

3CP 1 – MOBILIZATION**PART 1 GENERAL****1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General Conditions and Special Provisions, and other Technical Specification Sections apply to this Section.

1.02 SUMMARY

- A. This Section specifies contractor is responsible for all preparatory work and operations required prior to beginning work.

1.03 GENERAL

- A. Mobilization shall include, but not limited to, the following:
 - 1. Movement of personnel, tools, equipment, materials, supplies, and incidentals to the project site and all preparatory work.
 - 2. Establishment of all necessary facilities for the Contractor's convenience
 - 3. Obtaining permits necessary for the execution of the work and adhere to conditions of existing permits.
 - a. USACOE 404, CDFW Streambed Alteration Agreement, and RWQCB 401 certification have been obtained for this project
 - b. Revise existing or acquire a new EBRPD Encroachment Permit as required to cover work period and Contractor.
 - 4. Providing required bonds and proof of insurance.
 - 5. Upon completion of the work, Contractor shall remove tools, equipment, and unused materials and supplies from the Project site and restore all disturbed areas outside the Project area to their pre-construction condition.
- B. Owner has the right to reject construction tools, equipment, materials, and supplies which are, in Owner's opinion, unsafe, improper, or inadequate.
 - 1. Contractor shall bring rejected construction tools, equipment, materials, and supplies to an acceptable condition as approved by Owner or remove from the Project site.

1.04 SUBMITTALS

- A. Projected Work Schedule: The Contractor will provide a Work Schedule acceptable to Owner or its representative, to be discussed at the pre-construction meeting, fixing the dates at which the various phases of work will be performed. The Contractor's work schedule shall not supersede any working days period stated in the Agreement. No payment will be made by Owner to the Contractor until the Work Schedule has been received and approved by the Owner's representative/Resident Project Manager. Failure to make Work Schedule and/or request and receive approval of appropriate adjustments will cause Owner to delay payments to Contractor.
- B. Detour Plan: Contractor shall provide a Marsh Creek Trail detour plan if Contractor anticipates trail closures during construction. Trail closures will not be permitted without an approved trail detour plan.

1. Contractor shall install informational, closure and detour signs routing users. All signs shall meet mutcd standards. Signs shall be posted on marsh creek trail 30 days prior to construction informing public about trail closures and detours resulting from this project. Maintain public access to and along The Marsh Creek Regional Trail to the greatest extent feasible.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION

3.01 PROGRESS OBSERVATIONS

- A. A written notice or phone call requesting site observation shall be given to the O.R. at least (1) one week prior to any anticipated observation date.
- B. The following progress observations are required:
 1. Observation of all on-site mock-ups prior to installation.
 2. Observation and approval of subgrade for all installations noted in this Specification, prior to installation.

3CP 2 - SITE FURNISHINGS**PART 1 GENERAL**

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and Special Provisions, and other Technical Specification Sections apply to this Section.

1.02 SUMMARY

- A. This Section includes the following site work and site furnishings in the Project:
1. Installing Timber Bench on Pedestal – **Additive Bid Item No. 3 and No. 5**
 2. Installing Logs on Grade – **Additive Bid Item No. 3**
 3. Salvaging and installing EBRPD sign, trash receptacle, Mutt mitt® – **Additive Bid Item No. 3**
 4. Installing Restoration Fence – **Additive Bid Item No. 3 and No. 5**
 5. Installing EBRPD Standard Pipe Gate – **Additive Bid Item No. 1**
 6. Steel Header – **Additive Bid Item No. 3 and No. 5**
 7. Contra Costa County Gate
 8. Community Notice Board - **Additive Bid Item No. 5**
- B. Related Sections include the following:
1. Section “Site Boulders”

1.03 DEFINITIONS

- A. Owner refers to the Contra Costa County Flood Control and Water Conservation District, which is the lead agency. Owner or Owner's Representative (O.R.) for the project refers to the district engineer, associates, or agents.
- B. EBRPD: East Bay Regional Parks District

1.04 SUBMITTALS

- A. Submittal Package: All submittals in this specification section (excluding re-submittals) shall be compiled together and submitted to O.R. as one package.
- B. Product Data: Provide for each type of product indicated. Include construction and fabrication details, material descriptions, dimensions of individual components and profiles, finishes, field-assembly requirements, and installation details.
- C. Shop Drawings: For EBRPD Standard Pipe Gate. Show locations and dimensions of all posts in relation to paving, adjacent fencing and grades. Indicate materials, dimensions, sizes, weights, and finishes of components. Include plans, elevations, sections, details of post anchorage and concrete footing dimensions, attachment, bracing, swing direction and clearances, and other required installation and operational clearances.
- D. On-Site Mock-ups: provide mock-ups for all site work and site furnishing installations including but not limited to: Bench installation, and Logs on Grade (each type), for O.R. approval prior to installing.

- E. Samples for Verification: For each material (provided in Ziploc bags), and for every type of exposed finish required, prepared on samples not less than 6-inch long for linear components and 6-inch square for sheet components.
- F. Material Certificates: For site furnishings, signed by manufacturer

1.05 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of site furnishing through one source from a single manufacturer.
- B. Contractor installing the Site Furnishings shall have a minimum of 5 years of experience in the installing of such elements with the personnel, facilities, and equipment adequate for the products specified, and shall produce written proof of such with bid.

PART 2 PRODUCTS

2.01 SITE FURNISHINGS

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include elements noted below:
- B. Timber Bench on Pedestal
 1. Redwood Timbers: Free of Heart Center, Clear Heart Vertical Grain, sanded finish all sides.
 2. If request by O.R. a clear, invisible, non-staining sealer shall be applied to all surfaces of the redwood.
 3. Pins: #5 Rebar, hot dipped galvanized. Meet or exceed ASTM A153.
 4. Epoxy: Two-component, epoxy based adhesive, Simpson, brand, SET, High Strength Epoxy-Tie Anchoring Adhesive, ASTM C-881, or approved equal.
- C. Log on Grade
 1. Custom milled eucalyptus log sections shall be reviewed and approved by O.R. prior to final trimming and finishing for use as benches. Milled log sections shall be of the highest quality, without checking or splitting, warping, discoloration or scars from felling, stockpiling, storage, or handling processes. Saw cuts shall be straight, even, and plumb. Belt sand all surfaces and face cuts to complete, smooth finish which allows for no splintered surfaces. Final sanding treatment shall be with #100 grit paper.
 2. Galvanized Pipe: Schedule 40 Steel, ASTM A53 and A733
- D. EBRPD sign, trash receptacle, Mutt mitt®. Contractor to salvage and re-install.
- E. Restoration Fence
 1. Post: Pressure Treated (P.T.) Douglas fir. Structural grade, No. 1 or better, FOHC. Pressure treated for ground contact, to meet AWPA standards. Pressure treated with CA-C copper azole. Treat all cut sections and ends with CA-C copper azole to match factory pressure treatment stain. Ensure that wood does not exhibit cupping, warping, or crowning, twisting or checking.
 2. Cable: Galvanized cable, see Plans.
 3. Cable Fittings: Cable Clamps, Nut Eye Bolts, Thimble, Washers, Cable Crimps; hot-dipped galvanized. See Plans.

- F. Anchors, Fasteners, Fittings, and Hardware (if specified): Manufacturer's standard, corrosion-resistant-coated or non-corrodible materials; commercial quality; tamperproof, vandal and theft resistant; concealed, recessed, and capped or plugged. Provide as required for site furnishing assembly, mounting, and secure attachment.
- G. Anti-theft Hold-Down Brackets: For securing site and street furnishings to substrate; two per unit.
- H. EBRPD Standard Pipe Gate: Furnish and install Single Pile Gates where noted on plans. Swing Gate shall be per EBRPD detail in Specification Appendix. Provide all materials and accessories noted for complete installation as noted in Specifications.
- I. Steel Edge: Col-met #1007, 3/16-inch thick by 4-inch height, with factory stakes. Factory applied satin-black painted finish. Telephone: 800.829.8225. Col-met #712 (lighter gauge) can be used for limited areas with tight radius turns only if approved by O.R.
- J. CCC Gate: CCC Standard Plan CD70, 4-ft Height, Black Vinyl Coating, 12-FT Minimum Clearance.
- K. Community Notice Board:
 - 1. Post: Pressure Treated (P.T.) Douglas fir. Structural grade, No. 1 or better, FOHC. Pressure treated for ground contact, to meet AWPA standards. Pressure treated with CA-C copper azole. Treat all cut sections and ends with CA-C copper azole to match factory pressure treatment stain. Ensure that wood does not exhibit cupping, warping, or crowning, twisting or checking. Above grade portions of post to be sanded and sealed with Penofin for Pressure Treated Wood in Clear/Rainer
 - 2. Cap, Stringer, Rail, and Vertical Closure Piece: Construction Common Redwood, sanded and sealed with Penofin Redwood All Heart.
 - 3. Fence fabric shall be commercial grade "galvanized after welded" utility fabric as manufactured by Howard Wire Cloth, Hayward, CA, phone (510) 887-8787, or equal. Fabric shall be 11 gauge with 3-inch vertical by 3-inch horizontal spacing.
 - 4. Steel clips used to attach welded wire mesh fabric shall be 9-gauge, and commercial grade galvanized.

