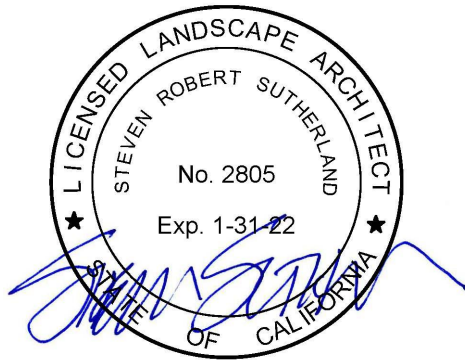


SSA Project No. 180006.01

BUENA VISTA MIDDLE SCHOOL PHASE 1 IMPROVEMENTS

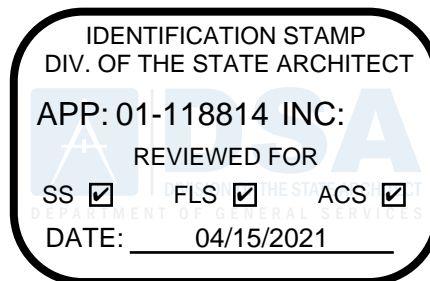
SPRECKELS UNION SCHOOL DISTRICT
130 RAILROAD AVENUE, SPRECKELS, CA 93962

APRIL 2021



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TECHNICAL SPECIFICATIONS

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SECTION 02 41 19 SELECTIVE DEMOLITION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including Special Conditions and all Specification sections, may apply to work of this section.
- B. Related Sections:
 - 1. SECTION 31 10 00 – SITE CLEARING
 - 2. SECTION 31 20 00 – EARTH MOVING

1.02 SECTION INCLUDES

- A. Extent of selective demolition work is indicated on drawings.
- B. Types of Selective Demolition Work: Demolition requires the selective removal and subsequent salvage or off-site disposal of the following:
 - 1. Temporary removal and/or protection of existing elements and equipment items indicated "to remain" or "preserve and protect".
 - 2. Removal and disposal of fixtures, elements, equipment, etc., indicated "demolish and remove".
 - 3. Removal, protection and salvage of elements, equipment, etc., indicated "remove and salvage".

1.03 SUBMITTALS

- A. Schedule
 - 1. Submit estimated timeline schedule (gantt chart) indicating proposed methods and sequence of operations for selective demolition work to Owner's Representative for review prior to commencement of work.
 - 2. Include coordination of shut-off, capping, and continuation of utility services as required, together with details and/or written plans for dust and noise control.
 - 3. Re-submit updated schedules per Owner's Representative request.
- B. Provide detailed sequence of demolition and removal work to ensure uninterrupted progress of Owner's on-site operations.
- C. Coordinate with Owner with respect to Owner's continuing occupation of portions of existing site and make necessary provisions as applicable.

1.04 JOB CONDITIONS

- A. Condition of Structures
 - 1. Owner assumes no responsibility for actual condition of items or structures to be demolished. Contractor is responsible to cover cost of removing footings of structures regardless of their size.
- B. Owner will remove and salvage selected elements from the area of work prior to start of demolition or during progress of work. Elements so affected will be clearly marked/identified and are to be excluded from work.
- C. Conditions existing at time of commencement of contract will be maintained by Owner insofar as practicable. However, variations within site may occur by Owner's removal and salvage operations prior to start of selective demolition work.
- D. Partial Demolition and Removal: Items indicated to be removed and disposed but of salvable value to Contractor may be removed from site as work progresses. Transport salvaged items from site as they are removed.
- E. Storage or sale of removed items on site is not permitted.
- F. Protections: Provide temporary fencing and other forms of protection as required to protect Owner's personnel and general public from injury due to selective demolition work. Extent of construction fencing to be determined by Contractor unless indicated in plan set and associated costs incorporated into initial bid.
- G. Protect from damage existing finish work that is to remain in place and becomes exposed during demolition operations.
- H. Damages
 - 1. Promptly repair damages caused to adjacent facilities by demolition work at no cost to Owner.
 - 2. Restore damaged finishes to match adjacent undamaged work.
- I. Traffic: Conduct selective demolition operations and debris removal in a manner to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities.
- J. Explosives: Use of explosives is not permitted.
- K. Utility Services: Maintain existing utilities indicated to remain, keep in service, and protect against damage during demolition operations.
- L. Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, acceptable to governing authorities.
- M. Environmental Controls

1. Use water sprinkling, temporary enclosures, and other suitable methods to limit dust and dirt rising and scattering in air to lowest practical level.
 2. Comply with governing regulations pertaining to environmental protection.
- N. Do not use water when it may create hazardous or objectionable conditions such as ice, flooding, and pollution.
- O. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
1. Hazardous materials will be removed by Owner before start of the Work.
 2. If suspected hazardous materials are encountered, do not disturb; immediately notify Landscape Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 – EXECUTION

3.01 INSPECTION

- A. Prior to commencement of selective demolition work, inspect areas in which work will be performed. Photograph any existing conditions which could be misconstrued as damage resulting from selective demolition work and file a record copy with the Owner's Representative prior to starting work.

3.02 PREPARATION

- A. Install all construction fencing and gates prior to commencement of work under this section.
- B. Locate, identify, stub off and disconnect utility services and irrigation that are indicated to be removed and disposed.
1. Contractor shall provide for temporary irrigation connections to ensure existing planting areas to remain maintain irrigation operations.
- C. Establish and identify acceptable temporary debris stockpile locations and secure appropriate waste containers on-site prior to commencement of work under this section.
- D. Cover and protect furniture, furnishings, and equipment that are to remain.

3.03 DEMOLITION

- A. Demolish concrete and masonry in small sections. Cut concrete and masonry at junctures with construction to remain using power-driven masonry saw or hand tools; do not use power-driven impact tools.

- B. Completely fill below-grade areas and voids resulting from demolition work. Provide fill consisting of approved fill material, gravel or sand, free of trash and debris, stones over 6" diameter, roots or other organic matter. See SECTION 31 20 00 – EARTH MOVING for compaction requirements.
- C. If unanticipated mechanical, electrical or structural elements which conflict with intended function or design are encountered, investigate and measure both nature and extent of the conflict. Submit report to Owner's Representative in written, accurate detail. Pending receipt of directive from Owner's Representative rearrange selective demolition schedule as necessary to continue overall job progress without delay.

3.04 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.
- B. Salvage Items: Where indicated on Drawings as "Salvage-Deliver to Owner", or similar, carefully remove indicated items, clean, temporarily store as may be required and turn over to Owner and obtain receipt.
- C. Historic or archeological artifacts and other articles of historic significance remain the property of the Owner. Notify Owner's Representative if such items are encountered and obtain acceptance and direction before proceeding with any further work regarding method of removal and salvage for Owner.

3.05 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove debris, rubbish and other materials resulting from demolition operations from project site. Transport and legally dispose of materials off site on a daily basis or as Dumpsters become full.
- B. If hazardous materials are encountered during demolition operations, comply with applicable regulations, laws, and ordinances concerning removal, handling and protection against exposure or environmental pollution. Notify Owner's Representative immediately.
- C. Burning of removed materials is not permitted.
- D. The Contractor shall be responsible to pay all applicable disposal fees.

3.06 REMOVED AND SALVAGED ITEMS

- A. Clean salvaged items.
- B. Store items in a secure area until delivery to Owner.
- C. Transport items to Owner's storage area designated by Owner.
- D. Protect items from damage during transport and storage.

3.07 REMOVED AND REINSTALLED ITEMS

- A. Clean and repair items to functional condition adequate for intended reuse.
- B. Protect items from damage during transport and storage.
- C. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

3.08 CLEAN-UP AND REPAIR

- A. Upon completion of demolition work, remove tools, equipment and demolished materials from site.
- B. Repair demolition performed in excess of that required. Return structures and surfaces to remain to condition existing prior to commencement of selective demolition work. Repair adjacent construction or surfaces soiled or damaged by selective demolition work.
- C. Damage to existing site trees to be protected in place is the responsibility of the contractor.

END OF DOCUMENT 02 41 19

SECTION 03 30 00 CAST-IN-PLACE CONCRETE

PART 1 -- GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including Special Conditions and all Specification sections, may apply to work of this section.
- B. Related sections:
 - 1. SECTION 32 11 23- AGGREGATE BASE COURSES
 - 2. SECTION 32 13 13 – CONCRETE PAVING

1.02 DESCRIPTION OF WORK

- A. The work to be performed under this specification includes all labor, equipment, materials and supplies necessary to construct cast-in-place concrete for:
 - 1. Basketball pole footings
 - 2. Fence/gate post footings
 - 3. Exercise equipment footings
 - 4. Backstop footings
 - 5. Wall Ball Footings
 - 6. Walls
 - 7. Any other structural concrete as indicated on the drawings or in the contract documents

1.03 SUBMITTALS

- A. General: Submit under the provisions of General Conditions- Submittals.
- B. Design Mixture: Submit for each concrete mixture, indicated clearly on submittal use for mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
 - 1. Indicate amounts of mixing water to be withheld for later addition at Project site.

- C. Placing Drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.
- D. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.
 - 1. Location of construction joints is subject to approval of the Landscape Architect.

1.04 QUALITY ASSURANCE

- A. Perform Work in accordance with ACI 301.
- B. Maintain one copy of latest construction documents on site, including design drawings, approved shop drawings and permit drawings, and special inspection and testing agreement
- C. Acquire cement and aggregate from same source for all work.
- D. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.
- E. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
- F. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- G. Welding Qualifications: Qualify procedures and personnel according to AWS D1.4/D 1.4M.

1.05 FIELD CONDITIONS

- A. Hot-Weather Placement: Comply with ACI 301 (ACI 301M) and as follows:
 - 1. Maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 - 2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

1.06 REFERENCES

- A. In addition to complying with all pertinent standards, codes and regulations, comply with all requirements of:
 - 1. ACI 308 - Standard Practice for Curing Concrete.
 - 2. ACI 309 - Guide for Consolidation of Concrete.
 - 3. ASTM C33 - Concrete Aggregates.
 - 4. ASTM C94 - Ready-Mixed Concrete.
 - 5. ASTM C150 - Portland Cement.
 - 6. ASTM C309 - Liquid Membrane-Forming Compounds

1.07 COORDINATION

- A. Coordinate work with that specified in other sections before start of construction or installation. Any installation found to be in conflict with such work as a result of neglected coordination, shall be removed and reinstalled in new locations designated by the District's representative at no additional expense to the District.

PART 2 - PRODUCTS

2.01 CONCRETE MATERIALS

- A. Cement: ASTM C150, Type II, and shall be provided by one manufacturer.
- B. Aggregates:
 - 1. Coarse shall conform to ASTM C33 size 7 or better, graded. Provide aggregate from single source.
 - 2. Fine shall conform to ASTM C330.
 - 3. Pea Gravel or smooth aggregate shall not be used.
- C. Water: ASTM C94, clean, potable, and not detrimental to concrete.
- D. Color Pigment: ASTM C 979/C 979M, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, free of carbon black, nonfading, and resistant to lime and other alkalis.
 - 1. Color: Per drawings.

2.02 CONCRETE MIX

- A. Mix and deliver concrete in accordance with ASTM C94.
- B. Addition of water to the mix after leaving the plant is not permitted.
- C. Provide concrete to the following criteria:
 - 1. Compressive Strength (28 day):

- i. Fence footings: 3,000 psi
 - ii. Basketball post and Fitness Equipment footings: 3,000 psi
 - iii. Miscellaneous footings: 3,000 psi
2. Normal Weight Aggregate.
3. Water/Cement Ratio (maximum): 50 percent by weight.
4. Aggregate Size (maximum): 3/4 inch.
5. Slump: 4 inches.
6. Drying Shrinkage Limit: 0.04 percent. Drying shrinkage limit is percentage of change in length after 21 days of drying when tested per ASTM C157

2.03 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
- B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) when dry.
- C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- D. Water: Potable.
- E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.

2.04 ADMIXTURES

- A. No admixtures shall be allowed without written acceptance by the Owner's Representative. Admixtures that have a negative impact on concrete finish shall not be used. When more than one admixture is used, admixtures shall be compatible. Provide letter from admixture manufacturer that it is appropriate for proposed mix design.
- B. Air Entrainment: ASTM C260; "Daravair", "Micro-Air", manufactured by W.R. Grace, Master Builders or equal.

2.05 ACCESSORIES

- A. Non-Shrink Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents; capable of developing minimum compressive strength of 2,400 psi in 48 hours and 7,000 psi in 28 days. SIKAGrout 212 or approved equal.

- B. Epoxy Grout: Two-part epoxy adhesive product that conforms to the requirements of Simpson SET-XP High Strength Epoxy (ICC ESR-2508) by Simpson Strong Tie or equal product with prior written approval of the Owner's Representative. Installation shall be in strict conformance with the manufacturer's recommendations.
- C. Bonding Agent: ASTM C 1059/C 1059M, Type II, nonredispersible, acrylic emulsion or styrene butadiene.
- D. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:

2.06 REPAIR MATERIALS

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch (3.2 mm) and that can be feathered at edges to match adjacent floor elevations.
- B. Cement Binder: ASTM C 150/C 150M, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
- C. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
- D. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3.2 to 6 mm) or coarse sand as recommended by underlayment manufacturer.
- E. Compressive Strength: Not less than 4100 psi (29 MPa) at 28 days when tested according to ASTM C 109/C 109M.
- F. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch (6.4 mm) and that can be filled in over a scarified surface to match adjacent floor elevations.
- G. Cement Binder: ASTM C 150/C 150M, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
- H. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
- I. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3.2 to 6 mm) or coarse sand as recommended by topping manufacturer.
- J. Compressive Strength: Not less than 5000 psi (34.5 MPa) at 28 days when tested according to ASTM C 109/C 109M.

2.07 FORM-FACING MATERIALS

- A. Smooth-Formed Finished Concrete: Form-facing panels that provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
 - 1. Plywood, metal, or other approved panel materials.
 - 2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
 - i. High-density overlay, Class 1 or better.
 - ii. Medium-density overlay, Class 1 or better; mill-release agent treated and edge sealed.
 - iii. Structural 1, B-B or better; mill oiled and edge sealed.
 - iv. B-B (Concrete Form), Class 1 or better; mill oiled and edge sealed.
 - 3. Overlaid Finish birch plywood.
- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.
- C. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.
- D. Pan-Type Forms: Glass-fiber-reinforced plastic or formed steel, stiffened to resist plastic concrete loads without detrimental deformation.
- E. Void Forms: Biodegradable paper surface, treated for moisture resistance, structurally sufficient to support weight of plastic concrete and other superimposed loads.
- F. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch (19 by 19 mm), minimum. Refer to drawings for chamfer size.
- G. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.
- H. Form-Release Agent: Commercially formulated form-release agent that does not bond with, stain, or adversely affect concrete surfaces and does not impair subsequent treatments of concrete surfaces.
- I. Formulate form-release agent with rust inhibitor for steel form-facing materials.
- J. Form Ties: Factory-fabricated, removable or snap-off glass-fiber-reinforced plastic or metal form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

1. Furnish units that leave no corrodible metal closer than 1 inch (25 mm) to the plane of exposed concrete surface.
2. Furnish ties that, when removed, leave holes no larger than 1 inch (25 mm) in diameter in concrete surface.
3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.08 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.

2.09 REINFORCEMENT ACCESSORIES

- A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), plain-steel bars, cut true to length with ends square and free of burrs.
- B. Epoxy-Coated Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), plain-steel bars, ASTM A 775/A 775M epoxy coated.
- C. Epoxy Repair Coating: Liquid, two-part, epoxy repair coating; compatible with epoxy coating on reinforcement and complying with ASTM A 775/A 775M.
- D. Zinc Repair Material: ASTM A 780/A 780M.
- E. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
 1. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.
 2. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer-coated wire bar supports.
 3. For zinc-coated reinforcement, use galvanized wire or dielectric-polymer-coated wire bar supports.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify requirements for concrete cover over reinforcement.
- B. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not cause hardship in placing concrete.

3.02 PREPARATION

- A. Prepare joints in previously placed concrete by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.
- B. Coordinate the placement of joint devices with erection of concrete formwork and placement of form accessories.

3.03 FORMWORK INSTALLATION

- A. Design, erect, shore, brace, and maintain formwork, according to ACI 301 (ACI 301M), to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.
- B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117 (ACI 117M).
- C. Limit concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:
- D. Construct forms tight enough to prevent loss of concrete mortar.
- E. Construct forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast-concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
 - 1. Do not use rust-stained steel form-facing material.
- F. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- G. Form openings, offsets, and blocking required in the Work. Determine sizes and locations from trades providing such items.
- H. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- I. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- J. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.04 EMBEDDED ITEM INSTALLATION

- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use

setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC 303.

3.05 REMOVING AND REUSING FORMS

- A. General: Formwork for sides of walls, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations, and curing and protection operations need to be maintained.
 1. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.
- B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material are not acceptable for exposed surfaces. Apply new form-release agent.
- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Owners representative.

3.06 JOINTS

- A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Landscape Architect.
 1. Space vertical joints in walls. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
 2. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
 3. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- C. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.07 PLACING CONCRETE

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections are completed.

- B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Landscape Architect.
- C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301 (ACI 301M).
 - 1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
- D. Place concrete in accordance with ACI 301.
- E. In depositing concrete in piers, walls or thin sections, provide openings in forms, elephant trunks, tremies or other recognized devices, to prevent segregation and accumulation of partially hydrated concrete on forms or metal reinforcement above level of concrete being placed. Such devices shall be installed so that concrete will be dropped vertically. Unconfined vertical drop of concrete from end of such devices to placement surface shall not exceed 6 feet.
- F. Concrete shall be thoroughly consolidated during placement, and shall be worked around reinforcement and embedded fixtures with mechanical vibrators.
- G. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.
 - 1. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
 - 2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301 (ACI 301M).
 - 3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches (150 mm) into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- H. Notify the Owner's Representative a minimum two working days prior to commencement of operations. Do not place concrete until forms and reinforcement as well as other required inspections have occurred and the Owner's Representative is present to perform observations and testing during placement.
- I. Ensure reinforcement, inserts, embedded parts, formed expansion and contraction joints are not disturbed during concrete placement.

- J. Separate slabs on grade from vertical surfaces with 1/2 inch thick joint filler. Place joint filler to required elevations. Secure to resist movement by wet concrete.
- K. Extend joint filler from bottom of slab to within 1/8 inch of finished slab surface.
- L. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.
- M. Place concrete continuously between predetermined contraction joints.
- N. Do not interrupt successive placement; do not permit cold joints to occur.

3.08 CONCRETE FINISHING

- A. Provide formed vertical concrete surfaces to be left exposed with a smooth formed finish, unless noted otherwise. Coordinate with the Owner's Representative when questions arise.
- B. Provide a 3/4" chamfer on all exposed concrete edges, unless noted otherwise. Coordinate with the Owner's Representative when questions arise.
- C. Buried concrete surfaces can be rough formed beyond 4" below grade, unless noted otherwise.

