

PART 10

LANDSCAPE WORK

SECTION 1000

GENERAL REQUIREMENTS

Unless otherwise indicated on the plans or specified in the Special Provisions, the performance of Landscape Work shall be in accordance with the requirements set forth in these Standard Specifications. Furthermore, all performance of Landscape Work shall be coordinated with the installation of all systems and facilities as integral components of Landscape Work.

Due to the broad subject area of Landscape Work, references to specific sections shall be made to eliminate repetition and to maintain a uniformity in methods of operation.

The Contractor shall inform himself of, and consequently comply with, Sections 100, 101, 102, 103, 105, 106, 107 and 108 as applicable to materials' purchase, installation and operational procedures.

SECTION 1001

SITE PREPARATION

1001.01 GENERAL. - This work shall consist of the removal of all objectionable material from within the project limits in preparation for and in connection with the following Landscape Work: grading, irrigation, drainage, concrete and masonry construction, wood construction, planting, and installation of site furnishings (play equipment, benches, fences, etc.).

Site preparation/clearing for all work shall be performed in accordance with these Standard Specifications.

1001.02 PROTECTION OF EXISTING TREES. - The Contractor shall protect existing trees scheduled to remain on site against injury or damage including cutting, breaking or skinning of roots, trunks or branches, smothering by stockpiled construction materials, excavated materials or vehicular traffic. Trees designated to remain on site shall be protected with a temporary four-foot high double-rail wood fence enclosure. This enclosure shall be an eight-foot square centered around the trunk of the tree. The size of the enclosure shall be increased for larger trees as directed by the Engineer.

All temporary fencing shall be constructed before site preparation work. Temporary fencing shall remain during the full construction period and be removed only when no longer needed or when deemed acceptable to the Engineer.

Branches of trees that are to remain which interfere with construction shall be removed only when directed by the Engineer.

All trees damaged by construction operations shall be repaired or replaced depending upon the condition and extent of damage and as

approved by the Engineer. Trees to be replaced due to damage caused by construction operations shall be replaced with trees of similar size and species. Cost for tree replacement shall be determined in accordance with the Tree Evaluation Formula as described in "A Guide to the Professional Evaluation of Landscape Trees, Specimen Shrubs and Evergreens," published by the International Society of Arboriculture.

Repair and replacement of trees scheduled to remain which are damaged by construction operations shall be at the Contractor's expense.

SECTION 1002

EARTHWORK

1002.01 TOPSOIL FILL. - Topsoil shall consist of fertile, friable soil of loamy character and shall contain an amount of organic matter normal to the region. Topsoil shall be free of subsoil, heavy or stiff clay, stones, rocks, gravel, weeds, brush, litter, refuse and other extraneous materials. Topsoil shall not be infested with noxious animal life or toxic substances and shall be obtained from well-drained, arable land and shall be of even texture.

Topsoil shall be obtained from sources within the project as directed by the Engineer or shall be imported if required by the Special Provisions.

Topsoil shall be obtained from sources within the project as directed by the Engineer or shall be imported if required by the Special Provisions.

Topsoil shall not be worked when it is so wet or so dry as to cause excessive compaction or the forming of hard clods or dust.

Topsoil shall be spread at the rate shown on the plans or as specified in the Special Provisions.

1002.02 GRADING AND CULTIVATING. - Subsoil in planting areas shall be scarified in rough contours to a depth of 3 inches and shall be free of weeds and extraneous material prior to spreading topsoil.

Prior to planting, the soil shall be graded, cultivated or raked as required to obtain a uniform, smooth, fine-textured surface.

Areas having slopes steeper than 2:1 shall not be cultivated, but any weeds thereon shall be cut to stubble 2 inches maximum in height.

Finished surfaces of planting areas adjacent to curbs or pavements shall be graded 1 inch below curb or pavement elevations.

1002.03 EROSION CONTROL. - Erosion Control shall consist in general of furnishing erosion control materials; preparing slopes and planting areas; applying and incorporating straw; applying fertilizer, seed, fiber, and stabilizing emulsion; and planting the areas as shown on the plans or designated in the Special Provisions.

Topsoil preparation shall be in accordance with Section 1002.01.

Erosion Control work shall consist of applying straw, seed and fertilizer; or erosion control work shall consist of hydroseeding as specified in Section 1002.09.

Preparation shall include all work required to make ready the areas for erosion control materials including the cultivation necessary to

incorporate straw. Areas to receive straw application shall be prepared such that the straw will be incorporated into the soil to the degree specified in the Special Provisions.

Topsoil shall be spread uniformly at the rate shown on the plans or noted in the Special Provisions and cultivated if necessary to a sufficient depth to break up compaction resulting from spreading operations. Cultivation shall not be performed until all other equipment operations are complete.

Debris and rocks brought to the surface during cultivation shall be removed and disposed of outside of the project limits at the Contractor's expense.

1002.04 STRAW. - Straw shall be derived from wheat, oats, or barley. Straw which has been used for stable bedding shall not be used.

Straw shall be spread uniformly at the rates shown on the plans or specified in the Special Provisions.

Straw may be applied pneumatically, weather permitting. Straw shall be applied with a roller equipped with straight studs placed and staggered approximately eight inches apart and made of approximately seven-eighth inch steel plate. Length of studs shall not exceed six inches, and studs shall be rounded. Weight of roller shall be sufficient to incorporate straw into soil so as not to support combustion.

1002.05 FIBER. - Fiber shall be produced from non-recycled wood such as wood chips or similar wood material and shall not be produced from paper, cardboard, sawdust, or other such products nor may it contain any toxins. Fiber shall be of such character that the fiber, when mixed with water, will be dispersed in a uniform slurry. Water content of fiber prior to mixing with water shall not exceed 15 percent of the dry weight of the fiber. Commercially packaged fiber shall have the moisture content of the fiber marked on the package. Fiber shall be colored to contrast with the area to which it is to be applied. Color shall be non-toxic to plant or animal life and shall not stain concrete, masonry or painted surfaces.

1002.06 SEED. - Seed requiring labeling under the California Food and Agriculture Code shall be labeled in compliance with said codes.

Prior to seeding the Contractor shall furnish written evidence to the Engineer that seed not requiring labeling under the above mentioned code conforms to the germination requirements and purity as designated on the plans or specified in the Special Provisions. If seed conforming to the specified purity and germination requirements is not available, seed with less than specified purity and germination requirements may be substituted. Application rates for such seed shall be increased to attain such requirements and any additional seed required shall be furnished and applied at the Contractor's expense. Prior to seeding, see type and rates shall be subject to the approval of the Engineer.

Seed treated with mercury compounds shall not be used. All legume seed shall be pellet-inoculated with a viable bacteria compatible for use with the particular seed variety. Such seed shall be labeled to show date of inoculation, seed weight, and source of inoculant. Inoculation process shall conform to standards provided in Bulletin AXT-280 "Pellet Inoculation of Legume Seed", of the University of California Agriculture

Extension Service with the exception that inoculation materials shall be added at five times the rate as recommended on the inoculant package.

1002.07 STABILIZING EMULSION. - Stabilizing emulsion shall be of a liquid chemical type forming a plastic film upon drying while allowing air and water penetration. Material shall be nonflammable and have an effective life of one year.

Stabilizing emulsion shall be capable of being mixed with water at the time of application to plant and animal life and non-staining to concrete, masonry, wood, and painted surfaces. Material shall be registered and licensed with the State of California, Department of Food and Agriculture.

1002.08 COMMERCIAL FERTILIZER. - Commercial Fertilizer to be applied during erosion control operations shall be in pelleted or granular form and shall be applied at the rates as specified on the plans or in the Special Provisions. Fertilizer shall contain a minimum guaranteed chemical analysis of sixteen percent nitrogen and twenty percent phosphoric acid.

1002.09 HYDRO-SEEDING. - Hydro-seeding shall consist of mixing and applying fiber and water with a mixture of seed, commercial fertilizer and stabilizing emulsion or any combination thereof at rates specified on the plans or in the Special Provisions.