2.02 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for O.R. and Metal Products" for recommendations for applying and designating finishes.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for correct and level finished grade, mounting surfaces, installation tolerances, and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION

- A. Comply with City of Brentwood, Contra Costa County and furnishing manufacturers' installation standards, directions, and product manufacturers' written installation instructions, unless more stringent requirements are indicated. Complete field assembly of site furnishings, as required to complete the Work as shown on Plans.
- B. Install site furnishings level, plumb, true, and securely anchored at locations indicated on the Plans.
- C. Post Setting: When specified, set cast-in support posts in concrete footing with smooth top, shaped to shed water. Protect portion of posts above footing from concrete splatter. Verify that posts are set plumb or at correct angle and are aligned and at correct height and spacing. Hold posts in position during placement and finishing operations until concrete is sufficiently cured.
- D. Timber Bench on Pedestal: Protect bench during the duration of the of the project. Ensure surface remains free of dirt, debris, and scratches.
- E. Log on Grade: Install level. Orient logs with best face exposed. Lengths and specific layout per O.R. in field. Contractor shall trim logs per O.R. direction. Install as noted on the Plans. Pin logs with pipe pins as noted on Plans. Ensure pins are driven to refusal.
 - 1. At Central Bridge Triangle, install logs after edging and before DG. Slot logs to receive edging. Slot shall be $< \frac{1}{4}$ " width cut to depth of edging.
 - 2. At Sand Creek Confluence, install logs after DG installation.
 - 3. At Duffy Meadow, install logs on slope and retaining logs before edging and DG.
- F. Restoration Fence: Complete installation as noted on Plans and in Specifications. Posts shall be set level, plumb and true along a smooth alignment. Place washers between posts and nut eye bolts and cable clamps. Overlap splice 14-inches, install three cable crimps evenly spaced. Outer cable crimps shall be $\frac{1}{4}$ " from cable end.
- G. Trash/Recycle Receptacles: Install and locate as shown on Plans or as directed by O.R. in field. Install per City Standards.
- H. Restoration Fence: Install as noted and as directed by O.R. in field.
- I. EBRPD Standard Pipe Gate: Install per EBRPD Standard Plans and as directed by O.R. in the field. Gate Post must be installed on opposite side of trail from creek. Latch Post for trail closed position must be installed on the creek side of trail. Install second Latch Post for gates installed at both ends of Central Blvd undercrossing. Second latch post to secure the gate in the open condition. Second Latch Post must be installed on opposite side of the trail from the creek.
- J. CCC Gate: Install footing adjacent to existing mow band. Align gate perpendicular to mow band.
- K. Metal Edging: Set top of edging flush to finish surface and finish grade elevations noted on Plans. Stake per manufacturer recommendations.
 - 1. Ensure curves are smooth without seams or creases.
 - 2. No continuous run of edging longer than 10-ft shall have a section of edging shorter than 6-ft.
- L. Community Notice Board: Install per plans.

3.03 CLEANING

- A. After completing the work in this section, inspect all components. Remove spots, dirt, and debris. Repair damaged finishes to match original finish or replace component.

3CP 3– SITE BOULDERS – ADDITIVE BID NO. 3 AND NO. 4 ONLY

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and Special Provisions, and other Technical Specification Sections apply to this Section.

1.02 SUMMARY

- A. This Section includes the following for work in the project:
 - 1. Supply skilled experienced labor, materials, and equipment required to install boulders as specified.
 - 2. Purchasing and transporting Site Boulders and placing them throughout site areas noted on Plans.
- B. Related Sections include the following: Section "Site Furnishings"

1.03 DEFINITIONS

- A. Owner refers to the Contra Costa County Flood Control and Water Conservation District, which is the lead agency. Owner or Owner's Representative (O.R.) for the project refers to the district engineer, associates, or agents.
- B. Site Boulders (or Boulders): New, boulders transported to the site and placed as noted on Plans and directed by O.R. in field.

1.04 SUBMITTALS

- A. Submittal Package: All submittals in this specification section (excluding re-submittals) shall be compiled together and submitted to O.R. as one package.
- B. Provide on-site Mock-ups for the following, for review and approval prior to installation. Successfully approved Mock-up elements can be incorporated into the final site product if approved by O.R.:
 - 1. Site Boulder placements
- C. Note that all boulder placements shall be executed by the Contractor under direct observation by O.R. in field.

1.05 INSPECTION

- A. The Contractor shall obtain approval from O.R. of the following prior to proceeding with construction:
 - 1. Site Boulder submittal
 - 2. Mock-up approval
 - 3. Preparation of the sub-grade and prior to placement of all boulders.
 - 4. Scheduling of O.R. supervision for all boulder placements.

1.06 QUALITY ASSURANCE

- A. Pre-construction Meeting: Conduct with O.R. meeting at Project Site to comply with specified requirements.
- B. Ensure all boulder placement equipment and personnel meet the requirements of the specifications for type and experience level.

PART 2 PRODUCTS

2.01 SITE BOULDERS: INCLUDES BOULDERS FOR ADD ALTERNATE 1 BOULDERS

- A. Site Boulders shall be selected to match the Boulders installed as part of the preceding “Civil Set” work. Boulders shall be hand selected Napa Syar Rhyolite from the Syar Quarry. Stone shall be selected by Contractor under direct observation by the O.R. (O.R. reserves right to limit quarry visits) at quarry (selection at stone supply yard may be approved by O.R. but is not guaranteed).
- B. Site Boulders shall be select, high quality stone. Broken boulders, boulders with sharp edges, friable boulders, or boulders scarred from excavation and transportation shall not be accepted.
- C. Color shall be variable, from light brown to tan and grey, as determined by O.R. from quarry inventory.

2.02 SITE BOULDER SIZES AND QUANTITIES:

AREA	SMALL 1 TON	BIG 2.5 TON
Sand Creek Confluence	7	2
Duffy Meadow	5	1
TONS	12 TONS	7.5 TONS

- 1. Exact boulder sizes, weights, form, texture and tone as determined and approved by O.R. through submittal, quarry (or stone yard) review, and mock-up process.
- 2. Sizes shall range widely from small boulders to big boulders. Forms shall be square to rectangular, with rounded edges.
- B. Site Boulder quantities shall be controlled by total tonnage. O.R. shall determine the breakdown of the boulder sizes and weights during the boulder selection process at the quarry. Contractor is responsible for procuring and transporting all stone to the site and completing the work as specified.

PART 3 EXECUTION

3.01 SUBGRADE PREPARATION

- A. Areas where Site Boulders are to be placed shall be graded to achieve the design intent under direction from O.R. General grade elevations are shown on the Plans. Boulder elevations shall be determined in the field by O.R. The soil surface shall be smooth and free from any obstructions to provide adequate contact area between the soil and boulders.

3.02 SITE BOULDER PLACEMENT

- A. Contractor shall provide personnel both experienced and skilled in boulder placement (high-end residential garden level craftsmanship) to complete the specified Site Boulder placement. Provide at a minimum, (1) equipment operator and appropriate machine (See Below) and (2) man crew for Site Boulder setting.
- B. Site Boulder setting shall be completed under direct O.R. observation. Approved mock-up will be used to control all boulder installation detailing and quality.

- C. Site Boulders shall be located/relocated within the site per the Plans and per O.R. direction.
 - 1. Prepare site to accept Site Boulders as described on the Plans and as directed by O.R. Verify placement and boulder size with O.R. prior to installation. Site Boulders shall be placed after rough site grading has been completed, and prior to site paving operations. See Plans for additional information.
 - 2. Contractor shall be required to use a track excavator with articulating thumb and zero clearance arm capable of picking up, rotating, handling, and setting 5+ ton boulders. Site Boulders shall be expertly set to ensure a high quality, residential garden level of boulder setting workmanship. Ensure tight, permanent fit between adjacent boulders and native soil.
 - 3. Transport Site Boulders to general locations shown on Plans. Install Site Boulders in final locations directed by O.R. in the field.
 - 4. Site Boulders placements shall be scheduled so that O.R. observation of boulder placement work can be completed in four working days. Contractor time on this work is not constrained to four days. If Contractor requires additional time request from Contractor shall be submitted for review and approval by O.R. at no additional cost to the Owner.
 - 5. Protect all site improvements during the Site Boulders placement.

3.03 CLEAN-UP

- A. Keep project site and adjacent streets reasonably free from accumulation of debris resulting from work specified in this section.
- B. Immediately remove dirt, debris, and over seeding from seeding operations from buildings and structures, walls, pavements, and curbs.

3.04 PROTECTION

- A. Provide adequate barriers marked with white flags, throughout the duration of the installation to protect site improvements, existing features, and stockpiles.

3CP 3– SITE BOULDERS – ADDITIVE BID NO. 3 AND NO. 4 ONLY

3CP 4 – AGGREGATE SURFACING – ADDITIVE BID ITEMS NO. 3 AND NO. 5

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and Special Provisions, and other Technical Specification Sections apply to this Section

1.02 SUMMARY

- A. This Section includes the following:
 - 1. Subgrade and base courses
 - 2. Installation of D.G. (decomposed granite) paving
- B. Related Sections include the following:
 - 1. Section "Site Boulders"
 - 2. Section "Planting"

1.03 DEFINITIONS

- A. Owner refers to the Contra Costa County Flood Control and Water Conservation District, which is the lead agency. Owner or Owner's Representative (O.R.) for the project refers to the district engineer, associates, or agents.
- B. Base Course: Course placed between the subgrade asphalt, decomposed granite path, aggregate, or concrete site improvements
- C. In-Channel: Active Channel, Floodplain, and Banks
- D. Excavation: Removal of material encountered above finished and subgrade elevations and to lines and dimensions indicated
 - 1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by O.R. Authorized additional excavation and replacement material will be paid on an extra work basis in accordance with the provisions of the Contract.
 - 2. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by O.R. Unauthorized excavation and required replacement to grade with import soil shall be made without additional compensation.
- E. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below base course, drainage fill, or topsoil materials.
- F. Native Soil: Existing site soil
- G. General Fill: Soil selected from the excavations with the approval of the Soils Engineer, excluding only the black and dark brown expansive clays.

1.04 SUBMITTALS

- A. Product Data: For the following:
 - 1. Stabilizer Solutions Inc.; stabilizer and aggregate samples for D.G. Paving
 - 2. Base Course, Class II Permeable, Drain Rock, and Bedding Course

- B. Mock-up of Stabilized D.G. Paving (Decomposed Granite) surfacing. Coordinate D.G. aggregate analysis and product approval with Stabilizer Solutions Inc. prior to initiating mock-up. Provide 10-foot by 10-foot mock-up at designed depth, both with specified steel edging and without.
- C. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:
 - 1. Select Fill
- D. Specifications and certification sheets on Select Fill material.

