. Broadcast Treatments (High Volume Sprayers):

1. Calibration: Sprayer shall be calibrated to apply 40 gallons of spray per acre at 40 psi at tank gauge (boom nozzle pressure should approximately 38 psi during operation and approximately 42 psi in shut off mode).

2. Mixing: Fill the spray tank with 1/2 the required amount of water. Mix Roundup at a rate of 2-2.5 gallons (8-10 quarts) in 100 gallons of water (2-2.5%). After adding Roundup mix well before adding the remaining portion of water. When filling place the hose below the surface of the solution to prevent excessive foaming.

3. Application: Apply herbicide to specified areas at the calibrated rate (40 gallons/acre) so that the coverage is uniform and complete.

D. Two (2) weeks after application a second herbicide application shall be applied to target any vegetation that was that was not killed during the first application. The second application shall be a spot or broadcast treatment as determined by the COR.

4.11 SELECTIVE (BROADLEAF) HERBICIDE APPLICATION – TURF AREAS

4.11.1 Materials and Equipment

A. Herbicides:

Shall be a liquid post emergent herbicide containing Dicamba (benzoic acid), MCPA (2-methyl-4-chlorophenoxyacetic acid), and MCPP (2-(4 chloro-2-methylphenoxy) propionic acid) such as Trimec 959 or an approved equal. Note: Formulations containing 2, 4-D are prohibited.

B. Marker Dye/Colorant: Shall be Blazon or an approved equal.

C. Water: Shall be potable.

D Sprayers

1. Low Volume Hand Held/Backpack Sprayers: Shall be plastic, leak proof, equipped with proper nozzles and covers and free of rust, residues, and particulate matter such as grit and sand.

2. High Volume Boom Sprayers:

A. Shall be corrosion resistant. Galvanized (zinc coated) spray equipment shall not be used.

B. Shall be thoroughly cleaned and free of rust, residues, and particulate matter such as grit and sand.

C. Shall be equipped with properly fitting covers or hatch plates and a hand valve at the bottom of the tank for shut off in the event of a hose leak.

D. Shall be equipped with standard hoses and nozzles of the type most commonly used in applications of herbicides to plant surfaces.

E. Shall not have mechanical agitators and all bypass lines shall terminate at the bottom of the tank.

3. Tractor(s): Shall be a medium sized (minimum power take off of 40-horse power), hydraulically equipped tractor with turf tires to preclude compaction.

4.11.2 Submittals: The following shall be submitted within 5 working days after receiving a delivery order.

A. Herbicides: Product label(s) and mixing and application rates.

B. Posting Signage: 1 sample of each sign specified for use.

4.11.3 Execution

A. General:

1. All herbicide applications shall take place between August 15 – September 30 unless directed otherwise by the COR.

2. All herbicide applications shall be under the direct supervision of a Certified Pesticide Applicator licensed to spray within the states of Virginia and Maryland and the District of Columbia who posses verifiable experience and technical competence in applying herbicides to vegetated areas. The Certified Pesticide Applicator shall have verifiable work experience as a full time direct supervisor of herbicide application work crews and **must be present on the job site at all times work is being performed or pesticides are being handled**. The Certified Pesticide Applicator shall be the primary contact with the COR responsible for controlling the quality of work and inspecting all completed work to ensure that contract performance requirements are met.

3. All workers handling or applying herbicides shall, be registered as pesticide applicators and, through related training and on the job experience, be familiar with the safety and technical aspects of applying herbicides and equipment used in such operations.

4. A pre-herbicide application conference will be held prior to mixing or transporting any herbicides to the designated sites. The time, date, and location shall be agreeable to personnel of the Contractor and the Park Service who are responsible for the contractual requirements of both parties. Topics for discussion, but not limited to, will be scheduling and areas to be treated, handling, mixing, application of herbicides, sprayer capabilities (i.e.: pressure and nozzle types) and , safety etc. Participation at this conference is mandatory prior to beginning any applications of herbicide. After the conference the contractor shall notify the COR 48 hours prior to beginning any work.

5. The contractor shall be responsible for the calibration during calibration and characterization trials at a mutually agreed upon time and place before spraying begins. All applications shall be in accordance with the pressures and flow rates established during these trials.