Materials shall be mixed in a tank equipped with a continuous agitation system to achieve a homogenous mixture and with a discharge system capable of applying the mixture at a uniform rate.

Any mixture containing a stabilizing emulsion shall not be applied when the soil temperatures are below 45°F or during rainy weather. Care shall be taken so that equipment or pedestrians are not permitted in areas to which the stabilizing emulsion has been applied. Any material determined by the Engineer to be considered harmful shall not be used.

1002.10 PAYMENT. - Erosion control satisfactorily furnished and placed as specified shall be paid for as specified in the Special Provisions. When erosion control is specified to be paid for at the price bid per square foot, the area to be paid for shall be the actual area of sloped ground surface which the material covers.

SECTION 1003

SEWERAGE AND DRAINAGE

Sewerage and drainage consists of all structures for the transportation of waste and water from the site and the construction of such structures on the site including the connections to the existing storm drain and sewage lines. All runoff and sewage shall be taken off the site by means detailed in Part 3 of these Standard Specifications. The Contractor shall do all excavating of pavement and earth materials, shall construct sheet piling and lagging as set forth in Part 7 of these Standard Specifications and shall supply all the materials, work and knowledge of the applicable laws and specifications necessary for the satisfactory completion of the required sewerage and drainage work. Work shall be based on the plans, Special Provisions, and these Standard Specifications.

The Contractor, in accordance with the requirements of Sections 703, 707, and 109, shall do all backfilling and restore all pavements and related improvements removed, destroyed, damaged or undermined as a result of his operations.

SECTION 1004

PAVING

Paving consists of performing all work and furnishing and installing all materials required to attain the surface at the grade, color, texture and physical dimensions described in the plans and Special Provisions. Excavation and preparation of the subgrade and the compaction thereof shall be done as described in Part 7 of these Standard Specifications. The paving construction shall conform to Part 2, and Section 418 of these Standard Specifications. Any special jointing, surfaces, patterns or techniques shall be constructed as described in the Special Provisions. The Contractor shall supply all materials, work and knowledge of the applicable laws and specifications necessary for the satisfactory completion of the required paving work.

SECTION 1005

STRUCTURES

1005.01 GENERAL. - This work consists of all work and materials required to erect and complete all landscape structures and surfaces to said structures as described in the plans and Special Provisions. Excavation and preparation of the subgrade and any needed compaction thereof is to be performed as described in Part 7 of the Standard Specifications. Structures shall be in conformance with the applicable portions of Sections 411, 412, 413, 414, 415, and 416 of these Standard Specifications. Any special details, methods and designs shall be constructed as described in the Special Provisions. The Contractor shall supply all materials, work and knowledge of the applicable laws and specifications necessary for the satisfactory completion of the required construction work.

1005.02 WOOD TREATMENT. - All lumber and timber to be used in Landscape Work shall be treated with nontoxic elements, including wood used for decks, fences, trellises, retaining walls, pathways, furniture, containers, and play structures. All treated surfaces shall conform to the Health and Safety Code of California, SB 946, and the Federal Specification TT-W-571 and shall bear a stamp from a certified quality control inspection agency assuring that the wood has been treated to the specification noted above.

All cutting, adzing, boring, chamfering, gaining, mortising, and surfacing shall be done prior to treatment. Fire retardant treated wood shall meet the requirements for the specific use intended, as mentioned above and conform to the Building Code, Part II, Chapter I, of the San Francisco Municipal Code. The Contractor shall acquire knowledge of all applicable laws and specifications necessary for the satisfactory and safe use and implementation of treated lumber and use as mentioned in the plans, Special Provisions, and these Standard Specifications.

SECTION 1006

IRRIGATION WORK

1006.01 GENERAL. - The Contractor shall furnish, install and test irrigation facilities as shown on the plans and specified in these Standard Specifications and the Special Provisions. Irrigation plans are diagrammatic and correct for general design only; exact locations and dimensions shall be verified at the job site by the Contractor in the presence of the Engineer. The Contractor shall be responsible for laying out irrigation facilities so that coverage is complete and adequate. The Contractor shall do all related and Incidental Work, including connections to water and electrical supplies, excavation, backfill, and restoration of all disturbed planting areas, as well as supply all labor and materials, including those not specifically mentioned, for the complete installation and proper operation of the new irrigation system.

The Contractor shall be responsible for repair of damage to any property, facility, or work resulting from installation of the irrigation system or from leaks in the system, caused by the Contractor.

1006.02 WATER METERS AND SERVICE.

General. - The City will make all necessary arrangements for the installation of water meters at the locations shown on the plans. The installation of the meters, including service piping and connection thereof to City water mains, will be accomplished by the City and costs thereof will be solely the responsibility of the City. The Contractor shall cooperate, and coordinate his work, with the San Francisco Water Department as necessary.

Existing Water Meters And Service. - The Contractor shall make a complete downstream piping connection to each existing water meter.

1006.03 EXISTING IRRIGATION SYSTEMS.

General. - Existing irrigation systems are to be kept operational during construction. When it is necessary to deactivate existing systems or portions thereof the Contractor shall coordinate such deactivation with the gardener so as not to unduly hamper his maintenance work. Any damage to existing systems resulting from the Contractor's work shall be repaired promptly by the Contractor at no cost to the City.

Existing Irrigation Systems to Remain in Service. - The Contractor shall maintain the existing irrigation system completely operable, all to the satisfaction of the Engineer.

It shall be the responsibility of the Contractor to locate and ascertain the extent of the existing irrigation system affected by the new irrigation system to be installed and the Contractor shall support, work around, protect, and relocate such facilities, as required.

Existing Irrigation Systems to be Abandoned. - When the Special Provisions require that existing irrigation facilities be abandoned upon completion of the new work, the following shall apply:

All underground piping shall be abandoned in place; all piping on or above grade shall be removed to a depth of 16-inches and disposed of by the Contractor. All brass goods, quick coupling valves, box hydrants, and useable equipment shall be salvaged.

Equipment to be Salvaged. - All existing equipment specified to be salvaged shall remain the property of the City. The Contractor shall disconnect and remove all such items, package and deliver them to the Recreation & Park Maintenance Yard in Golden Gate Park at Bowling Green Drive and South Drive, Phone: 415-558-4431; or Bureau of Street Cleaning and Urban Forestry at 2323 Army Street, Phone: 415-695-2017, as directed by the Engineer. Arrangements shall be made prior to delivery of the salvaged equipment.

1006.04 DRAWINGS, DATA, AND INSTRUCTIONS.

General. - The Contractor shall submit drawings, data, instructions, etc., for all material, equipment, systems, etc., required by the Special Provisions.

Mechanical submittals are required as follows:

- (1) Pipe
- (2) Fittings and Solvent
- (3) Gate Valves and Check Valves
- (4) Valve Boxes
- (5) Sprinklers and spray heads
- (6) Remote Control Valves
- (7) Quick-Coupling Valves
- (8) Backflow Preventers
- (9) Pumps
- (10) Others - as specified in Special Provisions

Electrical submittals are required as follows:

- (1) Irrigation Controllers
- (2) Wiring
- (3) PVC Conduits
- (4) Pull Boxes

New facilities shall not be installed before the Engineer has received and has on hand, approved "shop drawings," and related literature for all the material and equipment the Contractor intends to furnish and install.

Record Drawings. - The Contractor shall provide and keep up to date a complete "As-Built" record of black line prints for each subcontractor's work such as plumbing, electrical, etc. These prints shall show every change from the approved drawings and specifications and the exact "As-Built" location, size and type of every valve fixture, run of pipe, wire and conduit. Prints for this purpose may be obtained from the City. The job set of these drawings shall be kept on the job site and be used only as a record set. On completion of the work, the record set shall be turned over to the Engineer.

