DIVISION 2 – TECHNICAL SPECIFICATIONS

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11/22/2022

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Section 02 41 00

Demolition

PART 1 GENERAL

1.01 SECTION INCLUDES

1.02 RELATED REQUIREMENTS

A. Section 01 57 00 - Temporary Controls

B. Section 31 10 00 - Site Clearing: Vegetation and existing debris removal.

C. Section 31 22 00 - Grading: Topsoil removal.

D. Section 31 23 23 - Fill: Fill material for filling holes, pits, and excavations generated as a result of removal operations.

1.03 REFERENCE STANDARDS

A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.
   1. Asbestos Standard
   2. Respiratory Protection
   3. Hazard Communication

B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2013.

C. U.S. Environmental Protection and Recovery Act (EPA)
   1. Worker Protection Rule
   2. National Emissions Standard for Hazardous Air Pollutants (Asbestos)
   3. Asbestos Hazard Emergency Response Act: Final Rule

1.04 SUBMITTALS

A. See Section 01 33 00 - Submittals, for submittal procedures.

B. Project Record Documents: Accurately record actual locations of capped and active utilities and subsurface construction.

PART 2 PRODUCTS

2.01 MATERIALS

A. Fill Material: As specified in Section 31 23 23 - Fill.

PART 3 EXECUTION

3.01 SCOPE

A. Remove paving and curbs as required to accomplish new work.

B. Remove items indicated, for salvage, relocation, recycling, and disposal.

C. Fill excavations, open pits, and holes in ground aeras generated as result of removals, using specified fill.

3.02 GENERAL PROCEDURES AND PROJECT CONDITIONS

A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
   1. Obtain required permits.
   2. Comply with applicable requirements of NFPA 241.
   3. Use of explosives is not permitted.
   4. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
   5. Provide, erect, and maintain temporary barriers and security devices.
   6. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
   7. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
   8. Do not close or obstruct roadways or sidewalks without permit.
   9. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.
   10. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon or limit access to their property.

B. Do not begin removal until receipt of notification to proceed from City.

C. Protect existing structures and other elements that are not to be removed.

1. Provide bracing and shoring.
2. Prevent movement or settlement of adjacent structures.
3. Stop work immediately if adjacent structures appear to be in danger.

D. Hazardous Materials: Comply with 29 CFR 1926 and state and local regulations.

E. Partial Removal of Paving and Curbs: Neatly saw cut at right angle to surface.

3.03 EXISTING UTILITIES

A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.

B. Protect existing utilities to remain from damage.

C. Do not disrupt public utilities without permit from authority having jurisdiction.

D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to City.

E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to City.

F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.

G. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities unless noted otherwise on the drawings.

3.04 DEBRIS AND WASTE REMOVAL

A. Remove debris, junk, and trash from site.

B. Leave site in clean condition, ready for subsequent work.

C. Daily Cleaning: Thoroughly clean the entire area under active asbestos disturbance at the end of each workday.

D. Clean up spillage and wind-blown debris from public and private lands.

PART 4 MEASUREMENT AND PAYMENT

4.01 DEMOLITION

A. The contract lump sum paid for Demolition shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in Demolition, complete in place, as shown on the plans, and as specified in the Standard Specifications and these special provisions, and as directed by the City’s Representative.

4.02 TREE REMOVAL

A. The contract unit price paid for Tree Removal shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in Tree Removal, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the City’s Representative.

End of Section

Section 03 10 00

Concrete Forming and Accessories

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Formwork for cast-in-place concrete, with shoring, bracing and anchorage.

B. Openings for other work.

C. Form accessories.

D. Form stripping.

1.02 RELATED REQUIREMENTS

A. Section 03 20 00 - Concrete Reinforcing.

B. Section 03 30 00 - Cast-in-Place Concrete.

C. Section 32 11 23 - Aggregate Base Courses

1.03 REFERENCE STANDARDS

A. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials; 2010.

B. ACI 301 - Specifications for Structural Concrete; 2010 (Errata 2012).

C. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2011.

D. ACI 347R - Guide to Formwork for Concrete; 2014.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Deliver prefabricated forms and installation instructions in manufacturer's packaging.