1.05 QUALITY ASSURANCE

- A. Geotechnical Testing Agency Qualifications: An independent testing agency qualified according to ASTM E 329 to conduct soil materials and rock-definition testing, shall be provide by Owner (ASTM D 3740 and ASTM E 548). See Special Provisions for special conditions of payment.
- B. Pre-excavation Meeting: Conduct meeting at Project site to comply with specified requirements.

PART 2 PRODUCTS

2.01 SOIL AND AGGREGATE MATERIALS

- A. General: Provide imported borrow soil materials for all fill.
- B. Satisfactory Soils: ASTM D 2487 Soil Classification Groups GW, GP, GM, GC, SW, SP, SC, SM, CL and ML; free of rock or gravel larger than 3-inches in any dimension, debris, waste, vegetation, and other deleterious matter.
- C. Unsatisfactory Soils: ASTM D 2487 Soil Classification Groups OL, OH, CH, MH, and PT.
 - 1. Unsatisfactory soils also include satisfactory soils not maintained within 4percent of optimum moisture content at time of compaction.
- D. Base Course: Shall conform to Caltrans Class II aggregate base specification, latest edition. Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 95 percent passing a 1½-inch sieve and not more than 8 percent passing a No. 200 sieve.
- E. General Fill: Native soil from site for use as general site fill for the old creek channel and at locations with final slopes less than 5:1. For additional specification data see "EarthMax Soils Report 2.8.10".
- F. Stabilized D.G. (decomposed granite): Crushed granite aggregate (approximately 3/8" minus) per Stabilizer Solutions Inc. specification and approval. Color, golden buff color from an approved, local Bay Area supplier (American Soil & Stone or approved equal). Aggregate sample shall be submitted to Owner and Stabilizer Solutions Inc. for review and approval for use. Combine aggregate with Stabilizer Solutions Inc. stabilizer product in quantities as recommended by the manufacturer to complete the work. Stabilizer Solutions Inc. tel. 800.336.2468. Northern California Representative Peter Herrera 480-590-0015. For D.G. surfacing edging see Site Furnishings Specification.

PART 3 EXECUTION**3.01 PREPARATION**

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
- B. Preparation of subgrade for earthwork operations including removal of vegetation, topsoil, debris, obstructions, and deleterious materials from ground surface is specified in Division 2 Section "Site Clearing."

3.02 SUBGRADE PREPARATION

- A. Soil subgrades in areas to receive DG paving should be scarified, moisture conditioned to at least optimum moisture content, and compacted.
- B. The compacted surface should be firm and unyielding and should be protected from damage caused by traffic or weather.
- C. Areas of unstable soils shall be over-excavated to competent soils or a minimum of 18-inches below finished subgrade elevation where competent soils are not encountered. The bottom of the excavation should then be completely covered with a ground stabilization Geotextile Fabric and backfilled with base course. Caltrans Class II permeable material may be allowed with O.R. approval. The Geotechnical Engineer should observe all weak and unstable areas during construction to determine if alternative subgrade stabilization procedures are more appropriate.

3.03 SUBGRADE INSPECTION

- A. Notify O.R. when excavations have reached required subgrade.
- B. If O.R. determines that unsatisfactory soil is present and/or not firm and unyielding, continue excavation and replace with compacted backfill or fill material as directed.
- C. Proof-roll subgrade below site improvements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
 - 1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.
 - 2. Proof-roll with a loaded 10-wheel, tandem-axle dump truck weighing not less than 15-tons.
 - 3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by O.R., and replace with compacted backfill or fill as directed.
- D. Authorized additional excavation and replacement material will be paid for according to Contract provisions for unit prices.
- E. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by O.R., without additional compensation.

3.04 UNAUTHORIZED EXCAVATION

- A. Fill unauthorized excavation under foundations or footings with additional concrete as specified above. Controlled density fill, with 28-day compressive strength of 1000 psi, may be used when approved by O.R.

3.05 STORAGE OF SOIL MATERIALS

- A. Stockpile borrow soil materials without intermixing. Place, grade, and shape stock piles to completely drain surface water. Cover to prevent windblown dust. Soils from specified areas required for resampling shall be separated and covered until final soil disposal determination.
 - 1. Stockpile soil materials away from edge of excavations. Do not store within drip line of trees.
 - 2. Locate Stockpiles where approved by O.R.

3.06 BACKFILL

- A. Place and compact backfill in excavations promptly, but not before completing the following:
 - 1. Construction below finish grade including, where applicable, sub-drainage, damp-proofing, and waterproofing
 - 2. Surveying locations of underground utilities for Record Documents
 - 3. Testing and inspecting underground utilities
 - 4. Removing concrete formwork
 - 5. Removing trash and debris
 - 6. Removing temporary shoring and bracing, and sheeting
 - 7. Installing permanent or temporary horizontal bracing on horizontally supported walls
- B. Place backfill on subgrades that are firm and unyielding.

3.07 SOIL MOISTURE CONTROL

- A. All Select Fill shall be moisture conditioned to 0 to 4% above optimum per ASTM D1557
 - 1. Do not place backfill or fill soil material on surfaces that are not firm or unyielding
 - 2. Remove and replace, or scarify and air dry otherwise satisfactory soil material that exceeds optimum moisture content by 4 percent and is too wet to compact to specified dry unit weight.

3.08 COMPACTION OF FILL, SOIL BACKFILL, SUBGRADE PREPARATION

- A. Place backfill and fill soil materials in layers not more than 8-inches in loose depth for material compacted by heavy compaction equipment, and not more than 4-inches in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.
- C. Compact soil materials to the following percentages of maximum dry unit weight according to ASTM D 1557:
 - 1. DG Surface: scarify and re-compact top 12-inches of existing subgrade and each layer of backfill or fill soil material to 95 percent.
 - 2. In unpaved planting areas scarify and re-compact the top 6-inches below subgrade and compact each layer of backfill or fill soil material to a maximum 85 percent. Coordinate with excavation mitigation measures noted below.

3.09 GRADING

- A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
 - 1. Provide a smooth transition between adjacent existing grades and new grades
 - 2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances
- B. Site Grading: Slope grades as shown on plans and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
 - 1. Unpaved Areas: Plus or minus 1-inch
 - 2. DG Surface: Plus or minus ½-inch

3.10 BASE COURSE

- A. Place base course on firm and unyielding subgrade.
- B. On prepared subgrade, place base course under pavements and walks as follows:
 - 1. Shape base course to required crown elevations and cross-slope grades
 - 2. Place base course 6-inches or less in compacted thickness in a single layer
 - 3. Place base course that exceeds 6-inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6-inches thick or less than 3-inches thick.
 - 4. Compact base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 1557.
- C. Pavement Shoulders: Shoulders along edges of D.G. pavement shall be installed with base course per plans. Construct shoulders of satisfactory, free draining soil materials and compact simultaneously with each subbase and base layer to max. 85 percent of maximum dry unit weight to allow for vegetation establishment.

3.11 D.G. SURFACING (DECOMPOSED GRANITE)

- A. Install D.G. Path and Surfacing per Stabilizer Solutions (manufacturer) Specifications and Installation Procedures under direct observation of a Stabilizer Solutions representative. Install only after O.R. review and approval of a successful paving mock-up.
- B. Compact soil area beneath path to 95 percent of maximum dry unit weight. Compact two 12-inch shoulders on each side of path or paving area edge at 90 percent to accommodate vegetation establishment. Once compaction is approved, excavate area for DG Path and Surfacing from compacted finish and subgrade with vertical sides. Over excavate only to the extent necessary to install metal edging and to minimize the re-compaction of shoulders adjacent to D.G. surfacing.
- C. Install as noted on the Plans and per Manufacturer's recommendations

3.12 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Disposal: Remove all excavated native soils, surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.

3CP 5 – IRRIGATION

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and Special Provisions, and other Technical Specification Sections apply to this Section.

1.02 SUMMARY

- A. This Section includes the following for work in the project:
 - 1. Park and Restoration Irrigation
 - 2. Irrigation Installation, Testing, and Coordination between Proposed and Existing City Irrigation at Sungold Park and Dainty Triangle Park
 - 3. Assessment of Existing Irrigation System including but not limited to Point of Connection, Controller, Main Line, Valves, Wiring, and miscellaneous irrigation elements.
 - 4. Purchase, transportation, and installation of all products, either specified, noted on Plans, or required miscellaneous products to complete the Work.
 - 5. Bidder design Restoration Irrigation for all temporary irrigation installed for the Restoration Plants
- B. Related Sections include the following:
 - 1. Section "Planting"
 - 2. Section "Aggregate Surfacing"

1.03 DEFINITIONS

- A. Owner refers to the Contra Costa County Flood Control and Water Conservation District, which is the lead agency. Owner or Owner's Representative (O.R.) for the project refers to the district engineer, associates, or agents.
- B. Finish Grade: Elevation of finished surface of planting soil.
- C. Subgrade: Surface or elevation of native subsoil remaining after completing excavation, or top surface of a fill or backfill, before placing planting soil.
- D. Plant: Any woody or herbaceous plant specified for the project.
- E. Native Soil: Existing site soil
- F. Restoration Plants: Plants installed outside of Sungold Park and Dainty Triangle Park. Noted on plans as "Restoration Plants"
- G. Park(s) or Park Improvements: Work within City of Brentwood owned and operated parks, including Sungold Park and Dainty Triangle Park.