Valve Location Records. - The Contractor, with the aid of the Engineer shall locate exactly in the field and record locations on contract plans all shutoff and remote control valves installed below grade. These locations shall be established using triangulation techniques giving distances from two adjacent sprinklers to each valve or; other similar method as approved by the Engineer that will allow maintenance personnel to accurately and easily locate all valves. The Contractor shall deliver the valve location record sheets to the Engineer upon completion of the work.

1006.05 PIPE AND FITTINGS.

General. - Pipe and fittings shall be as specified in these Standard Specifications and the Special Provisions. All pipe and fittings shall be continuously and permanently marked with manufacturer's name or trademark, kind and Internal Pipe Size (IPS) of pipe, material, manufacturer's lot number, schedule or type and National Sanitation Foundation's (NSF) seal of approval. All piping under constant pressure shall be galvanized steel. Installation shall be in strict accordance with the manufacturer's instructions.

Ductile Iron Pipe and Fittings. - Ductile iron pipe shall be push-on joint type, cement-lined, Class 51, and shall conform to ANSI A21.51; fittings shall be push-on joint, ANSI A21.10, complete with necessary adapters to make connections to galvanized steel pipe.

Steel Pipe and Fittings. - Steel pipe and couplings shall conform to the specifications of ASTM Designation: A 120, standard weight, galvanized. Fittings, except for couplings, shall be galvanized malleable iron, banded and threaded, conforming to ANSI standard: B16.3, 150 pound class.

Polyvinyl Chloride (PVC) Pipe and Fittings. - All PVC pipe shall meet the requirements of ASTM D-1785.

All PVC pipe shall be pressure rated, Type I, Grade I, solvent-weld or push-on joint type and shall be in accordance with ASTM D 1784 and D 2241. Push-on joint pipe shall also meet the requirements of ASTM D 3139.

PVC lateral outlets for sprinklers shall be made with PVC tees or polypropylene split saddles. The top half of the saddle body shall have an integral positioning neck and an iron pipe tap outlet with a stainless steel reinforcing cap, sized to suit the runout piping. An o-ring gasket, bonded in place under the boss section, shall provide a positive seal. The split halves of the saddle body shall be assembled with two stainless steel band clamps, adjusted to provide a positive hydraulic seal without deforming the PVC piping.

Fittings shall be rated at the same pressure requirements as the pipe and shall be furnished by the pipe manufacturer. Material shall be Type I, Schedule 40 PVC as per ASTM D-2466 for socket fittings; Schedule 80 per ASTM D-2464 for threaded fittings. Sockets shall be tapered conforming to the outside diameter of the pipe, as recommended by the pipe manufacturer.

Schedule 80 PVC threaded adapter shall be used in transition between threaded and socket welded piping.

Joint connections shall be made with ring gaskets supplied by the pipe manufacturer.

Minimum length of PVC nipples shall be 3 inches.

45° fittings shall be used at all changes in depth of pipe.

Couplings shall be of the same material and wall thickness as the pipe used. On PVC to metallic connections, the metallic connections shall be made up first. Teflon tape shall be applied to all threaded PVC to metallic connections and light wrench pressure is all that should be used. Connections between straight lengths of steel pipe and PVC pipe shall be made with straight couplings.

PVC Pipe Handling. - The Contractor shall use care in handling, loading and storing pipe to avoid damage. Pipe and fittings shall be stored under cover and protected from sunlight before using, and transported in a vehicle with a bed long enough to allow the length of pipe to lay flat, so as not to be subjected to undue bending or concentrated external load at any point. Any pipe that has been dented or damaged will not be accepted.

Joining Pipe by Solvent Weld. - Pipe shall be cut square, and connecting surfaces shall be cleaned, and dried. All burrs shall be removed inside and outside of pipe ends. Outside of pipe ends shall be chamfered before assembly. Make up of joints shall be accomplished in accordance with the pipe and fitting manufacturer's directions.

Pipe in Common Trench. - Parallel runs of piping, in a common trench, shall be laid on a horizontal plane with 2-inch clear minimum separation. Crossovers shall be accomplished by means of 45° or 90° fittings so as to cause no undue "flexing" of pipe runs.

Pipe Installation. - PVC Pipe up to and including 3 inches in size may be installed by a suitable trenchless technique (pulled in) where possible. Open trench installation shall be used where soil conditions are unsuitable for pulling or where terrain dictates. No loss of warranty due to installation technique will be allowed.

Pipe Installation, Trenchless Method. - Existing lines shall be located with a suitable metal detector by the Contractor prior to pulling lines. Lines shall be assembled solvent welded. Fittings for sprinklers and valve connections, etc., shall be installed after pipe is in the ground. Lines to be "pulled" in shall be assembled no less than sixteen hours before "pulling." When pulling line, the pulling blade shall be stopped before hitting each existing line, retracted, the existing line exposed, the materials repositioned for the pull to be continued. Installed lines shall have a minimum cover of 15 inches.

Pipe Installation by Trenching Method. - Trench depth shall allow a minimum of fifteen inches from the surface to the top of the pipe. The bottom of the trench shall be free of rocks, clods and other sharp edged objects, sand shall be added to cover any sharp objects. Pipe shall be lowered into the open trench after it is assembled on the surface. A firm, uniform bearing for the entire length of each pipe line shall be

provided to prevent uneven settlement. The pipe shall be snaked from side to side of the trench bottom to allow for expansion and contraction. One additional foot of pipe is the minimum allowance for snaking. PVC pipe shall not be placed when there is water in the trench or when the temperature is 32° F or below. Solvent-weld joints shall be given fifteen minutes minimum set-up time for curing before pipe is moved. Backfill shall be compacted to ninety percent relative compaction. Backfill material shall be as recommended by the pipe manufacturer.

Thrust Blocks. - Concrete thrust blocks shall be provided for all unrestrained (push-on) piping at all changes in direction, change in size, and at dead ends, and shall be of sufficient size to safely withstand thrusts due to 150 psi internal pipe pressure. Thrust blocks shall be not less than one (1) cubic foot in volume. Concrete shall be class 6-3000-3/4.

Unions. - Unions shall be 150-lb. malleable iron, ground joint, brass-to-iron seat and shall be installed adjacent to all screwed valves which do not have integral union connections in order to facilitate removal of the valves.

1006.06 CONTROL VALVES. - Control valves shall be normally closed, diaphragm type and slow-closing. Control valves shall be actuated by a solenoid, which is rated 24 VAC, is integral to the valve and is completely molded in epoxy and encased in a moisture-proof housing.

The valve body shall be of straight or angle globe pattern, made of bronze, cast iron or brass construction, and have threaded connections. All internal valve components shall be removable for maintenance without removing valve body from the system piping.

Flow control mechanism shall be designed for both automatic and manual operation of the valve. The valve shall operate when dirt and sand are in the irrigation water. The valve shall be self-flushing and self-cleaning without the use filters or screens.

Control valves shall be in regular production and marketed for at least five years.

Flow coefficient (Cv) shall not be less than the following values for the valve sizes indicated:

For 1" diameter Cv of 13.5 minimum,
For 1¼" diameter Cv of 16.6 minimum,
For 1½" diameter Cv of 26 minimum,
For 2" diameter Cv of 52 minimum,
and For 2½" diameter CV of 65 minimum.

1006.07 VALVE BOXES. - Valve boxes shall be of reinforced concrete or fiberglass reinforced polyester premix with one piece covers marked "WATER" in cast-in letters not less than one inch high. Valve box covers shall weigh less than 35 pounds. Valve boxes shall be installed with all required extensions. Valve boxes shall have a locking feature so as to minimize or prevent vandalism.

1006.08 GATE VALVES. - Gate valves shall be as specified on the plans or in the Special Provisions; shall be flanged, threaded or ring type; shall have an iron or bronze body, with non-rising stem; and shall withstand a cold water working pressure of 200 pounds per square inch. All threaded type valves, except gate valves for backflow preventers, shall be provided with a union on each side of the valve.

1006.09 QUICK-COUPLING VALVES. - Quick-coupling valves shall be brass or bronze, 1-inch IPS, two-piece valve, single slot, white vinyl cover with lock top.