3.09 CURING AND PROTECTION

- A. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
- B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
- C. Spraying: Spray water over horizontal concrete surfaces and maintain wet for 7 days.

3.10 PATCHING

- A. Allow Owner's Representative to inspect concrete surfaces immediately upon removal of forms.
- B. Honeycomb or embedded debris in concrete is not acceptable. Notify Owner's Representative upon discovery.
- C. Patch imperfections in accordance with ACI 301 and satisfaction of Owner's Representative.

3.11 DEFECTIVE CONCRETE

- A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.

- B. Repair or replacement of defective concrete will be determined by the Owner's Representative.
- C. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Landscape Architect for each individual area.
- D. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
 - 1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch (13 mm) in any dimension to solid concrete. Limit cut depth to 3/4 inch (19 mm). Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
 - 2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar matches surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
 - 3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Landscape Architect.
- E. No additional compensation will be allowed for repair of defective concrete.

3.12 FIELD QUALITY CONTROL

- A. Provide free access to Work and cooperate with Owner's Representative, and Special Inspector.
- B. Testing Agency: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
- C. One test cylinder will be taken during cold weather concreting, cured on job site under same conditions as concrete it represents.
- D. At a minimum one slump test will be taken for each set of test cylinders taken.

END OF SECTION 03 31 00

SECTION 11 66 13 EXERCISE EQUIPMENT

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including Special Conditions and all Specification sections, may apply to work of this section.
- B. Related Drawings:
 - 1. SECTION 03 30 00 – CAST-IN-PLACE CONCRETE
 - 2. SECTION 32 11 23 – AGGREGATE BASE COURSES
 - 3. SECTION 32 18 16.13 – PLAYGROUND PROTECTIVE SURFACING

1.02 DESCRIPTION OF WORK

- A. Provide all necessary materials, labor, tools and equipment to perform the work included in the section for the installation of freestanding and composite exercise equipment.

1.03 SUBMITTALS

- A. General: Submit under the General and Special Conditions section of the Project Specifications.
- B. Product Data: Submit manufacturer's "cut-sheets," technical data, installation instructions, warranties, and finish/color samples for all equipment listed, in compliance with General and Special Conditions Section "Submittal Procedures".
- C. Product Certificates: For each type of fitness equipment, from the manufacturer.
- D. Warranty: Sample product warranty.
- E. Material Certificates: For the following items, from the manufacturer:
 - 1. Shop finishes.
 - 2. Recycled plastic.

1.04 JOB CONDITIONS

- A. Contractor is solely responsible to protect all fitness equipment from any damage or vandalism until acceptance of project, or written acceptance of individual play equipment.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Installation must be completed by a manufacturer approved installer.

- B. Safety Standards: Provide exercise equipment complying with or exceeding the requirements in ASTM F 1487-17.

1.06 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of playground equipment that fails in materials or workmanship within the specified warranty period.

- 1. Failures include, but are not limited to, the following:

- i. Structural failures.
 - ii. Deterioration of metals, metal finishes, and other materials beyond normal weathering.

- B. Warranty period: Five years from date of contract acceptance.

PART 2 - PRODUCTS

2.01 EQUIPMENT

- A. Manufactures to be:
 - 1. Lappset
 - 2. Or Approved Equal.
- B. Colors: TBD through submittal process.
- C. Equipment items shall be as specified on the drawings.

2.02 PAINT

- A. Paint shall meet the following requirements:
 - 1. Primer shall be a quality two part epoxy primer with good hiding power and formulated specifically for the purpose of covering graffiti if graffiti removal is the aim.
 - 2. It shall be compatible with the surface it is used on as per the manufacturer's data sheet, and must adhere well to the substrate and resist fading and chalking.
 - 3. The paint shall comply with the volatile organic compound (VOC) requirements of California Environmental Protection Agency Air Resources Board, Architectural Surface Program.
 - 4. The Paint shall be exterior gloss enamel, mixed to match the color and finish of the adjacent surface to the satisfaction of the Owner's representative, unless otherwise directed.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for site clearing, earthwork, site surface and subgrade drainage, and other conditions affecting performance of the Work.
 - 1. Do not begin installation before final grading required for placing protective surfacing is completed unless otherwise permitted by Architect.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Verify locations of fitness area perimeter and pathways. Verify that fitness area layout and equipment locations comply with requirements for each type and component of equipment.

3.03 EQUIPMENT INSTALLATION

- A. All equipment to be installed per the manufacturer's specifications.
- B. To guide installation, each structure shall be accompanied by bills of materials, written instructions, an erection plan view drawing, and a footing plan location drawing to be furnished prior to or with the delivery of the exercise equipment. To facilitate assembly, each part shall be indelibly stenciled with an easily-read identification number keyed to the bills of materials and erection drawings. All components shall be shipped unitized, protectively wrapped, banded for mechanical handling and ready for assembly.
 - 1. Maximum Equipment Height: Coordinate installed heights of equipment and components with finished elevations of protective surfacing. Set equipment so fall heights and elevation requirements for age group use and accessibility are within required limits. Verify that equipment elevations comply with requirements for each type and component of equipment.
- C. Install all equipment per respective manufacturer's instructions in conjunction with all Contract Documents. Immediately notify Owners Representative of any conflicting information or discrepancies.
- D. Immediately after installation of adjacent paving, plantings, or other fixtures, contractor shall completely wash down equipment contained within the area until clean and free of debris.
- E. Post and Footing Excavation: Excavate holes for posts and footings as indicated in firm, undisturbed or compacted subgrade soil.

- F. Post Set on Subgrade: Level bearing surfaces with drainage fill to required elevation.
- G. Post Set with Concrete Footing: Comply with ACI 301 for measuring, batching, mixing, transporting, forming, and placing concrete.
 - 1. Set equipment posts in concrete footing. Protect portion of posts above footing from concrete splatter. Verify that posts are set plumb or at the correct angle, alignment, height, and spacing.
 - i. Place concrete around posts and vibrate or tamp for consolidation. Hold posts in position during placement and finishing operations until concrete is sufficiently cured.
 - 2. Embedded Items: Use setting drawings and manufacturer's written instructions to ensure correct installation of anchorages for equipment.
 - 3. Concrete Footings: Install per SECTION 03 31 00 – Cast-In-Place Concrete. Smooth top, and shape to shed water.

3.04 PAINTING EXISTING EQUIPMENT

- A. Prepare project site by cleaning the substrate surfaces. All dust, dirt, oil, grease, and other substances which might prevent the adhesion of the paint to the substrate shall be removed. No sandblasting will be allowed. Paint or solvent shall be applied as soon as practicable after cleaning is completed.
- B. Prime the area to be painted. Lightly sand area with 180 grit sand paper, solvent wipe, and apply a two-part epoxy primer.
- C. Two coats of paint shall be applied evenly in a neat and workmanlike manner by a brush or other suitable method, as approved by the Owner's Representative. The rolling shall be done at such a pace that no spinning of the roller or throwing off of paint occurs when the roller is lifted from the surface. The paint shall be feathered out by using light pressure at the end of the stroke to promote uniformity.
- D. If the paint to be applied requires more stringent or additional surface preparation than stated in this specification, the Contractor shall prepare the surface in accordance with the paint manufacturer's recommendations.
- E. Paint shall only be applied to metal surfaces. Composites and plastics shall not be painted.

3.05 QUALITY CONTROL

- A. Upon completion of the installation of exercise equipment products/parts, the exercise equipment shall be inspected by:
 - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations,

including connections. Any deficiencies noted by service representative shall be repaired to the satisfaction of the service representative prior to project closeout and at no additional cost to the owner.

- B. Notify the Owner's representative 48 hours in advance of date and time of final inspection.
- C. Painted surfaces shall be free of streaks and be consistent in color. Shall not be chipped or see old flaked paint outlines through the new paint. The Owner's representative shall inspect workmanship for approval.

3.06 MAINTENANCE

- A. Contractor shall maintain all exercise equipment in a first-class, new condition until project final acceptance, or written acceptance of individual exercise equipment.

END OF SECTION 11 68 00

SECTION 12 93 00 SITE FURNISHINGS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including Special Conditions and all Specification sections, may apply to work of this section.

1.02 SECTION INCLUDES

- A. This section includes specifications for:
 - 1. Benches
 - 2. Exercise Equipment
 - 3. Basketball Equipment
 - 4. Wall Ball Equipment
 - 5. Baseball Equipment

1.03 DESCRIPTION OF WORK

- A. Refer to drawings and construction details for location and further description of site furnishings.
- B. Types of furnishings required are listed in the Site Schedule.
- C. Acceptable manufacturers are listed in the Site Schedule; or approved equal.

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has completed installation of site furnishings similar in material, design, and extent to that indicated for this project and whose work has resulted in construction with a record of successful in-service performance.
- B. Manufacturer Qualifications: A firm experienced in manufacturing site furnishings similar to those required for this project and with a record of successful in-service performance.
- C. Source Limitations: Obtain each color, finish, shape and type of site furnishing from a single source per type of equipment with resources to provide components of consistent quality in appearance and physical properties.
- D. Product Options: Drawings indicate size, shape and dimensional requirements of site furnishings and are based on the specific system indicated.

1.05 SUBMITTALS

- A. Product Data: Submit manufacturer's "cut-sheets," technical data, installation instructions, warranties, and finish samples for all site furnishings listed, in compliance with General and Special Provisions Section "Submittal Procedures".
- B. Manufacturer's warranties, as applicable.
- C. Maintenance Data: For each site furnishing
 - 1. Include recommended methods for repairing damage to the finish.

1.06 JOB CONDITIONS

- A. Contractor is solely responsible to protect all site furnishings from any damage or vandalism until acceptance of project, or written acceptance of individual site furnishings.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Storage: Store materials in clean, dry area in accordance with manufacturer's instructions. Keep materials in manufacturer's original, unopened containers and packaging until installation.
- C. Handling: Protect materials and furniture during handling and installation to prevent damage.

1.08 WARRANTY

- A. Manufacturer's Warranty Information:
 - 1. Products will be free from defects in material and/or workmanship for a period of three years from the date of invoice.
 - 2. The warranty does not apply to damage resulting from accident, alteration, misuse, tampering, negligence, or abuse.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Site Furnishings shall be as specified on plans and details, or equal, as approved by Owner's Representative. If so desired, the Contractor may submit "or equal" site furnishings to the Owner's Representative a minimum of three (3) working days prior to bid date.
- B. When requesting a substitution, it is the Contractor's responsibility to provide the

Owner's Representative with a "side by side" comparison of the specified item and the proposed "or equal" to demonstrate equality of size, style, finish, quality and strength. Requests for "or equal" substitutions must be approved in writing by the Owner's Representative prior to bid date.

- C. All furnishings shall be designed and constructed specifically for commercial outdoor use. All furnishings shall be heavy-duty and designed for stability.
- D. All metal furniture to be powder coated, factory finished or stainless, as appropriate.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Do not begin installation until site is properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

- A. Clean surfaces thoroughly prior to installation
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

- A. Install all site furnishings per respective manufacturer's instructions in conjunction with all Contract Documents. Immediately notify Owners Representative of any conflicting information or discrepancies. As applicable, install all in-ground site furnishings with their concrete footings sufficiently below finish grade to allow for installation of specified finish materials above unless noted otherwise.
- B. Immediately after installation of adjacent paving, plantings, or other fixtures, contractor shall completely wash down site furnishings contained within the area until clean and free of debris. Do not use harsh cleaning materials or methods that could damage finish.
- C. Component Damage: Remove and replace damaged components that cannot be successfully repaired as determined by Owner's representative at no additional cost to the Owner.
- D. Protect installed furniture to ensure that, except for normal weathering, it will be without damage or deterioration at time of Substantial Completion.

3.04 CLEAN-UP AND PROTECTION

- A. Protect installed product until completion of project.
- B. Touch up, repair or replace damaged products.

3.05 MAINTENANCE

- A. Contractor shall maintain all site furnishings in a first-class, new condition until project final acceptance, or written acceptance of individual site furnishings.

END OF SECTION 12 93 00

SECTION 31 10 00 SITE CLEARING

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including Special Conditions and all Specification sections, may apply to work of this section.
- B. Related Sections:
 - 1. SECTION 02 41 19 – SELECTIVE DEMOLITION

1.02 DESCRIPTION OF WORK

- A. Protecting existing vegetation to remain.
- B. Removing existing vegetation.
- C. Clearing and grubbing.
- D. Stripping and stockpiling topsoil.
- E. Removing above- and below-grade site improvements.
- F. Temporary erosion- and sedimentation-control measures.

1.03 SECTION REQUIREMENTS

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations. Obtain an Encroachment Permit as required prior to start of any work within the street right-of-way. It is the Contractor's responsibility to determine necessity of Encroachment Permit and obtain permit.
- B. Salvable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises where indicated or at an approved off-site location as directed by the Owner.
- C. Utility Locator Service: Notify Underground Service Alert (USA - North) at 811 or (800) 227-2600 48 hours before start of work.
- D. Do not begin site-clearing operations until temporary erosion and sedimentation control measures are in place.
- E. Soil Stripping, Handling, and Stockpiling: Perform only when the topsoil is dry or slightly moist.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 – EXECUTION

3.01 PREPARATION

- A. Protect and maintain benchmarks and survey control points from disturbance.
- B. Provide temporary erosion and sedimentation control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, in accordance with the requirements of Spreckels Union School District.
- C. Inspect, maintain, and repair erosion and sediment control measures during construction.
- D. Protect existing site improvements to remain from damage. Restore damaged improvements to condition existing before start of site clearing.
- E. Locate and clearly flag vegetation to remain or to be relocated.
- F. Protect from damage and maintain all trees, shrubs and other vegetation that is not identified for removal on the project plans. Restore damaged vegetation.
- G. Do not store materials or equipment or permit excavation within drip line of remaining trees.
- H. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed.
- I. Arrange with utility companies to shut off indicated utilities.

3.02 SITE CLEARING

- A. Remove obstructions, trees, shrubs, grass, and other vegetation to permit installation of new construction. Removal includes digging out stumps and obstructions and grubbing roots to a minimum depth of 24-inches and as required to accommodate proposed construction elements.
- B. Strip topsoil in a manner to prevent intermingling with underlying subsoil or other waste materials.
 - 1. Stockpile topsoil that will be reused in the Work away from edge of excavations.
 - 2. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and erosion by water.
 - 3. Stockpile surplus topsoil to allow for re-spreading deeper topsoil as may be directed by the landscape plans.
- C. Remove existing above- and below-grade improvements as indicated and as necessary to facilitate new construction.
- D. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.
 - 1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut along line of existing pavement to remain before removing existing pavement. Saw-cut faces vertically.

2. Neatly saw-cut limits of walks identified for removal to provide neat joint for construction of proposed improvements. Locate saw-cut line at existing score mark, increasing quantity of curb, gutter and/or sidewalk to be removed, if the score mark is within three (4) feet of the location shown on the plans.

3.03 DISPOSAL OF SURPLUS AND WASTE MATERIALS

- A. Remove surplus soil material, unsuitable or excess topsoil, demolished materials, and waste materials, including trash, debris, and legally dispose of them off Owner's property. Burning waste materials on-site is not permitted.
- B. Separate recyclable materials produced during site clearing from other non-recyclable materials. Store or stockpile without intermixing with other materials and transport them to recycling facilities.

END OF SECTION 31 10 00

SECTION 31 20 00 EARTH MOVING

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including Special Conditions and all Specification sections, may apply to work of this section.
- B. Related Sections:
 - 1. SECTION 02 41 19 – SELECTIVE DEMOLITION
 - 2. SECTION 31 10 00 – SITE CLEARING
 - 3. SECTION 31 25 00 – EROSION & SEDIMENT CONTROLS

1.02 DESCRIPTION OF WORK

- A. Extent of earthwork is indicated on drawings. Additional earthwork is required in paving areas. This work can include, but is not limited to:
 - 1. Cutting and filling for establishment of: planting areas, baseball fields and soccer fields.
 - 2. Cross ripping for soil preparation.
 - 3. Erosion Control during construction.

1.03 QUALITY ASSURANCE

- A. Stormwater Pollution Prevention: Contractor shall at all times be responsible to prevent any site soil erosion and discharge of silt and other pollutants into storm drain systems in compliance with local, state or federal requirements and per the discretion of the Owner's Representative.
- B. Codes and Standards: Perform excavation work in compliance with applicable requirements of governing authorities having jurisdiction.
- C. Testing and Inspection Service: Owner reserves the option to engage soil testing and inspection services for quality control testing during earthwork operations.
- D. Certification: Contractor shall certify (in writing, if requested) that the grading is in conformance with the plans and specifications, prior to start of the landscape/irrigation work.
- E. Duties of the Inspector: As applicable, the inspector shall notify (min. 2 working days notice) the Owner's Representative, a.) when Earthwork is started on the project, and b.) when subgrades have been established for planting areas prior to

placement or replacement of accepted topsoil. A site observation may be made at this point at the Owners' Representatives discretion.

1.04 JOB CONDITIONS

- A. Existing Utilities: Locate existing underground utilities in areas of work. If utilities are to remain in place, provide adequate means of support and protection during earthwork operations.
1. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, Contractor shall consult utility owner or Owner's Representative immediately for directions and re-direct work so as to avoid delay. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair any damaged utilities to satisfaction of utility owner.
 2. Do not interrupt existing utilities serving facilities occupied and used by Owner or others except when permitted in writing by Owner's Representative and then only after acceptable temporary utility services have been provided.
 3. Provide minimum of 48-hour notice to Owner's Representative, and receive written notice to proceed before interrupting any utility.
 4. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies for shut-off of services if lines are active.
- B. Protection of Persons and Property: Barricade and cover open excavations occurring as part of this work. This shall be an on-going procedure during the course of the project.
1. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations.
 2. Perform any excavation within drip-line of trees to remain by hand, and protect the root system from damage or dryout to the greatest extent possible. Maintain moist condition for root system and cover exposed roots with burlap. Paint root cuts of 1" diameter and larger with emulsified asphalt tree paint.

PART 2 – PRODUCTS

2.01 DEFINITIONS

- A. Topsoil: See Specification SECTION 31 10 00 - SITE CLEARING.
- B. Fill: all soil material placed to raise the natural grade of the site or to backfill excavations.
- C. On-Site Material: that which is obtained from the required excavation on the site.

- D. Import Material: that which is hauled in from offsite borrow areas.
- E. Engineered Fill: fill upon which the Geotechnical Engineer has made tests and observations to enable him to issue a written statement that in his opinion the fill has been placed and compacted in accordance with the specification requirements.
- F. Subgrade: soil upon which paving or other construction will occur, depth at which topsoil ends and native parent soil is encountered and/or depth of required excavation for a particular installation.
- G. Materials Manual: State of California, Business and Transportation Agency, Department of Transportation, latest revision.
- H. Percent Compaction: the ratio, expressed as a percentage, of the dry density of the fill material as compacted in the field to the maximum dry density of the same material determined by California Test Method 216-F. Field densities shall be determined in accordance with ASTM D-1556 or ASTM D-2922-71.