6. The contractor shall be responsible for procurement, handling, storage, and safeguarding of herbicides from the time of delivery through completion of applications. All operations will conform to manufacture's pesticide label

instructions and the appropriate state requirements for storage, transportation, and application of insecticides.

7. Herbicide Spill Plan: The contractor shall develop and submit a Herbicide spill plan to the Park Service for approval before any herbicides are delivered.

8. Tanks shall be inspected by the COR and/or Designated Park Representative before filling with water or herbicide.

9. All hoses for filling shall be equipped with anti-siphon valves to prevent back siphoning into water source.

10. An approved dye shall be added so that sprayed areas can easily be delineated. Dye and rate shall be approved by the COR. **Do not add additional surfactant or mix with any materials other than water, dye and/or specified fertilizer**.

11. All herbicide applications shall be conducted under favorable weather as determined by the COR.

12. No applications shall be conducted when the winds are gusty or in excess of 10 miles per hour or when other conditions, including lesser wind velocities, will allow drift to occur. Avoid combinations of pressure and nozzle type that will result in fine particles (mist) which are more likely to drift.

13. Spray valves shall be open only while sprayer is over target. The spray valve shall be closed at the end of each pass and for turning, loading, and site to site movement.

14. All applications shall be properly directed to avoid drift and contact with non-target adjacent turf areas or desirable plants.

15. During spray applications it may be necessary to flush the spray system with water when the operation is delayed because of inclement weather or other factors. All flush water shall sprayed on a treatment site identified by the COR at the contractor's expense.

16. The contractor shall provide all routine maintenance to the spray system(s) at times that will not interfere with he scheduled spraying. Only emergency repairs are to be performed during scheduled spray hours.

17. Upon completion of herbicide application, post all treated areas at 30 foot intervals with signs at least 4x5" and printed in easy to read lettering. The sign shall include the phrase "Keep Off" with appropriate symbol. It must also include a phrase "Herbicide Application" or similar statement and

include the date and time of application. The National Park Service will be responsible for removing the signs.

4.12 STRIPPING AND REMOVAL OF OLD AND/OR DEAD TURF

4.12.1 Equipment

A. Sod Cutter: Shall be capable of cutting existing turf and/or dead vegetation to a depth of 1 – 2.5" and a width of 12-18".

4.12.1 Execution

A. Existing and/or dead turf shall be cut and removed as directed by the COR.

B. All cut vegetation and debris shall be removed and disposed of off unless directed otherwise by the COR.

4.13 TREE AND SHRUB PLANTING

4.13.1 Scope

A. The work to be performed under this section shall consist of providing all materials, labor, equipment, tools and services necessary to complete the installation of trees and shrubs in accordance with the specifications herein. Therefore any items not specifically noted, but necessary for a complete installation, shall be furnished under this section.

B. Note: The items quoted in the bid schedule shall cover alll costs associated with planting including handling and storage of plants upon delivery shall be included in the planting price. The quoted price does not include the cost of the tree and delivery to the contractor's place of business. This will be added to the quoted cost of planting and verified with invoices from the supplying nursery per the specifications.

4.13.2

A. Plant Materials

1. All plants shall be supplied from nurseries within U.S.D.A. Plant Hardiness Zone 6 or 7 and shall meet all requirements and recommendations of the American Standard for Nursery Stock (ANSIZ.60.1), sponsored by the American Association of Nurserymen, Inc, 1250 I Street, N.W. Suite #500, Washington, D.C. 20005, in effect on date of Invitation for Bid.

2. All balled and burlapped (B&B) plants must be dug and out of the ground by April 15 (spring plantings), and meet the standards described under

"Recommended Balling and Burlapping Specifications" of the American Standard for Nursery Stock. Specifically: dug by hand or with a mechanical tree digger in good condition, free of any hydraulic leaks, with all blades aligned and free of damage; wrapped firmly with untreated burlap; and bound carefully with untreated sisal or jute twine, cord or ungalvanized wire mesh, in a manner so as to not damage the bark, break branches, or destroy the natural shape. Minimum ball diameters for shall be as follows:

A. Deciduous Shade and Flowering Trees

Caliper	Minimum Diameter Ball (inches)
1.5"	20
1.75	22
2"	24
2.5"	28
3"	32
3.5"	38
4"	42
4.5"	48
5"	54