1006.10 STRAINERS. - Strainer shall have a Y-Pattern cast iron or bronze body with a removable No. 20 mesh stainless steel or monel screen. The screen element shall be rolled into the shape of a cylinder and the ends shall be reinforced. The connection may be screwed or flanged but the working pressure shall be at least 125 pounds. If the Contractor chooses to use screwed connections, then there shall be unions in all connecting pipes to allow removal of the strainer. The size shall be the same as the connected piping, disregarding the diameter of the blow-off pipe.

Strainers shall be equipped with a hose bib. Hose bibs shall be threaded or flanged and of the same size as the blow-off outlets of the strainers.

1006.11 BACKFLOW PREVENTERS WITH PADS AND ENCLOSURES.

Reduced-Pressure Backflow Preventer. - Each reduced-pressure backflow preventer shall have two independently acting spring-loaded check valves with an automatically operating pressure differential relief valve located between the two check valves; two gate valves with non-rising stem, one located at each end of the unit; and four properly located test cocks. A protective reduced-pressure zone shall be maintained between the two check valves against backpressure and back siphonage. All parts shall be removable and replaceable without disassembling the whole unit from the line. Pressure loss across each 2-inch unit shall not be more than 7.5 psi at 120 GPM. Working pressure rating shall be 150 psi. Each unit shall meet the specifications of AWWA, International Association of Plumbing Mechanical Officials (IAPMO), and the University of Southern California (USC) Foundation for Cross Connection Control.

Tests shall be conducted by the Contractor on each backflow preventer in accordance with the manufacturer's literature to assure the proper function of the two check valves and the pressure-relief valve, and to verify a minimum 2 psi differential pressure between the inlet pressure and the pressure between the two check valves, at which the pressure-relief valve shall remain open.

The Contractor shall obtain, at no extra cost to the City, the services of a certified backflow preventer device tester to inspect and check all installed reduced-pressure backflow preventers for proper installation and operation; all in compliance with applicable health codes and backflow prevention device standards. A written certification by the certified tester for each inspected reduced pressure backflow preventer shall be forwarded to the City by the Contractor.

Enclosures. - The Contractor shall furnish and install Type "A" chain-link enclosures set on concrete pads, where and as shown on the plans, and in accordance with Section 803 of these Standard Specifications.

1006.12 PUMPS. - Pumps shall conform to requirements in the Special Provisions and as shown on the plans.

Pumps shall be bronze-fitted, single-stage, close-coupled uni-type, centrifugal pumps. Pumps shall be so constructed so that the motor and rotating parts can be removed without disturbing the volute case or the piping. Pumps shall be furnished with a heavy cast iron base. The entire pump assembly shall have a shop applied baked enamel epoxy finish.

1006.13 SPRINKLERS.

General. - The sprinklers shall conform to the requirements in the Special Provisions and as shown on the plans and as set forth in these Standard Specifications. All sprinklers shall be set perpendicular to finish grade.

Rotary Pop-Up Sprinklers.

Materials of construction - All Rotary pop-up sprinkler parts subjected to mower induced loads including but not limited to nozzles, nozzle holder, and outer housing shall consist of suitable metal in adequate thickness to carry such loads without damage resulting in sprinkler breakdown.

Vandalism requirements - Rotary pop-up sprinklers shall have no easily removable fasteners, no small easily removable parts which are exposed at rest or during operation, and no easily changed operating adjustments, and shall pass destructive tests which include forced turning of nozzle assembly, and steady and shock loads in vertical and horizontal directions on exposed parts both at rest and during operation.

Note: Impact arm devices have been found to be too easily jammed and will not meet City vandalism requirements

Rotary pop-up sprinklers shall have vandal-resistant fasteners as approved by the City for securing the sprinkler covers.

Anti-drainage valves - Rotary pop-up sprinklers shall be provided with anti-drainage valves to prevent drainage on grades, where a sprinkler is installed 3 feet or more below the highest common outlet. Anti-drainage valves shall be installed with triple swing joint assembly and shall match thread diameter of sprinkler inlet. The anti-drainage valves shall have less than 2.0 psi loss at rated sprinkler flow.

Manufacturer's warranty - The nozzles, nozzle holder and outer housing of these products shall be guaranteed for a period of 7 years to be free of field breakage or defects in workmanship or material. The manufacturer shall repair or replace any of these parts without charge, provided equipment has been installed and used in accordance with the

manufacturer's instructions and is returned to the manufacturer at the expense of the City. This guarantee shall be absolute and shall not be prorated.

The gear train of these products shall be guaranteed for a period of 7 years to be free of defects in workmanship or material. The manufacturer shall repair or replace any part of the gear train developing defects within the guaranteed period without charge provided it has been installed and used in accordance with the manufacturer's instructions and is returned to the manufacturer at the expense of the City. This guarantee shall be absolute and shall not be prorated.

Construction details - Rotary pop-up sprinklers shall have the nozzles and internal drive mechanisms readily accessible without removing the sprinkler housing from the ground. Each sprinkler shall be supplied with rubber cap and sprinkler cover.

Production History - The sprinklers shall have been in regular production for at least 7 years unless otherwise specified.

Performance requirements - Full circle and part circle rotary pop-up sprinklers shall meet the following performance criteria:

Operating pressure (psig)	30 to 50	40 to 55
Flow rate (gpm) ± 10%	9.8 to 12 OR	13 to 15.7
Spacing.....	50 ft. min.	58 ft. min.

Uniformity criteria at square spacing with up to 3 mph wind shall be as follows:

Christiansen coefficient of uniformity (Cu) of 92 or more, and

Maximum percentage of area involved	Variation from mean precipitation rate
0	less than 50% & greater than 150%
2	less than 60% & greater than 140%
4	less than 70% & greater than 130%

Performance requirements for low-pressure rotary pop-up sprinklers - Sprinklers specified on the plans as low-pressure rotary pop-up sprinklers shall have been in regular production for at least two years and meet the following performance criteria:

- 1) Minimum coverage of 35 to 38 feet radius at a base pressure of 20 to 30 psi.
- 2) Rate of discharge: 3.9 to 5.0 gpm.

1006.14 TRIPLE SWING JOINT ASSEMBLIES. - Each triple swing joint assembly shall be made of PVC and have a 6-inch nipple of schedule 80 PVC. On swing-ell shall be affixed together and affixed to the nipple. A swing-ell is a street ell constructed so that the male threaded portion may be freely turned independently of the ell. To prevent leakage between male threaded portion and the body, two Buna-N O-rings shall be used. The assembly shall have a factory three year warranty and shall be rated for 150 psig working pressure.

1006.15 TESTING OF IRRIGATION FACILITIES. - The Contractor shall flush and test all irrigation piping furnished and installed under the contract prior to the backfilling of pipe trenches and installation of the sprinklers and valves. The piping may be flushed and tested in sections as approved by the Engineer.

Each piping system shall be flushed clean with water and then tested at a hydrostatic pressure of 100 psig for a period of one hour. All detectable leaks, regardless of amount of leakage shall be corrected.

After completion of a satisfactory test for each piping system the Contractor shall install the sprinklers and quick-coupling valves, and make all necessary adjustments for proper sprinkler coverage, all to the satisfaction of the Engineer.

The Contractor shall furnish all labor, material, equipment and tools for flushing, testing and adjusting of the entire irrigation system. All flushing, testing and adjusting shall be done in the presence of the Engineer.

The Contractor shall not backfill or cover any of his work until it has been inspected, tested and approved by the Engineer. If any part of the irrigation system is found to be at fault and if coverage is found to be inadequate, the Contractor shall make all restoration and repairs so that the system will be in order. At final inspection, the system shall be thoroughly clean and operable and meet the requirements set forth in the plans, the Special Provisions and these Standard Specifications.

1006.16 ADDITIONAL IRRIGATION WORK NOT SHOWN ON PLANS. - The Engineer will determine at any time during the course of the work under this contract the extent or amount of additional irrigation work required, if any.

