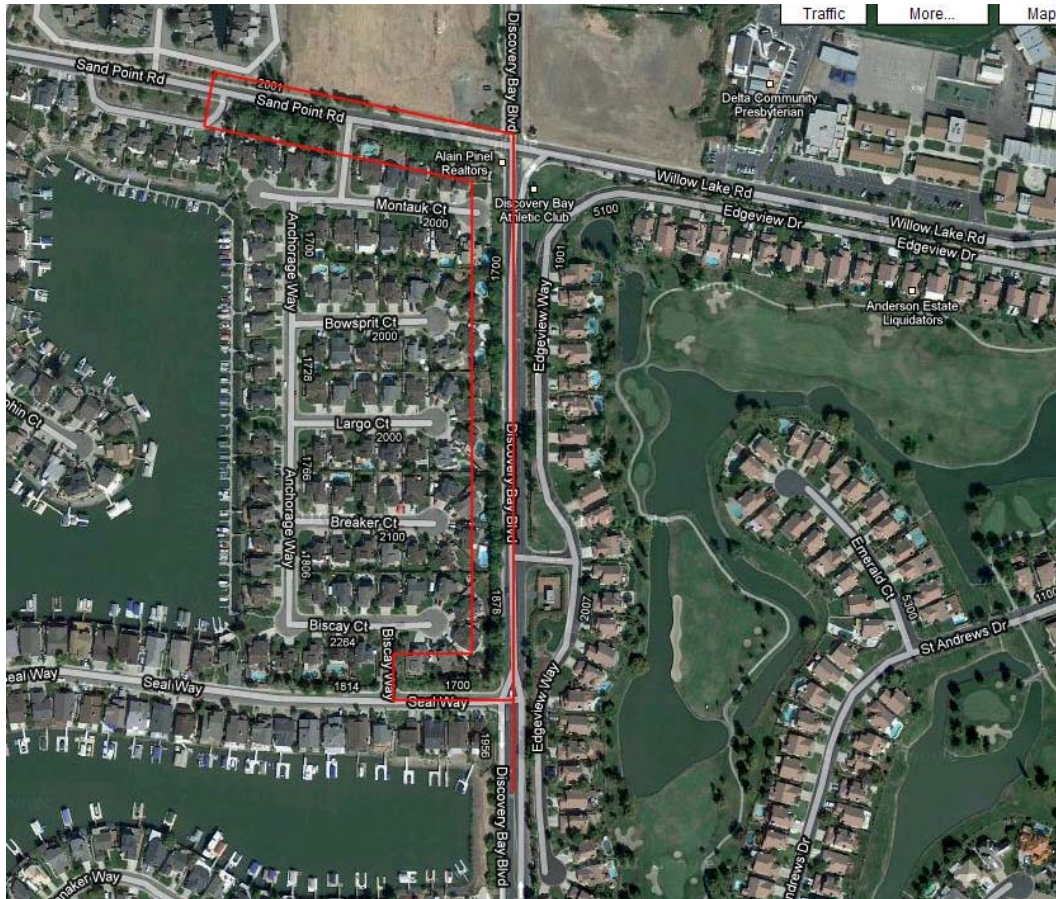
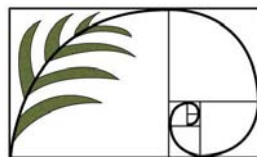


TOWN OF DISCOVERY BAY
DISCOVERY BAY BLVD
PROJECT MANUAL



100% CONSTRUCTION DOCUMENTS

August 25, 2010



Bruce Jett Associates
LANDSCAPE ARCHITECTS
2470 MARINER SQUARE LOOP
ALAMEDA CA 94501

SECTION 011000

SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Project information.
 - 2. Work covered by Contract Documents.
 - 3. Phased construction.
 - 4. Work under separate contracts.
 - 5. Access to site.
 - 6. Coordination with occupants.
 - 7. Work restrictions.
 - 8. Specification and drawing conventions.
 - 9. Miscellaneous provisions.

1.2 PROJECT INFORMATION

- A. Project Identification: Discovery Bay Blvd. Landscape Improvements
 - 1. Project Location: Town of Discovery Bay, Ca
- B. Owner: Town of Discovery Bay, Ca
 - 1. Owner's Representative: Fairin Perez

1.3 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of Project is defined by the Contract Documents and consists of the following:
 - 1. Selective site clearing
 - 2. Soil Preparation
 - 3. Protection and Maintenance of existing plants, irrigation, utilities and miscellaneous improvements.
 - 4. 180 day Maintenance
- B. Type of Contract.
 - 1. Project will be constructed under a single prime contract.

1.4 ACCESS TO SITE

- A. General: Contractor shall have full use of Project site for construction operations during construction period. Contractor's use of Project site is limited only by Owner's right to perform work or to retain other contractors on portions of Project.
- B. Use of Site: Limit use of Project site to work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1.5 WORK RESTRICTIONS

- A. Work Restrictions, General: Comply with restrictions on construction operations.
 - 1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.
- B. On-Site Work Hours: Limit work in the existing building to normal business working hours of 7a.m. to 4:30 p.m., Monday through Friday, unless otherwise indicated.
- C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
 - 1. Notify Owner not less than two days in advance of proposed utility interruptions.
 - 2. Obtain Owner's written permission before proceeding with utility interruptions.
- D. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Owner occupancy with Owner.
 - 1. Notify Owner not less than two days in advance of proposed disruptive operations.
 - 2. Obtain Owner's written permission before proceeding with disruptive operations.
- E. Controlled Substances: Use of all tobacco products and other controlled substances on Project site is not permitted.

1.6 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 - 1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
 - 2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
- C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:

1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings
3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

PART 2 - PRODUCTS

- A. Shall be as indicated on the drawings and as stated in the project specifications. In the event a discrepancy between the drawings and specifications occur, specifications shall govern.

PART 3 - EXECUTION

- A. Execute all work to be performed under this contract as stated in the project specifications as required to comply with construction or items shown on the drawings
- B. Comply with all applicable codes, conditions, regulations , and standards of care.

END OF SECTION

SECTION 012300

ALTERNATES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for alternates.

1.2 DEFINITIONS

- A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
 - 1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
 - 2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.3 PROCEDURES

- A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
 - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated revisions to alternates.
- C. Execute accepted alternates under the same conditions as other work of the Contract.
- D. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

- A. Alternate No.
 - 1. Base Bid: As specified in.

END OF SECTION

SECTION 012500
SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.

1.2 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

1.3 ACTION SUBMITTALS

- A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Substitution Request Form: Use facsimile of form provided in Project Manual.
 - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
 - b. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. Certificates and qualification data, where applicable or requested.
 - g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - h. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.

- i. Cost information, including a proposal of change, if any, in the Contract Sum.
 - j. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
 - k. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
3. Landscape Architect's Action: If necessary, Landscape Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Landscape Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
- a. Forms of Acceptance: Change Order, Construction Change Directive, or Landscape Architect's Supplemental Instructions for minor changes in the Work.
 - b. Use product specified if Landscape Architect does not issue a decision on use of a proposed substitution within time allocated.

1.4 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.
 - 1. Conditions: Landscape Architect will consider Contractor's request for substitution when the following conditions are satisfied:
 - a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - b. Requested substitution provides sustainable design characteristics that specified product provided for achieving Bay Friendly Landscape.
 - c. Requested substitution will not adversely affect Contractor's construction schedule.
 - d. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - e. Requested substitution is compatible with other portions of the Work.
 - f. Requested substitution has been coordinated with other portions of the Work.
 - g. Requested substitution provides specified warranty.
- B. Substitutions for Convenience: Not allowed.

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 013100

PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
1. Coordination drawings.
 2. Requests for Information (RFIs).
 3. Project meetings.

1.2 DEFINITIONS

- A. RFI: Request from Owner, or Contractor seeking information required by or clarifications of the Contract Documents.

1.3 INFORMATIONAL SUBMITTALS

- A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
1. Name, address, and telephone number of entity performing subcontract or supplying products.
 2. Number and title of related Specification Section(s) covered by subcontract.
 3. Drawing number and detail references, as appropriate, covered by subcontract.

1.4 GENERAL COORDINATION PROCEDURES

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.
1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
 3. Make adequate provisions to accommodate items scheduled for later installation.

- B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
 - 1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 - 1. Preparation of Contractor's construction schedule.
 - 2. Preparation of the schedule of values.
 - 3. Installation and removal of temporary facilities and controls.
 - 4. Delivery and processing of submittals.
 - 5. Progress meetings.
 - 6. Preinstallation conferences.
 - 7. Project closeout activities.
 - 8. Startup and adjustment of systems.

1.5 REQUESTS FOR INFORMATION (RFIs)

- A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified below.
 - 1. Landscape Architect or Owner's Representative will return RFIs submitted to Landscape Architect by other entities controlled by Contractor with no response.
 - 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
 - 1. Project name.
 - 2. Date.
 - 3. Name of Contractor.
 - 4. Name of Landscape Architect or Owner's Representative
 - 5. RFI number, numbered sequentially.
 - 6. RFI subject.
 - 7. Specification Section number and title and related paragraphs, as appropriate.
 - 8. Drawing number and detail references, as appropriate.
 - 9. Field dimensions and conditions, as appropriate.
 - 10. Contractor's suggested resolution. If Contractor's solution(s) impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 - 11. Contractor's signature.
 - 12. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
- C. Landscape Architect's or Owner's Representative's Action: Landscape Architect will review each RFI, determine action required, and respond. Allow seven working days for Landscape

Architect's response for each RFI. RFIs received by Landscape Architect after 1:00 p.m. will be considered as received the following working day.

1. The following RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for coordination information already indicated in the Contract Documents.
 - d. Requests for adjustments in the Contract Time or the Contract Sum.
 - e. Requests for interpretation of Landscape Architect's actions on submittals.
 - f. Incomplete RFIs or inaccurately prepared RFIs.
 2. Landscape Architect's or Owner's Representative action may include a request for additional information, in which case Landscape Architect's time for response will date from time of receipt of additional information.
 3. Landscape Architect's or Owner's Representative action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit.
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Landscape Architect in writing within ten days of receipt of the RFI response.
- D. On receipt of Landscape Architect's or Owner's Representative action, and immediately distribute the RFI response to affected parties. Review response and notify Landscape Architect or Owner's Representative within seven days if Contractor disagrees with response.
1. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
 2. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.

1.6 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.
1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and/ or Landscape Architect of scheduled meeting dates and times.
 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
 3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and/or Landscape Architect, within three days of the meeting.
- B. Preconstruction Conference: Landscape Architect or Owner's Representative will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Landscape Architect, but no later than fifteen days after execution of the Agreement.

1. Attendees: Authorized representatives of Owner, Landscape Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Tentative construction schedule.
 - b. Phasing.
 - c. Critical work sequencing and long-lead items.
 - d. Designation of key personnel and their duties.
 - e. Procedures for processing field decisions and Change Orders.
 - f. Procedures for RFIs.
 - g. Procedures for testing and inspecting.
 - h. Procedures for processing Applications for Payment.
 - i. Distribution of the Contract Documents.
 - j. Submittal procedures.
 - k. Preparation of record documents.
 - l. Use of the premises
 - m. Work restrictions.
 - n. Working hours.
 - o. Owner's occupancy requirements.
 - p. Responsibility for temporary facilities and controls.
 - q. Procedures for moisture and mold control.
 - r. Procedures for disruptions and shutdowns.
 - s. Construction waste management and recycling.
 - t. Parking availability.
 - u. Office, work, and storage areas.
 - v. Equipment deliveries and priorities.
 - w. First aid.
 - x. Security.
 - y. Progress cleaning.
 3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.
- C. Progress Meetings: Conduct progress meetings at regular intervals.
1. Attendees: In addition to representatives of Owner, and Landscape Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

- 1) Review schedule for next period.
- b. Review present and future needs of each entity present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Status of submittals.
 - 4) Deliveries.
 - 5) Off-site fabrication.
 - 6) Access.
 - 7) Site utilization.
 - 8) Temporary facilities and controls.
 - 9) Progress cleaning.
 - 10) Quality and work standards.
 - 11) Status of correction of deficient items.
 - 12) Field observations.
 - 13) Status of RFIs.
 - 14) Status of proposal requests.
 - 15) Pending changes.
 - 16) Status of Change Orders.
 - 17) Pending claims and disputes.
 - 18) Documentation of information for payment requests.
3. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.
 - a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 015639

TEMPORARY TREE AND PLANT PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes general protection of existing trees and plants that are affected by execution of the Work, whether temporary or permanent construction.

1.2 DEFINITIONS

- A. Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction, and indicated on Drawings

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Existing Conditions: Documentation of existing trees and plantings indicated to remain, which establishes preconstruction conditions that might be misconstrued as damage caused by construction activities.

1.4 QUALITY ASSURANCE

- A. Arborist Qualifications: Certified Arborist as certified by ISA, licensed arborist in jurisdiction where Project is located, current member of ASCA, or registered Consulting Arborist as designated by ASCA.
- B. Pre-installation Conference: Conduct conference at Project Site.

1.5 PROJECT CONDITIONS

- A. The following practices are prohibited within protection zones:
 - 1. Storage of construction materials, debris, or excavated material.
 - 2. Parking vehicles or equipment.
 - 3. Foot traffic.
 - 4. Erection of sheds or structures.
 - 5. Impoundment of water.
 - 6. Excavation or other digging unless otherwise indicated.
 - 7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
- B. Do not direct vehicle or equipment exhaust toward protection zones.

- C. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones and organic mulch.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Protection-Zone Fencing: Fencing fixed in position and meeting one of the following requirements. Previously used materials may be used when approved by Landscape Architect or Owner's Representative.
 - 1. Plastic Protection-Zone Fencing: Plastic construction fencing constructed of high-density extruded and stretched polyethylene fabric with 2-inch maximum opening in pattern and supported by tubular or T-shape galvanized-steel posts spaced not more than 8 feet apart. High-visibility orange color, nonfading.
 - 2. Height of Fencing: 4 feet

PART 3 - EXECUTION

3.1 EXAMINATION AND PREPARATION

- A. Erosion and Sedimentation Control: Examine the site to verify that temporary erosion- and sedimentation-control measures are in place. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.
- B. Protect tree root systems from damage caused by runoff or spillage of noxious materials while mixing, placing, or storing construction materials. Protect root systems from ponding, eroding, or excessive wetting caused by dewatering operations.

3.2 PROTECTION ZONES

- A. Protection-Zone Fencing: Install protection-zone fencing along edges of protection zones in a manner that will prevent people from easily entering protected area
 - 1. Posts: Set or drive posts into ground one-third the total height of the fence without concrete footings. Where a post is located on existing paving or concrete to remain, provide appropriate means of post support acceptable to Landscape Architect.
- B. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Landscape Architect or Owner's Representative
- C. Maintain protection-zone fencing and signage in good condition as acceptable to Landscape Architect or Owner's Representative, remove when construction operations are complete and equipment has been removed from the site.