PART 3 – EXECUTION

3.01 EXCAVATION

- A. The site shall be excavated to the required grades. All excavations shall be carefully made true to the grades and elevations shown, or implied, on the plans. The excavated surfaces shall be properly graded to provide good drainage during construction and prevent ponding of water.
- B. Unauthorized Excavation: Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of Owner's Representative. Unauthorized excavation, as well as remedial work as directed by Owner's Representative, shall be at Contractor's expense.
 - 1. Elsewhere, backfill and compact unauthorized excavations as specified for authorized excavations of same classification, unless otherwise directed by Owner's Representative.
- C. Subgrade Inspection: When excavations have reached required subgrade elevations, notify Owner's Representative who will make an inspection of conditions.
 - 1. As applicable, if horticulturally or structurally unsuitable materials are encountered at subgrade elevations, carry excavations deeper and replace excavated material with suitable fill that has been approved by Owner's Representative.
 - 2. Removal of unsuitable material and its replacement as directed will be paid on basis of contract conditions relative to changes in work.
- D. Dewatering: Prevent surface water and subsurface or ground water from flowing into excavations and from flooding project site and surrounding area.

1. Do not allow water to accumulate in excavations. Provide and maintain dewatering system components as may be necessary to convey water away from excavations.
 2. Establish and maintain temporary drainage ditches and other diversions outside excavation limits to drain rain water and water removed from excavations to collecting or run-off areas. Do not use trench excavations as temporary drainage ditches.
 3. All costs borne from dewatering activities shall be at the Contractor's expense.
- E. Material Storage: Stockpile satisfactory excavated materials where directed, until required for backfill or fill. Place, grade and shape stockpiles for proper drainage. Do not mix topsoil with excavated subgrade soil or stockpile them close enough together for incidental mixing to occur.
1. Locate and retain soil materials away from edge of excavations. Do not store any materials within drip line of trees indicated to remain.
 2. Dispose of excess soil material and waste materials in a legal fashion provided Owner has no use for such materials.

3.02 GRADING

- A. General: Uniformly scarify and/or grade areas described on drawings, including adjacent transition areas, to required elevations. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are indicated, or between such points and existing grades.
- B. Finish Grades: Finished soil surfaces shall be free from irregular surface changes and as follows:
- C. Turf Planting Areas: These areas shall contain or receive a minimum of 4" clean, accepted topsoil. These areas shall be brought to grade with topsoil such that after soil preparation (Section 32 91 13), finish grades of seeded areas shall be 1/2" below adjacent paving, headers, etc. and finish grade for sod areas shall be 1" below adjacent paving, headers, etc. Areas to receive topsoil shall be ripped 6" deep first. Owner's Representative is to be called in to observe ripping depth prior to placement of topsoil (minimum 48 hours' notice).
- D. Shrub/Non-Turf Planting Areas: These areas shall contain or receive a minimum of 12" of clean, accepted topsoil. These areas shall be brought to grade with topsoil such that, after soil preparation finish grades for shrub and other planting areas are 2" below adjacent paving, headers, etc. Areas to receive topsoil shall be ripped 6" deep first. Owner's Representative is to be called in to observe ripping depth prior to placement of topsoil (minimum 48 hours' notice).

- E. Paving Areas: Shape surface of subgrade areas under pavement to line, grade and cross-section, with finish surface not more than 1/2" above or below required elevation.
- F. Compaction: After grading, compact subgrade surfaces to the depth and indicated percentage of maximum or relative density for each area classification.

3.03 COMPACTION

- A. General: Control soil compaction during construction providing minimum percentage of density specified for each area classification as indicated below.
- B. Percentage of Maximum Density Requirements: Compact soil to not less than the following percentages of maximum density (cohesive soils) determined in accordance with California Test Method 216- F.
- C. Turf or Unpaved Areas: Scarify & recompact top 6" of subgrade and each layer of backfill or fill material at 85% maximum density (80% minimum).
- D. Pavements & Walkways: Scarify & recompact top 6" of subgrade and each layer of backfill or fill material at 90% maximum density. Lifts not to exceed 6" layers.
- E. Moisture Control: Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade, or layer of soil material, to a water content of one to three percent above laboratory optimum.
 - 1. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.
 - 2. Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing or pulverizing until moisture content is reduced to a satisfactory value. After sufficient drying, utilize soil in appropriate ways or remove and dispose in legal manner.

3.04 BACKFILL AND FILL

- A. General: Place fill material in layers to required elevations, for each area classification listed below.
 - 1. Under planting areas, use acceptable stockpiled on-site or import topsoil as specified above.
 - 2. Under pavements, use on-site fill material, imported material, or combination of both.
- B. Backfill excavations as promptly as work permits, but not until completion of the following:

1. Inspection, testing, acceptance, and recording locations of underground utilities.
2. Removal of concrete formwork.
3. Removal of trash, debris, or water.

3.05 MAINTENANCE

- A. Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.
 1. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.
- B. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, re-shape, and compact to required density prior to further construction.
- C. Settling: Where settling is measurable or observable at excavated areas during general project warranty period, remove surface (pavement, lawn or other finish), add backfill material, compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.06 DISPOSAL OF EXCESS AND WASTE MATERIALS

- A. Removal from Owner's Property: Contractor shall remove waste materials, including unacceptable or excess excavated material, trash and debris, and dispose of it in a legal manner off Owner's property as it accumulates.

END OF SECTION 31 20 00

SECTION 31 23 16 TRENCHING

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including Special Conditions and all Specification sections, may apply to work of this section.
- B. Related sections:
 - 1. SECTION 31 20 00 – EARTH MOVING
 - 2. SECTION 32 84 00 – IRRIGATION WORK

1.02 DESCRIPTION OF WORK

- A. The work to be performed under this specification includes all labor, equipment, materials and supplies necessary for the excavation and backfill of utility trenches.

1.03 DEFINITIONS

- A. Utility: Any buried pipe, duct, conduit, wire or cable.

1.04 SUBMITTALS

- A. Materials Source: Submit name of imported bedding sand materials suppliers.

1.05 QUALITY ASSURANCE

- A. Perform Work in accordance with Section 19 of Caltrans Standard Specifications, latest edition.
- B. Perform Work in accordance with City Standard Details, latest edition.

1.06 REFERENCES

- A. City Standards Drawings and Specifications, latest edition.
- B. Caltrans Standard Specifications, latest edition.
- C. ASTM International:

1. ASTM D1557 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³)).
2. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
3. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

1.07 COORDINATION

- A. Verify field measurements prior to fabrication.
- B. Verify Work associated with lower elevation utilities is complete before placing higher elevation utilities.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Pipe: as specified for the utility being installed
- B. Foundation, bedding and backfill materials shall be as noted on the Plans and as specified for the type of facility being installed.
- C. Clean Sand: Natural river or bank sand; free of silt, clay, loam, friable or soluble materials, or organic matter; maximum particle size and volume of ½ inch and 18 percent respectively, with minimum Sand Equivalent value of 30 per California Test 217 or ASTM D2419
- D. Select native material may be used for bedding and/or backfill only if approved by the Owner's Representative.

2.02 ACCESSORIES

- A. Detection tape: Metallic detectable polyester warning tape, minimum 5 mils thick and 3" wide for utilities at 12"-18" depth and minimum 6" wide for depths exceeding 18".
- B. Tracer wire: Insulated No. 12 copper wire
- C. Geotextile fabric: in accordance with Section 88 of the Standard Specifications and as approved by the Owner's Representative.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Call Underground Service Alert (USA) at 8-1-1 not less than two working days before performing Work.
- B. Request underground utilities to be located and marked within and surrounding construction areas.
- C. Identify required lines, levels, contours and datum locations.
- D. Protect plant life, lawns and other features remaining as portion of final landscaping.
- E. Protect bench marks, existing structures, fences, sidewalks, paving and curbs from excavating equipment and vehicular traffic.
- F. Maintain and protect above and below grade utilities indicated to remain on the Demolition Plans.

3.02 INSTALLATION

A. LINES AND GRADES

- 1. Lay pipes to lines and grades indicated on Drawings.
- 2. Landscape Architect reserves right to make changes in lines, grades and depths of utilities when changes are required for Project conditions.
- 3. Use laser-beam instrument with qualified operator to establish lines and grades.

B. TRENCHING

- 1. Excavate subsoil required for utilities to utility service. Remove lumped subsoil, boulders, etc.
- 2. Perform excavation within 24 inches of existing utility service in accordance with utility's requirements.
- 3. Do not advance open trench more than 200 feet ahead of installed pipe.
- 4. Cut trenches to width per the Details on the Drawings. Remove water or materials that interfere with Work.
- 5. Excavate trenches to depth indicated on Drawings. Provide uniform and continuous bearing and support for bedding material and pipe.
- 6. Do not interfere with 45-degree bearing splay of foundations.
- 7. When subsurface materials at bottom of trench are loose or soft, excavate to greater depth as directed by Landscape Architect until suitable material is encountered.
- 8. Trim excavation. Hand trim for bell and spigot pipe joints. Remove loose matter.
- 9. Correct over-excavated areas with compacted backfill as directed by the Engineer.

10. Remove excess subsoil not intended for reuse, from site.

C. SHEETING AND SHORING

1. Sheet, shore and brace excavations to prevent danger to persons, structures and adjacent properties and to prevent caving, erosion and loss of surrounding subsoil.
2. Design sheeting and shoring to be removed at completion of excavation work.
3. Repair damage caused by failure of the sheeting, shoring or bracing and for settlement of filled excavations or adjacent soil.
4. Repair damage to new and existing Work from settlement, water or earth pressure or other causes resulting from inadequate sheeting, shoring or bracing.

D. BACKFILLING

1. Backfill trenches to contours and elevations with unfrozen fill materials.
2. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen, or spongy subgrade surfaces.
3. Place and compact the initial backfill material to the pipe spring line in maximum 8-inch lifts. Carefully compact this material around and under the pipe.
4. Place and compact the initial backfill material to 12 inches above the top of the pipe in maximum 8-inch lifts. Carefully compact this material around and under the pipe.
5. Place and compact final trench backfill material in maximum 8 inch lifts to the final grade or subgrade elevation.
6. Bedding and backfill shall be compacted to at least 95% relative compaction in improved areas and 90% in landscaped or unimproved areas.
7. Employ placement method that does not disturb or damage foundation perimeter drainage and utilities in trench.
8. Maintain optimum moisture content of fill materials to attain required compaction density.

3.03 TOLERANCES

- A. Top Surface of Backfilling under Paved Areas: Plus or minus 0.1 foot from required elevations.
- B. Top Surface of General Backfilling: Plus or minus 0.1 foot from required elevations.

3.04 FIELD QUALITY CONTROL

- A. Density Tests: ASTM D2922.
- B. Moisture Tests: ASTM D3017.
- C. When tests indicate Work does not meet specified requirements, remove Work, replace, compact and retest.

END OF SECTION 31 23 16

**SECTION 31 25 00
EROSION & SEDIMENT CONTROL**

PART 1– GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including Special Conditions and all Specifications sections, may apply to work of this section.
- B. Related Sections:
 - 1. SECTION 02 41 19 – SELECTIVE DEMOLITION

1.02 DESCRIPTION OF WORK

- A. The work to be performed under this specification includes all labor, equipment, materials and supplies necessary to install and maintain erosion and sedimentary control measures in compliance with all local, state and federal regulations. The Work shall also include the removal of temporary erosion and sedimentary control measures upon the completion of the project.

1.03 SUBMITTALS

- A. Product Data:
 - 1. Submit data on erosion control materials.
- B. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.
- C. Project / water pollution control Schedule.

1.04 EROSION CONTROL

- A. Definition: The Contractor shall be responsible for complete and thorough erosion and sediment control within the project site or anywhere that project construction disturbs the surface vegetation or soil.
 - 1. Contractor shall prevent erosion of graded areas during construction and until permanent stabilization measures are installed.
 - 2. Contractor shall prevent any sediment or dust from leaving the project site, either water-borne, air-borne, on the tires of vehicles, or by spillage from hauling.

3. Contractor shall thoroughly research and include the cost of all erosion and sediment control measures that would be required on site, per the drawings and specifications, in the bid price. No allowances will be made for Contractor's failure to adequately determine the extent of such measures.

1.05 QUALITY ASSURANCE

- A. Perform Work in accordance with Section 20 of Caltrans Standard Specifications, latest edition.

1.06 JOB CONDITIONS

- A. The Owner's Representative will review the erosion control work, however, because the Owner has little control over how the Contractor implements the work to be completed on this site, the Contractor shall at all times be completely responsible for erosion control on and off-site, until notice of completion has been filed.
- B. Do not move or modify devices without the approval of the Owner's Representative.
- C. All removable protective devices shown shall be in place at the end of each working day when the five-day rain probability forecast exceeds 40 percent.
- D. After a rainstorm, remove all silt and debris from check berms and desilting basins. Immediately repair any graded slope surface protection measures damaged during a rainstorm.
- E. Fill slopes at the project perimeter must have straw waddles in place at the conclusion of each working day.
- F. Whenever the depth of water in any device exceeds two feet, barricade or guard the site for public safety until the water has subsided.
- G. Do not pump or otherwise drain unfiltered water from the basins until sediment has settled.
- H. Do not fill sand bags with gravel; use only sand or granular soil.
- I. Do not use perforated risers as pond outlets.
- J. Do not use filtering devices as a means of control.
- K. Completely cover any pipe outlet from a desilting basin with sandbags as a final means of protection.

1.07 PERMANENT DRAINAGE FACILITIES

- A. Any drainage structures, or detention devices which appear in the contract documents may be utilized in the Erosion and Sediment Control Plan on the condition that they are temporarily modified to serve the Contractor's purposes, and cleaned before project completion.
- B. Such facilities have been designed for the Owner's use in drainage control upon completion of the Project, and shall not be considered as adequate for control during construction except by the independent determination of the Owner's Representative.

1.08 REFERENCES

- A. Caltrans Standard Specifications, latest edition.
- B. Construction Best Management Practices (BMP's).

PART 2– PRODUCTS

2.01 EROSION CONTROL MATERIALS

- A. Straw bales: Shall be Molate Fescue or Elmus glaucus straw available from: CONSERVASEED, P.O. Box 455, Rio Vista, CA 94571, Phone: (916) 775-1676
- B. Sand Bags: Shall be new or nearly new burlap bag with 60 to 90 lbs. capacity for sand.
- C. Sand for Sand Bags: Shall be fine sand such as fill sand or concrete sand.
- D. Straw Wattles: Shall be straw-filled tubes made of jute, nylon, or other photo-degradable materials and placed on the contours across slopes or surrounding catch basins, drain inlets or drainage structures to track sediment being moved with the flow of water. The tubes shall be 9 to 12 inches in diameter filled with compressed, weed-free straw. The individual tubes will be 20 to 25 feet in length.

PART 3– EXECUTION

3.01 GENERAL

- A. Erosion Control shall be a daily operation from October 1st through May 1st, and shall be taken into careful consideration when planning staging of work, stock piling of materials and timing of all grading operations.

- B. The Contractor shall have work crews available at all times to repair or put erosion control devices into place as necessary or as directed by the Owner's Representative.
- C. Install as necessary any erosion control device throughout the construction process as per the details provided or as submitted with the approved Erosion Control Plan.

3.02 SITE STABILIZATION

- A. Incorporate erosion control devices into the Project at the earliest practicable time, as indicated on the Drawings and in accordance with the manufacturer's specifications. Maintain the devices as necessary.
- B. Construct, stabilize and activate erosion controls before site disturbance within tributary areas of those controls.
- C. Stockpile and waste pile heights shall not exceed 15 feet. Slope stockpile sides at 2:1 or flatter.
- D. Stabilize any disturbed area of affected erosion control devices on which activity has ceased and which will remain exposed for more than 20 calendar days.
- E. Stabilize earth swales and stockpiles immediately.

3.03 EROSION CONTROL MATERIALS

- A. Straw bales: Install where shown and as detailed in drawings or approved Erosion Control Plan.
- B. Sand Bags: Install where necessary, where directed, and where shown on approved Erosion and Sediment Control Plan.
- C. Straw Wattles: Install where shown and as detailed in drawings or approved Erosion Control Plan.

3.04 FIELD QUALITY CONTROL

- A. Inspect erosion control devices on a weekly basis and after each runoff event. Make necessary repairs to ensure erosion and sediment controls are in good working order.
- B. When inspections indicate Work does not meet specified requirements, remove Work, replace and retest.

3.05 CLEANING

- A. When sediment accumulation in sedimentation structures has reached a point one-third depth of sediment structure or device, remove and dispose of sediment.
- B. Do not damage structure or device during cleaning operations.
- C. Do not permit sediment to erode into construction, site areas or natural waterways.
- D. Clean channels when depth of sediment reaches approximately one-half channel depth.

3.06 REMOVAL OF TEMPORARY MEASURES

- A. Remove all temporary erosion and sediment control devices as directed by the Owner, within one year of completion of the entire project.

END OF DOCUMENT 31 25 00

SECTION 32 11 23 AGGREGATE BASE COURSES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including Special Conditions and all Specification sections, may apply to work of this section.
- B. Related sections:
 - 1. SECTION 32 18 23.13 – BASEBALL INFIELD FINES
 - 2. SECTION 32 12 16 – ASPHALT PAVING
 - 3. SECTION 32 13 13 – CONCRETE PAVING
 - 4. SECTION 32 18 16.13 – PLAYGROUND PROTECTIVE SURFACING

1.02 DESCRIPTION OF WORK

- A. The work to be performed under this specification includes all labor, equipment, materials and supplies necessary to install aggregate base course for:
 - 1. Baseball infield fines
 - 2. Asphalt paving
 - 3. Concrete paving
 - 4. Playground protective surfacing

1.03 SUBMITTALS

- A. General: Submit under the General Conditions, and Special Conditions -Submittals.
- B. Product Data: Submit source, gradation, R-value, sand equivalent, and durability for the proposed base material.
- C. Test Reports: Submit plant and field test reports as specified in Articles 2.02 and 3.05 herein.