B. Protect plastic foam products from damage and exposure to sunlight.

PART 2 PRODUCTS

2.01 FORMWORK - GENERAL

A. Provide concrete forms, accessories, shoring, and bracing as required to accomplish cast-in-place concrete work.

B. Design and construct concrete that complies with design with respect to shape, lines, and dimensions.

C. Comply with applicable state and local codes with respect to design, fabrication, erection, and removal of formwork.

D. Comply with relevant portions of ACI 347R, ACI 301, and ACI 318.

2.02 WOOD FORM MATERIALS

A. Form Materials: At the discretion of the Contractor.

2.03 FORMWORK ACCESSORIES

A. Form Release Agent: Capable of releasing forms from hardened concrete without staining or discoloring concrete or forming bugholes and other surface defects, compatible with concrete and form materials, and not requiring removal for satisfactory bonding of coatings to be applied.

1. Products:
    a. SpecChem, LLC; Bio Strip WB (water-based): www.specchemllc.com/#sle.

B. Dowel Sleeves: Plastic sleeve and nailable plastic base for smooth, round, steel load-transfer dowels.

C. Filler Strips for Chamfered Corners: Rigid plastic type; size as shown on the Drawings; maximum possible lengths.

D. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

3.02 EARTH FORMS

A. Earth forms are not permitted.

3.03 ERECTION - FORMWORK

A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301.

B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.

C. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.

D. Align joints and make watertight. Keep form joints to a minimum.

E. Coordinate this section with other sections of work that require attachment of components to formwork.

3.04 APPLICATION - FORM RELEASE AGENT

A. Apply form release agent on formwork in accordance with manufacturer's recommendations.

B. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings that are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

C. Verify form release agent is acceptable for use with specified decorative formliner.

3.05 INSERTS, EMBEDDED PARTS, AND OPENINGS

A. Provide formed openings where required for items to be embedded in passing through concrete work.

B. Locate and set in place items that will be cast directly into concrete.

C. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other work.

D. Install accessories in accordance with manufacturer's instructions, so they are straight, level, and plumb. Ensure items are not disturbed during concrete placement.

3.06 FORMWORK TOLERANCES

A. Construct formwork to maintain tolerances required by ACI 117, unless otherwise indicated.

3.07 FIELD QUALITY CONTROL

A. Do not reuse wood formwork more than 3 times for concrete surfaces to be exposed to view. Do not patch formwork.

3.08 FORM REMOVAL

A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.

B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.

PART 4 MEASUREMENT AND PAYMENT

4.01 CONCRETE FORMING AND ACCESSORIES

A. Full compensation for Concrete Forming and Accessories shall be considered as included in the contract price paid for Site Concrete, and no separate compensation will be allowed therefor.

End of Section

Section 03 20 00

Concrete Reinforcing

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Reinforcing steel for concrete paving and cast-in-place concrete.

B. Supports and accessories for steel reinforcement.

1.02 RELATED REQUIREMENTS

A. Section 03 10 00 - Concrete Forming and Accessories.

B. Section 03 30 00 - Cast-in-Place Concrete.

C. Section 32 13 13 - Concrete Paving.

1.03 REFERENCE STANDARDS

A. ACI 301 - Specifications for Structural Concrete; 2010 (Errata 2012).

B. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement; 2015.

C. CRSI (DA4) - Manual of Standard Practice; 2009.

1.04 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI 301.

PART 2 PRODUCTS

2.01 REINFORCEMENT

A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi).
   1. Deformed billet-steel bars.

B. Reinforcement Accessories:
   1. Tie Wire: Annealed, minimum 16 gauge, 0.0508 inch.
   2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.

2.02 FABRICATION

A. Fabricate concrete reinforcing in accordance with CRSI (DA4) - Manual of Standard Practice.

PART 3 EXECUTION

3.01 PLACEMENT

A. Place, support and secure reinforcement against displacement. Do not deviate from required position.

B. Accommodate placement of formed openings.

C. Maintain concrete cover around reinforcing as follows:

3.02 FIELD QUALITY CONTROL

A. An independent testing agency will inspect instaled reinforcment for conformance to contract documents before concrete placement.

PART 4 MEASUREMENT AND PAYMENT

4.01 CONCRETE REINFORCEMENT

A. Full compensation for Concrete Reinforcing shall be considered as included in the contract price paid for Site Concrete, and no separate compensation will be allowed therefor.

End of Section

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Section 03 30 00

Cast-in-Place Concrete

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Seat walls.

B. Joint devices associated with concrete work.

C. Concrete walls

D. Concrete containment curb at sand play area

E. Structure footings

F. Miscellaneous concrete elements

G. Concrete curing.

1.02 RELATED REQUIREMENTS

A. Section 03 10 00 - Concrete Forming and Accessories: Forms and accessories for formwork.

B. Section 03 20 00 - Concrete Reinforcing.

C. Section 32 13 13 - Concrete Paving.

1.03 REFERENCE STANDARDS

A. ACI 117 - Standard Specifications for Tolerances for Concrete Construction and Materials; 2010.

B. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; 1991 (Reapproved 2009).