3.3 EXCAVATION

- A. Trenching near Trees: Where utility trenches are required within protection zones, hand excavate under or around tree roots or tunnel under the roots by drilling, auger boring, or pipe jacking. Do not cut main lateral tree roots or taproots; cut only smaller roots that interfere with installation of utilities. Cut roots as required for root pruning.
- B. Do not allow exposed roots to dry out before placing permanent backfill.

3.4 ROOT PRUNING

- A. Prune roots that are affected by temporary and permanent construction. Prune roots as follows:
 - 1. Cut roots manually by digging a trench and cutting exposed roots with sharp pruning instruments; do not break, tear, chop, or slant the cuts. Do not use a backhoe or other equipment that rips, tears, or pulls roots.
 - 2. Temporarily support and protect roots from damage until they are permanently covered with soil.
 - 3. Cover exposed roots with burlap and water regularly.
 - 4. Backfill as soon as possible.
- B. Root Pruning at Edge of Protection Zone: Prune roots by cleanly cutting all roots to the depth of the required excavation.
- C. Root Pruning within Protection Zone: Clear and excavate by hand to the depth of the required excavation to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.

3.5 REGRADING

- A. Lowering Grade: Where new finish grade is indicated below existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.
- B. Raising Grade: Where new finish grade is indicated above existing grade around trees, slope grade beyond the protection zone. Maintain existing grades within the protection zone.
- C. Minor Fill within Protection Zone: Where existing grade is 2 inches or less below elevation of finish grade, fill with topsoil. Place topsoil in a single un-compacted layer and hand grade to required finish elevations.

3.6 FIELD QUALITY CONTROL

- A. Inspections: Engage a qualified arborist to direct plant-protection measures in the vicinity of trees, shrubs, and other vegetation indicated to remain and to prepare inspection reports.

3.7 REPAIR AND REPLACEMENT

- A. General: Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Landscape Architect or Owner's Representative.
1. Have arborist perform the root cutting, branch pruning, and damage repair of trees and shrubs.
 2. Treat damaged trunks, limbs, and roots according to arborist's written instructions.
 3. Perform repairs within 24 hours.
 4. Replace vegetation that cannot be repaired and restored to full-growth status, as determined by Landscape Architect.

3.8 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: Remove excess excavated material, displaced trees, trash and debris, and legally dispose of them off Owner's property.

END OF SECTION

**SECTION 017700
CLOSEOUT PROCEDURES**

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
 - 1. Substantial Completion procedures.
 - 2. Final completion procedures.
 - 3. Warranties.
 - 4. Final cleaning.
 - 5. Repair of the Work.
- B. Related Requirements:
 - 1. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.

1.2 ACTION SUBMITTALS

- A. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.
- B. Certified List of Incomplete Items: Final submittal at Final Completion.

1.3 CLOSEOUT SUBMITTALS

- A. Certificate of Insurance: For continuing coverage.
- B. Field Report: For pest control inspection.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

1.5 SUBSTANTIAL COMPLETION PROCEDURES

- A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.

- B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
 - 1. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 - 2. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Owner' s Representative. Label with manufacturer's name and model number where applicable.
- C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
 - 1. Advise Owner of pending insurance changeover requirements.
- D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Landscape Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Landscape Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Landscape Architect, that must be completed or corrected before certificate will be issued.
 - 1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
 - 2. Results of completed inspection will form the basis of requirements for final completion.

1.6 FINAL COMPLETION PROCEDURES

- A. Preliminary Procedures: Before requesting final inspection for determining final completion, complete the following:
 - 1. Certified List of Incomplete Items: Submit certified copy of Landscape Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Landscape Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 - 2. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 - 3. Submit pest-control final inspection report and warranty.
- B. Inspection: Submit a written request for final inspection to determine acceptance. On receipt of request, Landscape Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Landscape Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
 - 1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.7 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
1. Submit list of incomplete items in the following format:
 - a. MS Excel electronic file. Landscape Architect will return annotated copy or,
 - b. PDF electronic file. Landscape Architect will return annotated copy.

1.8 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Landscape Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
 3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
 4. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

PART 2 - PRODUCTS (not used)

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:

- a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
- B. Pest Control: Comply with pest control requirements in Section 33 01 00 Model Bay Friendly Landscaping Maintenance Specifications

3.2 REPAIR OF THE WORK

- A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.
- B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.

END OF SECTION

SECTION 017839
PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for project record documents, including the following:
 - 1. Record Drawings.
 - 2. Record Specifications.
 - 3. Record Product Data.
- B. Related Requirements:
 - 1. 017700 – Closeout Procedures

1.2 CLOSEOUT SUBMITTALS

- A. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit one set of marked-up record prints.
 - 2. Number of Copies: Submit copies of record Drawings as follows:
 - a. Initial Submittal:
 - 1) Submit one paper-copy set of marked-up record prints.
 - 2) Submit PDF electronic files of scanned record prints
 - 3) Landscape Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
 - 4) Print each drawing, whether or not changes and additional information were recorded
 - b. Final Submittal:
 - 1) Submit three paper-copy sets of marked-up record prints.
 - 2) Submit PDF electronic files of scanned record prints
 - 3) Print each drawing, whether or not changes and additional information were recorded.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised Drawings as modifications are issued.
 - 1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
 - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Record data as soon as possible after obtaining it.
 - c. Record and check the markup before enclosing concealed installations.
 - 2. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
 - 3. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
 - 4. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 311000

SITE CLEARING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Protecting existing vegetation to remain.
 - 2. Removing existing vegetation.
 - 3. Clearing and grubbing.
- B. Site clearing, removal, recycling and reuse of materials shall be in accordance with Bay Friendly Landscape Practices and Procedures. Bay Friendly Landscape practices and procedures can be found at ww.stopwaste.org or by calling 510.891.6500

1.2 MATERIAL OWNERSHIP

- A. Except for materials indicated to be stockpiled or otherwise remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.3 PROJECT CONDITIONS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
 - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
 - 2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.
 - 3. All necessary permits to be responsibility of contractor.
- B. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing.
- C. Do not commence site clearing operations until temporary erosion- and sedimentation-control and plant-protection measures are in place.
- D. The following practices are prohibited within protection zones:
 - 1. Storage of construction materials, debris, or excavated material.
 - 2. Parking vehicles or equipment.
 - 3. Foot traffic.
 - 4. Erection of sheds or structures.
 - 5. Impoundment of water.
 - 6. Excavation or other digging unless otherwise indicated.
 - 7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protect and maintain benchmarks and survey control points from disturbance during construction.
- B. Locate and clearly identify trees, shrubs, and other vegetation to remain or to be relocated.
- C. Protect existing site improvements to remain from damage during construction.
 - 1. Mark all items to be removed for approval by Landscape Architect or Owner's Representative prior to commence work.
 - 2. Restore damaged improvements to their original condition, as acceptable to Owner.
- D. Located and protect existing irrigation system during construction. Coordinate this work with the Town of Discovery Bay. Maintain system and make repairs under direction of the Town.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

- A. Provide temporary erosion- and sedimentation-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings and according to requirements of authorities having jurisdiction.
- B. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross protection zones.
- C. Inspect, maintain, and repair erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
- D. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.3 TREE AND PLANT PROTECTION

- A. General: Protect trees and plants remaining on-site according to requirements in Section 015639 "Temporary Tree and Plant Protection."
- B. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Architect.

3.4 EXISTING UTILITIES

- A. Locate, identify, and protect all existing utilities.
 - 1. Arrange with utility companies to locate underground utilities.

- B. Interrupting Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others.

3.5 CLEARING AND GRUBBING

- A. Remove obstructions, trees, shrubs, groundcovers, and other vegetation as indicated.
 - 1. Grind down stumps and remove roots, obstructions, and debris to a depth of 18 inches below exposed subgrade.
 - 2. Use only hand methods for grubbing within protection zones.
- B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.
 - 1. Place fill material in horizontal layers not exceeding a loose depth of 8 inches, and compact each layer to a density equal to adjacent original ground.
- C. Remove bark, chips and deleterious materials.

3.6 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.
- B. Separate recyclable materials produced during site clearing from other nonrecyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities. Do not interfere with other Project work.

END OF SECTION

SECTION 32 86 00
SOIL PREPARATION

PART 1 - GENERAL

1.0 SUMMARY

- A. Section Includes;
 - 1. Topsoil
 - 2. Organic Soil Amendments
 - 3. Fertilizer

1.1 CONDITIONS AND REQUIREMENTS

- A. Refer to the Special Provisions and Additional Provisions of the specifications, and applicable provisions of the 1988 State of California Standard Specifications and Standard Plans.

1.2 DESCRIPTION

- A. Provide incorporation of soil amendments, fertilizers and conditioners in planted areas and fine grading.
- B. Related Work Described Elsewhere:
 - 1. Section 31 10 00: Site Clearing
 - 2. Section 32 93 00: Plants

1.3 DEFINITIONS

- A. Compost – is the product of controlled biological decomposition of organic materials, often including urban plant debris and food waste. It is an organic matter resource that has the unique ability to improve the chemical, physical and biological characteristics of soils or growing media. It contains plant nutrients but is typically not characterized as a fertilizer. (*Excerpted from US Compost Council , Field Guide to Compost Use*)
- B. The Organic Materials Research Institute (OMRI) – is a national nonprofit organization founded in 1997 to support the organic community. OMRI reviews products to determine their suitability for producing, processing and handling organic food and fiber under the USDA National Organic Program Rule (OMRI General Materials List)

1.4 SUBMITTALS

- A. Furnish manufacturer's literature or laboratory analytical data for approval on the following items:
 - 1. Organic amendments.
 - 2. Commercial fertilizers.
 - 3. Provide agricultural analysis from an approved testing laboratory including pH, salinity, sodium hazard, boron hazard, lime content, organic matter, soil texture and available nutrient levels per Section 2.1-A.
- B. Topsoil Analysis: Furnish soil analysis by a qualified soil-testing laboratory.
 - 1. Contractor shall arrange and pay for soil testing by an accredited soils laboratory approved by the Owner's Representative. Laboratories that participate in the North

American Proficiency Testing Program (NAPT) are recommended. See www.usual.usu.edu/napt/ for participating laboratories

2. At a minimum the soil analysis shall include:
 - a. soil texture
 - b. infiltration rate determined by laboratory test or soil texture infiltration rate table;
 - c. Ph
 - d. total soluble salts
 - e. sodium
 - f. essential nutrients
 - g. percent organic matter
3. Recommendations- request that the laboratory make recommendations for amending the topsoil soil with compost to bring the soil organic matter to a minimum of 5% by dry weight and incorporating natural, non-synthetic fertilizers to recommended levels for planting area.

1.5 JOB CONDITIONS

- A. Store fertilizers and soil amendments in a dry place and protect from intrusion of moisture.
- B. Store products to protect them from damage and contamination and comply with manufacturer's storage instructions.
- C. Coordinate work with other site work.
- D. Inspect job for conditions which would prevent the execution of this work as specified. Do not proceed until such conditions are corrected.
- E. Do not permit trucks and vehicles to pass over curbs, sidewalks, paving, etc., unless adequately protected against damage.

PART 2 - PRODUCTS

2.0 MATERIALS

A. FERTILIZER

1. Organic Fertilizer: Raw blend of 100% organic fertilizers. Fertilizers may contain mycorrhizae and humic acid
2. Microorganisms: Contains natural microorganisms to activate soil.
3. Organic fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:
 - a. Composition: 5 percent nitrogen, 5 percent phosphorous, and 5 percent potassium, by weight.
4. Fertilizers: Non-synthetic fertilizers as recommended by the soils report. Synthetic, quick-release fertilizers shall not be permitted. Fertilizers prohibited in the Generic Materials List by the Organic materials Review Institute (OMRI) are prohibited in the project.

B. TOPSOIL

1. Topsoil: ASTM D 5268, pH range of 5.5 to 7, a minimum of 5% and up to 10% percent organic material (with 20% or more compost content), free of stones 1 inch or larger in any dimension and other extraneous materials harmful to plant growth.
2. Topsoil Source: Reuse surface soil stockpiled on-site, if any. Verify suitability of stockpiled surface soil to produce topsoil. Clean surface soil of roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth.
3. Supplement with imported or manufactured topsoil from off-site sources when quantities are insufficient.
4. Topsoil Source: Import topsoil or manufactured topsoil from off-site sources. Obtain topsoil displaced from naturally well-drained construction or mining sites where topsoil occurs at least 4 inches deep; do not obtain from agricultural lands bogs or marshes.
5. Topsoil Source: Amend existing in-place surface soil to produce topsoil. Verify suitability of surface soil to produce topsoil. Clean surface soil of roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth.
6. Surface soil may be supplemented with imported or manufactured topsoil from off-site sources.

C. SOIL AMENDMENTS

1. The organic amendments, and fertilizer rates and quantities listed in Part Three are to be used for bid basis only. If compost is being used as a soil amendment and before delivery of the compost the contractor will submit a copy, to the Owner, of a lab analysis performed by a certified US Composting Council Compost Analysis Program (CAP) laboratory, using the approved Test Methods for the Evaluation of Composting and Compost (TMECC). Verifying current participation in CAP can be achieved by visiting www.compostingcouncil.org.
2. Contractor shall arrange and pay for soil testing by an accredited soils laboratory approved by the Owner. Laboratories that participate in the North American Proficiency Testing Program (NAPT) are recommended. See www.usual.usu.edu/napt/ for participating laboratories. Test the existing site soil after demolition and rough grading operations are completed. Take samples from three site locations to be selected by Landscape Architect. Mark location of each sample on field set plan for reference and label each sample. Request that the laboratory make recommendations based on an 'organic' approach to soil and landscape management. Adjust the quantities of soil amendments and fertilizer per soil lab written report recommendation. Submit soil lab report and any proposed soil amendments and cost adjustments to Owner for written approval. After review and written approval by the Owner, amend the soils according to said laboratory's recommendations. The approved soils laboratory recommendations shall be considered a part of this specification.
3. The base bid shall include cost of testing site soil and organic amendments noted in this spec section. Adjustments to project costs resulting from the soil report recommendation shall be submitted as a modification the base bid.