1.04 SUBMITTALS

- A. Submittal Package: All submittals in this specification section (excluding re-submittals) shall be compiled together and submitted to O.R. as one package.
- B. Product Data and Samples: For each type of product indicated.
- C. Product Certificates: For each type of manufactured product, signed by product manufacturer, and complying with the following:

1. Manufacturer's certified analysis for standard products.
 2. Analysis of other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.
- D. Qualification Data: For irrigation Contractor.
- E. Mock-up: Provide two (2) mock-ups, (1) Bubbler Assembly; (2) Pop-up Spray Head; for O.R. review and approval.
- F. Irrigation Installation Schedule: Indicating locations, sources of all materials. Schedule shall be a detailed schedule of anticipated installation process and dates.
- G. Bidder Design Irrigation Strategy for Restoration Plants: Outline approach, anticipated watering schedule (seasonal and daily durations), zones and irrigation components if applicable.
- H. Parks Irrigation System (Existing) Survey: Contractor to perform survey with City of Brentwood staff participation. Survey shall be limited to four (4) hours on-site. Provide results of on-site existing irrigation system survey as legible, handwritten notes marked-up on a full-size set of City as-built Plans and Specifications. Ensure all irrigation changes that resulted from the recent site improvements are noted correctly so that this survey accurately depicts the existing irrigation system condition. Note if any valves need replacement or servicing during the existing system survey.
- I. Parks Irrigation Design Submittal: Provide legible mark-up of plans showing irrigation strategy for Sungold (**BASE BID**) and Dainty Triangle Parks (**ADDITIVE BID ITEM NO. 5**) using Irrigation System Survey as a base. Allow three weeks O.R. review time prior to installation.
- J. Parks Record (As-Built) Drawings: provide clear, legible, drawing, drafted in AutoCAD 2016 or newer format. Include dimensions and actual installed locations of all irrigation system components (e.g. irrigation main, lateral and sprinkler head locations), show actual flow rates for each controller zone and actual pressure, plant substitutions and plant relocation and calculations demonstrating compliance with MWEL0, with licensed landscape architect's wet stamped signature and date. Include existing Sungold Park as-built irrigation as reference in the as-builts. O.R. will provide design files used to develop the bid set in Civil 3D 2016 format.
1. (1) original mylar of As-Built Irrigation and Landscape Plans
 2. that reflect as-built conditions, noted plant substitutions, plant relocation, irrigation main, lateral and sprinkler head locations, show actual flow rates for each controller zone and actual pressure,
 3. Provide three (3) paper copies within 2 weeks of the approval of the completed irrigation installation.
 4. Provide two (2) sets of irrigation plans, reduced to 11"x17", showing color coded and numbered irrigation circuits, plastic laminated.
 5. Provide two (2) copies of current backflow certification report, including meter size, serial number, transponder number and location
 6. Water audit performed by a certified irrigation water auditor verifying compliance of uniformity and distribution in accordance with the Model Water Efficient Landscape Ordinance (MWEL0).
- K. Parks Operations and Maintenance Instructions: For Irrigation System, prepare recommended operating procedures to be established by City including, zone schedules, and

maintenance of irrigation system for one calendar year. Submittal is required to complete conditions of Final Completion. For Maintenance Period see Specifications.

1.05 QUALITY ASSURANCE

- A. Irrigation Contractor Qualifications: A qualified irrigation Contractor whose work has resulted in successful installation of public agency irrigation system installations. Minimum of five (5) years of experience in each discipline.
 - 1. Field Supervision: Require Contractor to maintain an experienced full-time supervisor on Project site when irrigation work is in progress.
- B. Observation: O.R. may observe installation of irrigation components on-site. Irrigation installations which do not meet Plans and Specifications may be rejected or required to be re-installed.
 - 1. Notify O.R. two weeks in advance of the anticipated initiation of the irrigation system.
- C. Pre-Irrigation Installation Meeting: Conduct meeting at Project site to comply with specified requirements.
- D. Permanent irrigation installed or modified within City of Brentwood parcels must comply with City Standard Plans and Specifications.
- E. Installed and modified permanent irrigation must follow current MWELO design requirements. City of Brentwood has adopted the ordinance in full.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Store irrigation supplies properly on the site out of full sun and in a manner which preserves the integrity of the materials and prevents damage to piping and irrigation heads.

1.07 COORDINATION

- A. Weather Limitations: Proceed with irrigation installation only when existing and forecasted weather conditions permit.
- B. Coordinate irrigation connections for water and electrical service with City.
- C. Coordinate irrigation controller connections with City.
- D. If required, Contractor shall splice new irrigation wires into existing irrigation control wires for irrigation outside of the project limit of work. Connection of irrigation control wires for valves outside Limits of Work to the controller shall be the responsibility of the City.
- E. No Planting or Seeding shall be installed prior to the installation of the irrigation system and its approval by O.R.

1.08 WARRANTY

- A. Park Irrigation Warranty: 1 Year after Final Acceptance. Warrant against breakage and defects, except for defects resulting from lack of adequate maintenance, neglect, or abuse by the Owner, or incidents that are beyond Contractor's control.

1.09 MAINTENANCE PERIOD

- A. Park Irrigation: Maintain Irrigation System until Final Acceptance of park improvements. Coordinate complete turn-over including preparation of Operations and Maintenance Instructions Manual for the irrigation system and as-builts to O.R. prior to Final Acceptance of park improvements.
 - 1. Park Improvements are not subject to the three-year restoration planting maintenance period.

- B. Restoration Plant Irrigation: Any irrigation installed by the Contractor for the purposes of watering and maintaining the Restoration Plants must be maintained for the full duration of the project.

PART 2 PRODUCTS

2.01 IRRIGATION MATERIALS

- A. Provide commercial-grade irrigation materials for all components. Piping and Sleeving shall be PVC. Mainlines and laterals shall be Schedule 40. Fittings shall be Schedule 40 except at the Point of Connection where all fittings shall be Schedule 80. Sleeving shall be Schedule 40 unless otherwise noted on Plans. Sizes as noted on Plans. Provide concrete thrust blocks per City standards.
- B. Tree Bubblers: Hunter brand RZWS-36 (0.5 gpm) with check valve. Two per tree. Install per details.
- C. Pop-up Spray heads: Provide for irrigated turf areas of the site as noted on the Plans. Zone all spray heads on separate valves, with matched precipitation 12-inch pop-up style heads with radii and spray patterns as required to provide even and complete coverage. Provide Hunter PROS-12-PRS40-CV series with MP Rotator nozzles per plans.
- D. Zone Valves: Provide Commercial grade, plastic, automatic remote-control valves, wired to the centralized controller for the entire project site. Provide Hunter ICV valves, sized as noted on plans. Install valves in rectangular plastic, lockable boxes to match existing, 1 valve per box. Valves shall have pressurized supply line entering upwards with ell inside valve box. Lateral line exiting valve shall continue straight for 3-foot minimum before any fittings are used. All fittings at valves shall be glued; No unions at valves will be permitted. Valves shall be labeled with waterproof numbered tags that match corresponding controller station numbers. Intent is for contractor to re-use existing irrigation valves and supplement with additional valves as required.
- E. Irrigation Wiring: Use commercial grade single strand solid copper wire with polyethylene or PVC insulation, sized as appropriate for project conditions (14 AWG Min.). Wires shall be approved for direct burial. Snake wires in trench and loop at sharp turns to allow for slack. Wires shall be bundled together and taped under main line with reinforced tape every 10 ft. Do not tape irrigation wires inside sleeves. All wire splices shall be made using watertight splice connectors, Suresplice or approved equal. All wiring installed under paving shall be inside a PVC sleeve. All wire splices shall be inside valve boxes. Final wire size, type and insulation colors shall be per City of El Cerrito Standards.
- F. Shut-off Valves for Each Valve Manifold: Add (1) plastic shut-off valve at each valve to allow for isolating all valves for replacement and maintenance purposes. Commercial grade, Rainbird or Irritrol brand shut-off valves, sized to match adjacent Zone Valves and main line. Install in 10-inch round, black plastic, lockable Carson boxes or approved equal. Box lid shall have "GV" engraved on the top.
- G. Controller is existing controller, sized to accommodate all new proposed irrigation zones. Condition is operational. Contractor is only responsible for ensuring irrigation valves are connected to Controller. Contractor to provide City with all documentation regarding wiring to this existing Controller.
- H. Provide complete O+M Manual for the new irrigation equipment and system use and maintenance.
- I. Water: Contractor pays for water through Final Acceptance for water used for construction and Restoration Plant establishment. City of Brentwood will continue to pay for irrigation

within their parks. Park water shall not be used for construction purposes not directly related to irrigation for park plants.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine areas to receive irrigation for compliance with requirements and conditions affecting installation and performance. Proceed with installation only after unsatisfactory conditions have been corrected.
- B. Schedule a pre-irrigation meeting with O.R. on-site to coordinate any changes to irrigation layout, locations, equipment, prior to initiating irrigation work.
- C. Ensure all proposed changes to existing irrigation or new irrigation are coordinated and integrated into a complete, seamless connection between existing and new irrigation systems, as part of this Work.

3.02 IRRIGATION AREA PREPARATION

- A. Do not install irrigation system without prior approval of the O.R. that site conditions are ready for the installation of the irrigation system.
- B. Protect structures, utilities, sidewalks, pavements, and other facilities, and existing plants from damage caused by irrigation installation.
- C. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
- D. Lay out irrigation installation (Mock-up) for review by O.R. Stake locations and adjust locations when requested. Obtain O.R. acceptance of irrigation layout before installing irrigation system. Make minor adjustments as required, at no cost to Owner.

3.03 EXISTING IRRIGATION

- A. Existing Irrigation Survey: Contractor shall survey with City on-site the existing irrigation system prior to initiating the Work. Survey shall locate and assess condition existing Controller and Point of Connection (POC). Level of effort is noted in Specifications, 1.4 Submittals.
- B. Note: Contractor shall not be responsible for existing irrigation system, zones, or individual components which are found to be broken or not functioning at the time of the Irrigation Survey. Contractor responsibility shall be limited to new irrigation components and their proper operation via existing controller and POC. City shall be responsible for controller and POC.
- C. Contractor shall carefully disconnect existing irrigation equipment as required to complete the new system. Comply with current commercial industry standards and details for irrigation installation, testing, and tolerances.

3.04 NEW IRRIGATION

- A. Install the complete, approved irrigation system per Plans and Specifications. Comply with City of Brentwood standard plans and specifications and current commercial industry standards and details for irrigation installation, testing, and tolerances.
- B. Provide sleeves at prescribed burial depths for pipe requiring the sleeve. Extend sleeves 6-inches beyond paving edges. See plans for locations.
- C. City shall coordinate and provide all necessary electrical power and water connections.