1.04 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. ASTM C136: Test Method for Sieve Analysis of Fine and Coarse Aggregates
 - 2. ASTM D421: Practice for Dry Preparation of Soil Samples for Particle-Size Analysis and Determination of Soil Constants

3. ASTM D1241: Specification for Materials for Soil-Aggregate Subbase, Base, and Surface Courses
 4. ASTM D1557: Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort
 5. ASTM D2419: Test Method for Sand Equivalent Value of Soils and Fine Aggregate
 6. ASTM D2844: Test Method for Resistance R-Value and Expansion Pressure of Compacted Soils
 7. ASTM D2922: Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
 8. ASTM D3017: Test Method for Moisture Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
 9. ASTM D3744: Test Method for Aggregate Durability Index
- B. State of California, Department of Transportation (Caltrans), Standard Specifications, current edition:

PART 2 – PRODUCTS

2.01 MATERIAL

- A. Aggregate for base course at the time the base material is deposited on the prepared sub grade or sub base shall conform with ASTM D1241 and the following requirements:

1. Class 2 Aggregate Base:
 - i. Class 2 aggregate base shall be free of vegetable matter, reclaimed asphalt, concrete, glass and other deleterious substances. Coarse aggregate, material contained on the No. 4 sieve, shall consist of material of which 25 percent by weight shall be crushed particles. ^{3/4}" Class 2 aggregate base shall conform to the following grading determined in accordance with ASTM C136:

Percentage Passing Sieves

<u>Sieve Sizes</u>	<u>1-1/2 inch</u> <u>Maximum</u>	<u>3/4-inch</u> <u>Maximum</u>
2-inch	100	----
1-1/2 inch	90-100	----
1-inch	----	100
3/4-inch	50-85	90-100
No. 4	25-45	35-55
No. 30	10-25	10-30

No. 200 2-9 3-9

ii. Class 2 aggregate base shall conform to the following additional requirements:

ASTM Test

<u>Tests</u>	<u>Method</u>	<u>Requirements</u>
Resistance (R-Value)	D2844	78 min.
Sand Equivalent	D2419	30 min.
Durability Index	D3744	35 min.

Where aggregate base is used as finish surfacing, it shall be virgin material.

2.02 SOURCE QUALITY CONTROL

- A. The Contractor shall perform sampling and tests of the aggregate base material in accordance with the ASTM Test Methods herein specified and provide copies of such tests to District, to determine compliance with specified requirements. Samples shall be taken from material as delivered to the site, and shall be prepared in accordance with ASTM D421, as applicable.
- B. Aggregate grading or sand equivalent test shall represent no more than 500 cubic yards of base material or one day's production, whichever is the greater amount.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. The Contractor shall call for an inspection by the Owner and obtain written acceptance of the prepared sub grade or sub base before proceeding with the placement of aggregate base course.
- B. The sub grade or sub base to receive aggregate base course, immediately prior to spreading, shall conform to the compaction and elevation tolerances indicated for the material involved and shall be free of standing water and loose or extraneous material in accordance 31 20 00- EARTH MOVING.

3.02 INSTALLATION STANDARDS

- A. Aggregate base shall be applied over the prepared sub grade or sub base and compacted (95% relative compaction unless otherwise noted) in accordance with Section 26 of the Caltrans Standard Specifications.
- B. Aggregate base shall have minimum uniform thickness after compaction of dimensions indicated. Where not indicated, compacted thickness shall be 6 inches.

- C. All compaction expressed in percentages in this section refers to the maximum dry density as determined by ASTM D1557.
- D. Do not place fill on soft, muddy or frozen surfaces.
- E. Level and contour surfaces to elevations and gradients indicated.
- F. Maintain optimum moisture content of fill materials to attain required compaction density.
- G. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

3.03 SPREADING OF MATERIAL

- A. Aggregate for base shall be delivered as uniform mixture of fine and coarse aggregate and shall be spread in layers without segregation.
- B. Aggregate base material shall be free from pockets of large and fine material. Segregated materials shall be remixed until uniform.
- C. Aggregate base material shall be moisture-conditioned to at least 2% over optimum moisture content.
- D. Aggregate base 6 inches and less in thickness may be spread and compacted in one layer. For thickness greater than 6 inches, the base course aggregate shall be spread and compacted in two or more layers of uniform thickness not greater than 6 inches each per Caltrans Standard Specification Section 26.

3.04 COMPACTING

- A. Relative compaction of each layer of compacted aggregate base material shall be not less than 95 percent as determined by ASTM D1557.
- B. Thickness of finished base course shall not vary more than 3/4 inch from the indicated thickness at any point. Base that does not conform to this requirement shall be reshaped or reworked, watered, and recompact to achieve compliance with specified requirements.
- C. The surface of the finished aggregate base course at any point shall not vary more than 3/4 inch above or below the indicated grade.

3.05 FIELD QUALITY CONTROL

- A. The Owner may, for Owner's sole convenience, perform field tests to determine compliance with specified requirements for density and compaction of aggregate base material, and to determine moisture-content compliance of the installed base course.

- B. Testing frequency by Owner, if performed, is anticipated to be not less than one test for every 2,000 square feet of base course material, per layer or lift. Contractor shall accommodate and cooperate with such testing activity.

PART 4 - MEASUREMENT AND PAYMENT

4.01 MEASUREMENT

- A. Aggregate base course shall not be measured separately for payment for any item of work. Full compensation for work to provide and install aggregate base course shall be considered as included in the prices for other contract items in the schedule of bid prices in the Bid Form, and no additional compensation will be allowed.

4.02 PAYMENT

- A. The contract unit price for Aggregate Base Paving shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in placing Aggregate Base Paving, complete and in place, as shown on the plans, as specified in these specifications, and as directed by the Architect.

END OF SECTION 32 11 23

SECTION 32 12 16 ASPHALT PAVING

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including Special Conditions and all Specification sections, may apply to work of this section.
- B. Related Sections:
 - 1. SECTION 32 11 23 – AGGREGATE BASE COURSES

1.02 DESCRIPTION OF WORK

- A. Provide all necessary materials, labor, tools and equipment to perform the work included in the section for the extent of asphalt concrete paving work as shown on drawings.

1.03 SUBMITTALS

- A. General: Submit under the General Conditions and Special Provisions section of the Project Specifications.
- B. Product Data: Submit product information for all proposed products.
- C. Design Data: Submit mix design per Section 39 of Caltrans Standard Specifications for each product to be used.

1.04 SITE CONDITIONS

- A. Apply prime and tack coats when ambient temperature is above 50 deg F (10 deg C), and when temperature has not been below 35 deg F (1 deg C) for 12 hours immediately prior to application. Do not apply when base or surfaces are wet or contain an excess of moisture.
- B. Construct asphalt concrete surface course when atmospheric temperature is above 50 deg F (10 deg C), and when base course is dry. Base course may be placed when air temperature is above 40 deg F (4 deg C) and rising.

1.05 GRADE CONTROL

- A. Establish and maintain required lines and elevations.

1.06 QUALITY ASSURANCE

- A. Perform Work in accordance with Caltrans Standard Plans and Specifications, current conditions.

PART 2 – PRODUCTS

2.01 MATERIALS

A. General

1. Use locally available materials and gradations which exhibit a satisfactory record of previous installations.
2. Base Course Aggregate: Class 2 aggregate - 3/4" maximum.
3. Surface Course Aggregate: 1/2" maximum crushed stone, crushed gravel, crushed slag, and sharp-edged natural sand.
4. Asphalt Cement: AR-4000 in compliance with State of California Standard Specifications Caltrans Section 92 (also used under Pavement reinforcing fabric or AR-8000). Apply as per State of California Standard Specifications Caltrans Section 39-403.
5. Prime Coat: Emulsified asphalt conforming to ASTM D977 and complying with CSS Section 93 SC-70. Apply as per Caltrans Section 39-402
6. Tack Coat: Emulsified asphalt diluted with one part water to one part emulsified asphalt. Apply as per Caltrans Section 39-402.
7. Crack Filler: "OverKote Crack Filler" by Reed and Graham, Inc., San Jose, CA (408) 287-1400 or approved equal.
8. Seal Coat: "OverKote" asphalt sealant by Reed and Graham Inc., San Jose, CA (408) 287-1400 or approved equal. "Fog seals" are not acceptable as an equal.
9. Wood Headers: Wood headers shall be as called out in the drawings where required.

B. Asphalt-Aggregate Mixture

1. Asphalt concrete shall be Type B, 1/2-inch maximum, medium grading as defined in Caltrans Standard Specifications, Current Edition, Section 39.
2. Aggregate grading for asphalt concrete mixture shall be as specified in CSS Section 39.
3. Mix design of asphalt concrete shall conform to CSS Section 93.

PART 3 – EXECUTION

3.01 SURFACE PREPARATION

- A. Remove loose material from compacted sub-base surface immediately before applying herbicide treatment or prime coat.
- B. Proof roll prepared sub-base surface to check for unstable areas and areas requiring additional compaction.
- C. Notify Owner's Representative of unsatisfactory conditions. Do not begin paving work until deficient sub-base areas have been corrected and are ready to receive paving.
- D. Base Course Aggregate: Install to thickness shown in drawings and compact to 95% R.C. unless noted otherwise in Project Geotechnical Report.
- E. Tack Coat Apply to contact surfaces of previously constructed asphalt or concrete and surfaces abutting or projecting into asphalt concrete pavement. Distribute at rate of 0.05 to 0.15 gal. per sq. yd. of surface. Allow to dry until at proper condition to receive paving. Apply as per State of California Standard Specifications Caltrans Section 39-402.
- F. Crack Filler: Thoroughly clean out existing cracks of dirt, vegetation and foreign material and install product precisely per manufacturers recommendations and instructions. Re-apply crack filler until cracks are completely full upon drying and settling.
- G. Exercise care in applying all bituminous materials to avoid smearing of adjoining concrete surfaces. Remove excess asphalt and clean damaged surfaces.

3.02 PLACING MIX

A. General

- 1. Place asphalt concrete mixture on prepared surface, in compliance with section 39 of State of California Standard Specifications
- 2. The Contractor shall notify the Owner's Representative before the paving has begun. At the time of delivery to the work site, the temperature of mixture shall not be lower than 260 degrees Fahrenheit (F) or higher than 320 degrees F, the lower limit to be approached in warm weather and the higher in cold weather.
- 3. Asphalt concrete shall not be placed when the atmospheric temperature is below 50 degrees F or during unsuitable weather.
- 4. The asphalt concrete shall be evenly spread upon the subgrade or base to such a depth that, after rolling, it will be of the minimum specified cross section and grade of the course being constructed.

B. Joints

- 1. Make joints between old and new pavements, or between successive days' work, to ensure continuous bond between adjoining work. Construct joints to

have same texture, density and smoothness as other sections of asphalt concrete course. Clean contact surfaces and apply tack coat.

3.03 ROLLING

A. General

1. Begin rolling when mixture will bear roller weight without excessive displacement.
 2. Compact mixture with hot hand tampers or vibrating plate compactors in areas inaccessible to rollers.
- B. Breakdown Rolling: Accomplish breakdown or initial rolling immediately following rolling of joints and outside edge. Check surface after breakdown rolling, and repair displaced areas by loosening and filling, if required, with hot material.
- C. Second Rolling: Follow breakdown as soon as possible, while mixture is still hot. Continue second rolling until mixture has been thoroughly compacted.
- D. Finish Rolling: Perform finish rolling while mixture is still warm enough for removal of roller marks. Continue rolling until roller marks are eliminated and course has attained maximum density. In areas too small for the roller, a vibrating plate compactor or hand tamper shall be used to achieve thorough compaction.
- E. Patching: Remove and replace paving areas mixed with foreign materials and defective areas. Cut-out such areas and fill with fresh, hot asphalt concrete. Compact by rolling to maximum surface density and smoothness.
- F. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.
- G. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.04 FIELD QUALITY CONTROL

A. General

1. Test in-place asphalt concrete courses for compliance with requirements for thickness and surface smoothness. Repair or remove and replace unacceptable paving as directed by Owner's Representative.

B. Thickness

1. In-place compacted thickness will not be acceptable if exceeding following allowable variation from required thickness:
 - i. Base Aggregate: 1/2", plus or minus.
 - ii. Surface Course: 1/4", plus or minus.

- C. Surface Smoothness: Upon completion, the pavement shall be true to grade and cross section. When a 10-foot straightedge is laid on the finished surface parallel to the center of the primary path of travel, the surface shall not vary from the edge of the straightedge more than 1/8 inch except at intersections or changes of grade. Perpendicular to primary path of travel, the surface shall not vary from the edge of the straightedge more than 1/4 inch. Cold-laid asphalt or areas exhibiting rough aggregate (segregation) with voids greater than 3/16" are not acceptable. Cut out such areas a minimum of 12" past area showing segregation, re-pave and re-seal as specified.
- D. Check surface areas at intervals as directed by Owner's Representative.
- E. Thoroughly clean all adjacent paving, headers, etc. of excess asphalt or sealant.

END OF SECTION 32 12 16

SECTION 32 13 13 CONCRETE PAVING

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including Special Conditions and all Specification sections, may apply to work of this section.
- B. Related Sections:
 - 1. SECTION 03 30 00 - CAST-IN-PLACE CONCRETE
 - 2. SECTION 31 20 00 - EARTH MOVING
 - 3. SECTION 32 11 23 - AGGREGATE BASE COURSES

1.02 DESCRIPTION OF WORK

- A. Provide all necessary materials, labor, tools and equipment to perform the work included in the section for the:
 - 1. Installation of forming for slabs-on-grade, walks, , footings and paving.
 - 2. Placing reinforcement.
 - 3. Placing and finishing concrete.
 - 4. Curing of concrete.

1.03 SUBMITTALS

- A. General: Contractor shall submit under the General Conditions, Special Conditions and SECTION 01 33 00 – SUBMITTAL PROCEDURES.
- B. SHOP DRAWINGS: for reinforcing showing layout, dimensions and materials.
- C. REPORTS/TESTS:
 - 1. Certificates or mill test reports indicating physical and chemical properties of reinforcing.
 - 2. Compressive strength test reports from previous applications for each class of concrete.
- D. PRODUCT DATA: Concrete design mix, Color admixtures, non-shrink grout, curing compound, absorptive mats, expansion joint filler, and bonding agent.
- E. MOCK-UPS: Construct a 24-by-24-inch test panel for each type of texture and color.

1.04 QUALITY ASSURANCE

- A. Perform Work in accordance with ACI 301.
- B. Maintain one copy of latest construction documents on site, including design drawings, approved shop drawings and permit drawings, and special inspection and testing agreement
- C. Acquire cement and aggregate from same source for all work.
- D. Tolerances: Tolerances for sub-grade, subbase and finished grade shall be as specified by the Standard Specifications except that Contractor shall install the aggregate base and concrete to the minimum thickness shown. No combination of high and low tolerances will be permitted.
- E. All concrete work installed that does not conform to the approved samples shall be removed and replaced by Contractor at Contractor's expense.

1.05 JOB CONDITIONS

- A. Weather Conditions: Construct concrete surface course only when atmospheric temperature is above 40 degrees F., when the underlying base is dry, and when weather is not rainy.
- B. Grade Control: Establish and maintain the required lines and grades, including cross-slope during construction operations.

1.06 REFERENCES

- A. In addition to complying with all pertinent standards, codes and regulations, comply with all requirements of:
 - 1. ACI 308 - Standard Practice for Curing Concrete.
 - 2. ACI 309 - Guide for Consolidation of Concrete.
 - 3. ASTM C33 - Concrete Aggregates.
 - 4. ASTM C94 - Ready-Mixed Concrete.
 - 5. ASTM C150 - Portland Cement.
 - 6. ASTM C309 - Liquid Membrane-Forming Compounds

PART 2 – PRODUCTS

2.01 MATERIALS

- A. Forming Materials:
 - 1. Unless otherwise indicated, materials for formwork shall be wood, steel, fiber or reinforced plastic and of suitable quality to achieve required finishes. Contractor shall conform to considerations and recommendations in ACI-347, Chapter 3.

2. Unless otherwise indicated, contact surfaces in fabricated forms shall be smooth and uniform without warps, bends, dents, sags or irregular absorptive conditions and imperfections.
 3. Form ties and spreaders shall leave a hole not larger than 7/8-inch nor less than 1/2-inch in diameter in the concrete surface. The portion of the tie remaining in the concrete shall be at least 1-inch back from the concrete surface that will be exposed to view, painted, damp proofed or waterproofed.
 4. Radiused chamfer strips shall be milled from clear straight-grain lumber, surfaced on all sides. Other material of equal quality may be used only as authorized by Engineer's representative or Owner. Radii shall be as detailed in the Landscape drawings.
 5. Form coatings and bond breaking materials shall be non-staining and completely compatible with finish materials and other surface treatment materials to be used.
- B. Reinforcement:
1. Reinforcing Bars: Deformed, new billet-steel bars, conforming to ASTM Designation A 615, Grade 60 or ASTM A706 unless noted otherwise.
 2. Tie wires: ASTM A82
 3. Reinforcement supports:
 - i. At reinforcing placed over sand or earth, use precast concrete cubes.
 - ii. At reinforcing placed over forms, provide supports with legs which are hot dip galvanized, stainless steel or plastic protected.
 4. Mechanical Bar Splice: Xtender by Headed Reinforcement Corp. or equal to develop a minimum of 125% of yield strength of bar.
 5. Dowels: Deformed steel bars, ASTM A 615, Grade 60, unless otherwise shown.
 6. Welded Wire Mesh: Welded plain cold-drawn steel wire fabric, ASTM A 185. Furnished in flat sheets, not rolls.
- C. Portland Cement: ASTM C 150, Type II or V, gray as noted in 2.02 below. Shall be provided by one manufacturer.
- D. Normal-Weight Aggregates: ASTM C 33, uniformly graded, 3/4-inch max. Provide aggregates from a single source. Pee gravel or smooth aggregate shall not be used.
- E. Water: The water used in the concrete mix shall be clear and free from injurious amounts of oil, salts, acid, alkali, organic matter, or other deleterious substances.
- F. Air-Entraining Admixture: ASTM C 260. "Daravair", "Micro-Air", manufactured by W.R. Grace, Master Builders or equal.

- G. No admixtures shall be allowed without written acceptance by the Owner's Representative. Admixtures that have a negative impact on concrete finish shall not be used. When more than one admixture is used, admixtures shall be compatible. Provide letter from admixture manufacturer that it is appropriate for proposed mix design.
- H. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.
- I. Expansion- and Isolation-Joint Filler Strips: ASTM D 1752, cork or self-expanding cork; 3/8-inch thick asphalt impregnated fiberboard ASTM D 1571.
- J. Joint Sealant Material: ASTM C-920, self-leveling polyurethane elastomeric sealant. Sikaflex 2c SL or approved equal. Install per manufacturer's recommendations. Color to match adjacent finished surfaces.
- K. Non-Shrink Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents; capable of developing minimum compressive strength of 2,400 psi in 48 hours and 7,000 psi in 28 days. SIKAGrout 212 or approved equal.
- L. Epoxy Grout: Two-part epoxy adhesive product that conforms to the requirements of Simpson SET-XP High Strength Epoxy (ICC ESR-2508) by Simpson Strong Tie or equal product with prior written approval of the Owner's Representative. Installation shall be in strict conformance with the manufacturer's recommendations.