C. ACI 301 - Specifications for Structural Concrete; 2010 (Errata 2012).

D. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; 2000.

E. ACI 305R - Hot Weather Concreting; 2010.

F. ACI 306R - Cold Weather Concreting; 2010.

G. ACI 308R - Guide to Curing Concrete; 2001 (Reapproved 2008).

H. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2011.

I. ACI 347R - Guide to Formwork for Concrete; 2014.

J. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2016.

K. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2015a.

L. ASTM C150/C150M - Standard Specification for Portland Cement; 2016.

M. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2013.

N. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete; 2015.

O. ASTM C827/C827M - Standard Test Method for Change in Height at Early Ages of Cylindrical Specimens of Cementitious Mixtures; 2010.

P. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete; 2012.

1.04 SUBMITTALS

A. See Section 01 33 00 - Submittals for submittal procedures.

B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.

C. Mix Design: Submit proposed concrete mix design.
   1. Indicate proposed mix design complies with requirements of ACI 301, Section 4 - Concrete Mixtures.
   2. Indicate proposed mix design complies with requirements of ACI 318, Chapter 5 - Concrete Quality, Mixing and Placing.

D. Samples for Pigment Color Selection: Submit manufacturer's complete sample chip set, including pigment number and required dosage rate for each color.

E. Test Reports: Submit report for each test or series of tests specified.

F. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.

1.05 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI 301 and ACI 318.
   1. Maintain one copy of each document on site.

B. Follow recommendations of ACI 305R when concreting during hot weather.

C. Follow recommendations of ACI 306R when concreting during cold weather.

PART 2 PRODUCTS

2.01 FORMWORK

A. Comply with requirements of Section 03 10 00.

B. Formwork Design and Construction: Comply with guidelines of ACI 347R to provide formwork that will produce concrete complying with tolerances of ACI 117.

2.02 REINFORCEMENT MATERIALS

A. Comply with requirements of Section 03 20 00.

2.03 CONCRETE MATERIALS

A. Cement: ASTM C150/C150M, Type II - Moderate Portland type.
   1. Acquire cement for entire project from same source.

B. Fine and Coarse Aggregates: ASTM C33/C33M.
   1. Acquire aggregates for entire project from same source.

C. Fly Ash: ASTM C618, Class C or F.

D. Color Additives: Pure, concentrated mineral pigments specifically intended for mixing into concrete and complying with ASTM C979/C979M.
   1. Colored concrete for visible cast in place concrete only.
   2. Concentration: Base dosage rates on weight of Portland cement, fly ash, silica fume, and other cementitious materials but not aggregate or sand.
   3. Packaging: If pigments are to be added to mix at site, furnish pigments in premeasured disintegrating bags to minimize job site waste.
   4. Color(s) Lamp Black: 1.5 lbs per cubic yard. Per City of Berkeley Public Works details.
   5. Color(s): To match Landscape Architect's sample(s) when incorporated into specified mix design(s).
   6. Products:
      a. Lamp Black

E. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to concrete.

2.04 ADMIXTURES

A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.

B. Water Reducing Admixture: ASTM C494/C494M Type A.

2.05 ACCESSORY MATERIALS

A. Non-Shrink Cementitious Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
   1. Grout: Comply with ASTM C1107/C1107M.
   2. Height Change, Plastic State; when tested in accordance with ASTM C827/C827M:
      a. Maximum: Plus 4 percent.
      b. Minimum: Plus 1 percent.

2.06 BONDING AND JOINTING PRODUCTS

A. Expansion Joint Dowels Options
   1. Dia x 14" smooth round dowel @ 18" OC Centered in joint and lightly greased on (1) side.
   2. Plastic sleeve for smooth, round, steel load-transfer dowels. Sike Speed Dowel.
   3. Plate Dowel System: Steel plate dowel and plastic dowel sleeve; with integral faseners fo attchment to formwork. PNA Diamond Dowel.

2.07 CURING MATERIALS

A. Curing Compound, Naturally Dissipating: Clear, water-based, liquid membrane-forming compound; complying with ASTM C309.

2.08 CONCRETE MIX DESIGN

A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.
   1. Replace as much Portland cement as possible with fly ash, ground granulated blast furnace slag, silica fume, or rice hull ash as is consistent with ACI recommendations.

B. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.

C. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended or required by manufacturer.