B. Multi-Stem Trees

Height	Minimum Diameter all (inches)
4 ft.	14
5 ft.	16
6 ft.	18
7 ft.	20
8 ft.	22
10 ft.	24
12 ft.	28
14 ft.	32
16 ft.	38

C. Coniferous and Broadleaf Evergreen Trees

Height	Minimum Diameter Ball (inches)
3 ft.	14
4 ft.	16

5 ft.	20
6 ft.	22
7 ft.	24
8 ft.	27
9 ft.	30
10 ft.	34
12 ft.	34
14 ft.	42

D. Deciduous Shrubs

Height	Minimum Diameter Ball (inches)
12 in.	8
18 in.	9
2 ft.	10
3 ft.	12
4 ft.	14
5 ft.	16
6 ft.	18
7 ft.	20
8 ft.	22
9 ft.	24
10 ft.	26

E. Evergreen Shrubs

Spread	Minimum Diameter Ball (inches)
15-18 in.	10
2 ft.	12
2.5 ft.	14
3 ft.	16
3.5 ft.	18
4 ft.	21
5 ft.	24
6 ft.	28

3. Ball depths will carry the following ratios:

A. Balls with diameters less than 20 inches, depth not less than 75% diameter.

B. Balls with diameters of 20-30 inches, depth not less than 66-2/3% of

the diameter.

4. The genus, species and cultivar names shall agree with the nomenclature of the most current edition of "Hortus Third" by L.H. Bailey, Hortorium, Cornell University.

5. All plants shall be inspected and certified at the nursery and/or growing site by authorized Federal and State authorities or inspectors as required by Bureau of Entomology and Plant Quarantine, U.S. Department of Agriculture, Washington, D.C. for necessary transportation of same, before removal from State or District in which nursery and/or growing site is located. Each shipment, invoice or order of stock must be declared and certified free from disease of any kind. All necessary inspection certificates must be filed with Contracting Officer prior to acceptance and payment.

6. The COR reserves the right to inspect, select and tag all plants before they are dug or delivered to the job site. This inspection, if made, shall be at the nursery or growing site by the government without cost to the Contractor.

7. Shipment and delivery:

   A. Contractor shall notify the COR, 48 hours in advance, when plants are to be delivered to the site and/or contractors holding area and the method of shipment. If requested by the COR, the contractor shall furnish an itemized list of actual quantity and sizes. The number of B&B trees per 40 foot flat bed trailer shall not exceed the following:

1.75-2" caliper	130 trees per load
2-2.5" caliper	100 trees per load
2.5-3" caliper	70 trees per load
3-3.5" caliper	50 trees per load

   B. All plants shall be protected from weather and adequately packed to provide protection against climate and breakage during transit. When shipment is made by open vehicle, plant materials must be tied and covered to avoid windwhipping and dehydration. Evergreen and deciduous trees in leaf shall be sprayed with an approved antitranspirant in accordance with the manufacturer's instructions to afford protection from drying of so requested by the COR. When shipment is made by closed vehicle, plants must be carefully packed and adequately ventilated to prevent "sweating" of plants during transit.

   C. Plants shall be handled only by the earth ball. Handling by the plant stem or foliage will be cause for rejection of that plant.

D. Care shall be exercised at all times during the handling operations to prevent damage to bark, branches, and root systems. All earth balls shall be firm and undamaged. Cracked or crushed balls shall be rejected.

E. Plants shall be protected upon arrival at site by being thoroughly watered and properly maintained until planted. If plants are not planted within 72 hours of delivery, the contractor shall be prepared to cover the root balls with mulch if requested by the COR.

F. All plants shall be labeled. Labels shall be durable and legible stating the correct botanical name and size in weather-resistant ink or embossed letters. Labels shall be securely attached to each plant in a manner which will not restrict growth. Labels shall remain with the plants and shall be removed by the Contractor at Initial Acceptance unless approved otherwise by the COR.

G. Plants shall not be planted until inspected and approved by the COR. Trees not meeting specifications for quality herein stated, or plants that show improper handling or arrive onsite in unsatisfactory condition will be rejected. All rejected trees shall immediately be removed and disposed of off site by Contractor and shall be replaced with approved nursery stock of designated variety, size, age, etc., as specified under this contract without additional compensation.