Payment for additional irrigation work, satisfactorily done, complete in place, as specified, will be made at the respective unit price bid therefor, as set forth in the Schedule of Bid Prices in the Proposal.

If there is no unit price Bid Item or Items for irrigation work in the Schedule of Bid Prices, then such additional irrigation work, if authorized by the Engineer, will be done as Extra Work.

SECTION 1007

PLANTING

1007.01 GENERAL. - The work covered under this Section is considered specialty work and the Contractor must have a California License in Class C-27 or he must employ as a sub-contractor a person or persons holding such license. Only experienced landscape Contractors shall handle, plant, trim, prune or water nursery stock.

As set forth in Section 105.01, the Contractor shall keep himself informed of and shall comply with the laws and regulations applicable to the work, particularly those laws related to the transportation and shipment of plants and materials. Certification of inspection of nursery stock shall be provided as required by Federal, State and local laws.

Planting shall be done only during weather that is favorable for the particular type of planting operation and plant involved. The Contractor shall supply at his sole expense all water hose and other equipment as required to properly maintain the nursery stock for the duration of the contract. Names, quantities and sizes of plants shall be as set forth in the Plant list on the drawing.

The Contractor shall prepare the site for planting by:

- A) clearing the areas of weeds, roots, debris, rocks and underground obstructions to an acceptable planting depth prior to placing imported material and/or prepared backfill mix;
- B) treating the soil with a selective pre-emergence herbicide, so as to eliminate weeds or other undesirable plants;
- C) providing proper moisture for optimum planting conditions;
- D) cultivating, raking and rolling areas before planting.

The Contractor shall furnish and install all plants and materials, including imported soils, herbicide fertilizers, stakes, ties, straps and other accessories not called out but required to complete the work as intended.

1007.02 SOIL STERILIZATION. - Application of a soil sterilizing, or selective pre-emergence herbicide agent to the area or material shall be in strict accordance with the recommendations of the manufacturer. The Contractor, by instituting all precautions necessitated by the type of chemical agent and its application, shall prevent any contact of the agent occasioned by wind or otherwise with persons or animals or with existing planting on private property or otherwise not specifically intended to be destroyed. Any such planting destroyed or damaged shall be replaced at the sole expense of the Contractor with healthy planting of the type and at the stage of growth identical to that being replaced. Soil sterilizer or weed killer shall be an approved type which will permit planting and not inhibit normal growth of the nursery stock planted three weeks after application. Compounds containing cyanide or arsenic will not be acceptable.

1007.03 IMPORTED SOIL. - The Contractor shall furnish and place imported soil in the planting areas indicated on the plans. The soil to be imported shall conform to the following standards:

1. Particle size distribution;
Minimum ninety-five percent passing a 25.4 mm screen; minimum eighty-five percent passing a 9.5 mm screen; fraction passing a 9.5 mm screen shall contain a minimum of fifteen percent, and a maximum of forty percent total silt and clay.
2. Agricultural suitability;
Salinity (EC X10) less than 4.0 at twenty-five degrees Centigrade; Sodium absorption ratio (SAR) less than ten; Boron in saturation extract less than 1.0 ppm; pH (soil reaction) 6.0-7.5
3. Pests;
The population of any single species of plant pathogenic nematode less than five hundred per pint of soil.

The Contractor shall make the site of his soil source known to the Engineer two weeks minimum prior to the date he proposes to do hauling and placing of soil. The Engineer will inspect the site, collect samples of the soil, and deliver the samples to an accredited soils laboratory for analysis and report. The Contractor shall pay all costs for the required analysis and reports. Upon receipt of the analysis and report from the laboratory indicating compliance with the standards set forth in the Specifications, the Engineer will notify the Contractor that he may proceed with the importation of soil. No importation of soil shall be done prior to notification to the Contractor by the Engineer. Only approved soil shall be used for the entire project and substitutes will not be acceptable.

Imported soil shall be delivered to the site in a reasonably dry and workable condition; it shall not be muddy or wet. Imported soil shall be placed and spread to the lines and grades shown on the plans and as directed by the Engineer. Any extraneous or unacceptable materials not previously removed shall be raked off and removed from the site at the time of spreading. Imported soil shall be compacted to a uniform specified depth as shown on the plans or directed by the Engineer.

The character of the imported soil shall conform to the character of the existing soil so that the final product in:

- a) Lawn areas shall be a coarse, sandy loam with optimum drainage characteristics. The soil type in lawn areas shall be free of imported soil amendments. Optimum imported soil types shall include; Banks sand, Dillon Beach, Orly #2, Presidio Shoal or Lapis.
- b) Ground cover, shrub or areas other than lawn areas shall be a coarse sandy loam with optimum drainage characteristics similar to the types listed above with a ten to twenty-five percent addition of soil amendment.

1007.04 SOIL AMENDMENT. - Soil amendment shall be fresh raw fir or pine bark and consist of ninety-nine percent (99%) bark and less than one percent (1%) wood; fine grind, one-eighth (1/8) inch to zero (0) particle size, contain a minimum of ninety-two percent (92%) organic matter on a dry weight basis with a dry bulk density of 450-580 lbs. per cubic yard. Salinity shall not measure over 4.0 millimhos per centimeter at 25 degrees centigrade as measured by saturation. It shall be

stabilized with 0.8-1.2% nitrogen, 0.08% iron and a non toxic biodegradable wetting agent.

Samples of soil amendment and source of supply shall be submitted to the Engineer for testing and approval prior to delivery to the site. Only approved amendment and source of supply shall be utilized, and no substitutions will be accepted.

1007.05 PREPARED SOIL. - Prepared soil or backfill mix shall consist of, by volume, two thirds imported soil and one third soil amendment. The prepared soil shall be mixed on the site and no more shall be mixed than can be used in one day. It shall be thoroughly mixed and turned over four times minimum with a shovel to assure a good mixture.

1007.06 FERTILIZERS. - Commercial fertilizers shall be pelleted in form and shall be of the following formula: six percent nitrogen, nine percent phosphoric acid, and six percent potash. Fertilizer planting tablets shall be composed of slow release fertilizers compressed into tablets of twenty one gram weight and specifically designed for root zone placement. They shall be of the following formula: twenty percent nitrogen, ten percent phosphoric acid, and five percent potash. All fertilizers shall be brought to the job site in the manufacturer's unopened containers and shall carry labels stating manufacturer's name, fertilizer weight and assurance that analysis has been made.

1007.07 NURSERY STOCK. - Nursery stock shall be first class, representative of the normal species or variety, equal to, or exceeding the standards of the American Association of Nurserymen and applicable Federal and State Codes and of the size and caliber specified on the plans or in the Special Provisions. Only fresh, vigorous, healthy, full, bushy, not leggy, well-rooted, branched, shaped and established nursery stock, free from insects, disease, disfiguring knots, sun scald injuries, bark abrasions, or other disfigurements shall be furnished. Plants that become wilted anytime before planting will not be considered acceptable.

The soil level in fifteen gallon and larger containers shall not be lower than four inches below the top of the container, three inches below the top of the container for the five gallon size, and two inches below the top of the container for the one gallon size. Ground cover plants shall be grown in flats and will be inspected at the nursery by the Engineer, and shall be delivered to the job site in the flats in which they were grown.

Nursery stock nomenclature is based on the American Joint Committee on Horticultural Nomenclature, or on names generally accepted in the nursery trade. Each plant shall be well formed, undamaged, not root bound and shall not have a deformed root system.

In fifteen gallon containers, each tree trunk shall not have any limbs over one quarter inch in diameter from ground level to a height of six feet. Such limbs shall be removed as directed by the Engineer. However, light growth along the tree trunk is desirable. Each tree shall have a dominant leader, untrimmed, unbroken and trained to a vertical position. Any tree having a weak crotch will be rejected. Due to plants' varied growing habits, any exceptions to the standards set forth here shall be approved by the Engineer prior to accepting any plants.