D. ORGANIC SOIL AMENDMENTS

1. Compost shall be a well decomposed, stable and weed free. It shall be derived from one or more of the following materials: agricultural crop residues or herbivore animal manures or food waste or urban plant debris. It shall not contain mixed solid waste. The product shall contain no substances toxic to plants, will possess no objectionable odors and shall not resemble the feedstock (the original material from which it was derived). Compost

shall be tested through the US Composting Councils USCC Seal of Testing Assurance Program (STA). A lab analysis shall be performed by a STA certified laboratory using the test methods used in the Seal of Testing Assurance program found in the Test Methods for Examination of Compost and Composting Manual (TMECC). Verifying current participation in the STA program can be confirmed by logging onto the USCC website at www.compostingcouncil.com. The compost lab analysis shall be submitted as part of the "Compost Technical Data Sheet" before delivery of compost. The compost laboratory report shall confirm the following compost parameters

Parameters ^{1,6}	Reported as (units of measure)	General Range
pH ²	pH units	6.0-8.5
Soluble Salt Concentration	dS/m (mmhos/cm)	Maximum 10, less than 4 preferred
Boron	ppm	Soluble shall be <2.5
Moisture Content	% wet weight basis	30-60 %
Organic Matter Content	% dry weight basis	30-65%
Carbon Nitrogen Ratio	ratio of Carbon to nitrogen	25:1
Bulk Density	dry lbs/cubic yard	Between 500-1,100
Particle Size	% pass in a select mesh size, dry weight basis	98% pass through 3/4" screen or smaller
Stability ³ Carbon Dioxide Evolution Rate	Mg CO ₂ -Cper g OM per day	<8
Maturity ³ (Bioassay) Seed Emergence and Seed Vigor	% , relative to positive control % , relative to positive control	Minimum 80% Minimum 80%
Physical Contaminants (inerts)	% dry weight basis	<1%
Chemical Contaminants ⁴ ⁵	mg/kg (ppm)	Meet or exceed USEPA Class A standard, 40CFR: 503.13, Tables 1 and 3 levels
Biological Contaminants ⁵ Select Pathogens Fecal Coliform Bacteria, or Salmonella	MPN per gram per dry weight MPN per 4 grams per dry weight	Meet or exceed US EPA Class A standard, 40 CFR, 503.32(a) levels

(Table modified from the US Composting Council Landscape Architectural Specifications)

- a. Recommended test methodologies are provided in Test Methods for the Examination of Composting and Compost (TMECC, The US Composting Council)
- b. It should be noted that the pH and soluble salt content of the amended soil mix is more relevant to the establishment and growth of a particular plant, than is the pH or soluble salt content of a specific compost (soil conditioner) used to amend the soil. Each specific plant species requires a specific pH range. Each plant also has a salinity tolerance rating, and maximum tolerable quantities are known. Most ornamental plants and turf species can tolerate a soil/media soluble salt level of 2.5 dS/m and 4 dS/m, respectively. Seeds, young seedlings and salt sensitive species often prefer soluble salt levels at half the afore mentioned levels. When specifying the establishment of any plant or turf species, it is important to understand their pH and soluble salt requirements, and how they relate to existing soil conditions.

- c. Stability/Maturity rating is an area of compost science that is still evolving, and as such, other various test methods could be considered. Also, never base compost quality conclusions on the result of a single stability/maturity test.
 - d. US EPA Class A standard, 40 CFR § 503.13, Tables 1 and 3 levels = Arsenic 41ppm, Cadmium 39ppm, Copper 1,500ppm, Lead 300ppm, Mercury 17ppm, Molybdenum 75ppm, Nickel 420ppm, Selenium 100ppm, Zinc 2,800ppm.
 - e. US EPA Class A standard, 40 CFR § 503.32(a) levels = Salmonella <3 MPN/4grams of total solids or Fecal Coliform <1000 MPN/gram of total solids.
 - f. Landscape architects and project (field) engineers may modify the allowable compost specification ranges based on specific field conditions and plant requirements.
2. Additional amendments and fertilizers that are approved for use by the Organics Materials Research Institute (OMRI) for use on crop production are approved for use. See www.omri.org. Fertilizers that are not approved or are restricted for use by OMRI shall be applied only after review and written approval by the Owner.

PART 3 - EXECUTION

3.0 INSPECTION OF SITE CONDITIONS

- A. Examine site for conditions that will adversely affect execution, permanence and quality of work.
- B. Verify that demolition, clearing and grubbing work (Section 02110) are acceptable to Landscape Architect prior to commencing work of this section.
- C. Begin work required under this section only after conditions are satisfactory.

3.1 INSTALLATION

- A. Location
 1. Perform soil preparation only in areas noted on plan.
- B. Preparation of rough grade
 1. Loosen or scarify to 6 inches minimum depth. Bring grade to true and uniform grade and remove all stones larger than one inch, sticks, and other extraneous materials.
- C. Scarification
 1. Scarify all planting areas prior to fine grading in order to ensure relative compaction of 85% or less. Any planting areas which become compacted in excess of 85% due to construction activities shall be thoroughly cross-ripped to the maximum depth feasible to alleviate that condition (minimum depth of 8 inches), taking care to avoid all existing drainage and subsurface utility lines.
- D. Soil Amendments (The following is for BID PURPOSES only per section 2.A. – adjust quantity and types of amendments/fertilizers per submitted soils report)
 1. Spread the compost evenly over soil at a rate of 5% dry weight by volume, then uniformly and thoroughly incorporate into upper 8 inches of soil, obtaining a homogeneous soil mix. Soil shall be in a moist condition at time of mixing.
- E. Finish Grading
 1. Finely finish surfaces by raking smoothly and evenly. Remove all exposed, extraneous matter one inch or larger in size to facilitate natural runoff. Drag to smooth surface.

2. Finish grades will slope to drain, without water pockets or irregularities (humps or hollows). Finish grades will meet all existing controls and shall be 1½ inches below adjacent top of paving, curbs, sidewalks and planters, unless otherwise noted on plans. Grades will be of uniform slope between points of fixed elevation. Establish vertical curves or rounding at abrupt changes in slope.
3. All finish grades will be approved by the Landscape Architect prior to commencing the planting operations.

3.2 FIELD QUALITY CONTROL

- A. Samples and Tests
 1. The work performed under this section will be subject to approval by testing laboratory per section 01400 – Quality Requirement. Landscape Architect reserves the right to take and analyze samples of materials for conformity to specifications at any time. Furnish samples upon request by Landscape Architect. Immediately remove rejected materials from the site, at contractor's expense. Cost of testing materials not meeting specification will be paid by contractor at no increase in contracted price.
- B. Verification of Quantities
 1. Contractor to provide bills of lading or invoices of specified materials from original suppliers and manufacturers of soil amendments. Quantities shall be verified by the Landscape Architect. Any product deficiencies shall be promptly rectified by the contractor.
- C. Disposal of Waste Materials
 1. Stockpile and reutilize or recycle a minimum of 65% all waste materials generated from soil preparation activities, including rocks, excavated materials and debris.
- D. Cleaning
 1. Upon completion of soil preparation operations, clean areas within contract limits, remove tools and equipment. Provide site clear, clean, free of debris and suitable for irrigation and planting operations.

PART 4 - MEASUREMENT AND PAYMENT

- 4.0 Payment for SOIL PREPARATION shall be per Lump Sum as set forth on the BIDDING SHEET.
 - A. Adjusted costs resulting from the Owner approved soil lab report recommendations shall be submitted as a modification to the base bid cost for approval by the Owner as specified within section 2.1-A, herein.
 - B. The price bid for soil preparation shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in soil preparation per drawings and specifications and including plant lab soil testing and report.

END OF SECTION

SECTION 32 93 00

PLANTS

PART 1 - GENERAL

1.0 SUMMARY

- A. Section Includes:
 - 1. Trees.
 - 2. Shrubs.
 - 3. Ground cover
 - 4. Tree Root Barriers
 - 5. Tree Staking Materials
 - 6. Mulch

1.1 RELATED WORK

- A. Soil Preparation Section 32 86 00

1.2 DEFINITIONS

- A. Backfill: The earth used to replace or the act of replacing earth in an excavation.
- B. Finish Grade: Elevation of finished surface of planting soil.
- C. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.
- D. Planting Soil: Native or imported topsoil, or surface soil modified to become topsoil; mixed with organic soil amendments.
- E. Subgrade: Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill, before placing planting soil.
- F. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.
- G. Mulch: Organic or mineral used from recycled products to cover planting area surfaces for water retention and weed control.
- H. Integrated Pest Management – is a holistic approach to mitigating insects, plant diseases, weeds, and other pests. It involves the use of many strategies for managing, but not eliminating pests. Integrated Pest Management (IPM) uses cultural, mechanical, physical, and biological control methods before using pesticides to control pests and diseases in the landscape.. Chemical controls are applied only when monitoring indicates that preventative and non-chemical methods are not keeping pests below acceptable levels. When pesticides are required, the least toxic and the least persistent pesticide that will provide adequate pest control is applied.

2.0 PRODUCT DATA: FOR EACH TYPE OF PRODUCT INDICATED.

- A. Samples of mineral mulch.
- B. Samples of organic mulch.
- C. Tree Staking
- D. Root Barrier
- E. Product certificates.
- F. Pre Installation Conference: At project preconstruction meeting, schedules including meeting prior to planting for Bay-Friendly Landscaping Requirements.
- G. Planting Schedule: Indicating anticipated planting dates for exterior plants.

2.1 QUALITY ASSURANCE

- A. Pre-construction meeting-Contractor shall attend a pre-construction meeting prior to commencing with work.
- B. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when planting is in progress.
- C. Topsoil Analysis: Furnish soil analysis by a qualified soil-testing laboratory.
 - 1. Report suitability of topsoil for plant growth. State-recommended quantities of nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory topsoil.
- D. Provide quality, size, genus, species, and variety of exterior plants indicated, complying with applicable requirements in ANSI Z60.1, "American Standard for Nursery Stock."
- E. Preinstallation Conference: Conduct conference at Project site, Owner's Representatives Office.
- F. It is preferred that the Contractor have assigned to the project at least one employee who has experience or training in Integrated Pest Management (IPM) techniques.
- G. It is preferred that the Contractor have assigned to the project at least one employee who is a *Bay-Friendly Qualified Landscape Professional*.
- H. All plant species must be able to grow and spread to their natural shape and size with once per year or less shearing/pruning and the braches never impede the pathway between maintenance cycles.
- I. All plant species are to be non-invasive species.
- J. All plant species are to be very low to low water requirements.

2.2 DELIVERY, STORAGE, AND HANDLING

- A. Do not prune trees and shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of exterior plants during delivery. Do not drop exterior plants during delivery and handling.
- B. Handle planting stock by root ball.
- C. Deliver exterior plants after preparations for planting have been completed and install immediately. If planting is delayed more than six hours after delivery, set exterior plants and trees in shade, protect from weather and mechanical damage, and keep roots moist.

2.3 WARRANTY

- A. Special Warranty: Installer's standard form in which Installer agrees to repair or replace plantings that fail in materials, workmanship, or growth within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Death and unsatisfactory growth, except for defects resulting from lack of adequate maintenance, neglect, abuse by Owner, or incidents that are beyond Contractor's control.
 - b. Structural failures including plantings falling or blowing over.
 - 2. Warranty Periods from Date of Substantial Completion:
 - a. Trees and Shrubs: One year.
 - b. Ground Cover and Plants: Six months.

2.4 MAINTENANCE SERVICE

- A. Initial Maintenance Service: Provide full maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after each area is planted and continue until plantings are acceptably healthy and well established, but for not less than maintenance period below.
 - 1. Maintenance Period for Trees and Shrubs: Six months from date of Substantial Completion.
 - 2. Maintenance Period for Ground Covers and Plants: Six months from date of Substantial Completion.

PART 3 - PRODUCTS

3.0 TREE AND SHRUB MATERIAL

- A. General: Furnish nursery-grown trees and shrubs complying with ANSI Z60.1, with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock free of disease, insects, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.
- B. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which shall begin at root flare according to ANSI Z60.1.[Root flare shall be visible before planting.]
- C. Provide container grown trees.
- D. Shrub sizes indicated on Drawings are sizes after pruning.

3.1 GROUND COVER PLANTS

- A. Ground Cover: Provide ground cover of species indicated, established and well rooted in pots or similar containers, and complying with ANSI Z60.1.

3.2 PLANTS

- A. Biennials: Provide healthy, disease-free plants of species and variety shown or listed, with well-established root systems reaching to sides of the container to maintain a firm ball, but not with excessive root growth encircling the container. Provide only plants that are acclimated to outdoor conditions before delivery[and that are in bud but not yet in bloom].
- B. Perennials: Provide healthy, field-grown plants from a commercial nursery, of species and variety shown or listed, complying with requirements in ANSI Z60.1.
- C. Vines: Provide vines of species indicated complying with requirements in ANSI Z60.1

3.3 TREE ROOT BARRIERS

- A. Polypropylene, 0.08 minimum thickness, ribbed interlocking panels. 24 inch Universal Barrier (UB-24) as manufactured by deep Root Corporation Westminster, CA or accepted equal.

3.4 TREE STAKING MATERIALS

- A. Staking Materials:
 - 1. Stakes: Lodgepole pine (untreated), 3 inch diameter by 10 feet long minimum actual dimensions, of uniform size and pointed at one end
- B. Tree ties: Spring loaded "Wonder Tree Ties" by Alden Enterprises (818) 579-7115, recycled bicycle inntertube or approved equal.

3.5 PLANTING BED ESTABLISHMENT

- A. Loosen subgrade of planting beds to a minimum depth of 6 inches to achieve 12" of loosened soil after topsoil and amendment are placed.. Remove stones larger than 1 inch in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
 - 1. Apply organic fertilizer directly to subgrade before loosening.
 - 2. Thoroughly blend planting soil mix off-site before spreading; or spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil mix.
 - 3. Spread planting soil mix to a depth of 6 inches but not less than required to meet finish grades after natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.
- B. Finish Grading:
 - 1. Grade planting beds to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.
 - 2. Grade soil surface at edges of planting areas within 2' of adjacent to hardscape and drain inlets to an elevation of 3-4" below the finished surface of adjacent hardscape to allow adequate room for mulch.

3.6 TREES AND SHRUBS

- A. Excavation of Pits and Trenches: Excavate circular pits with sides sloped inward. Trim base leaving center area raised slightly to support root ball and assist in drainage. Do not further disturb base. Scarify sides of plant pit smeared or smoothed during excavation.
 - 1. Excavate approximately three times as wide as ball diameter.
 - 2. Excavate at least 12 inches wider than root spread and deep enough to accommodate vertical roots for bare-root stock.
- B. Before planting, verify that root flare is visible at top of root ball according to ANSI Z60.1.
- C. Stock with Root Balls: Set trees and shrubs plumb and in center of pit or trench with top of root ball 2 inches above adjacent finish grades.
 - 1. Container Grown: Carefully remove root ball from container without damaging root ball or plant.
 - 2. Fabric Bag Grown: Carefully remove root ball from fabric bag without damaging root ball or plant. Do not use planting stock if root ball is cracked or broken before or during planting operation.
 - 3. Place planting soil mix around root ball in layers, tamping to settle mix and eliminate voids and air pockets. When pit is approximately one-half backfilled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed. Water again after placing and tamping final layer of planting soil mix.
- D. Mulching: Apply min. 3-inch thickness of recycled wood chip mulch as indicated on the drawings. Do not place mulch within 3 inches of trunks or stems.