- D. Layout of proposed irrigation system shall be field staked and reviewed and approved by O.R. prior to installation. Contractor shall be responsible for adjustments to the approved system in the field to provide complete irrigation coverage. Ensure irrigation system layout and operation accommodates revegetation efforts and effectively irrigates all areas per plan.
- E. Bubblers: Install per plans. Ensure entire assembly is installed below grade, with top flush to finish grade.
- F. Install heads and valve boxes flush and plumb to adjacent features as directed by O.R. Group valves and quick couplers in neat, level, evenly spaced rows.
- G. Provide O.R. with pressure test on all mainline and lateral sections from Point of Connection to valves, prior to covering pipe. System shall hold 125 psi for one hour.
- H. Provide coverage test prior to plant installation.

3.05 RESTORATION PLANTS IRRIGATION

- A. Irrigate all restoration plants installed from containers through the Three-Year Maintenance Period, See Section 32-90-00 Planting.
- B. Plants must be watered by hand or other means determined by the Contractor and approved by the O.R. via submittal. The following evapotranspiration rates are provided as a general guide to aid in devising an irrigation approach. Actual evapotranspiration rates may vary significantly from the averages provided below. Contractor must anticipate this variation and develop a final irrigation plan that successfully enables the final performance criteria to be met.

	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sep	Oct	Nov	Dec	Annual ETo
Brentwood	1.0	1.5	2.9	4.5	6.1	7.1	7.9	6.7	5.2	3.2	1.7	0.7	48.3

Required Performance: Water plants the minimum amount necessary to ensure <5% plant mortality due to irrigation related stress after 3 years.

3.06 CLEANUP AND PROTECTION AND DISPOSAL

- A. During irrigation installations keep adjacent pavements and improvements clean and the work area in an orderly condition.
- B. Protect irrigation installations 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 irrigation components.
- C. Disposal: Remove surplus soil, and waste materials, including excess subsoil, unsuitable soil, irrigation debris, and general debris, and legally dispose of off-site.

3CP 6 – PLANTING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and Special Provisions, and other Technical Specification Sections apply to this Section.

1.02 SUMMARY

- A. This Section includes the following for work in the project:
 - 1. Plants and Planting.
 - 2. Mulch Trail.
 - 3. Contractor installation of all products and plants specified and noted on Plans. See plans for plant material to be furnished by owner and plant material furnished by Contractor.
 - 4. Mulch.
 - 5. Provision of As-Built Drawings at the end of Year 1 and end of Year 3.
- B. Related Sections include the following:
 - 1. Section "Soil Bioengineering"
 - 2. Section "Irrigation"

1.03 DEFINITIONS

- A. Owner refers to the Contra Costa County Flood Control and Water Conservation District, which is the lead agency. Owner or Owner's Representative (O.R.) for the project refers to the district engineer, associates, or agents.
- B. Balled and Burlapped Stock: Plants dug with firm, natural balls of earth in which they are grown, with ball size not less than diameter and depth recommended by ANSI Z60.1 for type and size of tree or shrub required; wrapped, tied, rigidly supported, and drum-laced as recommended by ANSI Z60.1.
- C. Container-Grown Stock: Healthy, vigorous, well-rooted plants grown in a container with well-established root system reaching sides of container and maintaining a firm ball when removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for kind, type, and size of plant required.
- D. Finish Grade: Elevation of finished surface of planting soil.
- E. Planting Area Soil Mix: soil mix for planting areas.
- F. Subgrade: Surface or elevation of native subsoil remaining after completing excavation, or top surface of a fill or backfill, before placing planting soil.
- G. Plant: Any woody or herbaceous plant specified for the project.
- H. Root Guard: Plant protection
- I. Mulch: Organic mulch for top dressing trees, planting areas, and general site areas.
- J. Restoration Plant: Plant grown for the purposed for habitat restoration.

- K. Record (As-Built) Drawings: provide clear, legible, drawing, drafted in AutoCAD 2016 or newer format. Include dimensions and actual installed locations of all installed plants and any permanent irrigation system components, if applicable, as well as other site furnishings included in the Design Drawings. O.R. will provide design files used to develop the bid set in Civil 3D 2016 format.

1.04 SUBMITTALS

- A. Submittal Package: All submittals in this specification section (excluding re-submittals) shall be compiled together and submitted to O.R. as one package.
- B. Product Data and Samples: For each type of product indicated, including ArborTie Green tree tie material, seed mixes, mulch, and Root Guard.
- C. Product Certificates: For each type of manufactured product, signed by product manufacturer, and complying with the following:
 - 1. Manufacturer's certified analysis for standard products.
 - 2. Analysis of other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.
- D. Qualification Data: For planting Contractor and irrigation Contractor.
- E. Material Test Reports: For existing surface soil and imported topsoil.
- F. Soil Management Report: Sample Sungold Park, Dainty Triangle Park, right bank at station 340+00, left bank at station 360+00 and right bank at station 369+00. Analyze Sungold Park and Dainty Triangle separately (for a total of three analyses). Furnish prior to start of soil preparation work. The requirements for fertilization and amendments as specified herein, may be modified as necessary by the Landscape Architect prior to start of work in this section. Submit soil samples to a laboratory for analysis and recommendations.
 - 1. Soil sampling shall be conducted in accordance with laboratory protocol, including protocols regarding adequate sampling depth for the intended plants.
 - 2. 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. percent organic matter; and
 - g. recommendations.
- G. Mock-up: Provide one (1) mock-up for Tree Planting with Staking, see Plan Detail, for O.R. review and approval.
- H. Mock-up of Mulch Trail: Coordinate product approval with O.R. prior to initiating Mock-up. Provide 10-foot long trail section Mock-up at designed depth. Mock-up can be part of the actual installation if approved by O.R.
- I. Mock-up of Plant Patch: Layout plants for a typical plant patch for O.R. review and approval. Patches planted prior to mock-up review and approval shall be replanted to meet

design intent per O.R. direction. This lay out and approval process must occur for each of the Patch Types designated in the Design Drawings.

- J. Maintenance Plan and Schedule: Submit a brief (6-10 page) maintenance plan that details the maintenance approach for each maintenance task. Provide invasive species removal strategies and a schedule that includes seasonal shifts in activities and frequency of site visits. See Irrigation Specifications for irrigation requirements.
- K. As-Built Report: See Section 32-80-00 IRRIGATION.
- L. As-Built Drawings showing all plants installed and any permanent irrigation elements as well as other site furnishings included in the Design Drawings.

1.05 QUALITY ASSURANCE

- A. Planting Contractor Qualifications: A qualified Landscape Contractor whose work has resulted in successful establishment of plants in public park settings. Minimum of five (5) years of experience in each discipline.
 - 1. Field Supervision: Require Contractor to maintain an experienced full-time supervisor on Project site when planting work is in progress.
 - 2. Training and experience in identifying the typical non-native and invasive species common to the region as well as the native plant species specified for the project.
- B. Soil-Testing Laboratory Qualifications: An independent laboratory, recognized by the State Department of Agriculture, with the experience and capability to conduct the testing indicated and that specializes in types of tests to be performed.
- C. Provide quality, size, genus, species, and variety of plants indicated, complying with applicable requirements in ANSI Z60.1, "American Standard for Nursery Stock."
 - 1. Contractor to indicate source of plant material. Selection of plants will be made by O.R., who will tag plants at their place of growth before they are prepared for transplanting. If designated supplier does not have sufficient quality or quantity of acceptable stock, additional supplier(s) to be designated by contractor.
 - 2. For substitutions, see PART 2 PRODUCTS in this specification section.
- D. Tree and Shrub Measurements: Measure according to ANSI Z60.1 with branches and trunks or canes in their normal position. Do not prune to obtain required sizes. Take caliper measurements 6-inches above ground for trees up to 4-inch caliper size, and 12-inches above ground for larger sizes. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip-to-tip.
- E. Nursery stock shall conform to Guideline Specifications for Nursery Tree Quality: https://ufe.calpoly.edu/files/pubs/NurseryTreeSpecs10_13.pdf
- F. Observation: O.R. may observe trees and shrubs either at place of growth or at site before planting for compliance with requirements for genus, species, variety, size, and quality. O.R. retains right to observe trees and shrubs further for size and condition of balls and root systems, insects, injuries, and latent defects and to reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from Project site.
- G. Notify O.R. of plant sources two weeks in advance of site delivery.
- H. Pre-Planting Meeting: Conduct meeting at Project site to comply with specified requirements.

- I. The pesticide applicator must have an active and valid qualified applicator license or certificate from the Department of Pesticide Regulation.
- J. Plant Establishment Evaluation: Restoration revegetation success will be measured by the O.R. annually. Results of the monitoring will be provided to the Contractor. The Contractor must adapt the maintenance regime as necessary to meet the success criteria.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Do not prune trees and shrubs before delivery, except as approved by O.R. 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 plants during delivery. Do not drop plants during delivery.
- B. Handle containerized plants by container or root ball.
- C. Contractor responsible for health and vigor of contract grown plants once delivered on-site and accepted.
- D. Deliver plants after preparations for planting have been completed and install immediately. If planting is delayed more than six hours after delivery, set plants and trees in shade, protect from weather and mechanical damage, and keep roots moist.
 - 1. Set balled stock on ground and cover ball with soil, peat moss, sawdust, or other acceptable material.
 - 2. Do not remove container-grown stock from containers before time of planting.
- E. Water root systems of plants stored on-site with a fine-mist spray. Water as often as necessary to maintain root systems in a moist condition.

1.07 COORDINATION

- A. Planting Restrictions: Coordinate planting periods with contract restrictions and maintenance periods.
- B. Ensure new plants are watered during Maintenance Period. Provide schedule and methods to City for review.
- C. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit.
- D. No Planting shall be installed prior to the installation of the irrigation system and its approval by O.R.
- E. Site access must be given to volunteer groups throughout the maintenance period. O.R. will determine timing, location and actions of volunteer groups in coordination and agreement with the Contractor.
 - 1. Anticipated actions by volunteer groups include planting of additional patches (including acorn plantings), irrigating volunteer installed plants, and general site-wide weeding.