The Engineer will attach a tag to each tree, shrub and container of ground cover accepted for planting. Any plant not tagged will be considered as a reject and shall not be planted. At time of planting, a plant which has been tagged yet shows signs of neglect will be rejected. Each and every variety of nursery stock shall be identified by its botanical name, specie and variety printed on a hardwood tag which shall be fastened to the trunk of the tree, shrub or to the flat of ground cover. Identification tags shall be fastened to every tree and to twenty percent of the shrubs in each grouping of each variety throughout the project. Ground cover shall have one tag for each flat of each variety.

The Contractor shall notify the Engineer forty-eight hours in advance of the time the nursery stock is to be received at the site. All nursery stock shall be available for inspection at a nursery located within fifty measured road miles from San Francisco's City Hall. If not available within this area, all additional expenses for transportation, board and lodging resulting from the Engineer's inspection shall be borne by the Contractor.

1007.08 PLANTING PROCEDURES FOR PLANTS IN CONTAINERS. -

Planting pits for plants supplied in containers shall conform to the following minimum standards; a one gallon container shall be twelve inches wider and six inches deeper than the container size; a five gallon container shall be sixteen inches wider and nine inches deeper than the container size, and a fifteen gallon container shall be twenty four inches wider and twelve inches deeper than the container size. The soil in the planting pits shall be of optimum moisture content at the time of planting. Excessively wet or dry soil as well as unfavorable weather conditions shall be considered unacceptable transplanting conditions.

All containers shall be cut with tin snips or approved can cutters. An axe shall not be used.

When planting, the root balls shall be handled carefully so that they do not crack or fall apart. The Engineer may require light slashing of the sides and/or a criss-cross across the bottom of the root ball to sever exposed roots growing in a circular manner.

All planting pits shall be backfilled with "prepared soil" as specified in Section 1007.05.

In planting, the plant root ball shall be placed high enough in the pit so that after due natural settling the top of the root ball soil is not more than one inch below the surface of the surrounding adjacent ground. This will be checked specifically during the premaintenance inspection. Adjustments shall be made by the Contractor to achieve the Specified positioning.

After the root ball is in position, more "prepared soil" shall be added and hand-tamped into place to bring the back fill up to grade.

When the backfill is approximately in place, fertilizer tablets shall be placed alongside and around the root ball according to the following schedule:

1 Gallon plant	:	3 tablets
5 Gallon plant	:	5 tablets
15 Gallon plant	:	6 tablets
24 Inch Box	:	8 tablets
36 Inch Box	:	10 tablets
48 Inch Box	:	12 tablets
54 Inch Box	:	14 tablets

After planting, the Contractor shall build a six-inch high berm around the root ball forming a basin to facilitate watering. The berms shall be maintained throughout the planting and maintenance periods. No berms are required in grass areas.

All plants shall be watered immediately after planting.

Trees shall be staked and tied immediately after planting.

1007.09 TREE STAKING. - Each tree shall be staked at the time of planting using stakes, tree straps and nails.

Each tree shall be double staked with two cross braces and two ties minimum. Cross bracing material shall be made of redwood or douglas fir construction grade wood with dimensions of one inch by three inches by the distance between the two stakes.

The position of the cross braces shall be determined for each tree according to the height and branching structure of the tree.

Stakes shall be positioned so as to miss the root ball completely. Stakes shall be made of douglas fir or redwood construction grade or lodgepole pine wood with dimensions of two inches by two inches by twelve feet long. Stakes shall be hardwood pointed at one end and treated after being pointed with copper naphthanate which shall penetrate the stake to a minimum of one-quarter inch depth. Four feet of the stake shall lie below grade level.

Each tree shall be secured to the cross braces using two straps (minimum) in a figure-eight tie. Tree ties shall be made of a durable corded rubber and of sufficient length so that they are semi-loose with approximately one-quarter inch clearance between the tree trunk and the strap.

The straps shall be secured to the braces by nailing with eleven-gauge galvanized roofing nails placed at the center of the brace.

1007.10 GUYING. - Guying material shall consist of zinc coated number ten BWG guy wire connected with galvanizing turnbuckles, one per line. Plastic ribbon tie one inch wide with a minimum tensile strength of five hundred pounds shall be used to connect guy wire to tree branch.

A deadman stake two inches by four inches by two feet long or a three-quarter inch diameter by three feet long steel pipe shall be used to hold each guy wire in place.

One-half inch polyethylene tubing painted white shall be used to cover guy wire.

For twenty-four inch and thirty-six inch boxes, a minimum of three guy wires shall be used. For forty-eight inch boxes and fifty-four inch boxes a minimum of four guy wires shall be used for safety.

1007.11 GROUND COVER. - Ground cover nursery stock and lawn and the planting thereof shall be in accordance with the applicable requirements of Section 1007.08.

Ground cover shall not be planted in an area until all trees and shrubs for that particular area have been planted and all surplus material removed.

Spacing of ground cover nursery stock shall be as indicated on the plans or specified in the Special Provisions.

Ice Plant (*Mesembryanthemu Edule*) cuttings shall be planted one to a hole, or at one-foot centers, in rows one foot apart ground measurement. Plants in adjacent rows shall be staggered.

1007.12 SEQUENCE OF PLANTING FOR GROUND COVER NURSERY STOCK. - Planting pits shall be excavated to the proper size and depth to accommodate root systems without cramping.

Each plant shall be centered in the pit in a plumb position, regardless of the slope of the ground.

The pit shall be backfilled with native soil material unless otherwise specified.

The soil shall be carefully tamped around the plant, taking care not to bruise the plant.

The area planted with ground cover plants shall be watered immediately after planting.

The soils shall be cultivated to a uniform grade between plants and commercial fertilizer shall be applied on the ground surface over the entire area at a rate of fifteen pounds per one-thousand square feet.

1007.13 GRASS SEED. - Each variety of seed shall be packed separately, delivered in good condition and clearly tagged as required by law showing the variety, purity, germination and weed content. The seed shall be delivered as specified and must be guaranteed to be as stated on the tags.

The following mixture of grass seed shall be used unless otherwise stated in the Special Provisions, the plans or as directed by the Engineer:

<u>Name of Seed</u>	<u>Percent of Mix</u>
Perennial Rye	
Yorktown 2	25%
Manhattan	25%
Hybrid Blue Grass	
A-24	30%
Baron	20%

1007.14 GRASS SEED SAMPLING AND TESTING. - Determination of purity shall be made separately for each type of seed in the mixture. A minus tolerance of two-tenths of one percent in the specified purity of each type of seed will be allowed.

The following tolerances in germination will be allowed:

96 or over.....	5
90 or over, but less than 96.....	6
80 or over, but less than 90.....	7
70 or over, but less than 80.....	8
60 or over, but less than 70.....	9
Less than 60.....	10

The Engineer will take a representative sample of each type of seed, seal the container and forward the sample to the State Department of Agriculture Seed Testing Division. The samples will be tested for purity, germination and weed content. The seals on the seed containers shall not be broken until the Engineer consents to same in writing. The Engineer may condemn any seed on which the seal has been broken prior to the time he consents to this action.

If the seed sample does not pass the specifications as determined by the tests made by the State Department of Agriculture, the Contractor shall immediately remove from the work the seed which did not meet specifications.

If it is in the City's best interest, the Engineer may allow the seed to be sampled and tested by an approved private laboratory but all fees and expenses connected therewith shall be paid by the Contractor.

1007.15 LAWN PLANTING. - After the area is to receive lawn has been graded and cultivated, it shall be disced and cross-disced in two directions or rototilled, thoroughly pulverizing the surface.

Fertilizer shall be applied to indicated turf areas at a rate equal to one pound of actual nitrogen per one thousand square feet. Fertilizers shall be applied by mechanical rotary or drop soil to a depth of three inches. Areas inaccessible to power equipment shall be fertilized with hand tools and incorporated into the soil. The Contractor shall restore prepared areas to the specified condition prior to seeding if eroded, settled, or otherwise disturbed after fine grading.