3. Substitutions - It is the Contractor's responsibility to locate the plants specified. In the event the material has become unavailable, the Contractor shall be responsible for providing written documentation of availability problems. All substitutions shall be approved by the COR.

B. Tree Backfill Lightweight Aggregate

1. Aggregate shall be a rotary kiln structural grade Lightweight Aggregate derived from expanded shale or slate meeting all the requirements of the American Society of Testing Materials ASTM-C300 as manufactured by Solite Corp., P.O. Box 11369, Richmond, VA, 23230 (804-329-8135) or Carolina Stalite Company, Drawer 1037, Salisbury, N.C. 28145-1037 (704-637-1515 or an approved equal. Aggregate shall be free of by-product slags or cinders and meet the following physical and chemical properites:

2. Gradation: Shall be ½" to No. 4 and meet the following gradation requirements:

Sieve Size	% Passing
3/4"	100

1/2"	90-100
3/8"	40-80
No.4	0-20
No.8	0-10

3. Density: Shall have a compacted moist density of less than 62.4 pounds per cubic foot (1000 kg/cubic meter) when measured by a point test conducted in accordance with ASTM D-698 "The Standard Test method for Moisture-Density Relations of Soils and Soil-Aggreagte Mixtures using 5.5 lb. Hammer and 12 inch Drop" (AASHTO T-99).

4. Bulk Loose Unit Weight: Shall be 45-60 pounds per cubic foot (70-1120 kg/cubic meter).

5. Toughness: The maximum Los Angels Abrasion loss when tested in accordance with ASTM C-131 (B grading) shall be 50%.

6. Physical Stability: Shall have an angle of internal friction greater than 40 when measured in a triaxial compression test on a laboratory sample with a minimum diameter of 10 inches.

7. Chemical Stability: Shall be totally inert, insensitive to moisture, with all organic materials burned out at 1090 degrees centigrade during the expansion process.

8. Corrosiveness: Shall be non-corrosive with less than 100 ppm chloride when measured by FHWA-RD-77.

9. Free Draining: Shall have a coefficient of permeability greater than 1 cm/sec.

10. Delivery: Shall be delivered in 40 (-50) lb bags. Bulk deliveries shall require the approval of the COR.

C. Fertilizer

Shall be a natural organic fertilizer with a minimum of 90% of the total nitrogen as water insoluble nitrogen (WIN) such Milorganite, 6-2-0 developed by the Milwaukee Metropolitan Sewage District, 260 West Seeboth Street, Milwaukee, Wisconsin (414-221-6810 or an approved equal.

D. Mulch

Shredded hardwood mulch shall be: derived from recycled wood products and yard waste, aged; dark brown to black in color; have a particle size less than 3 inches; be neutral Ph; and free of sticks, stones, clay or any other matter injurious to plant

growth.

E. Support Stakes

Support stakes shall be rough cypress, hard pine, cedar, oak or locust, free from unsound or loose knots and rot and from injurious cross grain and sap wood, or any other defect; 2" x 2" by 8 feet, pointed on one end.

F. Guys

Guys shall be 12-gauge annealed zinc-coated wire, enclosed in rubber garden hose (minimum diameter of 1/2 inch) where it comes in contact with tree trunk or branches. Hose shall be all one color, black or dark green, as approved by the COR.

4.13.3 Execution

A. Excavation/Preparation for Planting

1. General:

A. All planting locations shall be cleared of utilities per 2.09 before excavation.

B. If so requested by the COR, prior to excavation burlap shall be placed adjacent to the planting site to hold excavated soil.

C. All excavated rocks and debris shall be removed and disposed of off site at no expense to the government.

D. No holes will be allowed to remain open. Holes shall be barricaded or roped off in a manner approved by the Contracting Officer for the protection of the public.

E. After preparation for planting, all planting location shall be protected from pedestrian and vehicular traffic until the time of planting.

F. All planting locations shall be approved by the Contracting Officer's Representative before planting.

2. Container Grown and Balled and Burlapped (B&B) Shade and Flowering Trees, Coniferous and Broadleaf Evergreens and Shrubs with a Root Ball diameter equal to or greater than 22 in.