1.08 WARRANTY

- A. Plant Warranty: Warrant project plants installed by Contractor, for the warranty period indicated in the Specifications, against defects including death and unsatisfactory growth, except for defects resulting from lack of adequate maintenance, neglect, or abuse by Owner, or incidents that are beyond Contractor's control.

1. Sungold Park Plant Warranty: One year after written acknowledgement of substantial completion by O.R of all Sungold Park improvements.
2. Restoration Plant Warranty: Through Maintenance Period or 6 months after planting, whichever is longer.
3. Remove dead plants immediately. Replace immediately unless required to plant in the succeeding planting season.
4. Replace plants that are more than 25 percent dead or in an unhealthy condition at end of warranty period.
5. Plant replacements shall be limited to one replacement per specified plant, except for losses or replacements due to failure to comply with Specifications and Plans.

1.09 MAINTENANCE

- A. Three-Year Maintenance Period: Begins at mobilization. Ends June 15th three years following year one planting or after year three planting is complete, whichever is later. (e.g. if mobilization begins November 2020, and year 1 planting is completed in spring 2021, the maintenance period would end June 15th, 2024).
 1. Maintenance of planting and irrigation within Sungold Park will be done by the City following written acknowledgement by the O.R. of substantial completion of all Sungold Park improvements.
- B. Quarterly Reports: Summarize work completed during the previous quarter, including invasive species removed, weeding, status of irrigation and irrigation approach and a qualitative summary of overall plant and site health. Provide a look ahead for the next quarter, and a revised schedule if necessary. The final report submitted at the end of the project must include a list of ongoing maintenance activities required, and items to monitor for successful maintenance of the site by others.
- C. Plants: Maintain by pruning, cultivating, watering, weeding, restoring planting basins, tightening and repairing stakes and guy supports, and resetting to proper grades or vertical position, as required to establish healthy, viable plantings. Restore or replace damaged tree wrappings. Target weed management timing to minimize seed setting of weed species.
- D. Patches and individual landscape plants
 1. Mark individual plants installed outside patches with flagging or similar strategy to protect from inadvertent trampling, weeding, or line-trimming.
 2. Weeding: Maintain patches free of weedy non-native vegetation within mulched area.
 3. Maintain mulch to specified depth for the duration of the maintenance period.
- E. Landscape areas outside of patches: Areas outside of patches will be seeded by others prior to mobilization. Contractor must line-trim and weed to maintain areas to encourage vegetative cover, while limiting invasive species cover. Coordinate timing of line trimming with O.R. to precede seed setting of non-native species.
 1. Weeding: Remove all invasive species
 2. Fire Abatement: Dry grass/herbaceous plants must be cut to 3-inches or less within 10-ft of Marsh Creek Trail. Preserve and protect all container plants within this zone. Non-native dry grass/herbaceous plants further than 10-ft from the trail must be cut 6-8" in height. Protect volunteer and planted native plants.

F. Invasive species: Remove all invasive species listed moderate and above by the California Invasive Plant Council (CAL-IPC). Remove species following recommended protocols per CAL-IPC.

1. Herbicide shall not be applied within 100 feet of wetlands, ponds, streams, or riparian habitat. However, where appropriate to control serious invasive plants, herbicides that have been approved by the U.S. EPA for use in or adjacent to aquatic habitats may be used as long as label instructions are followed and applications avoid or minimize impacts on covered species and their habitats. In seasonal or intermittent stream or wetland environments, appropriate herbicides may be applied during the dry season to control nonnative invasive species. Herbicide drift should be minimized by applying the herbicide as close to the target area as possible and by avoiding applying during windy days.

G. Plant Establishment Success Criteria: Plant establishment must meet the vegetation performance criteria and the maximum roughness allowed for hydraulic conveyance of flood waters.

1. Vegetation Performance Criteria:

	1 Year after planting (2021)	3 Years after planting (2024)
total vegetation cover (absolute)	>5%	>20%
% native plant cover (relative)	>20%	>40%
% highly invasive species (relative)	<15%	<10%
% moderately invasive species (relative)	<20%	<15%
% bare ground (absolute)	<20%	<15%
% canopy cover (absolute; creek at low flow)	>1%	>5%
tree density within 20-ft of stream side of trail (# live trees, height [ft] per 40 ft of trail)	2, 2	2, 3

2. Maximum Roughness for Hydraulic Conveyance: Manning's n for the vegetated floodplain and banks range from 0.065 to 0.085. See the 90% Design Hydraulic Modeling Report for additional information.
3. See Section 32-80-00 Irrigation for plant performance criteria related to irrigation related stress.

H. General Site Maintenance: Remove and dispose all contractor generated refuse and green-waste generated from invasive weed removal. Alert O.R. of any dumping, trash accumulation, or vegetation damage due to vandalism or herbivory on-site within 48 hours.

1. Keep all walks and paved areas clean.

I. District Required Clear Zones: Remove any woody vegetation and maintain 2-ft maximum height of grasses (measured from ground to topmost leaf):

1. Within 10-ft of side drains and outfalls
2. At Personnel Access Corridors
3. At Vehicular Access Corridors

J. Maintenance demobilization: Prior to substantial completion of maintenance period complete the following tasks as directed by O.R:

1. Remove tree stakes from trees

2. Remove temporary restoration irrigation equipment installed by Contractor, including but not limited to buried and surface lines, emitters, heads, valves, stakes and controllers. Mainline and quick couplers shall be preserved and protected in place.

PART 2 PRODUCTS

2.01 SOIL AMENDMENTS – SUNGOLD PARK PLANTING (**BASE BID**) AND DIANTY TRIANGLE PARK (**ADDITIVE BID ITEM NO. 5**)

- A. Quantities are for bid purposes only. The Contractor shall install soil amendments as specified by soil test results or designated by Landscape Architect
- B. Organic Soil Amendment: Incorporate at a rate of 4 cy per 1,000 sf of planting area. Ground or processed wood product shall be Type I, as approved by the Landscape Architect and conform to the provisions of the Standard Specifications for Public Works Construction, Latest Edition Section 212-1.2.4.
- C. Commercial Fertilizer: Best Pro-Balance 15-15-15 at 590 lbs per acre. All materials shall comply with Section 212-1.2.3 of the Standard Specifications for Public Works Construction, Latest Edition.
- D. Agricultural Gypsum: Shall conform to Section 212-1.2 of the Standard Specifications for Public Works Construction, Latest Edition.
- E. Planting Tablet: Agriform 21 Gram.

2.02 PLANT MATERIAL

- A. General
 1. Restoration Plants supplied by others. Landscape Plants supplied by Contractor.
 2. 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. Grade: Provide trees and shrubs of sizes and grades complying with ANSI Z60.1 for type of trees and shrubs required. Trees and shrubs of a larger size may be used if acceptable to O.R., with a proportionate increase in size of roots or balls.
- C. Label every individual tree specified and one plant of each variety and caliper with a securely attached, waterproof tag bearing legible designation of botanical and common name.
- D. If formal arrangements or consecutive order of trees or plants is shown, select stock for uniform height and spread, and number label to assure symmetry in planting.
- E. Trees
 1. Single and multi-stem trees as appropriate for the site conditions and species and as directed by the Plans, Specifications, and O.R. Verify species specific tree forms with O.R. prior to selection and purchase. Select for well-branched and well-balanced crown, and intact leader. Comply with ANSI Z60.1 for type of trees required. Trees (within species) shall be generally matching for height, canopy, and branching structure.
 2. Tree Structure: Trees shall be container-grown with healthy and proper branching and root structures.
 3. During selection, O.R. reserves right to inspect all tree rootwads. Containers shall be pulled rootwads inspected. Roots shall be healthy, well-developed and extending

outward from the base of the trunk. Trees with circling, girdling, diving and kinked roots shall be rejected.

- 4. Improper root structures may be allowed to be corrected prior to planting if Contractor utilizes the services of a Certified Arborist to correct the root problems.
- 5. Tree Branching Height: One-half of tree height in single stemmed trees, multi-stemmed restoration form trees shall have branching within lowest third of the total tree height.
- 6. Tree Trunks: Trunks shall be sturdy and self-supporting of the entire tree canopy without the benefit of staking. Trees with trunks which exhibit drooping, bent, or weak trunk structure will not be accepted. Staking will not be acceptable as a correction method for weak trunk structure.

F. Container Plants

- 1. Form and Size: Normal-quality, well-balanced, plants, of type, height, spread, and shape required, complying with ANSI Z60.1. Provide and container-grown plants
Container Sizes: All plants shall be healthy, vigorous, fully leafed and well-branched specimens. Strongly rooted plants shall be provided. All plants from a Certified, California licensed nursery vendor specializing in native plants. Plants deemed unhealthy or lacking in vigor shall be rejected by the Engineer and replaced with same species (from a different nursery if necessary). Plant types and sizes and planting methods are noted on the Plans and Specifications.

- 2. Specified Sizes: (not all sizes may be utilized on the site)

Supercell (SC)	(1.5" dia. X 8.25" deep) similar to Plug
D16	(2" dia. X 7" deep)
D40	(2.5" dia. X 10" deep)
TB4	(4" sq.. X 10" deep)
TP4	(4" sq.. X 14" deep)
1 Gallon	(standard nursery size)
5 Gallon	(standard nursery size)
15 Gallon	(standard nursery size)

- G. Substitute Sizes for Plants: Should plants specified not be available in the specified containers, substitutes or changes in species shall be considered by the O.R.

2.03 PLANT ACCESSORIES

A. RootGuard™ Heavy Duty Tree Size Gopher Wire Basket (or approved equal):

- 1. Twenty-gauge, three-quarter-inch hex mesh, Hot-dipped galvanized before weaving.
- 2. 15-gallon: 17" diameter x 20" deep
- 3. 5-gallon: 12" diameter x 14" deep

B. Mulch

- 1. Planting and Mulch Trail: Treeincarnation from Green Waste Recycle Yard, (510) 527-8733 or approved equal (to be approved during submittal process).
- 2. City Owned Parcels (Sungold Park, Dainty Triangle Park, Central Blvd Triangle, Duffy Meadow): City of Brentwood Standard Spec, Shredded Cedar Bark as manufactured by Hyphenex or approved equal.