3.7 TREE AND SHRUB PRUNING

- A. Remove only dead, dying, or broken branches. Do not prune for shape.
- B. Prune, thin, and shape trees and shrubs according to standard horticultural practice. Prune trees to retain required height and spread. Do not cut tree leaders; remove only injured or dead branches. Prune shrubs to retain natural character.

3.8 GROUND COVER AND PLANT PLANTING

- A. Set out and space ground cover and plants as indicated.
- B. Dig holes large enough to allow spreading of roots and backfill with planting soil.
- C. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water.
- D. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.
- E. Protect plants from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.

3.9 INTEGRATED/ORGANIC PEST MANAGEMENT

- A. Integrated Pest Management (IPM) practices shall be used to control pests and diseases in the landscape.
- B. Synthetic pre emergents are prohibited.

- C. Pesticides that are not allowed by OMRI in its generic materials list are prohibited.

3.10 PLANT MAINTENANCE

- A. Tree and Shrub Maintenance: Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, restoring planting saucers, and resetting to proper grades or vertical position, as required to establish healthy, viable plantings. Spray or treat as required to keep trees and shrubs free of insects and disease.
- B. Ground Cover and Plant Maintenance: Maintain and establish plantings by watering, weeding, fertilizing, mulching, and other operations as required to establish healthy, viable plantings.
- C. Protect exterior plants from damage due to landscape operations, operations by other contractors and trades, and others. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.
- D. Pruning
 - 1. Selective pruning. Plants shall be pruned selectively to remove individual stems or branches that extend beyond the natural conformation of the plant to a lateral branch or at the point of attachment. Woody groundcovers shall be selectively pruned to control growth towards pavements rather than edged.
 - 2. Hedging and shearing. Contractor shall not shear plants into formal shapes as this destroys the natural form of the plant and generates excessive waste.
 - 3. Tree pruning shall be performed only by trained, experienced personnel. An I.S.A. Certified Arborist or Tree Worker is to be present at all times during pruning.
- E. Integrated Pest Management-
 - 1. Contractor shall utilize integrated pest management (IPM) practices during installation and maintenance to control pests and disease in the landscape. IPM uses cultural, mechanical, physical, and biological control methods before using pesticides. Chemical controls are applied only when monitoring indicates that preventative and non-chemical methods are not keeping pests below acceptable levels. When pesticides are required, the least toxic and the least persistent pesticide that will provide adequate pest control is applied. Refer to BFL Guidelines and Maintenance Specification for more information.
 - 2. Cultural/Mechanical/physical methods will be used as the first choice in weed management.
 - a. Monitor planting areas frequently to identify and eradicate weeds early in the growth stage prior to their setting seed.
 - b. Cut or pull weeds using hand operated equipment where possible.
 - c. Mulches shall be maintained at all times over soil surface that is not covered by vegetation. (see also Section 3.3 E, Incorporate Organic Soil Amedments)
 - d. Propane-fueled flamers may be used in winter and spring with required permits and approval by the Fire Marshall to kill early- season, non-grass weeds by heating the cells until they burst. The weed quickly wilts and dies.
 - 3. If allowed on this project, Contractor shall apply all chemicals in a safe manner and according to label instructions and Agency, State and Federal requirements. A California Chemical Applicators license is required by the Contractor for chemical applications. The Contractor shall mix and apply chemicals to protect against accidental spills and drift to non-target areas, and to insure safety of the applicator. Any spilled chemicals, as well as contaminated soil, water, and/or landscape materials must be removed from the Project and disposed of in accordance with the Agency requirements. The Contractor shall maintain applicator's licenses and records of applications as required by the State.

4. A Chemical Work Report shall be completed for each chemical application. The Contractor is responsible for submitting chemical usage reports to the County Agricultural Department.
5. Contractor shall maintain records of all pest management activities. Each record shall include the following information:
 - a. target pest;
 - b. type and quantity of pesticide used;
 - c. site of the pesticide application;
 - d. date the pesticide was used;
 - e. name of the pesticide applicator;
 - f. application equipment used;
 - g. prevention and other non-chemical methods of control used.
 - h. Contractor shall submit the pest management record to Owner on monthly basis.
6. Herbicides
 - a. Least toxic herbicides may be employed by Contractor as a last resort. (Trade names are used only as examples and are not intended as an endorsement) Examples are:
 - 1) Fatty acid potassium salts (herbicidal soaps e.g. Safer's Superfast Weed and Grass Killer® Dr. Bronner's Peppermint Anti-Bacterial Soap)
 - 2) Acetic and citric acids (e.g. Nature's Glory Weed and Grass Killer RTU®)
 - 3) Clove, citrus, mint and thyme oil (e.g. Matran II®, Xpress®)
 - 4) Corn gluten
 - 5) Low-toxic, low-residual herbicide [e.g. glyphosate (Round-up®), glufosinate-ammonium (Finale®), pelargonic acid (Scythe®)]
 - b. Restricted herbicides that may not be used because they have been identified as ground water contaminants are (trade names in parentheses):
 - 1) Atrazine (Aatrex)
 - 2) Simazine (Princep)
 - 3) Bromacil (Hyvar, Krovar)
 - 4) Prometon (Pramitol)
 - 5) Bentazon (Basagran)
 - 6) Norflurazon (Solicam, Predict, Zorial)
 - c. Restricted herbicides that may not be used because they have been identified as a compost contaminant are:
 - 1) Picloram
 - 2) Clopyralid
- F. Soil subsidence- Fill in any soil subsidence that may occur, replant trees and or shrubs that may have settled.
- G. Replace mulch materials and restore plant saucers.
- H. Adjust and repairing tree staking materials.
- I. Perform other operations as required to establish healthy viable plantings.
- J. Water Management. All plants shall be irrigated to provide adequate water to maintain an attractive, green, healthy and moderate growth rate during its growing season. The Contractor shall comply with the water budget approach to irrigation scheduling to match plant need with water application and avoid over-irrigation.
- K. Mulching. Contractor shall maintain a minimum of 3" of mulch at all times over soil surface that is not covered by vegetation. Keep mulch 6 inches away of tree trunks and 4 inches away from shrub stems. Restore plant basins.

END OF SECTION

SECTION 33 01 00

MODEL BAY-FRIENDLY LANDSCAPING MAINTENANCE SPECIFICATIONS

PART 1 - GENERAL INFORMATION

1.0 PROJECT GOALS

- A. Bay-Friendly Landscape Maintenance practices shall be employed to minimize waste, protect air and water quality, conserve energy and water, and protect natural ecosystems (refer to Bay-Friendly Landscape Guidelines, www.BayFriendly.org).

1.1 GENERAL SCOPE OF WORK

- A. This work shall include all supervision, labor, materials, equipment, tools, supplies and services to maintain in a superior condition all landscape areas, irrigation and drainage systems and other related work. All work shall be performed in a workmanlike manner, using quality equipment, Bay-Friendly methods and materials.

1.2 SITE DESCRIPTION

- A. Work to be done is located at Town of Discovery Bay and identified on the enclosed maps and plans. This area is owned or supervised by Town of Discovery Bay, hereafter referred to as Owner, with Fairin Perez acting as agent, hereafter referred to as Owner Representative.

1.3 LIMITS OF WORK: SPECIFIED WORK DOES NOT INCLUDE:

- A. Installation or replacement of plants, except for those damaged or allowed to decline or die by the Contractor
- B. Repair and/or modification of the irrigation system, except for those specified in section 3.4 Water Management.

1.4 SUPPLEMENTAL DOCUMENTS

- A. Site maps
 - 1. A site map will be provided and shared between the Owner and the Contractor. The map shall identify general plant palette, landscape features, building and parking footprints, streets and addresses.
 - 2. An irrigation plan identifying locations of meters, valves, controllers, and types of irrigation equipment specified for the site will be provided.
 - 3. A planting plan or list of all existing plants will be provided for use by the Contractor in developing pest management programs and irrigation schedules.
- B. Initial soil analysis
 - 1. Results of soil analyses from samples collected at the project area shall be provided to Contractor, if available.

1.5 SUPPLEMENTAL RESOURCES

- A. StopWaste.Org www.BayFriendly.org
 - 1. Bay-Friendly Landscape Guidelines
 - 2. A Landscaper's Guide to Grasscycling
 - 3. A Landscaper's Guide to Mulch
- B. *A Guide to Estimating Irrigation of Water Needs of Landscape Plantings*, California Dept of Water Resources, <http://cdec.water.ca.gov>
- C. *Irrigation water audits*, Irrigation Association, www.irrigation.org, and the Irrigation Technology Research Center, www.itrc.org.
- D. *California Irrigation Management Information System*, www.cimis.water.ca.gov, Waste management and recycling, www.ciwmb.ca.gov.
- E. *The Weed Worker's Handbook, A Guide to Techniques for Removing Bay Area Invasive Plants*, The Watershed Council (510) 231-5655 and the California , Invasive Plant Council (510) 843-3902
- F. *Pests of Landscape Trees and Shrubs: An Integrated Pest Management Guide*, 2nd ed., UC Publication 3359, <http://www.ipm.ucdavis.edu>
- G. *A Field Guide to Compost Use*, The Composting Council, 114 South Pitt Street, Alexandria, Virginia 22314, (703) 739-2401, <http://www.compostingcouncil.org/index.cfm>

PART 2 - GENERAL REQUIREMENTS

2.0 CONTRACTOR REQUIREMENTS

- A. Qualifications
 - 1. Contractor must have a valid California C-27 contractor's license authorized by the State of California.
 - 2. Contractor must have assigned to the project at least one employee possessing a California State Chemical Applicator's License for the control of weeds, plant diseases and other pests.
 - 3. It is preferred that the Contractor have assigned to the project at least one employee who has successfully completed the Pollution Prevention Training & Certification Program For Surface Cleaners issued by the Bay Area StormWater Management Agencies Association (BASMAA).
 - 4. It is preferred that the Contractor have assigned to the project at least one employee who is a Certified Irrigation Contractor (Irrigation Association).
 - 5. It is preferred that the Contractor have assigned to the project at least one employee who is a Certified Arborist or Certified Tree Worker (International Society of Arboriculture).
 - 6. It is preferred that the Contractor have assigned to the project at least one employee who has experience or training in Integrated Pest Management (IPM) techniques.

7. It is preferred that the Contractor have assigned to the project at least one employee who has experience or training in Bay-Friendly Landscaping practices.

B. Insurance

1. Contractor shall maintain insurance required in the bid documents throughout the contract period.

2.1 COMPLIANCE WITH LAWS, ORDINANCES AND POLICIES

All services rendered shall be provided in accordance with all ordinances, resolutions, statutes, rules, laws and regulations of the Owner, and any Federal, State, or local governmental Owner having jurisdiction in effect at the time service is provided

2.2 WORK REQUIREMENTS

A. Work schedule

1. Contractor is to provide Owner with a monthly work schedule describing the work to be performed in the Project Area.
2. The Contractor shall conduct all operations during the hours of 7:00 a.m. to 4:30 p.m. Monday through Friday, unless otherwise approved by the Owner. Contractor may not work on any Federal, State, or local holidays.
3. Any non-emergency work that may be deemed hazardous or disruptive (i.e., chemical spraying, tree pruning, etc.) shall be scheduled at least two (2) weeks in advance with the Owner's representative. For emergency work, Contractor must obtain written approval from Owner's representative prior to commencing work.
4. Owner reserves the right to change schedules for special events, conflicts with adjacent property owners/tenants within five (5) working days advance notice.

B. Protection of existing property

1. Contractor must protect all existing plant materials, site improvements, structures, facilities, utilities, and natural areas from damage, both above and below ground. Any damages shall be reported immediately to the Owner's representative. Any damages caused by Contractor shall be corrected and/or paid for by the Contractor at no cost to the Owner.
2. Contractor shall protect property from accidental chemical, fuel, oil or other contaminant spills.
3. Contractor shall not wash or blow soil, chemicals, litter, mulch, soil amendments or other materials into storm drains.

C. Safety

1. Contractor must at all times exercise necessary precautions to provide for the protection of the public and employees.
2. Landscape maintenance services conducted in the roadway center medians must be performed in a safe manner. The contractor is required to perform traffic diverting lane closures prior to beginning any trimming operations in the center median. Litter pickup does not require a lane closure.
3. All lane closure activities must comply with the California Highway Manual on Uniform Traffic Control Devices (MUTCD) [<http://www.dot.ca.gov/hq/traffops/signtech/mutcdsupp/supplement.htm>], and follow notification requirements of the Police and Fire Departments.
4. Chemical Applications

- a. Note: Bay-Friendly Landscaping emphasizes Integrated Pest Management (IPM) practices to control pests and diseases in the landscape. IPM uses cultural, mechanical, physical, and biological control methods before using pesticides. Chemical controls are applied only when monitoring indicates that preventative and non-chemical methods are not keeping pests below acceptable levels. When pesticides are required, the least toxic and the least persistent pesticide that will provide adequate pest control is applied.
- b. Contractor shall apply all chemicals in a safe manner and according to label instructions and Owner, State and Federal requirements. A California Chemical Applicators license is required by the contractor for chemical applications. The Contractor shall mix and apply chemicals to protect against accidental spills and drift to non-target areas, and to insure safety of the applicator. Any spilled chemicals, as well as contaminated soil, water, and/or landscape materials must be removed from the Project and disposed of in accordance with the Owner requirements. The Contractor shall maintain applicator's licenses and records of applications as required by the State.
- c. A Chemical Work Report shall be completed for each chemical application. The Contractor is responsible for submitting chemical usage reports to the County Agricultural Department. Copies are to be sent to the Owner's representative as part of the Contractor's monthly report.

D. Contractor's Personnel and Supervision

1. Contractor shall provide a list including all Contractor's and subcontractor's employees assigned to work site and include work schedule and assignment. Contractor must update list within 3 business days of any change. All Contractor's employees assigned to the Project must demonstrate they are United States citizens or have a legal right to work in the United States.
2. The Contractor shall assign a qualified trained supervisor to oversee work performed at the work site and to act as the Contractor's liaison with the Owner representative. This supervisor must inspect the Project daily (Monday through Friday) except holidays and provide direction to the Contractor's workers and/or subcontractors. This supervisor shall speak, write, read and understand English and be capable of writing schedules, monthly reports noting any deficiency that needs correcting and major projects for the coming month. This supervisor shall have at least three (3) years of landscape maintenance supervision experience.
3. All Contractor's personnel shall adhere to basic public works standards for working attire including; uniform shirts with Contractor's name or logo clearly visible at all times when working at all locations, proper shoes and other equipment required by State Safety Regulations. Shirts are to be maintained in a neat and presentable condition.
4. All Contractor vehicles are to have a readable sign with Contractor's name or logo and telephone number. Trucks are to be kept in a clean and presentable condition.