A. All planting locations shall be dug circular in outline with the sides at 45 degree angles and have a diameter measuring 24" wider than the root ball in all directions.

B. The depth shall be sufficient to set the rootball on a 2-3" pedestal of lightweight aggregate so that the root ball sits 2-3" inches above the exisiting grade.

3. Container Grown and Balled and Burlapped (B&B) Shade and Flowering Trees, Coniferous and Broadleaf Evergreens and Shrubs with a Root Ball diameter less than 22 in.

A. All planting locations shall be circular in outline with with the sides at 45 degree angles and have a diameter measuring 12" wider than the root ball in all directions.

B. The depth shall be sufficient to set the rootball on a 1-2" pedestal of lightweight aggregate so that the root ball sits 1-2" inches above the existing grade.

B Planting:

1. General:

A. No plants shall be installed during adverse weather or during periods when soil conditions are unfavorable as determined by the COR.

B. Plants shall be handled only by the earth ball. Handling by the plant stem or foliage will be cause for rejection of that plant.

C. Plants shall not be planted if the ball is cracked or broken either before or during planting operation.

D. All plants shall be spaced or located as specified and/or directed by the COR.

E. Container grown plants shall have the rootball scored with 4-5, one inch deep cuts with a sharp knife or other sharp instrument and flare out the four quadrants on the lower third of the ball to prevent a girdled root system. (Attachment B).

F. All excess excavate shall be removed and disposed of off site or as otherwise directed by the COR.

2. Container Grown and Balled and Burlapped (B&B) Shade and Flowering Trees, Coniferous and Broadleaf Evergreens and Shrubs with a Root Ball diameter equal to or greater than 22 in.

A. Place 40 (-50) lbs. of lightweight aggregate in the bottom of the hole

and create a pedestal so that the root ball rests 2-3 inches above grade and remain at the proper height and will not settle. Plants shall be kept in a vertical position.

B. Backfill with existing soil 1/2 of the way up the earth ball. Cut and remove the wire mesh 1/3 of the way down from the top of the root ball. Cut all twine and lay the burlap back off the top of the ball. Do not remove or pull the burlap and twine out from under the ball. Fold them back to the edge of the ball and cut the excess off 1/4 of the way down from the top.

C. Backfill the balance of the pit with (in following order) 40 (-50) lbs. of lightweight aggregate, existing soil, and 5 lbs. of milorganite. The backfill shall be thoroughly mixed using a hand shovel.

D. After mixing hand tamp around the root ball to fill voids and ensure that the backfill is mounded to the top of the root ball. The tops of the root balls shall not be covered with backfill.

E. Excess existing soil shall be used to create a saucer 4-6" above the existing grade to catch and retain water. The saucer shall have a diameter equal to that of the planting pit. Saucers on slopes shall be built up on the lower side only to catch and hold water.

F. **The entire planting hole shall be edged**.

3. Container Grown and Balled and Burlapped (B&B) Shade and Flowering Trees, Coniferous and Broadleaf Evergreens and Shrubs with a Root Ball diameter less than 22 in.

A. Place 20 (-25) lbs. of lightweight aggregate in the bottom of the hole and set the plant so that the root ball rests 1-2 inches above the grade at which it grew in the nursery to ensure that the rootball will remain at the proper height and will not settle. Plants shall be kept in a vertical position.

B. Backfill with existing soil 1/2 of the way up the earth ball. Cut and remove the wire mesh 1/3 of the way down from the top of the root ball. Cut all twine and lay the burlap back off the top of the ball. Do not remove or pull the burlap and twine out from under the ball. Fold them back to the edge of the ball and cut the excess off 1/4 of the way down from the top.

C. Backfill the balance of the pit with (in following order) 20 (-25) lbs. of lightweight aggregate, existing soil, and 2 lbs. of milorganite. The backfill shall be thoroughly mixed using a hand shovel.

D. After mixing hand tamp around the root ball to fill voids and ensure that the backfill is mounded to the top of the root ball. The tops of the root balls shall not be covered with backfill.

E. Excess existing soil shall be used to create a saucer 3-6" above the existing grade to catch and retain water. The saucer shall have a diameter equal to that of the planting pit. Saucers on slopes shall be built up on the lower side only to catch and hold water.