- a. The mulch shall consist of fibrous, woody bark mixture of varied particle size such that physical properties:

Percent Passing	Sieve Size
90 – 100	25.4 mm (3/4")
80-100	12.7 mm (1/2")
20-60	6.35 mm (3/8")

- C. Tree Stake: Provide two (2) per Tree. Size, 2-inch diameter wood tree stakes with sharpened end point and perpendicular cut top. Size, 2-inch diameter, minimum length 8'-0". Provide longer stake lengths (up to 10'-0" long) if required due loose subgrade soils.
 - 1. Provide ArborTie Green tree staking ties. Woven polypropylene (3/4"), 900 lbs. tensile strength. As provided by DeepRoot, 800.458.7668.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Examine areas to receive plants and irrigation for compliance with requirements and conditions affecting installation and performance. Proceed with installation only after unsatisfactory conditions have been corrected.
- B. Schedule a pre-planting meeting with O.R. on-site to coordinate any changes to planting locations with irrigation layout, prior to initiating irrigation work.

3.02 PLANTING AREA PREPARATION

- A. Coordinate work with Specifications
- B. Protect structures, utilities, sidewalks, pavements, and other facilities, and existing plants from damage caused by planting operations.
- C. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.
- D. Lay out individual plants and patches per plans for review by O.R. Clearly mark for review. Obtain O.R. acceptance of layout before planting. Make minor adjustments as required.

3.03 CONTAINER PLANTING PIT PREPARATION

- A. Coordinate work with Specifications
- B. Loosen subgrade of planting pits. Remove stones larger than 3-inches in any dimension and sticks, roots, rubbish, and other extraneous matter and carefully dispose of off-site.
- C. Finish Grading: Grade planting beds to a smooth, uniform surface plane with loose, uniformly fine texture. Rake and remove ridges and fill depressions to meet finish grades.
- D. Restore planting pits if eroded or otherwise disturbed after finish grading and before planting.

3.04 TREE AND PLANT EXCAVATION

- A. Pits and Trenches: Excavate circular pits with sides sloped inward. Trim base of pit or trench 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. See Plans for additional detail.
- B. Obstructions: Notify O.R. if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.

- 1. Hardpan Layer (if encountered): Drill 6-inch diameter holes into free-draining strata and backfill with a 50/50 mix of free-draining Planting Area Soil Mix and Native Soil.
 - C. Drainage: Notify O.R. if subsoil conditions evidence unexpected water seepage or retention in tree or shrub pits.
 - D. Fill excavations with water and allow them to percolate away before planting and positioning trees and shrubs.
- 3.05 PLANTING AND MULCHING PROCEDURES
- A. Follow procedures on Plans and Specifications, as well as means and methods approved by O.R. in Mock-ups.
 - B. Set plants plumb and in center of pit or trench as noted on details.
 - C. Remove containers, burlap, and wire baskets from tops of root balls and partially from sides, but do not remove from under root balls. Remove pallets, if any, before setting. Do not plant trees or shrubs if root ball is cracked or broken before or during planting operation.
 - D. Install Rootguard per manufacturers recommendation
 - E. Use Native Soil as backfill for all plantings. Spread out and grade into site contours all excess Native Soil from planting pit excavation and Planting Area Soil Mix blending on-site.
 - F. Place Native Soil around root ball in layers, tamping to settle mix and eliminate voids and air pockets. When planting pit is approximately one-half backfilled, water thoroughly before placing the remainder of backfill. Repeat watering until no more water is absorbed. Water again after placing and tamping final layer of planting soil.
 - G. Stake per Plans and ArborTie Green manufacturers recommended procedure for knots and dimensions.
 - H. Tree, Planting Areas, and Mulch Layout: Coordinate any planting location changes prior to irrigation layout.
 - 1. Trees and individual plants shown on plans will generally be sited as noted on the Plans. O.R. reserves the right to request Contractor to relocate trees prior to planting at no cost to Owner.
 - I. Mulch:
 - 1. Provide mulch for all plants, patches, and where noted on plans.
 - 2. Provide 4-inch thick layer of mulch at all plants and other mulched areas unless otherwise noted.
 - 3. Hold mulch edges to 3:1 max slope when adjacent to paving and 2-inches clear of plant leader/trunk.
- 3.06 TREE AND PLANT PLANTING AND PRUNING
- A. Only prune new trees and shrubs if directed by O.R.
- 3.07 CLEANUP AND PROTECTION AND DISPOSAL
- A. During planting installations keep adjacent pavements and improvements clean and the work area in an orderly condition.
 - B. Protect plant installations 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 planting.

- C. Disposal: Remove surplus soil, and waste materials, including excess subsoil, unsuitable soil, irrigation debris, and general debris, and legally dispose off City property.

3CP 7 – SOIL BIOENGINEERING**PART 1 GENERAL****1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General Conditions and Special Provisions, and other Technical Specification Sections apply to this Section.

1.02 SUMMARY

- A. This Section specifies soil bioengineering, including collection and transportation of live cuttings, live cuttings preparation and installation, seeding, wattle and fabric installation.
- B. Related Sections include the following:
 - 1. Section "Planting"
 - 2. Section "Irrigation"

1.03 DEFINITIONS

- A. Owner refers to the Contra Costa County Flood Control and Water Conservation District, which is the lead agency. Owner or Owner's Representative (O.R.) for the project refers to the district engineer, associates, or agents.
- B. Soil Bioengineering: Use of native plants and organic materials to stabilize slopes and creek channel and floodplain areas. Includes the use of coir fabric, coir wattles, live cuttings, and seeding.
- C. Live Cuttings (Poles): Woody material harvested from healthy stands of local native species including but not limited to willow and cottonwood
- D. Active or Bankfull Channel: The stream channel formed by the dominant discharge, which meanders across the floodplain as it forms pools, riffles, and point bars.
- E. In-Channel: Within the Active Channel of the creek.
- F. In-Channel Work (or work in the Active Channel): Work within the channel
- G. Fabric: Coir, 100% biodegradable coconut fiber erosion control fabric devoid of any plastic mesh.
- H. Wattle (or Fabric Wattle): Erosion control "log" or "roll" made of 100% biodegradable coir fabric without plastic mesh. Wattles with plastic mesh will not be accepted.
- I. Native Soil: Existing site soil

1.04 SUBMITTALS

- A. Data and samples of Products specified in this Section.
- B. Proposed Live Collection Sites: Plan prepared by Contractor detailing the locations and species of live plant collection sites and authorizing land management agency. Contractor is responsible for securing all permits for cutting and all required cuttings.
- C. Live Cuttings Collection and Installation Schedule: Prepared by the Contractor identifying the collection dates and sequence of live cuttings installation.
- D. Live Cuttings Storage and Preparation Plan: Plan identifying locations of storage basins that provide 24-hour shade protection, and remain constantly filled with fresh water.

- E. On-site Mock-up of each soil bioengineering treatment for O.R. review and approval.
- F. Soil Bioengineering work schedule
- G. Fabric sample (Coir fabric), and fabric installation Mock-up, prior to the installation of the Riprap with Joint Planting detail. Mock-up can serve as part of the Work if accepted by O.R.
- H. Contractor Experience in Public Sector Soil Bioengineering projects.

1.05 QUALITY ASSURANCE

- A. Contractor performing soil bioengineering measures including harvesting live cuttings shall have a minimum of five years of successful experience in public sector soil bioengineering projects. Contractor shall provide references and proof of experience to O.R. for review and approval.
- B. Pre-Soil Bioengineering Meeting: Conduct meeting at Project site to comply with specified requirements.

1.06 WARRANTY

- A. Contractor shall warranty all Soil Bioengineering work and the viability of live cuttings as defined in the specifications and as modified below.
- B. Viability of live cuttings shall be reviewed both at spring leaf-out in the year of construction, and then at the end of the growing season (October 1st) in the year of construction.
- C. Warranty shall cover all live cuttings through the period noted in the specifications. Willow cuttings shall be required to meet a 90% survival rating; cottonwood cuttings shall be required to meet a 70% survival rating.

PART 2 PRODUCTS

2.01 BIOENGINEERING

- A. Fabric (if specified): North American Green, 700BN, 100% biodegradable coconut fiber erosion control blanket natural fiber netting. No plastic or metal of any kind within the Fabric shall be permitted. North American Green, 14649 Highway 41 North, Evansville, IN 47711, tel. 812.867.6632.
- B. Fabric Fastener: Specialized Fabric Fastening wood stakes by North American Green, 14649 Highway 41 North, Evansville, IN 47711, tel. 812.867.6632.
- C. Wattle: Erosion control “log” or “roll” made of 100% biodegradable coir and jute fabric without any metal or plastic mesh. 6” min diameter. Filling shall be 100% Weed free, sterile California State Rice Straw. Plastic mesh in wattles will not be acceptable.
- D. Live Cuttings: Bottom cut at 60 degree angle, top cut flat.
- E. Short Poles (Fremont Cottonwood, *Populus fremontii* and Willow spp., *Salix lasiandra* var. *lasiandra*, *Salix lasiolepis*, *Salix gooddingii*, *Salix laevigata*): Equal to or larger than 0.75” Diameter and 42” long. Willow species shall be collected in equal numbers.
- F. Long Poles (Fremont Cottonwood, *Populus fremontii*): Equal to or larger than 2” Diameter and 78” long.