E. Subcontracting

1. A portion of the work covered by these specifications may be subcontracted with prior approval of the Owner. Contractor shall supervise subcontractor and guarantee work quality. Subcontractors and their qualifications must be submitted to the Owner thirty (30) days before working at the site. All subcontractors assigned to the Project must demonstrate they are United States citizens or have a legal right to work in the United States. It is preferred that subcontractors have training in Bay-Friendly Landscaping or other experience in sustainable landscape practices.

F. Supplies and Equipment

1. Fuel conservation and low emission equipment

2. The Contractor will implement strategies in work operations to reduce fossil fuel consumption and emissions, such as:
 - a. Use hand-powered equipment when possible.
 - b. Minimize use of gas-powered blowers, especially on planting beds.
 - c. Select smallest, most fuel efficient equipment to accomplish task.
 - d. Consider vehicles that operate on natural gas or biodiesel.
 - e. Maintain equipment properly and keep it well tuned.
 - f. Emphasize employee carpooling to Project.
 3. Use local products and suppliers
 4. The Contractor shall use local products and suppliers (produced within 150 miles from the project site) to the extent possible to minimize fuel consumption and emissions.
 5. Use recycled and salvaged materials
 6. The Contractor shall use salvaged and recycled-content products where possible. Materials for reuse may be found by contacting the CalMax website at www.ciwmb.ca.gov or at www.stopwaste.org.
- G. Equipment refueling and repair
1. The Contractor shall refuel and repair equipment in a safe manner to protect against accidental spills. Limit refueling to specific areas on a site. Measures shall be taken to prevent, control, and clean-up spills. Clean-ups should be immediate, automatic and routine and performed by a trained staff member or a licensed cleaning company. Contact the local emergency response team agencies to report all spills.
- H. Reporting and inspecting
1. The Contractor shall submit a written report each month stating all contract work completed. The report shall show the work completed during each week contract work was accomplished, and shall be submitted with and cover the same work as the Contractor's billing statement for the previous month's work. The report shall include documentation of stormwater and irrigation inspections, IPM monitoring, soil and pest management treatments and other chemical applications.
 2. Unusual horticultural problems such as pests, disease and damages that are beyond the scope of the Contractor's responsibility shall be brought to the attention of the Owner representative immediately.
 3. The Owner, through a designated representative, shall make periodic inspections to insure that complete and continuous maintenance is fulfilled. In addition, the Owner may obtain the services of an approved horticultural specialist to inspect plantings and make recommendations for improvements in the maintenance program.
- I. Work Performance
1. Contractor is responsible for (a) having thoroughly investigated and considered the scope of services to be performed, (b) carefully considering how the services should be performed, and (c) fully understanding the facilities, difficulties, and restrictions attending to the performance of the services required. Contractor is responsible to investigate the area and be fully acquainted with the conditions.
 2. Should the Contractor discover any latent or unforeseeable conditions, which will materially affect the performance of services, Contractor shall immediately inform the Owner of such fact and shall not proceed except at Contractor's risk until written instructions are received from the Owner.
 3. Plants, irrigation systems, etc., damaged by traffic accidents or vandalism, shall be reported immediately to the Owner.
- J. Extra Work

1. New and unforeseen work will be classed as extra work when determined by the Owner that such work is not covered by these specifications. Upon notification that extra work will be required, the Contractor shall submit an itemized, written cost proposal for such work to the Owner. The Owner shall retain the right to reject such cost proposal and perform the extra work with Owner forces or other contractors. Should the proposal be acceptable to the Owner, the Contractor shall be advised in writing, and upon receipt of such written notification, shall begin the work within five (5) working days or as agreed to between the Contractor and the Owner.
2. The Contractor shall do such extra work in accordance with the agreement for extra work and with the provisions of these specifications and shall furnish all labor, materials and equipment. Payment for extra work performed shall be as agreed to by the Contractor and the City and as bid. Compensation for material will not exceed Contractor cost plus 10%. Contractor must provide invoice copies to be compensated for material.

K. Emergency Work

1. Contractor shall supply office, pager and home phone numbers of employee responsible for emergencies. Said employee shall be fluent in English.
2. Owner will provide Contractor with emergency numbers for Owner's representatives and emergency personnel. Said employee shall be fluent in English.

PART 3 - LANDSCAPE STANDARDS AND MAINTENANCE REQUIREMENTS

3.0 OVERVIEW

A. Bay-Friendly Landscape Principles and Objectives

Contractor shall maintain the specified landscape in an integrated approach, consistent with the principles set forth in the Bay-Friendly Landscape Guidelines, www.BayFriendly.org. The seven Bay-Friendly principles are:

1. Landscape locally – The Project landscape is part of a larger natural ecosystem of the San Francisco Bay Area. The materials and methods used to maintain the Project can support the health, diversity and sustainability of the Bay.
2. Landscape for less to the landfill – Reducing waste starts with not generating plant debris in the first place by fertilizing, irrigating and pruning judiciously, grasscycling, mulching and composting plant debris. Using recycled content, salvaged, durable or local materials conserves resources and reduces the amount of energy consumed by the landscape.
3. Nurture the soil – Create a healthy soil that supports a healthy landscape by protecting the soil from compaction and erosion, replenishing organic matter and mulching, using slow-release and organic fertilizers and minimizing use of chemicals that harm beneficial soil organisms.
4. Conserve water – Use California's water supply efficiently by reducing irrigation requirements, irrigating according to plant need, maximizing irrigation system performance, increasing the water holding capacity of the soil and using recycled water.
5. Conserve energy – Conventional landscapes are fossil fuel consumptive. Nationally it is estimated that lawn mowers consume 400 million gallons of gas. Look for opportunities to conserve fuel and energy by choosing and maintaining materials and equipment for fuel conservation.
6. Protect water and air quality –Reduce runoff, reduce contaminants in runoff through an integrated pest management (IPM) program, and increase the soil's ability to remove pollutants from runoff through steps such as mulching bare soil. Reduce air

pollution by reducing fossil fuel consumption, recycling plant debris on –site and planting trees to remove CO2 and absorb air pollutants.,

7. Protect and maintain wildlife habitat – The Project may provide food, water, shelter and nesting sites for birds, butterflies, beneficial insects and animals that contribute to the ecological diversity of the Bay. Methods to protect them include minimizing application of chemicals by implementing an integrated pest management (IPM) program, and conserving flowers, berries, fruits, seed heads, low branch cover, and natural vegetation in open space areas.
- B. Applicable standards and Best Management Practices (BMP's). - Contractor shall adhere to applicable professional standards as defined by a professional organization including:
1. American National Standard for Tree Care Operations - ANSI A300, Parts 1 and 2
 2. International Society of Arboriculture BMP for Tree and Shrub Fertilization, and BMP for Tree Pruning.
 3. Irrigation Association BMPs
 4. Bay-Friendly Landscape Guidelines

3.1 SITE ANALYSIS

- A. Contractor shall characterize the Project's microclimate(s) and range in exposures as a precursor for developing the water management program.
- B. Contractor shall identify plants species present in the Project landscape
- C. Contractor will determine key plant species present
- D. Contractor will determine plant water use classification for each plant species present as a precursor for developing the water management program. Plant water use classifications may be found in "A Guide to Estimating Irrigation Water Needs of Landscape Plantings in California" (Univ. of Calif. Cooperative Extension, 2000).
- E. Contractor will identify any plants in the Project landscape that are protected from removal or damage by ordinance, and adhere to all protection requirements.
- F. Soil tests
1. Contractor shall collect and submit soil samples to an accredited and approved testing laboratory, annually for 3 years during the transition to a Bay-Friendly landscape and then when planning a renovation and when experiencing ongoing problems. At a minimum one soil sample shall be collected from turf and one from shrub/ground cover areas that are representative of site conditions. Sample collection procedures shall adhere to recommendations of the soil testing laboratory. Contractor shall request that the laboratory make recommendations based on an 'organic' approach to soil and landscape management. Submit soil lab report and any proposed soil amendments and cost adjustments to Owner Representative for written approval. After review and written approval by the Owner, amend the soils according to said laboratory's recommendations. The approved soils laboratory recommendations shall be considered a part of this specification. Analyses to be performed include:

- a. pH, electrical conductivity, nitrate, ammonium, phosphorus, potassium, calcium, saturation percent, sodium, chloride, sodium adsorption ratio, boron, % sand-silt-clay, lime, % organic
 2. Contractor shall determine infiltration rate and drainage characteristics within the Project. This information shall be considered when scheduling irrigation.
- G. Topography and potential for runoff
1. Contractor shall assess topography within the Project and evaluate potential for runoff. This information shall be considered when scheduling irrigation and determining need for erosion control measures.

3.2 SOIL & NUTRITION MANAGEMENT

- A. Goals
1. A healthy, biologically diverse soil is required to sustain a healthy landscape. A basic concept of Bay-Friendly Landscaping is to cultivate a functional, living soil foodweb which shall then provide nutrient elements as needed to sustain healthy and attractive plants while avoiding excessive growth that might attract pests and/ or need to be removed through pruning, edging or mowing. Landscape maintenance activities shall be implemented to nurture biological activity, provide organic material, and protect soil from damage. Bay and riparian water quality and soil and aquatic habitat shall be protected by controlling soil erosion.
- B. Contractor shall protect soil from compaction by:
- a. Cultivating soil when it is moderately moist; wet and dry soils shall not be cultivated.
 - b. Scheduling maintenance operations that require driving equipment over the soil (e.g. mowing turf) when the soil is dry.
 - c. Confining traffic to paved areas.
 - d. When temporary access is needed over non-paved areas, distribute the load over the soil with 6" thick coarse organic mulch or reusable planks.
- C. Contractor shall protect the soil from erosion by:
1. Maintaining vegetative cover over the soil to the extent possible.
 2. Placing compost berms, blanket, socks or tubes along slopes to slow water.
 3. Maintaining a minimum of 3" mulch cover over bare soil.
 4. Minimizing use of blowers in planting beds and on turf.
 5. Using coarse mulch on slopes to avoid washing of mulch into storms drains.
 6. Create leaf repositories in planting beds as appropriate.
- D. Soil and plant tissue analysis
1. Contractor shall submit soil samples for testing as described in Section 3.2 – Site Analysis. The types and quantities of fertilizer and/or soil amendments to be applied shall be determined from the results of the soil analysis and shall be based on an 'organic' approach to soil management.
 2. Where plant micronutrient deficiencies are suspected, plant tissue analyses are recommended to determine need for fertilizer application.
- E. Incorporate organic soil amendments

1. Contractor shall incorporate composted organic amendments into soil prior to planting annuals or replanting damaged turf or ground cover.
 - a. Planting beds for annuals and ground covers: Incorporate 2-4" of compost into the top 6-12" of soil
 - b. Turf: Incorporate 1-2" (3 1/3 – 6 2/3 cubic yards) compost into the top 5-7" of soil
2. Compost shall be a well decomposed, stable, weed free organic matter source. The product shall be certified through the US Composting Council's (USCC) Seal of Testing Assurance Program (STA) Program (a compost testing and information disclosure program). It shall be derived from agricultural and/or food waste and/or yard trimmings. The product shall contain no substances toxic to plants, will possess no objectionable odors and shall not resemble the feedstock (the original materials from which it was derived).
3. Before delivery of the compost, the supplier will submit proof of STA certification and a copy of lab analysis performed by a laboratory that is enrolled in the US Composting Council's CAP and using the approved Test Methods for the Evaluation of Composting and Compost (TMECC). The lab report shall verify:
 - a. Feedstock Materials shall be specified and include one or more of the following: landscape/yard trimmings, grass clippings, food scraps, and agricultural crop residues.
 - b. Organic Matter Content: 50% - 60% by dry wt. preferred, 35-70% acceptable
 - c. Carbon and Nitrogen Ratio: C:N < 25:1 plus at least one measure of stability and at least one measure of toxicity.
 - d. Maturity/Stability: shall have a dark brown color and a soil-like odor. In addition any one of the following is required to indicate stability
 - 1) Oxygen Test < 1.3 O₂ / unit TS / hr
 - 2) Specific oxy. Test < 1.5 O₂ / unit BVS / hr
 - 3) Respiration test < 8 C / unit VS / day
 - 4) Dewar test < 20 Temp. rise (°C)
 - 5) Solvita® > 5 Index value
 - e. Toxicity: any one of the following measures is sufficient to indicate non-toxicity.
 - a) NH₄- : NO₃-N < 3
 - b) Ammonium < 500 ppm, dry basis
 - c) Seed Germination > 80 % of control
 - d) Plant Trials > 80% of control
 - e) Solvita® > 5 Index value
 - f. Nutrient Content: provide analysis detailing nutrient content including N-P-K, Ca, Na, Mg, S, and B.
 - 1) Total Nitrogen content 0.9% or above preferred.
 - 2) Boron: Total shall be <80 ppm; Soluble shall be <2.5 ppm
 - g. Salinity: Must be reported; may vary but < 4.0 mmhos/cm preferred. Soil should also be tested: <2.5 mmhos/cm is preferred for soil/compost blend but may vary with plant species.
 - h. pH: pH shall be between 6.5 and 8. May vary with plant species.
 - i. Particle size: 95% passing a 1/2" screen.
 - j. Bulk density: shall be between 500 and 1100 dry lbs/cubic yard
 - k. Moisture Content shall be between 35% - 55% of dry solids.
 - l. Inerts: compost shall be relatively free of inert ingredients, including glass, plastic and paper, < 0.1 % by weight or volume.
 - m. Weed seed/pathogen destruction: provide proof of process to further reduce pathogens (PFRP). For example, turned windrows must reach min. 55C for 15 days with at least 5 turnings during that period.
 - n. Select Pathogens: Salmonella <3 MPN/4grams of TS, or Coliform Bacteria <10000 MPN/gram.
 - 1) Trace Contaminants Metals (Lead, Mercury, Etc.) Product must meet US EPA, 40 CFR 503 regulations.