2.02 CONCRETE MIXTURES

- A. Proportion normal-weight concrete mixes to provide the following properties:
 - 1. Compressive Strength: Minimum 3,000 psi at 28 days.
 - 2. Slump Limit: Minimum 2 inches, maximum 4 inches.
 - 3. Aggregate Size (maximum): 3/4 inch.
 - 4. W/C Ratio: 0.50 maximum at point of placement.
 - 5. Air Content: 3 percent plus or minus 1.5 percent.
 - 6. Drying Shrinkage Limit: 0.04 percent. Drying shrinkage limit is percentage of change in length after 21 days of drying when tested per ASTM C157.
 - 7. All other site concrete shall be mixed using gray Portland cement conforming to 2.01.C above.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Verify requirements for concrete cover over reinforcement.
- B. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not cause hardship in placing concrete.
- C. Subgrade: Verify that subbase is properly compacted and at suitable grade and prepare as required per the drawings.
- D. Protection: Take all steps necessary not to discolor or damage existing improvements. If damage occurs, repair immediately and if repair cannot be made to the satisfaction of the Owner's Representative, remove and replace at no expense to the Owner.

3.02 PREPARATION

- A. Accurately position and support reinforcement, and secure against displacement.
- B. Locate and install contraction, construction, isolation, and expansion joints as indicated or required.

3.03 INSTALLATION

- A. Place concrete in accordance with ACI 301.
- B. Place concrete in a continuous operation within planned joints or sections. Do not add water to adjust slump.
- C. Do not interrupt successive placement; if interrupted for more than 1/2 hour, place a construction joint.
- D. Concrete shall be thoroughly consolidated during placement, and shall be worked around reinforcement and embedded fixtures.
- E. Joints: Construct expansion and construction joints true-to-line with face perpendicular to surface of the concrete, unless otherwise shown. Construct transverse joints at right angles to the centerline, unless otherwise noted.
 - 1. Tool edges to a radius of 3/8 inch.
 - 2. Tool joints to a radius of 3/8 inch , 1/4 depth of concrete thickness.
 - 3. Saw-cut joints to be 3/16 inch, 1/4 depth of concrete thickness.
 - 4. Separate slabs on grade from vertical surfaces with 1/2 inch thick joint filler. Place joint filler to required elevations. Secure to resist movement by wet concrete.
 - 5. Extend joint filler from bottom of slab to within 1/8 inch of finished slab surface.

6. Furnish joint fillers in one-piece lengths for the full width being placed, wherever possible. Where more than one length is required, lace or clip joint filler sections together. Form top edge of filler to conform to top profile of concrete.
 7. Ensure reinforcement, inserts, embedded parts, formed expansion and contraction joints are not disturbed during concrete placement.
- F. Where new curb, gutter, and sidewalk adjoins existing, dowel to existing curb, gutter, and sidewalk with two #3 dowels 9-inches long
 - G. Begin curing after finishing concrete. Keep concrete continuously moist for at least seven days.
 - H. Remove and replace concrete paving that is broken, damaged, or defective. Exclude traffic from paving for at least 14 days.
 - I. Notify the Owner's Representative a minimum two working days prior to commencement of operations. Do not place concrete until forms and reinforcement as well as other required inspections have occurred and the Owner's Representative is present to perform observations and testing during placement.
 - J. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

3.04 CONCRETE FINISHES

- A. After striking-off and consolidating concrete, smooth the surface by screeding and floating. Use hand methods only where mechanical floating is not possible. After floating, test surface for trueness with a 10-foot straight-edge -- maximum 1/8-inch variation from any edge to concrete surface. Distribute concrete as required to remove surface irregularities, and refloat repaired areas to provide a continuous, smooth finish. Work edges of slabs, gutters, back top edge of curb, and formed joints with an edging tool, and round to 1/2-inch radius, unless otherwise shown. Eliminate any tool marks on concrete surface. After completion of floating and when excess moisture or surface sheen has disappeared, complete surface finishing, as follows:
 1. Concrete Walks and Curbing: Broom Finish: Draw a stiff hair broom across concrete surface, perpendicular to line of traffic. Repeat operation if required to provide a fine line texture. Texture must be true and straight across entire width of concrete slab.
 - i. Walks on grades less than 6% slope shall be given a light sand blast finish achieved by use of a retarder. Top Cast 05 or approved equal. Apply per manufacturer's recommendations.

- B. Concrete Colorant: Add 0.5 pint of liquid lamp black U.N.O per cubic yard mix to all exterior concrete which will be exposed to view when cured.
- C. Texture while concrete is in the plastic stage. For textures that require concrete stamps, use stamp under manufacturer's recommendations.

3.05 CURING AND PROTECTION

- A. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury. Place curing compound on exposed concrete surfaces immediately after finishing.
- B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

3.06 FIELD QUALITY CONTROL

- A. The District may employ a testing agency to sample concrete, perform tests, and submit test reports during concrete placement.
- B. Provide free access to Work and cooperate with Owner's Representative, and Special Inspector.
- C. Testing and Inspections shall be performed in accordance with District requirements.

3.07 PATCHING

- A. Allow Owner's Representative to inspect concrete surfaces immediately upon removal of forms.
- B. Honeycomb or embedded debris in concrete is not acceptable. Notify Owner's Representative upon discovery.
- C. Patch imperfections in accordance with ACI 301 and satisfaction of Owner's Representative.

3.08 DEFECTIVE CONCRETE

- A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.
- B. Repair or replacement of defective concrete will be determined by the Owner's Representative.
- C. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect for each individual area.
- D. No additional compensation will be allowed for repair of defective concrete.

END OF SECTION 32 13 13

SECTION 32 15 00 AGGREGATE SURFACING

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including Special Conditions and all Specification sections, may apply to work of this section.
- B. Related Sections:
 - 1. SECTION 31 20 00- EARTH MOVING
 - 2. SECTION 32 11 23 - AGGREGATE BASE COURSES

1.02 DESCRIPTION OF WORK

- A. Provide all necessary materials, labor, tools and equipment to perform the work included in the section for the:
 - 1. Extent of decomposed granite paving work is shown on drawings.
 - 2. Decomposed granite paving will have stabilizer binder additive as shown on the plans.

1.03 SUBMITTALS

- A. Material
 - 1. Provide “cut sheets” or product literature on all products to be used.
 - 2. Provide product sample with stabilizer and without for approval.
 - 3. Provide Mock-up- Refer to Quality Assurance section.
- B. Installer qualifications
 - 1. Authorized representative who is trained and approved for installation of the products as specified for this Project.
- C. Source limitations
 - 1. Each material shall be obtained from a single source from a single manufacturer.

1.04 ENVIRONMENTAL CONDITIONS

- A. Do not install decomposed granite paving during rainy conditions.

1.05 QUALITY ASSURANCE

- A. Upon request, the installer shall provide a list of projects (project name, year completed, area of decomposed granite, contact name and phone number) where

their company was responsible for installing decomposed granite paving containing a stabilizer binder additive.

B. Mock-up

1. Install 12 ft. wide x 5 ft. long mock-up of decomposed granite paving with Stabilizer additive and edging if called for at location as directed by the Owner's Representative. If approved, mock-up section may be used as part of final product. Unacceptable samples as determined by the Owner's Representative will be demolished, removed and replaced until approved at no additional cost to the owner.

1.06 EXCESS MATERIALS

- A. Provide owner's authorized representative with the following excess materials for use in future decomposed granite paving repair:
1. 40 – 50 lb. bags of the paving.
 2. 12 lb. of Stabilizer additive.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Base Course Aggregate

1. Class 2 aggregate - 3/4" maximum.

B. Decomposed Granite (DG) Paving

1. To be Gold Fines with the following sieve analysis:

Sieve Size	Percent Passing
3/16"	95-100%
#4	90-100%
#30	25-55%
#200	5-15%

C. Cinder Sand < 1/8"

D. The decomposed granite material shall be produced from a virgin source of granite rock deposits and free of serpentine and deleterious or hazardous material.

E. Stabilizer

1. Stabilized decomposed granite shall be pre-mixed and contain a stabilizer to be patented, non-toxic, organic binder that is buff color, odorless and binds decomposed granite together to produce a firm surface as provided by Natracil, Inc., 1-951-667-6102 or approved equal.

- F. DG Suppliers
 - 1. Vineyard Rock Wholesale, Hollister CA. Contact: Lance Brown (831) 637-6443 – Gold Fines
 - 2. Lyngso Garden Materials, Inc. Redwood City - Gold Fines

PART 3 – EXECUTION

3.01 PREPARATION

- A. Herbicide Treatment
 - 1. Apply chemical weed control agent, “Ronstar G” or approved equal, in strict compliance with manufacturer's recommended dosages and application instructions. Apply “Ronstar G” prior to installation of Class II base rock.

3.02 INSTALLATION OF DECOMPOSED GRANITE

- A. Base Course
 - 1. Install Class II Aggregate to thickness shown in drawings and compact per geotechnical report.
- B. Stabilizer
 - 1. Pre-blended stabilizer and D.G. mixture to be used.
 - 2. If not pre-blending contractor shall blend 12 – 16 lbs. of Stabilizer per (1) ton of decomposed granite per manufacturer’s instructions. It is critical that Stabilizer be thoroughly and uniformly mixed throughout decomposed granite.
- C. Placement of Decomposed Granite Screenings
 - 1. Upon thorough moisture penetration, compact aggregate screenings to 95% relative compaction by compaction equipment such as; double drum roller (2-4 ton) or single drum roller (1000 lbs.). Do not begin compaction for 6 hours after placement and up to 48 hours. Take care in compacting decomposed granite when adjacent to planting and irrigation systems.

3.03 REPAIRS AND PROTECTION

- A. Remove and replace decomposed granite paving that is damaged, defective or does not meet the requirements of this section.

END OF SECTION 32 14 40

SECTION 32 17 23 PAVEMENT MARKINGS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including Special Conditions and all Specification sections, may apply to work of this section.
- B. Related sections:
 - 1. SECTION 32 12 16 – ASPHALT PAVING

1.02 DESCRIPTION OF WORK

- A. Work in this section can include, but is not limited to the following:
 - 1. Parking lot striping.
 - 2. Loading zone striping.
 - 3. Traffic symbols and lettering.

1.03 QUALITY ASSURANCE

- A. Materials and work of this section shall conform to Caltrans Standard Plans and Specifications and California Manual of Uniform traffic Control Devices, latest edition.
- B. Conform to regulations of Bay Area Air Quality Management District and California Air Resources Board regarding use of architectural coatings (paint).

1.04 ENVIRONMENTAL REQUIREMENTS

- A. Do no painting when temperatures on the surface and of air in vicinity of the painting work are below 40 degrees F or below those temperatures recommended by the paint manufacturer.

1.05 COORDINATION

- A. Schedule applications of paint to ensure paint is dry prior to occupancy of adjacent structures.
- B. Where necessary or where requested by Owner's Representative, paint temporary pavement markings that will be re-painted permanently, as specified towards end of project, at no additional cost.

PART 2 – PRODUCTS

2.01 STANDARD CATALOG PRODUCTS

- A. Symbol Marking Paint and Traffic Marking Paint: Waterborne product conforming to State Specification 8010-426-30; Ennis Flint Waterborne Acrylic Emulsion Traffic Paint; Dunn-Edwards Traffic Paint W801; Sinclair 160 Vinyl Traffic Paint, or equal.
 - 1. Parking stall striping and lettering: Yellow color.
 - 2. Parking loading zone striping at accessible parking stalls to be white with a blue border.

2.02 PERFORMANCE REQUIREMENTS

- A. Paint Adhesion: Adhere to road or paving surface forming a smooth continuous film one minute after application.
- B. Paint Drying: Tack free by touch so as not to require coning or other traffic control devices to prevent transfer by vehicle tires or foot traffic within two minutes after application.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Examine receiving surfaces and verify that surfaces are proper for installation.
- B. Do not start work until unsatisfactory pavement surface conditions have been corrected.

3.02 PREPARATION

- A. Protect elements surrounding the work of this section from damage or disfiguration. Furnish drop cloths, shields, and protective methods to prevent spray and droppings from disfiguring other surfaces.
- B. Repair damage to other surfaces caused by work of this section. Replace surfaces which cannot be repaired to the satisfaction of the Owner's Representative.
- C. Remove dirt, oil, grease, and other foreign matter from the areas of the pavement and curbs to be painted.
- D. Do not apply traffic paint to surfaces which are excessively dirty, damp, and/or cold.
- E. Do not paint concrete surfaces until concrete has cured for 28 days.

3.03 REMOVAL OF EXISTING PAVEMENT MARKINGS

- A. Remove existing markings in an acceptable manner. Do not remove existing pavement markings by painting over with blank paint. Remove by methods that will cause least damage to pavement structure or pavement surface. Satisfactorily repair any pavement or surface damage caused by removal methods.
- B. Where blast cleaning is used for the removal of traffic stripes or pavement markings or for the removal of objectionable material, and such removal operation is being performed within 10-feet of a lane occupied by public traffic, the residue including dust shall be removed immediately after contact between the sand and the surface being treated. Such removal shall be by a vacuum attachment operating concurrently with the blast cleaning operation.

3.04 INSTALLATION

- A. Apply traffic paint with atomizing spray type striping machine equipped with separate thermostatically controlled heating devices for each paint pot and capable of applying paint whereby the lines and markings have clear-cut edges, true and smooth alignments and uniform thickness.
- B. Completed lines and markings shall be clean, sharp and to dimensions.
 - 1. Ragged ends of segments, fogginess along the sides or objectionable dribbling of paint along the unpainted portions of the stripes are not acceptable.
 - 2. The finished paint shall have an opaque, well painted appearance with no black or other discolorations showing through.
- C. Apply parking stall and parking loading zone striping as a 4 inch wide solid line at stall and access aisle perimeter with 3 inch wide striping at 3' O.C. in the field unless noted otherwise.
- D. Stripe parking stalls, ramps, and loading zones to dimensions and spacings shown on the Drawings; traffic symbols shall be as shown.

3.05 PROTECTION

- A. Exercise reasonable precautions to protect the paint, as applied, during drying time. Remove objectionable tracking.

END OF DOCUMENT 32 17 23

**SECTION 32 18 16.13
PLAYGROUND PROTECTIVE SURFACING**

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including Special Conditions and all Specification sections, may apply to work of this section.
- B. Related Sections:
 - 1. SECTION 11 66 13 – EXERCISE EQUIPMENT
 - 2. SECTION 31 20 00 – EARTH MOVING
 - 3. SECTION 32 11 23 – AGGREGATE BASE COURSES

1.02 DESCRIPTION OF WORK

- A. Provide all necessary materials, labor, tools and equipment to perform the work included in the section for the installation of the poured-in-place resilient safety surfacing at the outdoor exercise equipment area.

1.03 SUBMITTALS

- A. Manufacturer's Product Literature and Specification Data.
- B. ASTM F1292-17 Impact Attenuation Test Certification for safety surface system to be installed in compliance with the Critical Fall Height as determined by the Playground Equipment to be installed.
- C. ASTM F2223 Playground Surfacing
- D. ASTM F1951-14 ADA Accessibility Test.
- E. ASTM D2859 Flammability Test.
- F. ASTM E303 Skid Resistant Test.
- G. ASTM D624 Tear Resistance Test.
- H. ASTM D412 Tensile Strength test.
- I. IPEMA Certification Letter.
- J. Statement of Warranty for a minimum five-year period with detailed Warranty Claim requirements of the owner and specific procedures to be followed by the manufacturer in terms of response and repair of warranty claims.
- K. Samples of Poured-in-place (1) of each color formed, not loose, until approved.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer shall have manufactured and installed playground poured-in-place surfacing systems for a minimum of 10 years.
- B. Material Performance requirement:
 - 1. Safety surfacing shall meet current ASTM Test Criteria identified in 1.03 Submittals.
 - 2. The safety surface must yield deceleration of no more than 200 G-Max and a Head Injury Criteria (HIC) value of no more than 1000 for a head-first fall from the highest accessible portion of play equipment installed.
- C. Installer qualifications: The installation of the poured-in-place product shall be completed by Manufacturer Certified Contractors or by direct employees of the Manufacturer's Installation Division.
- D. Manufacturer's detailed installation procedures shall be submitted to the Architect and made a part of the Bid Specifications.

PART 2 – PRODUCTS

2.01 POURED-IN-PLACE RESILIENT SAFETY SURFACING

- A. MANUFACTURER/INSTALLER
 - 1. Surface America/Ross Recreation
 - 2. PlayPour/Playgrounds Unlimited
 - 3. Tot Turf /Robertson's Industries
 - 4. Approved equal.
- B. MATERIAL
 - 1. Complying with ASTM F2479
 - 2. A dual durometer poured-in-place system with a wearing layer upper membrane and an underlying impact attenuation cushion layer. The finished surface shall be porous and capable of being installed at varying thickness to comply with Critical Fall Height requirements of playground equipment installed in conjunction with the surface.
 - 3. The POURED-IN-PLACE surface shall be manufactured from EPDM, TPV and/or SBR rubber compounds mixed with a 100% MDI based Polyurethane Resin. Polyurethane contained any TDI shall not be allowed due to environmental regulations. Note: Aliphatic binder shall be provided for yellow, white, sky blue and bright green colors.

4. Cushion Course shall be a mixture of shredded and SBR rubber particles of heterogeneous distribution bonded by a polyurethane binder applied to 100% of the rubber and installed to a designated thickness as required by the Consumer Product Safety's Commission's Guidelines and ASTM F1292-13 Test Criteria.
5. Wearing Surface shall be a mixture of black EPDM or colored EPDM 1-4 MM granules bonded by a polyurethane binder applied to 100% of the granules and applied to a minimum thickness of 3/8" over the cushion layer. Color choice and blend ratios to be of color selected by the owner.
6. Color and pattern per drawings.

2.02 GEOTEXTILE FABRIC

A. MANUFACTURER

1. Tencate or approved equal.

B. MATERIAL

1. Fabric to be non-woven geotextile fabric.
2. Color to be earth tone.
3. Black plastic is prohibited.

PART 3 EXECUTION

3.01 POURED IN PLACE RESILIENT SAFETY SURFACING

- A. Contractor shall comply with the instructions and recommendations of the playground surfacing manufacturer.
- B. Contractor to create a funnel with the surfacing around rope/surface interfaces to allow for rope movement.
- C. Sub Surface Preparation:
 1. Aggregate subbase- Refer to SECTION 32 11 23 - AGGREGATE BASE COURSE.
 2. Aggregate subbase- Aggregate base shall be minimum 4" – maximum 10". Ensure that the subbase is compacted in 2" lifts to 95% or greater and has a min. 2% uniformly sloped surface variations will be telegraphed through to the rubber surface. The aggregate shall be fully contained. For conditions between poured-in-place and loose safety surfacing where the base material is rolled down, the roll down area shall be stable either by means of skim coating the aggregate with concrete or asphalt or by using a concrete roll down base. Aggregate base is not acceptable for use in mounded areas.