F. **The entire planting hole shall be edged**.

C. Watering

All plants shall be thoroughly watered immediately after planting, even if it is raining, to assure that the soil is brought to field capacity. This shall mean a full and thorough saturation of all backfill during the same day of planting. Apply water only by open end hose at a very low pressure to avoid air pockets and injury to the roots. No air pockets shall be left around the roots of any plants. When planted, watered, and fully settled, the plants shall be vertical.

D. Mulching

Mulch shall be placed no later than 24 hours after any planting to uniformely cover the entire prepared area. Mulch shall be placed to a loose measurement of 3 inches for all woody plants 2 inches for perennials The depth of mulch within 3-6 inches of the trunk/stem of a woody plant shall not exceed a loose measurement of 1/2 inch with no mulch shall be applied around the trunk/stem.

E. Staking

1. Support all shade and flowering trees with three (3) 96" x 2"x 2" stakes driven at equal spaces around the root ball. Support all coniferous and broadleaf evergreens with two (2) 96" x 2"x 2" stakes driven opposite each other. All stakes shall be outside the root ball, parellel to adjacent sidewalks or roadways, and driven at an angle and drawn to vertical and to a sufficient depth to hold trees rigid. NOTE: Stakes driven through the root ball will be cause for rejection.

2. Cut pieces of green or black 1/2" rubber garden hose long enough to extend 2 inches past the trunk of the tree when wrapped around. Place the hose around the trunk at the height to provide maximum support. Thread 12 gauge wire through he hose and pull both ends horizontally beyond each stake by about 2 feet.

3. Cut the ends of the wire and twist the wire at the rubber hose to keep it in

place. Wind both ends of the wire together around the stake twice and then twist wire back onto itself to secure the wire within 2-6" of the top of the stake. The stake shall be notched to prevent the wire from slipping. Cut off excess wire. There should be a 1-3" sway in the tree (the wires should not be pulled tight) for best establishment.

4. Plants requiring staking shall be staked no later than 48 hours after planting.

F. Pruning

Any necessary pruning shall be done after the plants are in place and shall only remove dead, dying, and broken or damaged limbs, below the point of injury, with due regard for the natural form and growth characteristics of the species. The main leader is not to be cut. If so directed by the COR trees shall be elevated to a minimum of 7 feet. All pruning cuts shall be just outside the branch collar, the swollen base of the branch, to encourage wound closure.

4.13 PERENNIAL DAFFODIL BED PLANTING AND MAINTENANCE

4.13.1 Materials and Equipment

A. Herbicide: Shall be Roundup (Isopropylamine salt of Glyphosate), EPA Registration Number 524-308-AA.

B. Grass Seed: Shall be as follows

1. Spring overseeding: Shall be a certified blend of certified Perennial Ryegrass (*Lolium perenne*) consisting of 3 varieties of which no one variety should exceeds 40% or is less than 20%.

2. Fall overseeding: Shall be a 90% certified mixture of certified Turf-type Tall Fescue (*Festuca arundinacea*) consisting of 3 varieties of which no variety exceeds 40% or is less than 20%, and 10% Kentucky Bluegrass (*Poa pratensis*).

C. Daffodils: Bulbs shall be Landscape Size Bulbs, 12-15 cm.

D. Straw Mulch: Shall be Oat or wheat straw and be reasonably free from weeds, or foreign matter detrimental to plant life, and in dry condition. Hay or chopped cornstalks are not acceptable substitutes.

4.13.2 Execution

A. Preparation for Planting - Spring

1. All beds designated for renovation shall be identified by the COR.

2. For such identified beds, immediately after flowering in spring spray all daffodils, turf, and weeds with a 5% solution of Roundup (For hand held or backpack sprayers mix at a rate of 6 ounces (12 tablespoons) per gallon. Apply so that the coverage is uniform and complete. Two (2) weeks after spraying a second application shall be performed to target vegetation that was not killed during the first application.

3. After vegetation has turned completely brown, mow the resulting vegetation to a height of two (2) inches.

4. Power drill seed the entire bed area with a Perennial Ryegrass Blend per Seeding, 4.05.3, Item B.

B. Preparation for Planting - Fall

1. Between September 1 and September 15 as directed by the COR, Treat the entire bed with herbicide per Item A-2, above

2. After vegetation has turned brown rototill the entire bed and remove all remaining bulbs. It may be necessary to rototill the bed several times in different directions to bring all the existing bulbs to the surface.