2.02 NATIVE SEED MIXES

Scientific Name	Common Name	Rate (lbs pure live seed per acre)
Grasses		

Bromus carinatus	California brome	4
Elymus glaucus	blue wildrye	3
Stipa pulchra	purple needlegrass	4
Wildflowers		
Achillea millefolium	white yarrow	1
Acmispon americanus var. americanus	Spanish clover	2
Artemisia douglasiana	Douglas mugwort	1
Eschscholzia californica	California poppy	2
Lupinus nanus	sky lupine	2

- A. Seed Mixes: As provided by Hedgerow Farms, Winters, CA (530) 662-6847; or Pacific Coast Seed, Livermore, CA (925) 373-4417
- B. Furnish seed in standard containers labeled with the following information:
 - 1. Seed Name
 - 2. Lot Number
 - 3. Net Weight
 - 4. Percentage of purity
 - 5. Percentage of germination
 - 6. Percentage of weed seed content and inert material clearly marked for each kind of seed in accordance with applicable state and federal laws.
- C. Furnish to the O.R. duplicate copies of a statement signed by the vendor certifying that each lot of seed has been tested by a recognized seed testing lab within six months before date of delivery on the project. Seed which has become wet, moldy or otherwise damaged in transit or storage will not be accepted.

2.03 HYDROSEEDING

- A. Fiber Mulch: Non-recycled wood fiber produced from cellulose such as wood pulp or similar organic material approved by the O.R. and shall be of such character that it will disperse into a uniform slurry when mixed with water. The fiber shall be of such character that when used in the applied mixture, an absorptive or porous mat, but not a membrane, will result on the surface of the ground. Materials which inhibit germination or growth shall not be present in the mixture. Rate: 2,000 lbs./acre. total in two applications.
- B. Water: Of such a quality that it will promote germination and growth of seeds and plants. Water shall not contain weed seeds, nor shall it be obtained from sources containing more salts than are found in irrigation water in the vicinity.
- C. Stabilizing emulsion (Tackifier): An organic binder derived from husks of plantain. Free-flowing, non-corrosive powder. Rate: 60 lbs/acre.
- D. Mycorrhizal inoculum: AM 120 mycorrhizal inoculum applied at the time of planting. Rate: 60 lbs./acre.

PART 3 EXECUTION**3.01 SOIL BIOENGINEERING SCHEDULE AND INSPECTION**

- A. Insure all work in area designated for Soil Bioengineering shall be complete prior to implementing Soil Bioengineering. Work includes but is not limited to grading, irrigation, seeding, and riprap. Provide O.R. with work schedule for review and approval prior to initiating work.
- B. Examine proposed planting areas and conditions prior to live cutting installation. Do not start live cutting installation until proper planting conditions are ensured and O.R. has approved the areas for planting.

3.02 HANDLING OF LIVE CUTTINGS

- A. Collection
 - 1. All live cuttings shall be collected within 10 miles of the Marsh Creek watershed.
 - 2. Contractor to secure appropriate location for collection of live cuttings and pay any fees that may be required for material collection on either private or public lands.
 - 3. Plant materials are to be collected by experienced restoration Contractors familiar with the various species specified and their identification. Contractor shall use sustained yield practices following standard pruning techniques for removal of live cuttings from host plant.
 - 4. Only healthy plant materials that are free of pest infestation and disease will be accepted.
- B. Transportation
 - 1. All live cuttings are to be covered and protected from damage during transport to the project site.
- C. Storage
 - 1. Live cuttings may not be stored for more than 96 hours after collection. Any plant materials not installed with the 96 hours deadline shall be discarded at Contractor's expense.
 - 2. Live cuttings shall be stored in a shaded location with root ends submerged in clean water. Live cuttings shall be kept moist during transport and anytime being staged outside of water.

3.03 SOIL BIOENGINEERING TREATMENTS: LIVE CUTTINGS, FABRIC, WATTLES

- A. General Bioengineering
 - 1. Install all areas of soil bioengineering indicated on Plans at specified spacing.
 - 2. Locate limits of soil bioengineering treatments for acceptance by the O.R. prior to installation.
 - 3. Native soil will be used for backfill unless otherwise indicated on the Plans or directed by O.R.
 - 4. Live Cuttings shall be installed after winter rains have saturated the upper-most 2-inches of the soil receiving the cuttings. Live Cuttings shall only be approved for installation in the late fall and winter season with prior O.R. approval. A typical late fall and winter season installation sequence is as follows:

- a. Day 1 – water and saturate soil to a depth of 1-inch or ensure natural conditions have attained this saturation.
 - b. Day 2 – water and saturate soil to a depth of 2-inches or ensure natural conditions have attained this saturation.
 - c. Day 3 – no work on-site (live cuttings collection day)
 - d. Day 4 – install live cuttings then after installation is complete, saturate soil to a depth of 1-inch, or ensure natural conditions have attained this saturation.
- B. Live Cuttings (Poles) Installation Method
1. Live cuttings shall be installed in areas shown on plans. As noted on Plans, Long Poles shall be installed through riprap in the (E) Riprap, and as Short Poles on the floodplain or channel bank.
 2. Live cuttings shall be installed in irregular placements within the specified area for the cutting as directed by O.R. Straight lines and even spacing will not be accepted.
 3. Each cutting shall be installed into a pre-drilled or augured hole per detail with growing end up. Contractor shall use a “stinger” backhoe attachment or similar to ensure Large Poles are installed through the existing riprap as shown on the plans.
 4. Backfill and saturate with water ensure airtight fit between soil and surface of the cutting along its entire length of embedment.
 5. Short Poles, after pre-drilling, may be tamped into place using a rubber mallet.
 6. Live Cuttings shall be trimmed to varying lengths above grade after the initial installation as directed in the field by O.R.
 7. Minor damage to the top of cutting caused by installation to be trimmed at approximately 10 degrees. Cuttings with damaged bark or that have been split during installation shall be replaced at the Contractor’s expense.
- C. Fabric Staking: (Coir biodegradable erosion control fabric)
1. Fabric to be located per Plans.
 2. Fabric to be placed on earthen surfaces that are smooth, and without debris. No obstructions shall be visible on the earthen surface. Contractor shall take all fine grading and clean-up measures required to ensure fabric shall not rip or tear.
 3. Fabric shall be secured with a minimum of two (2) fabric fasteners per square yard, or per the manufacturer specifications, whichever is the tighter staking spacing.
- D. Wattles: Install on contour lines as noted on Plans. Stake with 1x2x18-inch un-treated Doug Fir stakes at 4'-0" o.c. continuously. Tie in ends of wattles to subgrade and include stake at all ends. Overlap adjoining roll ends at least 12-inches and provide (1) additional stake and adjoining roll connection points.
- 3.04 SOIL PREPARATION OF SEEDING AREA
- A. Prepare all areas to be seeded. Seeding shall occur in all areas disturbed by construction not receiving mulch and outside of the Active Channel.
 - B. If requested, seeding shall be performed under direct observation of the O.R.
 - C. Soil seed bed shall be prepared from the final, O.R. approved, graded soil condition prepared by the Contractor. No seed bed preparation shall be initiated until the final grading for the project is accepted.

- D. Seed bed preparation shall include the following where construction work has disturbed the existing finish grade. Seed bed shall be free of surface irregularities and of even compaction (80% relative compaction):
- E. Rake out all debris and litter regardless of size or type and dispose of legally. Rocks and woody material greater than 2-inches in diameter shall all be removed from the site.
- F. Where disturbed areas have become over compacted use a commercial grade rototiller and hand rake soil areas to meet conditions noted above.

3.05 HYDROSEEDING

- A. All disturbed areas, not covered with mulch, or paving, or in the Active Channel, shall be hydroseeded as noted on the Plans.
- B. Do not apply hydroseeding emulsion during rainy weather or when soil temperatures are below 40 degrees Fahrenheit.
- C. Hydroseeding shall be completed in two applications. One application will not be acceptable. Three applications can be used if approved by O.R.
- D. First application shall be a mix of the seed, mycorrhizal inoculum, fertilizer, and a thin application of mulch (1/4 inch) and tackifier at 500 pounds/acre.
- E. Second application shall be a slurry mix of as greater amount of wood fiber and organic mulch at 1,500 pounds per acre
- F. Presoak seeds for 24 hours immediately before seeding. Change water three times, at eight-hour intervals, to prevent anaerobic damage.
- G. Perform mixing in a tank with a built-in, continuous agitation and recirculation system of sufficient operation capacity to produce a homogeneous slurry and discharge system which will apply the slurry at a continuous and uniform rate. Minimum capacity of tank: 3,000 gallons. O.R. may authorize use of smaller tank if it is demonstrated that such equipment is capable of performing all operations satisfactorily.
- H. Begin slurry preparation by adding water to the tank when engine is at half-throttle. When water level has reached height of agitator shaft, add stabilizing agent. Then add seed and fertilizer, followed by fiber mulch. Add the mulch to the mixture only after the seed and only with tank half full of water. Open the engine throttle to full speed when the tank is half filled with water. All the mulch shall be added by the time the tank is two-thirds to three-fourths full. Commence spraying within two hours after the tank is full. Do not over mix, as this can break down the viability of seed.
- I. All slurry mix which has not been applied within two hours after mixing will be rejected and removed from the site at Contractor's expense.
- J. Seed and subgrade shall be kept moist until germination occurs and seasonal rains ensure steady water supply. If late fall and winter rains do not maintain moist soil and vigorous seed growth conditions Contractor is responsible for manual irrigation of the seeded area.

3.06 CLEAN-UP

- A. Keep project site free from accumulation of debris resulting from work specified in this section.
- B. Immediately remove dirt, debris, and over seeding from seeding operations from buildings and structures, walls, pavements, and curbs.

3.07 PROTECTION

- A. Provide adequate barriers marked with white flags, throughout the duration of the soil bio-engineering period to protect installations and stockpile locations.

3.08 INSPECTION

- A. A written notice or phone call requesting an inspection shall be given to the O.R. at least two days prior to any anticipated inspection date.
- B. The following progress inspections are required:
- C. Inspection and approval of all live cuttings prior to installation
- D. On-site Mock-up of each soil bioengineering treatment prior to installation
- E. Inspection of seeding processes and results

3.09 ACCEPTANCE

- A. Soil Bioengineering treatments will be accepted provided all plan and specification requirements have been complied with and live cuttings are in a healthy condition.