D. Subbase Tolerance:

1. Aggregate subbase shall be within 3/8" in 10'-0".
2. Concrete subbase shall be 1/8" in 10'-0".

PART 4 TESTING AND INSPECTION

A. Upon completion of the installation of safety surface material, the playground shall be inspected by:

1. A Certified Playground Safety Inspector (CPSI) contracted by the DISTRICT and paid for by the Contractor for playground safety compliance.

END OF SECTION 32 18 16.13

SECTION 32 18 23 ATHLETIC COURT SURFACING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including Special Conditions and all Specification sections, may apply to work of this section.
- B. Related sections:
 - 1. SECTION 32 12 16- ASPHALT PAVING

1.02 DESCRIPTION OF WORK

- A. The work shall consist of construction and installation for the surfacing of the sport courts.
- B. Courts shall be cleaned using a stiff bristle broom and gas powered blower or water based pressure spray unit capable of generating 2500 psi at the nozzle tip, to remove all dirt and debris.
- C. The work to be performed under this specification includes all labor, equipment, materials and supplies necessary for the installation of the courts included in this contract.

1.03 SUBMITTALS

- A. Material samples and cut sheets.
- B. Installer's certificate.

1.04 SUBSTITUTIONS

- A. Submit substitutions in accordance with the Technical Specifications
- B. Information must include a QUV test of at least 2000 hours illustrating the UV stability of the system. The color system shall have an ITF pace rating in Category 4. Under no circumstances will systems from multiple manufacturers be considered.

1.05 QUALITY ASSURANCE

- A. Installer must be a certified Nova installer

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Store product in manufacturer's packaging until ready to install.

PART 2 - PRODUCTS

2.01 MANUFACTURER

- A. Nova Sports U.S.A.,
6 Industrial Rd., Bldg. #2.,
Milford, MA 01757
800-USA-NOVA
- B. Approved equal

2.02 MATERIALS

- A. COATINGS:
 - 1. NOVAPLAY SYSTEM for basketball and other court games.
 - 2. All coatings shall be pure acrylic, containing no asphaltic or tar emulsions, nor any vinyl, alkyd or non-acrylic resins. The color system shall be factory-mixed compounds requiring only the addition of water at the jobsite except for the addition of sand to top surface. All materials shall be delivered to the jobsite in sealed containers with the manufacturer's label affixed.
- B. LINE MARKINGS:
 - 1. Textured paint to be 'Novatex' by Nova Sports.
 - 2. Line primer to be 'Seal-A-Line' by Nova Sports.
 - 3. Color to be white unless noted otherwise.

PART 3 - EXECUTION

3.01 APPLICATION

- A. New asphalt pavement shall cure for 14 days prior to application of any surfacing materials.
- B. Contractors must notify the Owners Representative of all applications, 48 hours prior to installation.
- C. The surface to be coated shall be inspected and made sure to be free of grease, oil, dust, dirt and other foreign matter before starting work.
- D. The surface shall be flooded. Any ponding water remaining that is deep enough to cover the thickness of a five-cent piece shall be corrected using a patch mix per manufacturer's mix design and installation recommendations.

- E. Application shall proceed only if the surface is dry and clean and the temperature is at least fifty degrees (50°F) and rising, and the surface temperature is not in excess of one hundred forty degrees (140°F). Do not apply coatings when rain is imminent.
- F. Each coat must dry completely before next application. Between each coat, inspect entire surface. Any defects should be repaired. Scrape surface to remove any lumps, and broom or blow off all loose matter.
- G. Apply court surface per manufacturer's instructions.
- H. NOVAPLAY SYSTEM - Using a neoprene rubber squeegee, apply two (2) coats of Novaplay (colors to be per plans). Allow each application to dry thoroughly. A small (not to exceed 8 fl. oz per gal.) quantity of water may be used in diluting these coatings, only if coatings are drying too rapidly. Permission of the owner shall be obtained before adding additional water.

3.02 LINE MARKINGS

- A. Upon completion and acceptance of the court surface, prepare and paint lines for the courts.
- B. All lines are to be applied by painting between masking tape with a paintbrush or roller, according to United States Tennis Association (USTA) specifications.
- C. Prime masked lines. Allow application to dry.
- D. Paint lines with textured line paint. Allow application to dry.
- E. Remove masking tape immediately after lines are dry.
- F. Protect adjacent areas and structures (fences, posts, sidewalks, buildings, etc.), which are not to be coated. In the event that coatings are applied to above, remove immediately before drying is complete

3.03 CLEAN-UP AND PROTECTION

- A. Upon completion, the contractor shall insure proper removal of all construction debris, surplus materials, empty containers and wash water, and shall leave the site in a condition acceptable to the owner. The court is to be left secure so as to prevent vandalism.

3.04 LIMITATIONS

- A. Apply coatings only when ambient temperature is fifty degrees (50°F) and rising, and the surface temperature is not in excess of one hundred forty degrees (140°F).
- B. All NOVACRYLIC coatings are waterborne and cannot cure in cold temperatures or when subject to moisture. Care should be taken not to apply coatings when rain is forecast or sudden drop of temperature is expected. Climatic conditions such as very cool evenings and high dew points dictate that work should be completed early in

the day so the coatings can be exposed to enough warm sunlight to form a film before sunset. The opposite applies during times of high heat, low humidity and drying breezes: under these conditions, work very early in the morning or very late in the day. If the product seems to be drying too fast in hot weather, mist the pavement with water to make the application easier. Care must be taken to allow each application to dry thoroughly prior to recoating.

END OF SECTION 32 18 23

SECTION 32 18 23.13 BASEBALL INFIELD FINES

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including Earthwork and Planting Specification sections, may apply to work of this section.
- B. Related Sections:
 - 1. SECTION 31 10 00 – SITE CLEARING
 - 2. SECTION 31 20 00 – EARTH MOVING

1.02 DESCRIPTION OF WORK

- A. Provide all necessary materials, labor, tools and equipment to perform the work included in the section for the installation of infield fines work is shown on drawings.

1.03 SUBMITTALS

- A. Material Certificates: Provide copies of material certificates signed by material producer and Contractor, certifying that each material item complies with, or exceeds, specified requirements.
- B. Provide “cut sheets” or product literature on all products to be used.
- C. Installer Requirements: The installation company shall have at least 3 years experience installing this or similar products. Documentation should include a resume, with project names, addresses, owner’s name, size of installation and photographs of completed work
- D. Samples: Submit quart sample of material in color specified.
- E. Mock-up:
 - 1. Construct of 20 square feet minimum of surfacing, including base course and edging, at location approved by Owners Representative. Build mockup 5 days prior to installation. Intent of the mockup is to demonstrate surface finish, texture, color and standard of workmanship.
 - 2. Notify Owner’s Representative 2 days in advance of mockup construction.
 - 3. Allow Owner’s Representative to view and obtain approval of mock-up before proceeding with rest of surface installation.
 - 4. Approved mock-up may remain as first in place construction.

1.04 JOB CONDITIONS

- A. Do not install surfacing when sub-base is wet at saturated field capacity.
- B. Do not install materials during rainy conditions or below 40 degrees Fahrenheit and falling.

1.05 SEQUENCING

- A. Do not install work specified in this Section prior to acceptance of earth moving and aggregate base installation.
- B. Coordinate work specified in this Section with work specified in other Sections to minimize cutting of and operation of heavy equipment over newly installed surfacing.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Deliver all materials in original, unopened packaging. Protect materials from contamination with foreign matter. Store under waterproof cover and protect from dampness.

1.07 EXCESS MATERIALS:

- A. Provide owner's authorized representative with the following excess materials for use in future baseball infield repair:
 - 1. 40 – 50 lb. bags of the Infield Mix used.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. Infield Mix:
 - 1. Premium, red infield fines mix made from 1/16'-red volcanic cinder fines, clay and topsoil, such as Pacbell Mix available from TMT ETERPRISE.
 - 2. Fines are to consist of a premium, red infield fines mix made from 1/16'-red volcanic cinder fines, clay and topsoil, thoroughly blended and screened to 5mm to assure finished product is free from stones, sticks, clay balls, debris, etc. per the following analysis:

Sieve Size	% Passing
5mm	100
2mm	95-100
1mm	70-95
.5mm	60-80
.05mm	20-30

<.05mm (silt & clay)	20-30% Combined
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- B. SUPPLIER:
1. TMT ENTERPRISE, INC.
San Jose, CA Phone: (408) 432-9040
 2. Or Approved Equal.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine grading and subsoil conditions. Do not proceed until conditions are acceptable.

3.02 PREPARATION

- A. Excavation: Excavate to depth required so edges of surfacing will match adjacent grades and have a maximum cross slope as shown on the plans.
- B. Edging: Install flush with surfacing. Provide sufficient stakes to secure in place.

3.03 INSTALLATION

- A. Note that precise grading is critical and is best accomplished with laser-equipped machinery.
- B. Prior to installation, dampen surface on which installation is to occur. Install surfacing as per specified depth (minimum compacted thickness is 4"). Do not allow material to dry during installation. Mist as necessary to maintain optimum moisture content prior to compaction.
- C. Install material in 2" lifts; thoroughly water each lift until the entire depth is moist. Grade and smooth to required elevation. Smooth out any final irregularities prior to substantial compaction. Smooth by using the straight edge of an asphalt rake or a medium bristle broom over entire paving surface.
- D. Compact with a 1,000lb – 3,000lb roller after grading and wetting final lift. Hand-tamp around field equipment, etc. as required.
- E. Take care compacting adjacent to planting and irrigation systems.
- F. Allow material to dry, then spike and mat drag to obtain the desired finish. Completed, finished surface shall be of consistent quality and free of deleterious materials such as organic materials, nails, stones, and loose material. Surface shall not have depressions or humps greater than ¼ inch in ten feet.

3.04 MAINTENANCE & REPAIRS

- A. Repair: Spot repair as needed.
- B. Maintain per the manufacturer's recommendations.

END OF SECTION 32 18 23.13

**SECTION 32 31 13
CHAIN LINK FENCING AND GATES**

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to the work of this section.

1.02 DESCRIPTION OF WORK

- A. Extent of chain link fences and gates is indicated on drawings.

1.03 QUALITY ASSURANCE

- A. Provide chain link fences and gates as complete units controlled by a single source including necessary erection accessories, fittings, and fastenings.

1.04 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data, and installation instructions for metal fencing, fabric, gates and accessories.

PART 2 – PRODUCTS

2.01 GENERAL

- A. Dimensions indicated for pipe, roll-formed, and H-sections are outside dimensions, exclusive of coatings.
- B. Manufacturer: Subject to compliance with requirements, provide products of one of the following:
 - 1. Galvanized Steel Fencing and Fabric
 - i. Allied Tube and Conduit Corp.
 - ii. American Fence Corp.
 - iii. Anchor Fence, Inc.
 - 2. PVC Coated Galvanized Steel Fencing and Fabric
 - i. American Fence Corp.
 - ii. Anchor Fence, Inc.
 - iii. United States Steel

2.02 STEEL FABRIC

- A. Fabric: No. 9 ga. (0.148" \pm 0.005") size steel wires, 2" mesh, with top and bottom selvages knuckled.
- B. Furnish one-piece fabric widths for fencing up to 12' high.
- C. Fabric Finish: Galvanized, ASTM A 392, Class II, with not less than 2.0 oz. zinc per sq. ft. of surface.
- D. Comply with ASTM F 668, Class 2, except provide fabric with diameter (gauge) of core wire equivalent to fabric diameter specified when measured prior to application of non-metallic coating.

2.03 FRAMING AND ACCESSORIES

- A. Steel Framework, General: Posts, rails, braces, and gate frames.
 - 1. Type 1 Pipe: Hot-dipped galvanized steel pipe conforming to ASTM F1083, plain ends, standard weight (Schedule 40) with not less than 2.0 oz. zinc per sq. ft. of surface area coated.
 - 2. Type 11 Pipe: Manufactured from steel conforming to ASTM A569 of A446, grade D, cold formed, electric welded with minimum yield strength of 50,000 psi and triple coated with a minimum 0.9 oz zinc per sq. ft. after welding, a chromate conversion coating and a clear polymerf overcoat. Corrosion protection on inside surfaces shall protect the metal from corrosion when subjected to the salt spray test of ASTM B117 for 300 hours with the end point of 5 percent red rust.
- B. Fittings and Accessories: Galvanized, ASTM A 153, with zinc weights as per pipe and framework requirements.
- C. Steel Framework Finish: Galvanized, ASTM A 392, Class II, with not less than 2.0 oz. zinc per sq. ft. of surface.
- D. End, Corner, and Pull Posts: Minimum sizes and weights as follows:
 - 1. Up to 6' fabric height, 2.375" OD steel pipe, 3.65 lbs. per lin. ft., or 3.5" x 3.5" roll-formed sections, 4.85 lbs. per lin. ft.
 - 2. Over 6' fabric height, 2.875" OD steel pipe, 5.79 lbs. per lin. ft., or 3.5" x 3.5" roll-formed sections, 4.85 lbs. per lin. ft.
- E. Line Posts: Space 10' o.c. maximum, unless otherwise indicated, of following minimum sizes and weights.

1. Up to 6' fabric height, 1.90" OD steel pipe, 2.70 lbs. per lin. ft. or 1.875" x 1.625" C-sections, 2.28 lbs. per lin. ft.
 2. 6' to 8' fabric height, 2.375" OD steel pipe, 3.65 lbs. per lin. ft. or 2.25" x 1.875" H-sections, 2.64 lbs. per lin. ft.
 3. Over 8' fabric height, 2.875" OD steel pipe, 5.79 lbs. per lin. ft. or 2.25" x 1.875" H-sections, 3.26 lbs. per lin. ft.
- F. Top Rail: Manufacturer's longest lengths, with expansion type couplings, approximately 6" long, for each joint. Provide means for attaching top rail securely to each gate corner, pull and end post.
1. 1.66" OD pipe, 2.27 lbs. per ft. or 1.625" x 1.25" roll-formed sections, 1.35 lbs. per ft.
- G. Tension Wire: 7 gage, coated coil spring wire, metal and finish to match fabric.
1. Locate at bottom of fabric.
 2. Locate at bottom and top of fabric.
- H. Wire Ties: 11 ga. galvanized steel.
- I. Post Brace Assembly: Manufacturer's standard adjustable brace at end and gate posts and at both sides of corner and pull posts, with horizontal brace located at mid-height of fabric. Use same material as top rail for brace, and truss to line posts with 0.375" diameter rod and adjustable tightener.
- J. Post Tops: Provide weather tight closure cap with loop to receive tension wire or top rail; one cap for each post.
- K. Stretcher Bars: One-piece lengths equal to full height of fabric, with minimum cross-section of 3/16" x 3/4". Provide one stretcher bar for each gate and end post, and 2 for each corner and pull post, except where fabric is integrally woven into post.
- L. Stretcher Bar Bands: Space not over 15" o.c., to secure stretcher bars to end, corner, pull, and gate posts.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Do not begin installation and erection before final grading is completed, unless otherwise permitted.

- B. Excavation: Drill or hand excavate (using post hole digger) holes for posts to diameters and spacings shown, in firm, undisturbed or compacted soil.
- C. If not indicated on drawings, excavate holes for each post to minimum diameters as recommended by fence manufacturer, but not less than 4 times largest cross-section of post.
- D. Unless otherwise indicated, excavate hole depths approximately 3" lower than post bottom, with bottom of posts set not less than 36" below finish grade surface.
- E. Setting Posts: Center and align posts in holes 3" above bottom of excavation.
- F. Place concrete around posts and vibrate or tamp for consolidation. Check each post for vertical and top alignment, and hold in position during placement and finishing operations.
- G. Unless otherwise indicated, extend concrete footings 2" above grade and trowel to a crown to shed water.
- H. Top Rails: Run rail continuously through post caps, bending to radius for curved runs. Provide expansion couplings as recommended by fencing manufacturer.
- I. Center Rails: Provide center rails where indicated. Install in one piece between posts and flush with post on fabric side, using special offset fittings where necessary.
- J. Brace Assemblies: Install braces so posts are plumb when diagonal rod is under proper tension.
- K. Tension Wire: Install tension wires through post cap loops before stretching fabric and tie to each post cap with not less than 6 ga. galvanized wire. Fasten fabric to tension wire using 11 ga. galvanized steel hog rings spaced 24" o.c.
- L. Fabric: Leave approximately 2" between finish grade and bottom selvage, unless otherwise indicated. Pull fabric taut and tie to posts, rails, and tension wires. Install fabric on security side of fence, and anchor to framework so that fabric remains in tension after pulling force is released.
- M. Stretcher Bars: Thread through or clamp to fabric 4" o.c., and secure to posts with metal bands spaced 15" o.c.
- N. Tie Wires: Use U-shaped wire, conforming to diameter of pipe to which attached, clasping pipe and fabric firmly with ends twisted at least 2 full turns. Bend ends of wire to minimize hazard to persons or clothing.

- O. Tie fabric to line posts, with wire ties spaced 12" o.c. Tie fabric to rails and braces, with wire ties spaced 24" o.c. Tie fabric to tension wires, with hog rings spaced 24" o.c.
- P. Fasteners: Install nuts for tension bands and hardware bolts on side of fence opposite fabric side. Peen ends of bolts or score threads to prevent removal of nuts.

END OF SECTION 32 31 13

SECTION 32 84 00 IRRIGATION WORK

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including Special Provisions and all Specification sections, may apply to work of this section.
- B. Related Sections:
 - 1. SECTION 31 20 00 – EARTH MOVING

1.02 SECTION INCLUDES

- A. Irrigation materials, execution and testing.
- B. As-built and project close specifications.

1.03 DESCRIPTION OF WORK

- A. Provide all necessary materials, labor, tools and equipment to perform the work included in the section for the:
 - 1. Location and identification of existing underground utilities.
 - 2. Boring under existing pavements for new mainlines.
 - 3. Saw cutting and patching through existing paving for new mainlines
 - 4. Hookup to point of connection.
 - 5. Installation of new mainline.
 - 6. Installation of sleeving where necessary.
 - 7. All excavation, trenching, backfilling, and restoration of surfaces altered by the work. Restore existing paving to original quality, texture, thickness, and color.
 - 8. Repair of any control or electrical wires and or conduits damaged during the course of construction.
 - 9. Repair of any lateral or mainline damaged during construction.
 - 10. Installation of over-head broadcast irrigation components.
 - 11. Installation of quick couples, ball valves, remote control valves and valve boxes per plans.

1.04 QUALITY ASSURANCE

- A. All work and materials shall be in full accordance with the latest rules and regulations of the National Electric Code, the Uniform Plumbing Code published by the Western Plumbing Officials Association, and other applicable State or local laws or regulations.
- B. All piping shall be inspected and approved by the Owner's Representative prior to backfilling as described in the EXECUTION portion of this Section.