D. Normal Weight Concrete:
   1. Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: 3,000 pounds per square inch.
   2. Water-Cement Ratio: Maximum 40 percent by weight.
   3. Maximum Aggregate Size: 5/8 inch.

2.09 MIXING

A. Adding Water: If concrete arrives on-site with slump less than suitable for placement, do not add water that exceeds the maximum water-cement ratio or exceeds the maximum permissible slump.

2.10 ACCESSORIES

A. Letter Stamps to Concrete Curb at Sand
   1. Full alphabet to be stamped, in alphabetical order, to concrete curb at sand on horizotal / flat plane of sand play bench.
   2. Letter height / size to be 4".
   3. Letter and alphabet layout to be confirmed in field wtih contractor by Landscape Architect or City Representative.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify lines, levels, and dimensions before proceeding with work of this section.

3.02 PREPARATION

A. Verify that forms are clean and free of rust before applying release agent.

B. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.

C. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning and applying bonding agent in according to bonding agent manufacturer's instructions.

D. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.

3.03 PLACING CONCRETE

A. Place concrete in accordance with ACI 304R.

3.04 CONCRETE FINISHING

A. Repair surface defects, including tie holes, immediately after removing formwork.

B. Unexposed Form Finish: Rub down or chip off fins or other raised areas 1/4 inch or more in height.

C. Seat Wall: To be smooth trowel finish.

D. Sports Field Walls:To be smooth trowel finish

E. Containment Curb at Sand: To be medium broom finish.

3.05 CURING AND PROTECTION

A. Comply with requirements of ACI 308R. 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. Formed Surfaces: Cure by moist curing with forms in place for full curing period.

D. Surfaces Not in Contact with Forms:
   1. Initial Curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by water ponding, water-saturated sand, water-fog spray, or saturated burlap.
   2. Final Curing: Begin after initial curing but before surface is dry.

3.06 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests.

B. Provide free access to concrete operations at project site and cooperate with appointed firm.

C. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.

D. Tests of concrete and concrete materials may be performed at any time to ensure compliance with specified requirements.

E. Compressive Strength Tests: ASTM C39/C39M, for each test, mold and cure three concrete test cylinders. Obtain test samples for every 100 cubic yards or less of each class of concrete placed.

F. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.

3.07 DEFECTIVE CONCRETE

A. Test Results: The testing agency shall report test results in writing to the City and Contractor within 24 hours of test.

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

C. Repair or replacement of defective concrete will be determined by the City. The cost of additional testing shall be borne by Contractor when defective concrete is identified.

D. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of City for each individual area

3.08 PROTECTION

A. Do not permit traffic over unprotected concrete floor surface until fully cured.

PART 4 - MEASUREMENT AND PAYMENT

4.01 SITE CONCRETE

A. The contract lump sum price paid for Site Concrete shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in Site Concrete, including concrete sports field walls, concrete seat walls, concrete sand containment curb, concrete curb, stairs, transfer station, concrete pad for benches, footings, concrete sand curb stamping, aggregate base, formwork, joints, accessories, reinforcing, relocation of utility box, adjusting utility covers to grade complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the City's Representative.

End of Section

Section 05 50 00

Metal Fabrications

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Shop fabricated steel items, including:
   1. Handrails - Stairs and Sand Play Area Transfer Station
   2. Steel Edging at Metal Picket Fence
   3. Ball Net Posts and Attachments

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Placement of metal fabrications in concrete.

B. Section 09 91 13 - Exterior Painting: Paint finish.

1.03 REFERENCE STANDARDS

A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.

B. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2012.

C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2015.

D. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2013.

E. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2013.

F. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.

G. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015.

H. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel; International Accreditation Service, Inc; 2011.

I. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 1999 (Ed. 2004).

J. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

K. Steel: Meet requirments of AISC "Specifications of Architecturally Exposed Structural Steel", latest edition.

L. Welding: Meet requirments of AWS "Structural Welding Code," D1.1, latest edition.

M. SSPC-SP 2 - Hand Tool Cleaning; 1982 (Ed. 2004).

1.04 SUBMITTALS

A. See Section 01 33 00 - Submittals, for submittal procedures.

B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable. Indicate welded connections using standard AWS welding symbols.

C. Verification: Verify all measurements at the project. Show dimension, sizes, thickness, gauges, finishes, joining, attachments, and relationship of work to adjoining construction. Where items must fit and coordinate with finished surfaces and/or constructed spaces, take measurements at site and not from drawings.

D. Structural Calculations: Provide structrual calculations, stamped and signed by a California registered civil engineer for the ball net support posts / columns, foundations, cables and connections.