4. The delivery tags indicating the quantity delivered to the job site shall be submitted by contractor. Compost exhibiting a sour or putrid smell, containing recognizable grass or leaves, or heat (120F) upon delivery or rewetting will not be accepted.
- F. Maintain organic mulch
1. Contractor shall maintain a minimum of 2" [substitute 'minimum of 3" 'if required by the Owner's water conservation ordinance] of coarse organic mulch at all times over soil surface that is not covered by vegetation. Mulch shall be applied so that it is below grade (curb, edging, etc.) by half an inch. Some additional grading preparation and grading of areas adjacent to sidewalks or edging, etc. may be required to keep the finish grade of the mulch at an appropriate level. Mulch materials shall be chipped or shredded green waste, wood chips from pruning operations, or chipped landscape prunings. When available, use materials generated on-site. Shredded redwood bark mulch ("Gorilla hair") shall be avoided. Non porous material (e.g. plastic weed barriers) shall not be placed under the mulch.
 2. Sheet mulching shall be employed where possible.
- G. Retain natural leaf litter and clippings
1. To conserve nutrients on-site and protect the soil surface, Contractor shall retain natural leaf drop under trees or in shrub beds. Select only tree and shrub beds that will not allow leaf litter or mulch to wash out into storm drains. Where leaf litter detracts from landscape appearance due to large leaf size, it is preferable that leaves be chopped and returned to landscape beds. Remove diseased leaves that would provide inoculums for plant infection.
 2. Contractor shall practice grasscycling (discussed further in Section 4.1 *Turf Management*)
- H. Fertilizers and other soil amendments
1. Bay-Friendly Landscaping relies on organic fertilizers and soil amendments from natural sources that release elements slowly, which shall be preferred.
 2. Additional amendments and fertilizers that are approved for use by the Organics Materials Research Institute (OMRI) for use in crop production are approved for use in landscape. See www.omri.org. Contractor must supply fertilizer and soil amendment labels including the guaranteed analysis identifying components of the material and the percent nutrient content. Contractor is required to apply the appropriate amount of fertilizer to supply the specified quantity of nutrient as determined by soil analysis and/or plant tissue analysis.
 3. Contractor shall apply and manage fertilizers and amendments to prevent pollution of surface and ground water and to avoid creating a nitrogen draft in the soil or toxicity to plants.
 4. Application frequency
 - a. Fertilizers shall be applied on a prescription base only. Application frequency shall be determined by plant need and assessed through soil and/or tissue analyses. For bidding purposes the following maximum annual number of applications are provided.
 - 1) Trees, shrubs, woody ground covers: One time per year
 - 2) Herbaceous ground covers, perennials Two times per year
 5. Restricted materials. Fertilizers that are not approved or are restricted for use in crop production by OMRI shall be applied only after review and written approval by the Owner Representative.

3.3 WATER MANAGEMENT

- A. Water conservation goals - Landscapes shall be irrigated to maintain plant appearance and health, and managed to conserve water and avoid overspray and water damage to Owner's hardscape and property.
- B. Irrigation system assessment
1. Irrigation application rates and distribution uniformity are best assessed through an irrigation audit. Contractor is encouraged to perform an irrigation audit bi-annually (refer to www.itrc.org) or to schedule an audit with the water district that is the service provider to that property.
 2. If a water audit is not performed, the Contractor shall inventory of the irrigation system at the start of the job. For each hydrozone determine the irrigation type and nozzle size, spacing and gallonage (from manufacturer's literature).
- C. Irrigation scheduling – water budget method The water budget approach to irrigation scheduling shall be used to match plant need with water application and avoid over-irrigation and overspray.
1. Irrigation intervals and frequency shall be suitable for weather conditions, soil infiltration rates, and plant species' rooting depth and water requirements within each hydrozone. Calculation methods are described in *A Guide to Estimating Irrigation Water Needs of Landscape Plantings in California*, available from the Dept. of Water Resources, Sacramento, CA.
 2. Irrigation frequency shall be based on ET (evapotranspiration) data (available through CIMIS). Irrigation shall be applied at approximately 60% allowable depletion (AD) for turf and annuals, 70% for non-drought tolerant and 90% for drought tolerant plantings.
 3. Irrigation duration within each hydrozone shall be based on the soil infiltration rate, species water requirement and rooting depth within the hydrozone, and the application rate and distribution uniformity of the irrigation system within that zone. Enough water shall be applied at each irrigation cycle to wet through the depth of root zone. Where runoff occurs, the application time shall be divided into shorter time intervals and repeated as needed.
 4. Irrigation frequency for each hydrozone shall be adjusted a minimum of every four weeks to reflect ET expected in the next month.
 5. For sites with controllers that monitor ET and adjust schedules automatically, the Contractor shall program the controller according to manufacturer specifications, and monitor to ensure that frequency is appropriate.
 6. Whenever possible, landscape irrigation shall be scheduled between 2:00 a.m. and 10:00 a.m. to avoid irrigating during times of high wind or high temperature.
- D. Irrigation monitoring
1. Contractor shall monitor soil moisture within plant root zones using a soil probe or shovel and adjust irrigation schedules accordingly if a soil moisture sensor is not signaling the irrigation controller.
 2. Contractor shall observe irrigation system in operation to identify and correct water runoff or standing water problems as noted in the Section below 3.4.F *Maintenance and Repair*.
 3. Contractor shall determine irrigation run time demand monthly by recording water meter reading before and after irrigation (if site has a separate irrigation meter). This data should be reconciled with run times and flow rates to determine if there is unusual consumption which may indicate stuck valves or leaks.
- E. Irrigation with recycled water - For landscapes irrigated with recycled water and containing salt-sensitive plants, the Contractor should increase irrigation frequency and duration to allow for elevated salts in the water and reduce salt accumulation in the root zone.

1. As a general guideline it is recommended that irrigation frequency adjusted to 50% allowable depletion (AD) for turf and annuals, 60% for non-drought tolerant plantings and 80% for drought tolerant plantings.
2. Once a month during the summer, irrigation duration should be increased by 20% to leach salts below plant root zones.

F. Irrigation system maintenance and repair

1. Contractor shall maintain the irrigation system for optimum performance, as per manufacturers specifications, by inspecting the entire system on an ongoing basis. This includes cleaning and adjusting all sprinkler and bubbler heads, drip emitters and valves for proper coverage.
2. Contractor shall inspect the irrigation system in operation to ensure proper function according to the following schedule:
 - a. April – October Weekly
 - b. November – March Monthly (when system operating)
3. All malfunctioning equipment shall be repaired prior to the next scheduled irrigation.
4. All irrigation replacement parts shall be of the same manufacturer, type, and application rates as existing, or approved equals or upgrades.
5. Irrigation system pressure shall be checked and adjusted at least monthly during season of operation.
6. Twice a year, at a minimum, the Contractor shall:
 - a. Ensure all flush valve/cap locations are visible.
 - b. Ensure valve boxes are visible and can be opened.
 - c. Inspect valves, filters, and pressure regulators for damage or leaks. Check wire splices.
 - d. Clean valve boxes of dirt and debris.
 - e. Flush filters. A hose can be attached to the flush cap to keep water out of the valve box.
 - f. Inspect and clean filters. Replace damaged or torn filters.
 - g. Flush laterals.
 - h. Make sure plants have adequate numbers of drip emitters for their size.
 - i. Test backflow preventers.
7. Sprinkler heads shall be modified as needed to avoid overspray.
8. Where possible and appropriate, recommend to Owner where sprinklers could be converted to drip or bubblers.
9. Contractor shall maintain and submit monthly documentation of irrigation checks and as built plans of any changes or adjustments to the system. See Section 2.3.G.1. *Reporting and Inspecting.*

3.4 INTEGRATED PEST MANAGEMENT (IPM)

- A. Goals - An integrated pest management program shall be implemented to:
1. maintain healthy, attractive plants, maximize resistance to pests and out-compete weeds;
 2. monitor for presence of pests and to evaluate pest impact to plant health and appearance, and nuisance to the public;
 3. provide control treatments that have minimal negative effects on all but the pest and that protect air and water quality.
 4. Contractor shall assume pesticides are potentially hazardous to human and environmental health. Preference shall be given to reasonably available nonpesticide alternatives when considering the use of pesticides on Owner property.

- B. Insects and diseases
1. Key plant:key pests
 - a. Contractor shall identify primary plant species and cultivars in the landscape (key plants) and the pests that commonly cause significant harm to plant health or appearance (key pests).
 2. Monitoring
 - a. Contractor shall monitor landscape areas to identify presence of beneficial insects and pests, determine populations, life stage, and degree of damage to plants. Key plants:key pests will be monitored closely during normal periods of pest activity. This information will be the basis on which pest control methods are initiated. Records of monitoring activity shall be kept.
 3. Controls - Bay-Friendly Landscaping seeks to control pests without harming non-target organisms, or negatively affecting air and water quality and public health. It relies on IPM which uses a range of cultural, mechanical, physical, and biological control methods before using pesticides. Chemical controls are applied only when monitoring indicates that preventative and non-chemical methods are not keeping pests below acceptable levels. When pesticides are required, the least toxic and the least persistent pesticide that will provide adequate pest control is applied. Pesticides are not applied on a prescheduled basis.
 - a. Cultural/Mechanical/physical methods. A number of maintenance practices or modifications of them can make the environment unfavorable for pest reproduction, movement, or survival. Often simply modifying an existing maintenance practice, such as timing of pruning or fertilization, can produce positive results,. Other mechanical or physical practices may specifically combat plant pests or increase host resistance. Key treatments include:
 - 1) Fostering a healthy soil, judicious fertilization only when needed, and managing irrigation appropriately.
 - 2) Pruning to remove infected or infested branches and shoots. Time pruning to avoid periods of insect infestation. For example prune pines and eucalyptus in the winter (December-February) when bark beetles and borers are inactive.
 - 3) Removing fallen twigs, leaves, and fruit that contains disease inoculum.
 - 4) Mulching soil surface to reduce weeds and to reduce splashing and the drops of mud that would protect spores deposited on plant surfaces.
 - 5) Trapping insects using sticky surfaces (also used for monitoring). Mechanical traps can be used to control rodents.
 - 6) Bringing to attention of Owner plants that are disease or insect prone and suggesting resistant plant replacements or those better suited to the site and microclimate
 - b. Biological methods
 - 1) Biological controls are pesticides of natural origin that have limited or no adverse effects on the environment or beneficial organisms. Determining the effective biological control and proper timing of application are critical to success in pest control.
 - 2) The Contractor shall consider the following biological control methods when cultural/mechanical/physical methods are not adequate to lower pest populations to the target level.
 - a) *Bacillus thuringiensis* (Bt)
 - b) Parasitic nematodes
 - c) Pheromone traps
 - d) Beneficial insect release and conservation
 - c. Pesticides

- 1) The term pesticide applies to insecticides, fungicides and other substances used to control pests. Antimicrobial agents are not included in this definition of pesticides.
- 2) Least toxic pesticides
When cultural, mechanical, physical and biological controls have provided inadequate pest control, the Contractor may select and apply an appropriate least-toxic pesticide as a last resort. Least-toxic pesticides have a high LD-50, low residual, and narrow range of toxicity. Application must be timed to the appropriate life stage of the pest.
- 3) Examples are:
 - a) insecticidal soaps,
 - b) horticultural oils,
 - c) herbicidal soaps,
 - d) neem,
 - e) Pyriproxyfen insect growth regulator (e.g. Distance IGR)
- 4) Restricted chemicals
Organophosphate-containing pesticides have been found to persist in the environment and cause water quality impairment of some creeks, streams, and arroyos in Alameda County. They are restricted from use. Examples include:
 - a) diazinon, trade names Spectracide®, Knox-out® and
 - b) chlorpyrifos, trade names Dursban®, Pageant®)
 - c) malathion and carbaryl (trade name Sevin®)

Water quality agencies recommend against using pyrethroids and pyrethrins containing piperonyl butoxide (PBO). These chemicals are restricted from use.

Pyrethrins are toxic to birds, fish, and beneficial insects, should be used only as a last resort, and carefully applied to avoid runoff and contact with non-target plants.

Contractor shall not apply any Toxicity Category I or II Pesticide Product, any pesticide containing a chemical identified by the State of California as a chemical known to the State to cause cancer or reproductive toxicity pursuant to the California Safe Drinking Water and Toxic Enforcement Act of 1986, and any pesticide classified as a human carcinogen, probable human carcinogen or possible human carcinogen by the United States Environmental Protection Owner, Office of Prevention, Pesticides and Toxic Substances.

- 5) All chemical applications shall be performed by a licensed, trained technician. Contractor must be a licensed Pest Control Operator as required by the State of California, registered in Alameda Co., and strictly adhere to all laws.
4. Notice of pesticide use
- a. Signs shall be posted at least three days before application of the pesticide product and remain posted at least four days after application of the pesticide.
 - 1) Signs shall be posted (i) at every entry point where the pesticide is applied if the pesticide is applied in an enclosed area, and (ii) in highly visible locations around the perimeter of the area where the pesticide is applied if the pesticide is applied in an open area.

- 2) Signs shall be of a standardized design that are easily recognizable to the public and workers.
- 3) Signs shall contain the name and active ingredient of the pesticide product, the target pest, the date of pesticide use, the signal word indicating the toxicity category of the pesticide product, the date for re-entry to the area treated, and the name and contact number for the City department responsible for the application.
- b. Contractor shall not be required to post signs in right-of-way locations that the general public does not use for recreational purposes. However, Contractor shall notify Owner in writing three days prior to pesticide applications in the right-of-way areas.
- c. Contractor may obtain authorization from the Owner to apply a pesticide without providing a three-day advance notification in the event of a public health emergency or to comply with worker safety requirements. Signs shall be posted for at least four days after application of the pesticide, as described in the Section above, 3.5.B.4.a., *Notice of Pesticide Use*
5. Recordkeeping and reporting
 - a. Contractor shall maintain records of all pest management activities. Each record shall include the following information:
 - 1) target pest;
 - 2) type and quantity of pesticide used;
 - 3) site of the pesticide application;
 - 4) date the pesticide was used;
 - 5) name of the pesticide applicator;
 - 6) application equipment used;
 - 7) prevention and other non-chemical methods of control used.
 - b. Contractor shall submit the pest management record to Owner on a monthly basis.
- C. Weed management
 1. Landscapes shall be maintained in a healthy and attractive manner using Bay-Friendly methods.
 2. Identify key weeds
 - a. Contractor will identify key weeds present and design weed manage program to target those species.
 3. Invasive plants
 - a. Invasive plant species may have been included in the plantings inadvertently. Seedlings and/or suckers from those plants shall be removed by the Contractor. Refer to www.bayfriendly.org or www.cal-ipc.org for a list of invasive species. Remove all invasive plants not planted intentionally as noted in the Section below, 3.5.C.4, *Controls*. When invasive plants are an intended part of the landscape please notify Owner and propose a replacement option.
 4. Controls
 - a. Cultural/Mechanical/physical methods will be used as the first choice in weed management.
 - 1) Monitor planting areas frequently to identify and eradicate weeds early in the growth stage prior to their setting seed.
 - 2) Cut or pull weeds using hand operated equipment where possible.
 - 3) Mow large areas to reduce weed growth, and eliminate species that are not tolerant of mowing. Mowing is especially effective when done prior to seed set. Mowing also reduces fire hazard in open spaces.