1.05 SUBMITTALS

- A. Submit in accordance with General and Special Provisions Section "Submittal Procedures". Submit copies of descriptive literature of all proposed materials for review. All submittals shall be transmitted, in one bound package.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. All materials provided shall be new and in a first class condition.
- B. Mainline Pressure Pipe - MAINLINE PIPE SHALL BE AS NOTED ON Drawings and SHALL BE OF one of THE FOLLOWING SPECIFICATIONS:
 - 1. PVC 1120, SCH. 40 pipe for sizes 2" and under, shall conform to ASTM D1785, D1784, cell class 12454-A, B. Couplings and fittings to be joined with solvent cement in accordance with manufacturer's instruction.
 - 2. PVC 1120, CLASS 315 pipe for sizes over 2.5" and over. Couplings and fittings to be joined with solvent cement in accordance with manufactures instructions
- C. Fittings for solvent weld joints: shall be SCH 40 PVC unless otherwise noted.
- D. Irrigation sleeving: shall be 6" class 200 unless otherwise noted.
- E. Remote & Manual Control Valves: shall be as specified on the drawings. All valves to have a isolation ball valve within their assembly per the details.
- F. overhead broadcast emitters: shall be as specified on the drawings.
- G. Quick Coupler Valves: shall be as specified on the drawings.
- H. Valve Boxes: shall be manufactured by Brooks, Carson, Christy or approved equal.

PART 3 – EXECUTION

3.01 EXCAVATION

- A. Trenches may be excavated either by hand or machine, but shall not be wider than is necessary to lay the pipes. Any damages shall be repaired by Contractor at no additional cost to Owner.
- B. Minimum depth of cover for irrigation pipelines shall be:
 - 1. Twenty four inches (24") for mainline pressure piping and eighteen inches (18") for lateral piping unless otherwise noted on the plans.
 - 2. Twenty four inches (24"), minimum cover, for any pipe, wire or sleeve under paving of any kind.
 - 3. Refer to drawings, details and legends for additional information.
 - 4. Irrigation sleeving: Install where shown or needed, extend sleeving min. 6" into planters.

3.02 PIPE JOINTS AND CONNECTIONS

- A. Jointing shall be performed by competent tradesmen, specially trained in the type of work required and using tools and equipment recommended by the manufacturers of the pipe fittings or equipment.
- B. All screwed joints shall be made tight with tongs and wrenches without the use of handle extensions. Use of thread cement or caulking to make joints water tight will not be permitted. All cut ends shall be remade to full bore before assembly.
- C. Contractor shall use only the solvent supplied and recommended by the pipe and/or fitting manufacturer to make plastic pipe joints.
- D. All pipe and fittings shall be joined using manufacturers recommended procedures.
- E. Use clean rag and wipe off all excess solvent from both pipe and fittings.
- F. Allow at least fifteen (15) minutes set-up time for each solvent-welded joint before moving pipe.
- G. Connections and controls shall be functionally as shown on the Drawings, but physically shall be the most direct and convenient method while imposing the least hydraulic friction.

3.03 HANDLING OF PIPE

- A. Handling and assembly of pipe, fittings, and accessories shall be by skilled tradesmen using approved methods and tools and exercising care to prevent damage to the materials or equipment. Interior of pipe, fittings, and accessories shall be kept clean at all times, and all openings in piping runs shall be closed at the end of each day's work or otherwise as necessary to prevent the entry of foreign materials. Bending of galvanized steel pipe will not be permitted.

- B. All plastic pipes to be installed shall be free from blisters, internal striations, dents, wrinkles, cracks, holes, foreign materials, and the interior wall shall be smooth and have a glass-like appearance. Plastic pipe shall be marked continuously and permanently with the following information: Manufacturer's name and quality control identification, National Sanitation Foundation's seal, class, or schedule of pipe, pressure rating of pipe, and pipe size. The pipe shall be turned with the markings up during installation so that they may be read when viewed from above while trenches are open.

3.04 INSTALLATION OF PIPING - GENERAL

- A. There shall be minimum 3" clear, horizontally and vertically around all piping in trenches. Plastic pipe shall always be installed so that there will be a small amount of excess length in the line to compensate for contraction and expansion of the soil around the pipe. This shall be accomplished by "snaking" the pipe, side to side in the trench during the time of installation. Refer to irrigation details for additional information

3.05 TESTING PIPING

- A. All testing shall be done in the presence of the Owner's Representative. All work herein shall be done by the Contractor. Center-load all pipelines with appropriate backfill material to resist hydraulic pressures, but leave all fittings exposed for inspection. Piping under paving shall be tested and approved before paving or re-paving. All glued fittings must be allowed to dry a minimum of 48 hours prior to testing. Install a 0 to 160 P.S.I. water-filled pressure gauge on lines to be tested. All valves shown on Plans shall be in place, and shall be in the closed position. Gasketed supply lines shall be tested at 150 P.S.I., solvent weld supply lines shall be tested at 120 p.s.i., and laterals at 65 P.S.I. Fill pipelines with water slowly to avoid pipe damage, and bleed all air from lines as they are being filled. After closing valve at water source and bringing piping to specified pressure, supply lines shall hold specified pressure for six (6) hours with no pressure loss or leaks. Laterals are expected to have minor leakage at swing joint assemblies etc., subject to the discretion of the Owner's Representative. Major leaks are not acceptable. Laterals shall be tested for one (1) hour at 65 P.S.I. solely to reveal any piping or assembly flaws. The laterals are not expected to hold gauge pressure.
- B. For testing laterals, cap risers or turn adjusting screws on nozzles to the "off" position, as appropriate.
- C. Repair any flaws discovered in supply lines or laterals, then retest in same fashion as outlined in presence of the Owner's Representative, until all lines have been approved.

3.06 BACKFILL

- A. For all trench conditions refer to plans, and for all backfill specifications, refer to SECTION 31 20 00 – EARTH MOVING.

3.07 RECORD DRAWINGS

- A. The Contractor shall provide and maintain in good order two (2) complete sets of prints of all sprinkler drawings which form a part of the Contract, showing all water supply lines, valves, and stub-outs modified under the scope of work. These prints shall be updated on a continual basis and be available for review on job site at any time by the Owner's Representative. At the completion of the work, prior to start of Maintenance Period, the Record Drawing prints shall be submitted to the Owner's Representative for review and comment. After comments are made, Record Drawings will be sent back to Contractor for modification or redrafting. When Record Drawings are acceptable to the Owners Representative, the Contractor shall affix the company seal and signature which shall serve as the Contractors guarantee of accuracy. First submittal of Record Drawing prints shall be made before punchlist inspection.

3.08 ADDITIONAL TURN-OVER MATERIALS

- A. Deliver to the Owner's Representative upon completion of work:
 - 1. Two (2) laminated 11x17 color coded prints of valve sequencing plans.

3.09 PROTECTION

- A. The Contractor shall be responsible for any and all damages to any of their materials or work prior to final acceptance. This includes any damages incurred during specified maintenance period. Securely cover all openings and cover all apparatus, fixtures and appliances both before and after setting into place to prevent obstruction in the conduits and breakage or disfigurement of equipment. Should the equipment become damaged, restore it to its original condition and finish before final acceptance

3.10 MAINTENANCE

- A. Maintain all materials in prudent, workmanlike fashion after delivery to site and all work immediately after installation until final acceptance.
- B. Specifically, Contractor shall at minimum: Repair and/or replace any damaged equipment or site damages (including planting) resulting from defects in or vandalism to irrigation system components.
- C. The Contractor shall submit first draft of record drawings, all turn-over materials, and other items in accordance with General and Special Provisions "Project Closeout". Contractor is allowed (2) inspections, one, to establish the punchlist" and a second to verify completion of the punchlist. Any additional walk-throughs

or observations required to obtain approval will be back-charged to the Contractor.

3.11 GUARANTEE

- A. The entire system shall be guaranteed by the Contractor in writing, to be free from defects in material and workmanship for a period of one (1) year from date of final acceptance of work. Guarantee shall include repair of any trench settlement occurring within the guarantee period, including related damage to paving, landscaping, or improvements of any kind. Written guarantee shall be submitted with any remaining turn-over materials before final acceptance will be issued.

END OF SECTION 32 84 00

SECTION 32 90 00 PLANTING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including Special Conditions and all Specification sections, may apply to work of this section.
- B. Related sections:
 - 1. SECTION 31 10 00 – SITE CLEARING
 - 2. SECTION 31 20 00 – EARTH MOVING
 - 3. SECTION 32 84 00 – IRRIGATION WORK
 - 4. SECTION 32 91 13 – SOIL PREPARATION

1.02 DESCRIPTION OF WORK

- A. Provide all necessary materials, labor, tools and equipment to perform the work included in the section for the:
 - 1. Method of Planting
 - 2. Planting of sod and hydroseeded areas
 - 3. Extent of landscape development work as shown on drawings, details and on sheet legends.

1.03 DEFINITIONS

- A. **Finish Grade:** Elevation of finished surface of planting soil below mulch.
- B. **Planting Soil:** Surface soil mixed with soil amendments.
- C. **Subgrade:** Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill, before placing planting soil.
- D. **Wound:** A discontinuity resulting from the removal of the bark and cambium. Pruning cuts that are not closed over are not considered wounds.

1.04 SUBMITTALS

- A. General:
 - Submit under the provisions of the General Conditions- Submittals.
- B. Product data:

1. Submit product information or “cut-sheets” for all proposed products on all specified products to be used. Clearly indicate specific product to be used on each “cut-sheet”.
 2. Copies of invoices or purchase orders for all plant materials confirming order and supplier.
- C. Samples for verification:
1. Physical samples of soil amendment and mulch top dressing (one quart bag full minimum).
- D. 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. Submit certificates of inspection, as required by governmental authorities for transportation of plant materials across state lines. Submit manufacturer's or vendor's certified analysis for soil.
- E. Design data:
1. Xerox reductions of drawings with graphic area take-offs of all planting areas stating quantities of all soil amendments, fertilizers and other soil additives to be used by volume per area.

1.05 SOURCE QUALITY CONTROL

A. General

1. Substitution in variety or size without approval will not be permitted. If specified plant material or seed is not obtainable, submit proof of non-availability to Owner’s Representative, together with proposed equivalent materials for review at least two weeks prior to scheduled planting time. If a size of plant is not available, approval must be obtained from the Owner’s Representative for any change. In no case will additional compensation be allowed to the Contractor for any substitution of size. If the next size larger is available in the species, the Contractor shall provide them at no additional cost to the Owner.

B. Analysis and Standards

1. Package standard products with manufacturers certified analysis. For other materials, provide analysis by recognized laboratory made in accordance with methods established by the Association of Official Agriculture Chemists, wherever applicable.

1.06 QUALITY ASSURANCE

- A. Planting work shall be awarded to a single firm specializing in planting work.

- B. Notify Owner's Representative at least 48 hours in advance of the following required observations:
 - 1. Approval of turf beds prior to seeding and/or sodding
 - 2. "Pre-maintenance" observation and punch-list formation
 - 3. "Pre-maintenance" punch-list completion verification
 - 4. "Final acceptance" observation
 - 5. Allow at least 3 business days for the Owner's representative's inspection.
- C. SITE/MATERIAL INSPECTION: The Owner's Representative shall inspect all sod and seed before planting for compliance with specified requirements for genus, species, variety, and quality.

1.07 COORDINATION

- A. Coordinate work with that specified in other sections, such as soil preparation and fine grading, before start of installation. Any installation found to be in conflict with such work as a result of neglected coordination, shall be removed and reinstalled in new locations designated by the Owner's representative at no additional expense to the Owner.
- B. Proceed with, and complete landscape work as rapidly as portions of site become available, working within seasonal limitations for each kind of landscape work required and discretion of Owner's Representative.
- C. Utilities: Determine location of underground utilities and perform work in a manner which will avoid possible damage. Hand excavate as necessary. Maintain grade stakes set by others until removal is mutually agreed upon by parties concerned.
- D. Excavation: When underground conditions detrimental to plant growth are encountered, such as rubble fill, adverse drainage conditions, or obstructions, notify Owner's Representative for recommendation prior to planting.

1.08 DELIVERY, STORAGE AND HANDLING

- A. Plant material: Ship plant material and seed with certificates of inspection required by governing authorities. Comply with federal and state regulations applicable to plant materials requiring inspection for diseases and infestations. Inspection certificates required by law must accompany each shipment of plants.
- B. Packaged materials: Deliver packaged materials in containers showing weight, analysis and name of manufacturer.
- C. Protect materials from vandalism and deterioration during delivery, and while stored at site. The Owner's Representative may mark certain containers upon, or after, delivery. All marked containers shall be stored on site, empty or full until final acceptance of the project for review by Owner's Representative.

- D. The sod shall be delivered and installed within a period of 36 hours.
- E. Quality of plant material shall be maintained during transportation from the nursery and throughout the planting process.

1.09 ENVIRONMENTAL REQUIREMENTS

- A. On days expected to be 90 degrees Fahrenheit or greater, the Contractor shall schedule planting in the morning only to avoid stressing plants during installation.
- B. Sodding shall be performed only during the time of day and during seasons when satisfactory results can be expected unless authorized in writing by the Owner's Representative.

1.10 PLANTING GUARANTEE

- A. Contractor shall guarantee, in writing, all planting work and plant material for a period of one year after date of start of maintenance period, against material and workmanship defects including death and unsatisfactory growth, except for defects resulting from neglect by Owner, abuse or damage by others, or unusual phenomena or incidents which are beyond Contractor's control. Planting Guarantee shall be submitted with Irrigation Guarantee (if applicable) and other turn-over materials before final acceptance will be issued. A sample of the guarantee format is available from the Owners Representative.

PART 2 - PRODUCTS

2.01 TURF SOD

- A. Approved manufacturer:
 - Delta Bluegrass Co.**
 - 111 Zuckerman Rd.
 - Stockton, CA
 - 209.469.7979

Or approved equal.
- B. Grass Sod Product: Sod shall consist of live, growing mature Bolero Plus as specified below.
 - 1. 90% Dwarf Fescue/10% Bluegrass
- C. Sod shall be harvested mature with a uniform thickness of 1/2"-5/8" of soil that completely covers the roots of the sod. The sod shall be delivered and installed within a period of 36 hours.

- D. The sod shall arrive vigorous and have a lush appearance, uniform texture and dark-green color through with no dead or dry edges. The sod shall be sufficiently dense to bear handling and placement without tearing.
- E. The sod shall be free of disease and harmful insects, noxious weeds or other grasses and shall not contain any other matter deleterious to its growth or which might affect its subsistence or hardiness when transplanted.

2.02 MULCH TOP DRESS:

A. MANUFACTURER

VISION RECYCLING

Attn: Andrew Tuckman
41900 Boscell Road
Fremont, CA 94538
(510) 353-6030
contact@visionrecycling.com

OR approved equal

B. MATERIAL

1. 'Dyed Wood Fines' in mahogany color or 'Wonder Mulch' by Vision Recycling.
2. Material shall be shredded wood and bark residual from pine and/or fir and meet the following:
 - i. Grading:

Sieve Size	Percent Passing
1"	95%
3/8"	50%
mesh	25%
3. Shall have acid pH, based on dry weight.
4. Ash content shall not exceed 7 percent based on dry weight.
5. Moisture shall be between 12% and 35% based on fresh material.
6. Shall be free of soluble salts such that the saturation extract conductivity shall not exceed 1.5.
7. Mulch shall be screened wood chips, uniform color, clean and free of impurities. Maximum size to be 1 1/4".
8. Texture of mulch shall be blended with sawdust, bark and wood chips and have an overall fine texture with no large bark chunks or only fine particles.
9. Color may be mahogany or have no color added but must look natural and not died red.

- C. Gorilla hair is prohibited.
- D. Lava rock is prohibited.

PART 3 - EXECUTION

3.01 GENERAL

- A. Refer to SECTION 32 91 13- SOIL PREPARATION for preparing the soil, weed abatement, and adding amendments and fertilizers prior to planting work.
- B. Clearing and scarifying: Installer shall install planting on a clean site with positive drainage away from buildings and walks. Finish grade after installation of irrigation and planting shall maintain a minimum 2 percent slope away from buildings. Soil finish grades below finish grade of walks, pavements, and curbs shall be specified.
- C. All planting work shall be done while soil is in a dry, friable condition. Contractor shall not work in soil areas wet enough to become overly compacted or muddy. Any work done while soil is too wet is subject to rejection.

3.02 MULCHING

- A. Re-cultivate any compacted soil areas and rake smooth prior to application of pre-emergent weed control and mulch top-dressing.
- B. Spray out and physically remove all weeds from all planting areas and areas that will receive mulch top dress.
- C. Apply mulch top dress to plant pits and tree/shrub/ground cover planting areas and where shown.
- D. Provide not less than 2" depth of approved mulch, slightly work into top of backfill and finish level with adjacent finish grades avoiding tree rootballs. A thin layer of mulch (1/2 inch) can be applied to the root ball area for aesthetics.
- E. Do not pile much against the trunk of the tree.
- F. Pull the thicker layer of mulch top dress 4" away from stalk or trunk of plant.

3.03 SOD TURF INSTALLATION

- A. Prepare sod areas per SECTION 32 91 13- SOIL PREPARATION (3.02 TURF AREA PREPARATION). Water the prepared are to a depth of 6 inches if not already done so, to settle soil and provide a moist base for sod turf.
- B. Surface elevations and drainage to be the same as shown on grading plans except top of sod shall be flush with adjacent paved surfaces. But in no case will soil be graded to create a ridge to the interruption of even slope to the drainage run.
- C. Sod is to be unrolled into place with careful attention to tight joints with no overlapping and avoidance of any stretching. Stagger the joints in each new row like

rows of brick. Use a sharp knife for shaping around trees, landscape edges or borders. Immediately after placement, soak with water. Roll sod after second watering to smooth out bumps and air pockets, and roll again if sod is not even. Water frequently for the first 10 - 14 days, enough water to saturate soil to a depth of 4". DO NOT LET SOD DRY OUT.

- D. Provide temporary fencing around turf areas for 6 weeks after installation. Use Tensar or Mirafi webbed plastic rolled fencing 4' in height with 1-1/2" pipe stakes 8' o.c.
- E. Mow sod to 2 inches 7 - 10 days after installation (and whenever turf reaches 3" in height), after allowing soil to dry enough to provide a firm footing for mower wheels without rutting. The Contractor shall remove sod and re-grade any areas that have been rutted from mowers to the Owner's Representative's satisfaction.
- F. As it becomes evident that certain sod areas have not grown, re-sod the areas immediately with sod of the same type as originally used and maintain as specified.