3. The bed shall be fertilized with a Bulb Booster with an analysis of 9-9-6 at a rate of 40 lbs of fertilizer per 1,000 square feet and rototilled to a depth of 8" and graded to a smoothness comparable to results obtained by hand raking. The final grade shall be blended with existing adjacent grades leaving the entire area drainable and free from abrupt changes in slope. All beds shall be protected from pedestrian and vehicular traffic until the time of planting.

C. Planting

1. After Grade finishing the beds shall be marked for planting 8 inches on center and the bulbs be set on the marks.

2. After setting the bulbs shall be planted using a bulb planter to a depth of 7-8". Bulbs shall be set with the pointed end up after which it shall be covered with soil and hand tamped.

D. Overseeding

1. After planting broadcast a Turf Type Tall Fescue Blend over the entire bed area at a rate of 300lbs/acre (8 lbs/1,000 square feet).

2. The entire bed shall then be scarified using a hand rake to ensure good soil/seed contact.

3. The entire bed shall then be covered with a straw mulch so that 50-60% of the soil surface is covered.

PART 5: LIABILITY, ACCEPTANCE, and PAYMENT

5.01 Liability

5.01.1 Seeding

A. Seeded areas shall be maintained by the contractor until a grass coverage of 95% is established.

B. The contractor shall be responsible for maintaining grass height at 3 inches high unless requested otherwise by the COR. The first mowing shall not be conducted until the seeded grass is at least 3 inches high and no more than 1/3 of the grass leaf shall be removed by the initial or subsequent cutting.

C. Areas showing root growth failure, deterioration, and/or bare or thin spots shall be re-seeded at no additional cost to the government. Reseeding/ shall be done as many times as necessary to establish a 95% cover as determined by the COR.

5.01.2 Sodding

The contractor shall be responsible for properly caring for all sodded areas performing watering, mowing, and other maintenance tasks necessary to keep the sod in a live, healthy condition until final acceptance.

5.01.3 Seasonal Floral Displays

The contractor shall be responsible for properly caring for all seasonal floral displays performing watering, mowing, and other maintenance tasks necessary to keep the plants in a live, healthy condition throughout the entire season.

5.01.4 Trees and Shrubs

The contractors liability shall be in accordance with Attachment D: Maintenance and Replacement Schedule. During the liability period, the Contractor shall properly care for all plants furnished performing watering, cultivating, and other maintenance tasks necessary to keep plants in a live, healthy condition until final acceptance. Plants that have died back into the crown or beyond the normal pruning line shall be replaced by the Contractor with the same size and species as the original during the next defined planting season at no additional expense to the Government. Plants shall be considered unacceptable when the main leader has died back or 25% of the crown is dead. The contractor is responsible for a one time replacement only.

5.2 Disclaimer: Conditions beyond the contractor's control such as vandalism or acts of God shall not be the responsibility of the contractor. Generally areas will be closed and/or protected by the NPS; however, certain tenant damage may be experienced. Any requests for reseeding, resodding and/or planting as a result of such conditions shall be an addition to the contract in accordance with the contract unit prices.

5.3 Acceptance

A. Acceptance will be given by the COR after an inspection and verification of the work performed as defined in the contract specifications. Acceptance can be on partially completed work if approved by the COR.

B. Acceptance on Seeding and Sodding will be given by the COR when a uniform 3" stand of 95% grass coverage is established.

C. Tree and Shrub Planting

1. Initital Acceptance will be given by the COR after an inspection and verification of the work performed as defined in the contract specifications. Plants that have died back beyond the normal pruning line shall be removed within 72 hours of notice. The Contractor shall remove all tags and labels at the time of initial acceptance.

2. Final Acceptance on tree and shrub planting will be given at the end of the liability period. Prior to final acceptance the contractor is responsible for removing all stakes, guys and wrapping material and re-mulching all planting locations and beds to a loose measurement of 3 inches.

D. The National Park Service will provide the Contractor with an Acceptance Report.

E. The Contractor shall include with all invoices for payment the Acceptance Report signed by the COR that all work partially or completely performed conforms to contract requirements. In the event the COR and Contractor disagree on work completed and accepted, his or her comments shall be noted thereon or attached thereto. The Acceptance Report will serve to document completed work and/or deficiencies and to determine whether the provisions for the deduction clause applies.