- 4) Goats may be used to manage weed growth, where appropriate. Goats must be well managed and plants fenced to avoid damage to non-target plants.
 - 5) Mulches shall be maintained at all times over soil surface that is not covered by vegetation. (see also Section 3.3 E, *Incorporate Organic Soil Amedments*)
 - 6) Sheet mulching, a layered system of non-plastic weed barrier overlain by mulch, shall be employed where possible.
 - 7) Propane-fueled flammers may be used in winter and spring with required permits and approval by the Fire Marshall to kill early-season, non-grass weeds by heating the cells until they burst. The weed quickly wilts and dies.
- b. Least toxic herbicides may be employed by Contractor as a last resort. Examples are:
- 1) Fatty acid potassium salts (herbicidal soaps e.g. Safer's Superfast Weed and Grass Killer® Dr. Bronner's Peppermint Anti-Bacterial Soap)¹
 - 2) Acetic and citric acids (e.g. Nature's Glory Weed and Grass Killer RTU®)
 - 3) Clove, citrus, mint and thyme oil (e.g. Matran II®, Xpress®)
 - 4) Corn gluten
 - 5) Low-toxic, low-residual herbicide [e.g. glyphosate (Round-up®), glufosinate-ammonium (Finale®), pelargonic acid (Scythe®)]
- c. Restricted herbicides that may not be used because they have been identified as ground water contaminants are (trade names in parentheses):
- 1) Atrazine (Aatrex)
 - 2) Simazine (Princep)
 - 3) Bromacil (Hyvar, Krovar)
 - 4) Prometon (Pramitol)
 - 5) Bentazon (Basagran)
 - 6) Norflurazon (Solicam, Predict, Zorial)
- d. Restricted herbicides that may not be used because they have been identified as a compost contaminant are:
- 1) Picloram
 - 2) Clopyralid
- D. Vertebrate pests
1. Identify key pests that significantly affect plant health and appearance. Accurate identification is critical to appropriate control. Common vertebrate pests are:
 - a. Rodents including rats, mice, voles, moles, gophers
 - b. Deer
 - c. Rabbits
 2. Controls
 - a. Mechanical/physical/cultural methods shall be implemented as a first course of action. Preferred treatments include:
 - 1) Exclusion – Protect plants from damage by grazing animals with fences or cages.
 - 2) Habitat modification – Reduce cover at the periphery of the project as needed to solve problem.
 - 3) Application of repellents that are suitable for use in public areas.

¹ Trade names are used only as examples and are not intended as an endorsement.

- 4) Traps may be used where mechanical/physical/cultural methods have been insufficient to control moles, voles, gophers, rats and mice.
- 5) Encouragement of predators – owl boxes
- b. Least toxic rodenticides

3.5 PLANT GROWTH CONTROL

A. Goals

- 1. The goals of plant growth control are to maintain healthy, attractive plants within the planting space allotted with minimal removal and disposal of vegetative growth.

B. Pruning

- 1. Selective pruning
 - a. Plants shall be pruned selectively to remove individual stems or branches that extend beyond the natural conformation of the plant to a lateral branch or at the point of attachment.
 - b. Woody groundcovers shall be selectively pruned to control growth towards pavements rather than edged.
- 2. Hedging and shearing
 - a. Existing hedges that have been maintained by shearing in the past and that do not have adequate space to grow to mature plant size can continue to be maintained by shearing. Suggest to Owner alternative plantings to these existing hedges that can be maintained in their natural shape for future renovations
 - b. For hedges that have not yet been maintained by shearing: shearing of plants into formal shapes shall be avoided as this destroys the natural form of the plant and generates excessive waste.
 - 1) Plants having adequate space for development shall instead be selectively pruned on an as needed basis.
 - 2) Where plant size must be controlled because of inadequate space for the plant, prune to reduce size by cutting individual branches or stems to interior lateral branches at appropriate locations. Contractor will notify Owner where hedges could be replaced with size-appropriate plants to eliminate requirement for shearing.
- 3. Tree Pruning
 - a. Tree pruning shall be preformed only by trained, experienced personnel. An I.S.A. Certified Arborist or Tree Worker is to be present at all times during pruning. See Section 3.5.C., *Pruning*, for additional requirements.

C. Fire management/defensible space

- 1. For projects that adjoin open space areas, manage growth of grasses shrubs and trees to minimize fire risk. Contractor shall maintain vegetation clearances as required by the Alameda County Fire Marshall. Where recommended clearances would negatively affect plant health or environmental quality, Contractor will contact the Fire Marshall for a field inspection and recommendation. See also Section 4.5.B. *Fire Management*.

D. Irrigation and fertilization programs shall be designed to avoid excessive plant growth that would require additional pruning or mowing to manage.

3.6 WASTE MANAGEMENT

- A. Goals
 - 1. Bay Friendly landscapes are maintained to minimize producing waste and to use as much of the plant debris generated on-site as is possible and to recycle plant debris and discarded materials to the maximum extent feasible at appropriate recycling centers to avoid adding it to landfill.

- B. Retain natural leaf litter
 - 1. To conserve nutrients on-site and protect the soil surface, Contractor shall retain natural leaf drop and other organic materials in shrub beds. Select sites where leaves will not enter the storm drain. Where leaf litter detracts from landscape appearance due to large leaf size, it is preferable that leaves be chopped and returned to landscape beds. Remove diseased leaves that would provide inoculum for plant infection.

- C. Grasscycle
 - 1. Contractor will leave grass clippings on the lawns after mowing, from at least April through October,. Sports turf may be excluded 'in season' when clippings will interfere with play.

- D. Debris removal and clean-up
 - 1. Contractor shall keep all landscaped areas, walkways, building entries and exits free from trash and debris. Debris clean up with brooms and rakes is preferred to blowers.

- E. Producing mulch from site generated untreated and unpainted wood and plant debris
 - 1. Contractor is encouraged to chip all vegetative materials and wood and use on site as mulch.

- F. Producing compost from site generated plant debris
 - 1. Where appropriate space is available, Contractor is encouraged to compost site-generated green waste and reuse on site. Site must be approved by Owner, have a water hook-up nearby, be in an area that discourages interaction with public and be regularly monitored. Contractor should have knowledge of compost basics such as: C:N ratio, proper moisture content, and proper aeration.

- G. Recycle waste
 - 1. Contractor shall separate all plant debris that cannot be reused on site and other discarded materials that are readily recyclable and transport to appropriate recycling facilities.
 - 2. If lawn clippings, shrub and tree trimmings, or prunings must be removed from site, they must be kept free of other types of debris and transported to a local composting facility or transfer station that offers a separate processing (and often discounts) of plant debris for composting.

3.7 LANDSCAPE REPAIR/REFURBISHMENT

- A. When landscapes are repaired and/or refurbished, the Contractor will employ Bay-Friendly landscape guidelines to enhance the sustainability of the landscape, reduce waste and protect watersheds. Refer to the Bay-Friendly landscape guidelines at www.BayFriendly.org

- B. Replace high input plants with species better suited to location and use. Species should be selected that are:
 - 1. appropriate size at maturity for planting site
 - 2. native to region and/or drought tolerant
 - 3. resistant to significant pests
 - 4. non-invasive
 - 5. increase diversity of the plant palette.
- C. Reduce amount of area occupied by high water use plantings where possible (e.g. replace turf with drought-tolerant ground cover). Suggest alternative plantings to Owner for decorative turf especially turf areas less than 8 feet wide.
- D. Reuse materials removed from the landscape that are in good condition.
- E. When buying new materials, select recycled content materials where possible.
- F. When irrigation systems are replaced or upgraded, install high efficiency systems.

PART 4 - LANDSCAPE SPECIFICATIONS FOR PLANT TYPES AND LANDSCAPE ZONES

4.0 GROUND COVER

- A. Standards for Health and Appearance
 - 1. Ground covers shall be maintained to sustain an attractive, healthy, normal color for the species, and uniform density with no bare spots. Ground covers shall be kept free of trash and debris.
- B. Protect Environmental Resources
 - 1. Ground cover shall be maintained using materials and methods that protect environmental quality and human health, conserve water and energy, minimize waste, and reuse and recycle materials to the extent possible.
- C. Edging and Mowing
 - 1. Ground covers shall be trimmed on a regular basis to maintain pavements and other features clear of vegetation.
 - 2. The edge of woody ground covers (e.g. rosemary, cotoneaster) shall be maintained by pruning individual branches or stems to interior lateral branches a minimum of 6" and maximum of 12" from the edge of pavement.
 - 3. The edge of herbaceous ground covers (e.g. hypericum) may be maintained using turf edging equipment.
 - 4. When ground covers become excessively woody or develop thatch in excess of 4", the Contractor shall prune the planting severely to rejuvenate it. For most woody ground covers, prune to approximately 6-8" height. Herbaceous ground covers may be mowed at an appropriate height, generally 4-6". This treatment shall only be applied in the late winter/early spring when ET is low and regrowth will occur quickly.
 - 5. Handling of plant debris
 - a. Contractor is encouraged to chip all vegetative materials use on site as mulch and/or compost and use as soil amendment.

- b. If ground cover prunings must be removed from site, they must be kept free of other types of inorganic debris and transported to a local composting facility or transfer station that offers a separate processing (and often discounts) of plant debris for composting.

D. Mulching

1. Contractor shall maintain a minimum of 3" of coarse organic mulch at all times over bare soil areas that is not covered by ground cover. Mulch shall be applied so that it is below grade (curb, edging, etc.) by half an inch. Some additional grading preparation and grading of areas adjacent to sidewalks or edging, etc. may be required to keep the finish grade of the mulch at an appropriate level. Mulch materials shall be chipped or shredded plant debris wood chips from pruning operations. When available, utilize chipped plant prunings generated on-site.

E. Water Management

1. Ground cover shall be irrigated to provide adequate water to maintain an attractive, green, healthy plants, and moderate growth rate during its growing season.
2. The water budget approach to irrigation scheduling shall be used to match ground cover need with water application and avoid over-irrigation (see Section 3.4, *Water Management*)

F. Soil and Nutrition management (see also Section 3.3, *Soil & Nutrition Management*)

1. Contractor shall incorporate composted organic amendments into soil prior to planting annuals or replanting damaged turf or ground cover as per Sections 3.3.D, *Soil and Plant Tissue Analysis* and 3.3.E., *Incorporate Organic Soil Amendments*.
2. Fertilization shall be managed to provide moderate, not excessive, growth, and avoid polluting surface and ground waters.
3. Fertilizer applications are to be made on a prescription basis only when soil and/or plant tissue analyses identify specific deficiencies. For bidding purposes plan to apply 1-2 lbs. of actual nitrogen to ground cover areas in two applications annually.
4. Contractor shall select fertilizers that are released over a period of time, predominately are organic and derived from natural sources, are produced locally, and will not pollute surface and ground water when properly used to provide primary nutrient needs of the ground cover.

G. Pest management

1. Contractor is responsible for monitoring ground cover to identify, assess pest problems and taking action to control pests that affect ground cover health and appearance when pest populations or damage exceed established thresholds.
2. Contractor shall employ integrated pest management procedures (see also Section 3.5, *Integrated Pest Management*).
3. Contractor shall select pest controls to provide adequate pest control without harming non-target organisms, or negatively affect air and water quality and public health. Pest management shall rely first on cultural, mechanical, physical, and biological control methods. Chemical controls may be applied only when monitoring indicates that preventative and non-chemical methods are not keeping pests below acceptable levels. When pesticides are required, the least toxic and the least persistent pesticide that will provide adequate pest control will be applied. Pesticides may not applied on a prescheduled basis.
4. Contractor shall not apply restricted chemicals that may harm water resources.

4.1 Shrubs

- A. Standards for Health and Appearance
 - 1. Shrubs shall be maintained to sustain an attractive and healthy plant that is characteristic for the species.

- B. Protect Environmental Resources
 - 1. Shrubs shall be maintained using materials and methods that protect environmental quality and human health, conserve water and energy, minimize waste, and reuse and recycle materials to the extent possible.

- C. Pruning
 - 1. Selective pruning
 - a. Shrubs shall be pruned selectively only as necessary to enhance their natural shape.
 - b. Where plant size must be controlled because of inadequate space for the plant, prune to reduce size by cutting individual branches or stems to interior lateral branches at appropriate locations
 - 2. Hedging and shearing
 - a. Existing hedges that have been maintained by shearing in the past and that do not have adequate space to grow to mature plant size can continue to be maintained by shearing. Suggest to Owner alternative plantings to these existing hedges that can be maintained in their natural shape for future renovations
 - b. For hedges that have not yet been maintained by shearing: shearing of plants into formal shapes shall be avoided as this destroys the natural form of the plant and generates excessive waste.
 - 1) Plants having adequate space for development shall instead be selectively pruned on an as needed basis.
 - 2) Where plant size must be controlled because of inadequate space for the plant, prune to reduce size by cutting individual branches or stems to interior lateral branches at appropriate locations. Contractor will notify Owner where hedges could be replaced with size-appropriate plants to eliminate requirement for shearing.
 - 3. Trimmings generated by pruning shall either be chipped and used as mulch on the site, or transported to a plant debris recycling facility.

- D. Mulching
 - 1. Contractor shall maintain a minimum of 3" [substitute 'minimum of 3" of coarse organic mulch at all times over bare soil areas surrounding shrubs. Mulch shall be applied so that it is below grade (curb, edging, etc.) by half an inch. Some additional grading preparation and grading of areas adjacent to sidewalks or edging, etc. may be required to keep the finish grade of the mulch at an appropriate level. Mulch materials shall be chipped or shredded composed green waste, wood chips from pruning operations, or chipped landscape prunings generated on-site.
 - 2. Sheet mulching shall be employed at installation, where possible.

- E. Water Management
 - 1. Shrubs shall be irrigated to provide adequate water to maintain an attractive, healthy plants, and moderate growth rate during their growing season.
 - 2. The water budget approach to irrigation scheduling shall be used to match shrub need with water application and avoid over-irrigation (see Section 3.4 *Water Management*)

- F. Soil and Nutrition Management (see also Section 3.3, *Soil & Nutrition Management*)
 - 1. Fertilization shall be managed to provide moderate, not excessive, growth, to and avoid polluting surface and ground waters.
 - 2. Fertilizer applications are to be made on a prescription basis only when soil and/or plant tissue analyses identify specific deficiencies. Additional fertilization of mature shrubs maintained with mulch may not be necessary.
 - 3. Contractor shall select fertilizers that are released over a period of time, predominantly are organic and derived from natural sources, are produced locally, and will not pollute surface and ground water when properly used to provide primary nutrient needs of the ground cover.