Only skilled workmen will be allowed to sow the seed. The surface shall be raked lightly and the seed sown evenly by a mechanical seeder at the rate of one pound per one hundred square feet. Sowing shall be done only in calm weather and in the presence of the Engineer.

After the seed has been sown, the surface of the soil shall be raked very lightly, so that the germination is even throughout. After raking, the surface shall be rolled with a light roller to achieve an even surface free of humps and surface irregularities to facilitate mowing.

Immediately after completion of planting, the seeded area shall be watered with a fine spray to provide a one-inch depth of penetration into the soil. The top surface shall not be allowed to dry out at any time.

1007.16 LAWN SOD. - Lawn sod shall be at least ten months old and have a well developed root system firmly knitted together. The sod shall be free from weeds and shall be treated with a lawn moth control agent. Sod shall be delivered in one foot wide strips, five feet long and one and one-half inches thick. Sod shall be as specified in the Special Provisions or on the plans.

1007.17 LAWN SOD PLANTING. - Preparation for lawn sod planting shall be similar to that as required for lawn planting in Section 1007.15.

The Contractor shall lay sod to form a solid mass with tightly fitted joints. Ends and sides of sod strips shall be butted together and edges shall not be overlaid. Strips shall be staggered to offset joints in adjacent courses. All excess sod shall be removed to avoid smothering of adjacent grass. The top of the sod pad shall be flush with adjacent curbs, sidewalks, drains and seeded areas.

Sod shall not be installed on saturated soil. The initial row of sod shall be installed in a straight line beginning at the bottom of slopes, perpendicular to the direction of the sloped areas. Subsequent rows shall be placed parallel to and tightly against previously installed rows.

Sod placed on slopes greater than three to one shall be pegged to prevent slippage. Place two stakes per yard of sod.

Sod shall be thoroughly watered with a fine spray immediately after laying. Sod shall be rolled with a light lawn roller to ensure contact with subgrade.

1007.18 STREET TREE AND MEDIAN PLANTING. - All street tree and median planting shall be performed in accordance with the requirements of Section 1007.08, except as hereinafter specified. The Engineer shall be notified forty-eight hours prior to planting. In street tree planting, the tree's root ball shall be flush with the bottom edge of the bricks or precast covers in the sidewalk areas.

All plantings in center islands having an irrigation system, in areas not requiring slope stabilization or in removed sections of the sidewalk, shall be planted without basins or berms around the pits and shall not be mulched.

1007.19 CUTTING CONCRETE AND ASPHALT PAVEMENTS. - Concrete and asphalt sidewalk and island pavement shall be cut along the edge of each tree pit with a concrete cutting saw, as specified in Section 701.03, to a depth of two inches to isolate the section of concrete or asphalt to be removed and to leave a clean-cut edge on the remaining sidewalk or pavement. Edges shall be cut parallel and perpendicular to the curb and shall be squared and true except for pits in traffic islands which shall be aligned as directed by the Engineer.

1007.20 BRICKS OR PRECAST COVERS SET ON SAND. - Bricks or precast covers set on a sand bed shall not be placed until the last days of the "Plant Establishment Period." The prepared backfill in the tree pits shall have settled and present a firm bed, as determined by the Engineer, before placing the sand bed. Bricks shall be burned solid clay masonry units, standard building bricks, brick-red colored, smooth-faced texture and shall conform to the requirements for Grade MW of ASTM "Standard Specifications for Building Brick (Solid Masonry Units from Clay or Shale)," Designation C62.

Prepared backfill in planting pits shall be regraded to receive the bricks or precast cover on the sand bed. The Contractor shall make certain that backfill is firmly packed under adjacent sidewalk and pavement and shall hand-tamp fill material under adjacent sidewalk and pavement if necessary at the same time the sand bed is placed. A two inch layer of clear river sand shall be placed over the prepared backfill to form a firm setting bed for the bricks or precast cover. The top surface of the bricks or precast cover shall be flush with the adjacent pavement surface.

After the bricks have been placed and full-joint mortared, clean sand shall be placed around the tree to about one-half inch below the surface of the bricks and the bricks shall be brushed clean. Any bricks that within a one year period tip, rock or settle, shall be removed and reset to finished grade in accordance with Section 105.10.

1007.21 TREE GUARDS. - Except for conifers, all trees planted in paved areas shall have a tree guard constructed of three-quarter mesh, sixteen gauge, four feet wide galvanized wire cloth, placed immediately around the tree. Each guard shall be securely fastened top and bottom to the inner side of the tree stakes with three, three-quarter inch galvanized staples. The guard shall be positioned with the joint at the inside of the stakes so that passers-by will not get snagged. The bottom edge of the tree guards shall be a maximum of eighteen inches above the adjacent grade.

1007.22 PAYMENT. - Imported soil satisfactorily furnished and placed as specified shall be paid for as specified in the Special Provisions. When imported soil is specified to be paid for at the price bid per unit volume, the depth to be used in computing the volume shall be the depth measured normal to the slope of the natural grade with compacted soil in place, multiplied by the area measured along the surface of the finished grade. When imported soil is specified to be paid for at the price bid per unit area, the area shall be measured along the surface of the finished grade.

SECTION 1008

MAINTENANCE AND PLANT ESTABLISHMENT

1008.01 GENERAL. - The Contractor, from the time of planting, shall maintain all nursery stock and other planting planted under the contract, shall do all work to establish the satisfactory growth of such planted nursery stock and other planting, shall maintain the entire of the areas landscaped under the contract, shall continue such maintenance throughout the "Plant Establishment Period", and shall do all related and Incidental Work.

Maintenance shall include replacing any planted nursery stock or other planting which fails to establish normal healthy growth, as determined by the Engineer. Replacement with healthy stock shall be made immediately upon withering or failure to grow, or within forty-eight hours after notification by the Engineer; in addition, any replacements which fail to grow satisfactorily, as determined by the Engineer, shall be satisfactorily replaced by the Contractor; all at no additional cost to the City.

Maintenance shall also include keeping the landscaped areas free of weeds, rocks, debris and other deleterious material; maintaining and keeping plant irrigation basins and saucers properly formed; cultivating; restoring ground areas damaged by erosion or trespassing; doing all necessary watering including furnishing water and equipment for the use thereof; and doing all other work necessary, or required, for the satisfactory establishment of normal healthy growth of the planted nursery stock or other planting.

1008.02 INSPECTION. - After planting, the site will be periodically inspected by the Engineer. Should the Contractor, after written notification by the Engineer of any deficiency in the maintenance or necessity for replacement of plants, fail to remedy such deficiency or make such replacement, the Engineer may cause such deficiency to be remedied or replacement made and the cost thereof deducted from moneys due the Contractor. Should the best interest of the City require immediate remedy without the delay incident to such notification, remedial action, as necessary to alleviate the emergency will be taken and the cost thereof deducted from moneys due the Contractor.

1008.03 PRE-MAINTENANCE INSPECTION AND APPROVAL. - The Contractor shall notify the Engineer in writing, at least one week prior to the completion of all planting and related work that all plant material,

will at the time stated, be satisfactorily in place, weed free, and in satisfactory condition.

The Engineer will schedule and make arrangements for the planting inspection. Approval of the planting at this inspection signifies that the planting has been satisfactorily completed and the "Plant Establishment Period" may commence.

If the inspection reveals deficiencies in the planting, the Engineer will give the Contractor a list of deficiencies to be corrected by the Contractor before the "Plant Establishment Period" may commence.

If the inspection reveals deficiencies in the planting, the Engineer will give the Contractor a list of deficiencies to be corrected by the Contractor before the "Plant Establishment Period" may begin. The Contractor shall correct the deficiencies, request a second inspection to verify that the corrections have been made, and if so verified, the Engineer will notify the Contractor to begin the "Plant Establishment Period." If deficiencies still exist, the procedure shall be repeated and the beginning of the "Plant Establishment Period" shall be delayed until all noted deficiencies have been corrected.