3.04 MAINTENANCE

- A. Contractor shall maintain all project areas in a broom-clean, litter free, weed free condition from start of construction until final acceptance. Maintain all security and protective measures in a first-class condition at all times until final acceptance.
- B. A "pre-maintenance" observation will be made with the Project Inspector following Contractor's notification to Owner's Representative that all irrigation and planting work is complete. Give 48 hours notice minimum for "pre-maintenance" observation. At this time the Contractor shall submit first draft of record drawings, maintenance manuals, and other items as specified in Division 1 Section Project Close-out and SECTION 32 84 00 - Irrigation Work. Failure to turn over these items can result in the delay of the beginning of the maintenance period. Contractor is allowed two (2) inspections. One, to establish the "pre-maintenance punchlist", and one to verify completion of "pre-maintenance punchlist". Any additional walk-throughs or observations required to obtain approval for the beginning of the maintenance period will be back charged to the Contractor. The specified maintenance period will only be allowed to commence once all of the planting and irrigation work is done, irrigation is running from the controller, and all items on the "pre-maintenance punchlist" have been completed to the satisfaction of the Owner's Representative and the Project Inspector.
- C. The Maintenance Period on this project is 90 calendar days.
- D. Maintain turf by watering (see below), fertilizing, spraying for weeds, mowing no lower than 2", trimming, edging and other operations such as rolling, re-grading and replanting as required to establish a smooth, acceptable turf, free of weeds and eroded or bare areas.

- E. Maintain turf sod by watering at least daily to avoid drying out and to enable root system to penetrate its new soil environment. Once the new sod has started to root in, watering frequency should be reduced. Stretch the time intervals between irrigation. Avoid run-off by matching water application rates to soil infiltration rates. Irrigate at night or early morning. Reduce or increase watering times according to seasonal needs. Water a minimum amount to keep turf and native grasses vigorous.
- F. Fertilize all turf areas with Gro-Power “High Nitrogen” at the rate of 25 lbs. per 1,000 sq. ft. on day 45 and day 90 (if within maintenance period) after planting. If the maintenance period has been extended due to un-established turf areas, or any other reason, apply the same at the same rate every 6 weeks.
- G. Weed control done with an herbicide, per SECTION 32 91 13 - SOIL PREPARATION, shall be with a pest control recommendation written by a licensed California Pest Control Advisor. Herbicides are to be applied by a qualified State of California licensed Pest Control Advisor and/or Applicator, registered in the project County.
- H. As applicable, Contractor is to provide ongoing gopher control and eradication by a licensed pest control operator. This work should begin as soon as site clearing begins with the goal of eradicating the problem prior to hydroseeding. Use any legal method with the exception of poison grain, nuts or bait. Contractor shall be responsible for repairing any damage as a result of gopher activity until final acceptance.
- I. If cultural and biological control methods, such as trapping, are not working and the State of California licensed Pest Control Advisor prescribes chemical applications, then the Contractor shall adhere to the following requirements: Pesticide materials shall be delivered to the site in the original unopened containers bearing legible labels indicating the Environmental Protection Agency (EPA) registration numbers.
- J. Prior to any pesticide application the Contractor shall submit to the Owner’s representative all pest control recommendations for review and approval.

3.05 CLEANUP AND PROTECTION

- A. During all stages of work, keep pavements clean and work area in a clean and orderly condition.
- B. Protect planting work and materials from damage due to planting operations, operations by other contractors, trades people and trespassers. Maintain protection during installation and maintenance periods and until final acceptance. Treat, repair or replace damaged work or materials as necessary or as directed by Owner’s Representative.

PART 4 FINAL ACCEPTANCE

- A. When all work is completed, including specified maintenance period, Owner's Representative(s) will, upon request from contractor (minimum 48 hrs notice), make the "final observation" to determine acceptability.
- B. At the "final observation" the Owner's Representative(s) will thoroughly investigate project and either issue written statement of project acceptance, or advise Contractor of work remaining. The Contractor's specified maintenance period shall be extended until project acceptance is issued, in writing, by Owner's Representative. (The date of the start of the maintenance period shall mark the beginning of the 1 Year Planting Guarantee.)

END OF SECTION 32 90 00

SECTION 32 91 13 SOIL PREPARATION

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and General Provisions of Contract, including Special Provisions and all Specification sections, may apply to work of this section.
- B. Related Sections:
 - 1. SECTION 31 10 00 – SITE CLEARING
 - 2. SECTION 31 20 00 – EARTH MOVING
 - 3. SECTION 32 90 00 – PLANTING

1.02 SECTION INCLUDES

- A. Weed control
- B. Topsoil
- C. Soil amendments and fertilizer
- D. Finish grading

1.03 DESCRIPTION OF WORK

- A. The work includes, but is not necessarily limited to, the following:
 - 1. Weed abatement for all planting areas prior to amending and fertilizing the soil.
 - 2. Ripping, tilling and amending native soil or imported fill material for the preparation of planting areas to be planted.
 - 3. Importing topsoil for the use in planting areas, raised planters and/or planter pots.
- B. The work to be performed under this specification includes all labor, equipment, materials and supplies necessary for the installation of the planting work included in this contract.

1.04 DEFINITIONS

- A. **Topsoil:** Upper, outermost layer of soil, possessing organic matter and horticultural nutrients. Typically, the top 2 to 8 inches of soil.
- B. **Subsoil:** Layer of soil under the topsoil on the surface of the ground. Typically, the first densely packed soil layer under the topsoil.

- C. **Planting Soil:** Surface soil mixed with soil amendments.
- D. **Fill material:** Imported soil free of organic matter, containing no rocks or lumps larger than 2 inches in greatest dimension and to be approved by the project Geotechnical Engineer.
- E. **Finish grade:** Elevation of finished surface of planting soil below mulch.
- F. **Subgrade:** Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill, before placing planting soil.

1.05 SUBMITTALS

- A. Product literature or “cut-sheets” on all specified products to be used listed below but not limited to:
 - 1. Amendments and fertilizers
 - 2. Weed control herbicides
- B. Horticultural Soil Analysis Test and Recommendations: A soil fertility test and report shall be provided by a qualified soils laboratory. Soil amendments shall be specified according to the recommendations of the lab based on the test results. Soil samples for testing shall be collected of the existing soil conditions after the grading contractor has fine graded the site soil or added any imported fill material, in sufficient numbers (not less than 3 from different representative locations of the site) to account for any soil variations that may be present on the site. At a minimum, the following shall be tested for complete soil evaluation:
 - 1. Soil Saturation percent
 - 2. Soil Texture
 - 3. Infiltration Rate
 - 4. pH, including sulfur or lime requirements
 - 5. Organic Matter Content
 - 6. Conductivity, Total Dissolved Salts and CEC
 - 7. Available Nutrients (Potassium, Sodium, Calcium, Magnesium, Nitrate and Phosphate)
- C. Appropriate documentation from installer to confirm to the Owner’s Representative that specified materials and quantities have been delivered and installed and that installer has complied with all local, state and federal documentation requirements.
- D. If top soil material is to be imported, a horticultural soil test from a qualified lab is required prior to shipment and placing to evaluate the soil and revise any amendments outlined within this section.

1.06 DELIVERY, STORAGE AND HANDLING

- A. Packaged Materials: Deliver packaged materials in containers showing weight, analysis and name of manufacturer.
- B. Protect materials from vandalism and deterioration during delivery, and while stored at site. The Owner's Representative may mark certain containers upon, or after, delivery. All marked containers shall be stored on site, empty or full until final acceptance of the project for review by Owner's Representative.

1.07 QUALITY ASSURANCE

- A. Notify Owner's Representative a minimum of 48 hours in advance of the following required observations by the Owner's Representative:
 - 1. Delivery, quantity verification, and container marking of soil amendment materials.
 - 2. Site reviews to assure compliance with approved specifications.
 - 3. The cross ripping depth of soil by prior to contractor amending the soil.
 - 4. The turf bed is to be inspected and approved by the Owner's Representative prior to sodding.

PART 2 – PRODUCTS

2.01 TOPSOIL FOR PLANTING AND TURF AREAS

- A. On-Site Existing Topsoil
 - 1. May be stockpiled on site for re-use in landscape work.
 - 2. Contact Owner's Representative prior to bidding for verification. If quantity of stockpiled topsoil is insufficient (refer to SECTION 31 20 00 – EARTH MOVING, as applicable), coordinate with Owner's Representative and provide import topsoil as required to establish landscape finish grades.
- B. Imported Topsoil
- C. All Import Fill material used in planting areas shall meet the following requirements:
 - 1. All import soil shall be free of harmful physical or chemical materials, roots, rocks or other debris larger than 1 inches in any direction, and any living plant materials including weed seed, roots, rhizomes, culms and or bulbs that can grow, propagate or germinate.
 - 2. USDA CLASSIFICATION- of fraction passing 2.0-mm sieve: **sandy loam, sandy clay loam or loam** and conform to the following:

<u>Class</u>	<u>Particle size range</u>	<u>Maximum %</u>	<u>Minimum %</u>
Coarse sand	.5 – 2.0 mm	15	0
Silt	.002-.05 mm	30	10
Clay	<.002 mm	25	10
Gravel	2 – 13 mm	15	0
Rock	1/2 - 1 inch	5% by volume with non > 1 inch	
Organic	NA	15	0

3. CHEMISTRY- SUITABILITY CONSIDERATIONS-

- i. **Salinity:** Saturation Extract Conductivity (ECe) = Less than 3.0 dS/m @ 25 degrees
- ii. **Sodium:** Sodium Adsorption Ratio (SAR) = Less than 6.0
- iii. **Boron:** Saturation Extract Concentration = Less than 1.0 ppm
- iv. **Reaction:** PH of Saturated Paste = 6.0 – 7.5 without high lime content. Optimum lime content % CA CO3 <3.0.

4. Nutrients- Soil to contain sufficient quantities of available nutrients to support normal plant growth. In the event of nutrient inadequacies, provisions shall be made to add required materials prior to planting. A range for required nutrients follows:

<u>Nutrient</u>	<u>Particle size range</u>
Nitrogen,	25-75 ppm
Phosphorus	50-100 ppm
Potassium	150-300 ppm
Calcium	2000-4000 ppm
Magnesium	150-500 ppm

- 5. Prior to approval the Contractor shall submit a Horticultural Soil Analysis test **for the exact soil proposed soil to be used for Import Fill material.** The report shall be provided by a qualified soils lab. Soil samples for testing shall be collected of the existing soil conditions from the source in sufficient numbers (not less than 3 from different representative locations of the site or source stockpile) to account for any soil variations that may be present on the site. The recommendations of the soil test submitted for the actual fill material to be used in the planting area will supersede the soil amendment schedule provided within this section for bidding purposes only.
- 6. Obtain import topsoil from local sources or from areas having similar soil characteristics to that found at project site. Obtain topsoil only from

naturally, well-drained sites where topsoil occurs in a depth of not less than 4"; do not obtain soil from bogs or marshes.

- D. The amount of topsoil to be imported, if any, shall be calculated by the Contractor. The Contractor is required to provide topsoil to the specified grades or implied grading concept as shown on the plans and as described in SECTION 31 20 00 – EARTH MOVING.

2.02 SOIL AMENDMENTS AND FERTILIZER

The recommendations below shall be used for bidding purposes only; contractor shall have any the site retested with a horticultural soil analysis test if it has been filled with imported material or imported topsoil. The following amendments/fertilizers shall be revised based on recommendations by an approved lab. Contractor shall submit to report findings to the Owners Representative for review and approval prior to amending. Refer to submittals and preparation articles in this section for more information.

Soil Amendments and fertilizer shall consist of the following materials:

- A. Soil Amendment: Shall be Nitrogen Stabilized (0 - 1/4") Organic Amendment, Ammonium Sulfate (21-0-0) and Potassium Sulfate (0-0-50)
- B. Soil Conditioner: Shall be "Gro-Power Plus (5-3-1) with 4% sulfur", available through Gro-Power Inc., 15065 Telephone Avenue, Chino, CA 91710-9614. 1-(800)-473-1307. No known equal.
- C. Fertilizer Tablets: Shall be as manufactured by Gro-Power™ Inc. 7 gram tablets containing 12-8-8, NPK in a one-year time-release formulation with 4% Humic Acid, 20% Humus, 2% Iron, 3.5% Sulfur. No known equal.
- D. Pre-Plant Fertilizer: Complete fertilizer of neutral character, with some elements derived from organic sources and containing the following percentages of available plant nutrients: 6-20-20 NPK.
- E. Ferrous Sulfate: Non-staining, manufactured for horticultural use, Gro-Power "Premium Green" or acceptable equal.
- F. Agricultural Gypsum: Manufactured for horticultural use with 90% minimum calcium sulfate.
- G. Calcium Carbonate: Calcium Carbonate Lime (Oyster shell) for horticultural use.
- H. Pre-emergent Weed Control: shall be Ronstar G or acceptable equal.
- I. Lime: Ground limestone, if required, containing not less than 85% carbonates: 50% passing a No.100 sieve and 90% passing a No. 20 sieve.
- J. Organic Amendments, if required:
 - 1. Composted manure is acceptable if well composted and if soluble salt levels are less than 3.0 millimhps/cm. Ash: Maximum, 0.6%

2. Treated wood or sawdust; pine sawdust.
3. Organic amendment must meet the following specifications:

Physical Properties:

95% - 100% passing, sieve size 6.35mm, (14');

80%-100% passing sieve size 2.38mm. (no.8 mesh);

0%-30% passing, sieve size 50 micron (no 35, 32 mesh)

Chemical Properties:

Nitrogen content (dry weight basis): 0.4 %-0.6%: Iron content: minimum 0.8% dilute acid soluble Fe on dry weight basis.

Soluble salt; Maximum 3.5 millimhos/cm @ 25 C. as determined by saturation extract method

- K. Amendments containing biosolids which require EPA Section 503 reporting are prohibited.

2.03 WEED CONTROL

- A. Contractor shall keep disturbed areas in a weed free condition by Contractor's choice of methods. If herbicides are used conform to all national, state, county and city reporting requirements.
- B. Herbicide materials shall be delivered to the site in the original unopened containers bearing legible labels indicating the Environmental Protection Agency (EPA) registration numbers.
- C. Pre-emergent: shall be Ronstar G or acceptable equal.

PART 3 - EXECUTION

3.01 GENERAL PREPARATION

- A. All soil preparation shall be done while soil is in a dry, friable condition. Contractor shall not work in soil areas wet enough to become overly compacted or muddy. Any work done while soil is too wet is subject to rejection.
- B. Contractor shall remove all vegetation and weeds, dead or alive, from the site per SECTION 31 10 00 – SITE CLEARING prior to beginning work on soil preparation.
- C. Mechanically cross-rip all areas exhibiting less than 3:1 slope 10"-12" deep. Areas steeper than 3:1 shall be ripped by hand or rototiller to 6" depth.
- D. Before mixing amendments, clean soil of stones over 1-1/2" in diameter, clay lumps, and other extraneous materials harmful or toxic to plant growth. Secure approval of ripping depth by Owner's Representative prior to amending.

3.02 TURF AREA PREPARATION

- A. WEED GERMINATION/ERADICATION: Six weeks prior to seeding or sodding, irrigate prepared turf beds thoroughly with a minimum of 6” of water to germinate weed seed. After two weeks, spray with a 1% solution of Roundup or equal as per manufacturer’s recommendations. Repeat the process with the same at three weeks prior to seeding or sodding. Contractor is responsible to abide by all California State law’s regarding applying herbicides on project property.
- B. If six weeks time period for above process cannot be met, it is acceptable to complete this process one time 3 weeks prior to seeding in areas that have previously been over excavated and cleared with large grading machinery at the Owner’s representative’s desecration. Contractor must gain approval prior to reducing weed germination time period.
- C. Lightly till and re-grade the top 1 – 2” after the above procedure, removing all dead weeds, debris, etc. prior to seeding or sodding.
- D. Fertilize and amend soil as specified in this section AND ADD an additional 10 lbs. per 1000 square feet of 6-20-20 pre-plant commercial fertilizer. Pre-plant fertilizer shall be raked into the top 2 inches of soil. Roll turf bed until a smooth, firm surface with uniform grade has been produced. The turf bed is to be inspected and approved by the Owner’s Representative prior to sodding.

3.03 FERTILIZER AND AMENDMENT PLACEMENT

The Contractor shall complete a Horticultural Soil Analysis Test with recommendations via a certified plant laboratory to confirm or supersede the soil additive schedule contained here-in.

- A. Thoroughly incorporate the following soil additives and fertilizers with topsoil in all planting areas at rates specified below. Thoroughly mix soil additives into top 6" of soil by rototilling once in each direction.

TYPE	QUANTITY
Soil amendment	5 cubic yards/ /1000 SF Nitrogen
	Stabilized Organic Amendment
	7 pounds Ammonium Sulfate (21-0-0)
	5 pounds Potassium Sulfate (0-0-50)*
Pre-plant fertilizer	12 lbs/1000 SF
Soil conditioner	200 lbs/1000 SF

Agricultural gypsum	30 lbs/1000 SF

* The rate may change based on the analysis of the chosen organic amendment. This rate is based on 270lbs. dry weight of organic matter per cubic yard of amendment. If a composted green waste product is chosen that is shown to have sufficient potassium, the potassium sulphate may be omitted.

- B. Fertilizer and amendments shall be installed per the manufacturer’s published instructions including those instructions published by turf sod and seed vendors.
- C. Contractor shall save all soil conditioner bags with Owner’s Representative’s mark on-site for verification of proper installation of quantity and type of soil conditioning. Failure to do so shall result in the requirement of the Contractor to re-condition soil, and pay for additional lab testing and adjustments to soil condition.

3.04 FINISH GRADING

- A. Created landforms shall be integrated into the existing site providing naturalized contouring to integrate newly graded areas with the natural topography.
- B. Compact amended planting areas by watering and soaking soil. For planting areas, soils shall be pre-irrigated. Soil shall be between 70-80% relative compaction (this should be attained naturally after pre-irrigation).
- C. Fine grade planting and turf areas to smooth, even surface with loose, uniformly fine texture. Roll, rake and drag all TURF areas, remove ridges and fill depressions, as required to meet finish grades (refer to SECTION 31 20 00 - EARTH MOVING) while providing positive drainage to drain structures and away from buildings. Limit fine grading to areas which can be planted immediately after grading. Finish grade of soil shall be 3 inches below top of paving, headers, boxes etc. to allow for 3 inches of mulch top dressing unless directed otherwise.
- D. Finish grade after installation of irrigation and planting shall maintain a minimum 2 percent slope away from buildings U.N.O. Soil finish grades below finish grade of walks, pavements, and curbs shall be specified.

3.05 LEACHING

- A. After soil amending and prior to planting, irrigate prepared planting areas with a minimum of 3" of potable water to leach and start fertilizer breakdown. Apply irrigation in increments of 1/2 to 3/4 of an inch of precipitation, and then allow ample time for infiltration, repeating this procedure until the specified amount of

water has been applied. Allow surface moisture to dry before planting. Do not create a muddy or overly compacted soil conditions.

- B. Restore planting areas to specified condition if eroded or otherwise disturbed after fine grading and prior to planting.

3.06 CLEANUP

- A. During all stages of work, keep pavements clean and work area in a clean and orderly condition.

END OF SECTION 32 91 13