- G. Pest Management
 - 1. Contractor is responsible for monitoring shrubs to identify, assess pest problems and taking action to control pests that affect shrub health and appearance when pest populations or damage exceed established thresholds.
 - 2. Contractor shall employ integrated pest management procedures (see also Section 3.5, *Integrated Pest Management*).
 - 3. Contractor shall select pest controls to provide adequate pest control without harming non-target organisms, or negatively affect air and water quality and public health. Pest management shall rely first on cultural, mechanical, physical, and biological control methods. Chemical controls may be applied only when monitoring indicates that preventative and non-chemical methods are not keeping pests below acceptable levels. When pesticides are required, the least toxic and the least persistent pesticide that will provide adequate pest control will be applied. Pesticides may not applied on a prescheduled basis.
 - 4. Contractor shall not apply restricted chemicals that may harm water resources.

4.2 TREES

- A. Standards for Health and Appearance
 - 1. Trees shall be maintained to sustain an attractive, healthy and structurally stable plant that is characteristic for the species.

- B. Protect Environmental Resources
 - 1. Trees shall be maintained using materials and methods that protect environmental quality and human health, conserve water and energy, minimize waste, and reuse and recycle materials to the extent possible.

- C. Pruning
 - 1. All tree pruning shall be performed only by trained, experienced personnel. An I.S.A. Certified Arborist or Tree Worker is to be present at all times during pruning. Arborist must have a State of Calif. Contractors License for Tree Service (C61-D49).
 - 2. All pruning shall be in accordance with the Best Management Practices for Pruning (International Society of Arboriculture, 2002) and adhere to the most recent editions of the American National Standard for Tree Care Operations (Z133.1) and Pruning (A300).
 - 3. Young trees shall receive annual pruning for up to five years after planting by personnel trained in pruning to develop tree structure. The purpose of the pruning is to direct the tree into the appropriate form for the species and the site and to develop a strong branch structure. Trees with codominant trunks and multiple branch attachments shall be pruned to correct those defects over a period of several years.

4. Trees shall be pruned in the following manner:
 - a. Clear the crown of diseased, crossing, weak and dead branches. Trees shall not be routinely thinned.
 - b. Provide 14' vertical clearance over roads, 8' over walkways;
 - c. Reduce end weight on heavy, horizontal branches
 - d. Create a strong central trunk with lateral branches spaced vertically and horizontally.
 - e. Interior branches shall not be stripped out.
 - f. No more than 20% of live foliage shall be removed within the trees.
 - g. Trees shall not be climbed with spurs.
 - h. Branch removal or reduction cuts (thinning cuts) are to be employed rather than heading cuts. Trees shall not be topped or headed back.
 - i. No green palm fronds shall be removed above a horizontal line drawn across the base of the crown.
 5. Schedule pruning to avoid time of bud break, flowering and leaf drop on live branches, and to avoid peak periods of insect and disease activity for pests to which the tree species is susceptible.
 6. Pruning operations shall be conducted in a manner that does not damage surrounding and understory plants and structures.
- D. Staking
1. Tree stakes, ties and guys shall be checked regularly to ensure trees are not being damaged. Adjust ties and stake as necessary to prevent girdling and wounding.
 2. Tree stakes shall be removed within two years of planting. For trees unable to stand alone after two years, Contractor will shorten the stakes and lower the ties to 3-4' height. If after the third year the tree will not stand without a stake, Contractor will inspect to determine cause of instability, and make recommendations to Owner for corrective action.
 3. If new ties are needed to secure tree to stake, use ties composed of recycled materials. The tie must be broad, have a smooth surface where it contacts the trunk, and provide some elasticity. Wire covered with hose, tubing or other materials, and covered electrical wire are not acceptable materials.
- E. Mulching
1. Contractor shall maintain a minimum of 3" of coarse organic mulch at all times over bare soil areas surrounding trees taking care not to place mulch against trunks. Mulch shall be applied so that it is below grade (curb, edging, etc.) by half an inch. Some additional grading preparation and grading of areas adjacent to sidewalks or edging, etc. may be required to keep the finish grade of the mulch at an appropriate level. Mulch materials shall be chipped or shredded plant debris and/or wood chips from pruning operations. When available, utilize chipped landscape prunings generated on-site.
 2. Sheet mulching shall be employed at installation, where possible.
- F. Water Management
1. Trees shall be irrigated to encourage deep root growth and to provide adequate water to maintain an attractive, healthy plants, and a moderate growth rate during their growing season.
 2. The water budget approach to irrigation scheduling shall be used to match shrub need with water application and avoid over-irrigation (see Section 3.4, *Water Management*)

- G. Soil and Nutrition Management (see also Section 3.3, *Soil & Nutrition Management*)
 - 1. Fertilization shall be managed to provide moderate, not excessive, growth, and to avoid polluting surface and ground waters.
 - 2. Fertilizer applications are to be made on a prescription basis only when soil and/or plant tissue analyses identify specific deficiencies. Additional fertilization of mature trees may not be necessary.
 - 3. Contractor shall select fertilizers that are released over a period of time, are predominantly organic and derived from natural sources, are produced locally, and will not pollute surface and ground water when properly used to provide the primary nutrient needs of the tree.

- H. Pest management
 - 1. Contractor is responsible for monitoring trees to identify, assess pest problems and taking action to control pests that affect tree health and appearance when pest populations or damage exceed established thresholds.
 - 2. Contractor shall employ integrated pest management procedures (see also Section 3.5, *Integrated Pest Management*).
 - 3. Contractor shall select pest controls to provide adequate pest control without harming non-target organisms, or negatively affect air and water quality and public health. Pest management shall rely first on cultural, mechanical, physical, and biological control methods. Chemical controls may be applied only when monitoring indicates that preventative and non-chemical methods are not keeping pests below acceptable levels. When pesticides are required, the least toxic and the least persistent pesticide that will provide adequate pest control will be applied. Pesticides may not be applied on a prescheduled basis.
 - 4. Contractor may not apply restricted chemicals that may harm water resources.

4.3 BIOSWALES AND BIORETENTION AREAS

- A. Standards for Health and Appearance and Function
 - 1. Bioswales and bioretention areas remove pollutants from the stormwater by filtering runoff slowly through an active layer of soil. They shall be maintained to ensure that flow is not obstructed, erosion is prevented and they continue to be effective without causing flooding or harboring vectors and in accordance with the site's Stormwater Control Plan's Operation and Maintenance Plan, if available.

- B. Protect Environmental Resources
 - 1. Bioswales depend on soils that are biologically active and held together by plant roots. They shall be maintained using materials and methods that support this biological activity, protect environmental quality and human health, conserve water and energy, minimize waste, and reuse and recycle materials to the extent possible.

- C. Monitoring and inspection
 - 1. Inspect inlets for channels and exposure of soils and report to the Owner if evidence of erosion is found. Examine rock or other material and report to the Owner if it requires replacement.
 - 2. Inspect inlets and slopes for instability, erosion or obstructions. Report indications of problems to Owner.
 - 3. Observe soil at the bottom of the swale for uniform infiltration. Confirm that irrigation is adequate but not excessive. Report water that does not drain within 48 hours of a storm.

4. Confirm that check dams and flow spreaders are in place and level. Report problems to Owner.
- D. Sediment control
 1. Clear minor obstructions and inspect for accumulation of sediment. Contractor shall remove accumulated sediment in bioswales by hand and around catch basins and culverts as necessary to maintain adequate flow.
- E. Vegetation management
 1. Examine vegetation to ensure that it is healthy, adequately but not overwatered, and dense enough to provide filtering. Remove debris. Prune large trees and shrubs as per previous Sections 4.4, *Shrubs* and 4.5 *Trees*. Weeds and invasive plant species shall be controlled as described in 3.5.C. *Weed Management*. Refer to www.cal-ipc.org for list of invasive species
- F. F.Mowing
 1. Grassy swales shall be mowed as needed to maintain adequate water flow. For bidding purposes assume 4 mowings per year. Remove no more than 1/3 of the length of the leaf blade. Clippings should be collected and either used elsewhere on-site or transported to a plant debris recycling facility.
- G. Mosquito Abatement
 1. Areas of seasonal water collection that do not drain within 48 hours shall either be filled with gravel/cobble or treated monthly with Bt (See Section 3.5.B.3, *Controls*)

4.4 PLANTER BOXES FOR STORMWATER MANAGEMENT

- A. Standards for Health and Appearance and Function
 1. Planter boxes capture runoff from downspouts, plaza or paved areas. The runoff briefly floods the box and then percolates through an active layer of soil. They shall be maintained to continue to be effective, attractive and healthy.
- B. Protect Environmental Resources
 1. Planter boxes depend on soils that are biologically active. They shall be maintained using materials and methods that support this biological activity, protect environmental quality and human health, conserve water and energy, minimize waste, and reuse and recycle materials to the extent possible.
- C. Monitoring and inspection
 1. Examine downspouts or inlets from paving. Remove debris and separate organic matter for recycling. Check splash blocks or rocks. Report damaged pipes, downspouts, blocks or rocks that need replenishing.
 2. Examine overflow pipe to make sure it can safely convey excess flows to a storm drain. Repair disconnected pipe or report damage to Owner.
 3. Check underdrain piping to make sure it is intact and unobstructed. Report evidence of damage or malfunction to the Owner.
 4. Check planter box for holes, cracks, rot or failure. Make minor repairs and report more significant damage to Owner.
- D. Vegetation management
 1. Examine vegetation to ensure that it is healthy, adequately but not overwatered, and dense enough to provide filtering. Remove debris. Prune large trees and shrubs as

per previous sections on growth and waste management. Weeds and invasive plant species shall be controlled as described in Section 3.5.C., *Weed Management*. Refer to www.cal-ipc.org for list of invasive species

- E. Soil and Nutrition Management
 - 1. Check that the soil is at the appropriate depth to allow a reservoir of water above the soil surface and to function as a stormwater filter. Confirm that water is draining through soil within 3-4 hours after a storm event. Alleviate compaction or replace soil as needed, with soil that includes compost at a rate of 1 part compost to 3 parts soil.
 - 2. Remove accumulations of sediment, litter or plant debris. Separate organic matter and handle as section on waste management. If plant debris must be removed from site, it must be kept free of other types of debris and transported to a local composting facility or transfer station that offers a separate processing (and often discounts) of plant debris for composting.

4.5 HARDSCAPE

- A. Debris removal and clean-up
 - 1. Contractor shall keep all hardscape areas, walkways, building entries and exits free from trash and debris.
- B. Surface cleaning
 - 1. Contractor will clean hard surfaces as needed to remove accumulation of sediment, dirt, or other materials that distracts from the visual impact of the area or creates a safety hazard. Cleaning methods must be consistent with the Bay Area Stormwater Management Agencies Association. (BASMAA) criteria (listed below in Section 4.9.E., *BASMAA Certification*).
- C. Root interference
 - 1. Potential root damage to hardscapes shall be reported to Owner. Corrective action will be determined and directed as an extra service.
- D. Pervious paving
 - 1. Contractor shall clean the surface of pervious paving to remove fine debris and dirt as needed to maintain permeability (approximately four times per year). Pavement may be cleaned with street sweepers equipped with vacuums, water, and brushes, followed by high-pressure hosing of surface. If necessary, replace displaced aggregate fill with clean gravel. Cleaning methods must be consistent with the Bay Area Stormwater Management Agencies Association. (BASMAA) criteria (listed below in section 4.9.E., *BASMAA Certification*).
- E. BASMAA Certification
 - 1. Pollution Prevention Training & Certification Program For Surface Cleaners issued by the Bay Area StormWater Management Agencies Association (BASMAA) is required to perform surface cleaning work. BASMAA certification number: _____, <http://www.basmaa.org/recognition/> All work should conform to BASMAA standards. BASMAA standards encourage the use of dry cleaning methods over wet such as the use of absorbing materials for oils and sweeping. It discourages the use of any soaps or solvents. It encourages directing wash water into the landscape or collection of waste water for disposal into a sanitary sewer instead of a storm drain. See their website for a thorough list of criteria.

4.6 DEFINITIONS

Antimicrobial agent – Any substance or mixture of substances intended for inhibiting the growth of or destroying any bacteria, fungi pathogenic to human and other animals, or viruses declared to be pests under Section 12754.5 of the California Food and Agricultural Code, except slime control agents. Antimicrobial agents include, but are not limited to, disinfectants, sanitizers, bacteriostats, sterilizers, fungicides and fungistats.

Biodiesel – A fuel produced through a process in which organically-derived oils such as soybean or vegetable oil are combined with alcohol.

Bioswale - Channel constructed to improve the water quality of runoff, usually while also conveying it, through filtering by vegetation and other mechanisms that capture and hold water pollutants.

Blanket – Mat of organic, biodegradable materials such as coir fibers, straw or curled wood fiber, on or between photodegradable polypropylene or degradable natural fiber netting. The blanket is placed on the soil surface to protect from surface erosion.

Compost Berm – An erosion control device composed of linear mounds of compost placed along a slope to slow water movement and retain sediment.

Evapotranspiration (ET) – The combined loss of water from a given area, and during a specified period of time, by evaporation from the soil surface and by transpiration from plants.

Grasscycling – A turf management technique in which turf is mown frequently and clippings are left on the turf to return nutrients to the soil, thereby reducing fertilizer requirements by as much as 50%.

Hardscape – The hard-surface components of the landscape such as sidewalks, pavements, non-living features.

Hydrozone – A portion of a landscaped area having plants with similar water needs that are served by one irrigation valve or set of valves with the same schedule.

I.S.A. – International Society of Arboriculture, www.isa-arbor.com

Integrated Pest Management – A holistic approach to managing insects, plant disease, weeds and other pests so that their populations do not exceed a tolerable level by fostering an environment favorable for plants and other beneficial organisms and unfavorable for pests. If pest problems arise a variety of control techniques are considered, with least toxic pesticides being applied as a last resort.

Pesticide – As defined in Section 12753 of the California food and Agricultural Code, a pesticide includes any of the following: (a) Any spray adjuvant. (b) Any substance, or mixture of substances which is intended to be used for defoliating plants, regulating plant growth, or for preventing, destroying, repelling, or mitigating any pest, which may infest or be detrimental to vegetation, man, animals, or households, or be present in any agricultural or nonagricultural environment whatsoever. Antimicrobial agents are excluded from the definition of pesticide.

“Toxicity Category I Pesticide Product” means any pesticide product that meets United States Environmental Protection Owner criteria for Toxicity Category I under Section 156.10 of Part 156 of Title 40 of the Code of Federal Regulations.

“Toxicity Category II Pesticide Product” means any pesticide product that meets United States Environmental Protection Owner criteria for Toxicity Category II under Section 156.10 of Part 156 of Title 40 of the Code of Federal Regulations.

Sheet Mulching - A layered system of non-plastic weed barrier (e.g. recycled cardboard, newspaper) overlain by mulch that is used for soil improvement and weed control

Sock – Sleeve filled with mulch, straw, or other organic, biodegradable material to create long tube placed along a slope to slow water movement and retain sediment.

Tube – See sock.

Wattle – See sock.

END OF SECTION