1008.04 PLANT ESTABLISHMENT WORK. - The "Plant Establishment Period" shall be a period of continuous satisfactory maintenance, the duration of which shall be as specified in the Special Provisions.

The "Plant Establishment Period" shall commence on the date designated by the Engineer after satisfactory completion and approval of the planting and related work.

Weeding shall be done periodically, often enough to prevent weeds from growing to two inches in height.

Weed control by chemical treatment will be permitted, but the Contractor shall be responsible for any damage to adjacent plants by the use thereof. The use of mowers and scythes will not be allowed.

Sand in planting pits for trees planted in sidewalk areas shall be replenished every thirty days prior to final inspection.

Irrigation basins shall be reformed and remulched prior to final inspection.

Additional work, in the judgment of the Engineer necessary for proper plant establishment, shall be done as Incidental Work. Examples of such work are: wind guards for trees and shrubs, stakes for shrubs, additional protective fencing, and drainage ditches.

Planting shall be replaced as necessary in accordance with the requirements of Section 1008.01. In addition, replacement trees and shrubs planted during the "Plant Establishment Period" shall each be clearly identified by a large, white, wooden tag attached thereto, showing the date of planting.

Plants, replacing those previously planted and not observed for the full "Plant Establishment Period", which, after acceptance of the work, fail to establish normal healthy growth shall be considered to be defects in the work, and subject to the requirements of Section 105.10.

1008.05 TREE AND SHRUB MAINTENANCE. - Maintenance of trees and shrubs, and plant establishment work therefor, shall be in accordance with the applicable requirements of Sections 1000 and 1008.

Any plants that have settled so that the top of the root ball is below the bottom of the basin or finished grade, as applicable, shall be raised to the specified level. All plants that have settled deeper than as

specified immediately hereinbefore, and have failed to grow, shall be removed and replaced by the Contractor at his sole expense.

1008.06 GROUND COVER NURSERY STOCK MAINTENANCE. - Midway in the "Plant Establishment Period", fifteen pounds of commercial fertilizer shall be applied per 1000-square feet of ground cover area.

Nursery stock shall be watered sufficiently to keep the ground moist well below the root system, throughout the life of the contract.

1008.07 LAWN MAINTENANCE. - Areas planted with lawn shall be watered sufficiently to keep the area uniformly moist throughout the life of the contract.

The lawn shall be mowed and trimmed when the grass reaches a height of two inches, after which the area shall be satisfactorily rolled. After initial mowing, the lawn shall be mowed once a week.

All bare spots on the lawn shall be reseeded.

The lawn shall be maintained for the duration of the "Plant Establishment Period" at the end of which time the lawn shall be mowed, weeded, and trimmed for final inspection.

1008.08 SOD MAINTENANCE. - While the grass is growing the Contractor shall keep the lawn free from weeds and disease. Either chemical weeding, hand weeding, or both may be used to maintain healthy lawn growth. The grass shall be cut as many times as required to keep the height of the grass below two inches. No cut grass shall be allowed to lay on the turf. Any bare spots shall be filled with sod to fit. No seeding will be allowed.

1008.09 CULTIVATING. - The area between plants shall be kept cultivated and shall have been cultivated within seven days prior to the pre-maintenance inspection and within seven days prior to the final acceptance inspection.

1008.10 FINAL ACCEPTANCE INSPECTION AND APPROVAL. - At least one week in advance of the expiration of the "Plant Establishment Period" the Contractor shall request the Engineer to schedule a final acceptance inspection.

The inspection will be similar to the pre-maintenance inspection. If any deficiencies are noted by the Engineer at the final inspection, the "Plant Establishment Period" will be extended until such deficiencies are satisfactorily corrected. The Contractor shall bear all costs required to maintain the plantings during the extended "Plant Establishment Period" and if the time allowed for completion of the job is exceeded, will be liable for liquidated damages.

SECTION 1009

RESTORATION OF EXISTING LAWN AND OTHER PLANTING

1009.01 GENERAL. - The Contractor shall not disturb or cause neglect to existing lawn and planting within or outside the contract area due to his operations.

Where trenches and other excavations and land used by the Contractor are in existing lawn or other existing planted areas, the Contractor, as specified in the Special Provisions or designated on the plans, shall either replace existing lawn by reseeding or shall remove, store and subsequently replace existing lawn by resodding; and shall remove, store and subsequently replant all other existing vegetation other than ground cover planting; all, except as otherwise specified, to the extent required to be removed as a result of his operations; and shall maintain for the duration of the contract, all lawn and other planting replaced by him.

Lawn and other planting not required to be removed but damaged or destroyed by the Contractor's operations, plants not acceptable for replanting due to improper removal and storage, plants which the Contractor chooses to replace, and ground cover planting, shall be replaced with lawn and other planting, as applicable, at least equivalent in quality to that which existed prior to the work under the contract. In this case, replacement of existing lawn shall be by reseeding.

In order that future growth can be assured, the Contractor shall not delay completion of backfill and restoration of lawn and other planting.

All lawn and other planting replaced by the Contractor shall be planted, maintained, and inspected prior to acceptance as hereinbefore specified for the respective type of planting.

1009.02 MATERIALS. - Commercial fertilizer, imported soil, plantings, grass seed, and other materials necessary or required for the satisfactory restoration of existing plantings shall be as specified in Section 1007.

1009.03 REPLACEMENT OF TOPSOIL. - When excavating in existing lawn and other planted areas, the Contractor shall properly separate, as determined by the Engineer, topsoil from the other material excavated; or in lieu thereof, may furnish imported soil at his own expense.

The Contractor shall construct compacted backfill to the required subgrade for topsoil and shall comply with the provisions of Section 1001.

He shall place topsoil or imported soil as the case may be, and in lawn area replace the lawn sod if specified to a thickness at least equal to that of the adjacent existing topsoil. In any case, a minimum depth of eight inches of topsoil or imported soil and lawn sod, as applicable, shall be placed.

Imported soil shall be in accordance with the requirements of Section 1007.

Before any tree, shrub or ground cover replanting or lawn resodding or reseeding, topsoil or imported soil shall be fertilized with an application of commercial fertilizer, mixed thoroughly in the top one-quarter inch of topsoil or at the rate of two pounds per one hundred square feet.

1009.04 REPLACEMENT OF LAWN BY RESODDING. - Before removal of any lawn sod, the lawn shall be cut short and well watered. Lawn sod shall be lifted in twelve inch squares, two inches in thickness; shall be laid flat so that no square rests on top of another square and placed in a shaded place and shall be protected during storage and be watered at least three times each day, when and as directed by the Engineer.

The Contractor shall carefully replace and tightly butt the squares of lawn sod, firmly hand tamp the replaced area and fill any voids between squares with fine topsoil seeded as directed. The replaced lawn sod shall provide a smooth continuous lawn completely covering the appropriate area and conforming to adjacent grade and shall be watered immediately following the replacement.

1009.05 RESTORATION OF LAWN BY RESEEDING. - Restoration of existing lawn areas by reseeded shall be in accordance with the requirements of Section 1007.15.

Maintenance and plant establishment shall be in accordance with the applicable requirements of Section 1008.

1009.06 PAYMENT. - Restoration of existing lawn and other planting damaged, destroyed or removed by the Contractor in the performance of his work shall be done as Incidental Work and payment thereof shall be included in the price or prices bid.

SECTION 1010

IMPORTED FURNISHINGS

The furnishing and installation of prefabricated site furnishings such as benches, play equipment, kiosks, trash enclosures, fire pits, bicycle racks, etc. and imported furnishings such as sand used in play areas, shall meet all requirements as set forth in these Standard Specifications.

In the event there is a conflict between the method of installation of prefabricated site furnishings required by the specifications and that recommended by the manufacturer, the Contractor shall request resolution of such conflict by the Engineer.

SECTION 1011

PAYMENT

Landscape work satisfactorily constructed or furnished and installed as specified, will be paid for at the lump sum price bid therefor, except as otherwise specified in the Special Provisions.

END PART 10