F. Failure of the contractor to obtain signed Acceptance Report will release the Government from any obligation to pay for services claimed but not documented by a signed Acceptance Report.

5.4 Measurement and Payment:

The amount to be paid will be based on the actual bid items completed and accepted. Quantities will be paid for at the contract unit prices and measured as follows.

A. Grounds Maintenance: Measurement shall be year over a 10 month period (March - December. The monthly payment will be the total amount for Grounds Maintenance divided by ten.

B. Seasonal Floral Displays:

1. Payment shall be based on the actual number of plants delivered, beds prepared and planted. Quantities so measured will be paid for at the contracted bid price and shall be billed in the month in which the planting took place and was accepted.

2. Measurement for maintenance shall be year over a 10 month period (March – December). The monthly payment will be the total for Seasonal Floral Bed Maintenance divided by ten.

C. Miscellaneous Grounds Maintenance Activities: Quantities will be identified on individual delivery orders and paid for at the contract unit prices in the bid schedule. Quantities so measured shall be billed in the month in which the work took place and was accepted. Specifically:

1. Additional Mulching

A. Tree Ring Mulching: Measurement shall be per tree

B. Bed Mulching: Shall be per cubic yard to the nearest tenth of a cubic yard verified by delivery tickets and/or as otherwise required.

2. Soil Amendment

A. Topsoil: Measurement shall be by the cubic yard, to the nearest tenth of a cubic yard, verified by delivery tickets.

B. Compost: Measurement shall be by the cubic yard, to the nearest tenth of a cubic yard, verified by delivery tickets.

C. Lightweight Aggregate: Measurement shall be by the ton, to the nearest tenth of a ton, verified by delivery tickets.

3. Aeration (Rolling Tined, Core, Shatter): Measurement will be to the nearest acre measured to two decimal places.

4. Soil Preperation/Grade Finishing: Measurement shall be to the nearest acre measured to two decimal places.

5. Seeding: Measurement will be the number of pounds, to the nearest 10 pounds, verified by manufacturer's packaging labels.

6. Sodding: Measurement will be the number of square yards, to the nearest square yard, based on measurements of the actual sodded areas.

7. Fertilization: Measurement will be the number of pounds, to the nearest 10 pounds, verified by manufacturer's packaging labels and field measurements. Except that where bulk application has been approved, measurement shall be by the ton, to the nearest tenth of a ton, verified by delivery tickets.

8. Liming: Measurement will be the number of pounds, to the nearest 10 pounds, verified by manufacturer's packaging labels. Payment will be made at the contract unit price per pound. Except that where bulk application has been approved, measurement shall be by the ton, to the nearest tenth of a ton, verified by delivery tickets.

9. Thatching: Measurement will be to the nearest acre measured to two decimal places.

10. Non-Selective Herbicide Treatment: Measurement shall be to the nearest acre measured to two decimal places.

11. Selective (Broadleaf) Herbicide Treatment

12. Stripping/Removal of Old/Dead Turf: Measurement shall be to the nearest square foot.

13. Tree and Shrub Planting: The amount to be paid will be based on the actual bid items completed and accepted. Quantities so measured will be paid at the bid item price plus the cost of the tree verified with an invoice from the nursery in which the plant was obtained.

14. Perennial Daffodil Beds: The amount to be paid will be based on the actual bid items completed and accepted. Quantities so measured will be paid at the bid item price

D. The National Park Service reserves the right to conduct any testing or inspection it may deem advisable to assure that all work conforms to the specifications herein.

Note: Useful Conversions:

1 acre = 43,560 square feet = 4,840 square yards
1" of topsoil/compost/lightweight aggreagate per acre = 135 cubic yards
This is roughly 3 cubic yards per 1,000 square feet
1 cubic yard of Lightweight Aggregate = 1,500 lbs (dry) therefore:
1/4" of Lightweight Aggregate per acre = 25 tons/acre = 1,200 lbs per 1,000 square feet
or
1" of Lighweight Aggregate per acre = 100 tons/acre = 4,600 lbs per 1,000 square feet