1.05 QUALITY ASSURANCE

A. Fabricator Qualifications: A qualified steel fabricator that is accredited by IAS AC172.

B. Welder Qualifications: Welding shall be done only by certified welding operators currently qualified, according to AWS D1.1.

C. Qualifications of Workmen: Provide at least one person who shall be present at all times during execution of this portion of the Work, and who shall be throughly familar with the type of materials being installed,

the referenced standards, the requirements of the work and who shall direct all work permformed under this Section. Welds indicated may be made in shop or field with approval.

PART 2 PRODUCTS

2.01 MATERIALS - STEEL

A. Steel Sections: ASTM A36/A36M.

B. Steel Tubing: ASTM A500/A500M, Grade B cold-formed structural tubing.

C. Plates: ASTM A283/A283M.

D. Pipe: ASTM A53/A53M, Grade B Schedule 40, hot-dip galvanized finish.

E. Welding Rods:

F. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded. Welding Rods to be E-70 series low hydrogen unless otherwise noted on drawings.

G. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

H. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

I. Grout: Non-shrinking Master Builder’s “Embedco”, Conrad Sovig’s “metel-Mxs Grout”, Sonneborn’s “Ferrolith G Redi-Mixed Grout” or approved equal.

J. Other Materials:All other materials, not specifically described but required for a complete and proper installation for miscellaneous metals, shall be new, first quality of their respective kinds and subject to the approval of the Owner's Representative.

2.02 FABRICATION

A. Fit and shop assemble items in largest practical sections, for delivery to site.

B. Fabricate items with joints tightly fitted and secured.

C. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

D. Furnish components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.03 FABRICATED ITEMS

A. Handrails.
   1. Steel, hot-dip galvanized. Locations indicated on drawings.

2.04 FINISHES

A. Fabricated steel items shall have the following finishes:
   1. Handrails: hot-dip galvanized, natural grey.
   2. Steel Edging at Metal Picket Fence: Painted black, see Exterior Painting specification.

B. Prime painted steel items.
   1. Exceptions: Do not prime surfaces in direct contact with concrete, where field welding is required, and items to be covered with sprayed fireproofing.
   2. Prepare surfaces to be primed in accordance with SSPC-SP2.
   3. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
   4. Prime Painting: Two coats.

C. Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A123/A123M requirements.

D. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A123/A123M requirements.

2.05 FABRICATION TOLERANCES

A. Squareness: 1/8 inch maximum difference in diagonal measurements.

B. Maximum Offset Between Faces: 1/16 inch.

C. Maximum Misalignment of Adjacent Members: 1/16 inch.

D. Maximum Bow: 1/8 inch in 48 inches.

E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work. Notify City's Representative if conditons are unacceptable to begin work.

B. Do not proceed with work until unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

B. Storage of Materials: Materials which are stored at the project site shall be above ground on platforms, skids, or other supports. Protect steel from corrosion. Store other material in a weather-tight and dry place until ready for use.

3.03 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects.

B. Install metal fabrications in strict accordance with the drawings, the approved Shop Drawings, and all pertinent codes, regulations and standards.

C. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

D. Projection:
   1. Use all means necessary to protect miscellaneous metal before, during and after installation and to protect the installed work and materials of all other trades.
   2. Protect any adjacent materials or areas below from damage due to weld splatter of sparks during welding.

E. Fabrication:
   1. Shop assemble in largest practicable dimensions, making members true to length so assembling may be done without fillers.
   2. Provide all surfaces free of file marks, dents, hammer marks, wire edges or any unsightly surface defects.
   3. Steel Pipe Coping: Roll pipe to conform to top radius curve of each bowl and ledge as shown on drawings. Refer to drawings for relational tolerance to concrete surface and other steel.

F. Attachments and Reinforcements: Do all cutting, shearing, drilling, punching, threading, tapping, etc., required for site metalwork or for attachment of adjacent work. If applicable, drill or punch holes; do not use cutting torch.

G. Perform field welding in accordance with AWS D1.1/D1.1M.

H. Obtain approval prior to site cutting or making adjustments not scheduled.

I. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

J. Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting. Apply or brush or spray to provide minimum dry film thickness of 0.051 mm (2.0 mils).

K. Other Connectors: Make all permanent connections in ferrous metal surfaces using welds where at all possible; do not use bolts or screws.

L. At all galvanized products, clean all damaged areas and re-coat using specified galvanizing coating per manufacturer's criteria.

M. Welding:
   1. Preparation: Remove all rust, paint, scale and other foreign matter. Wire-brush all flame-cut edges. Clamp members as required and alternate welds, all as necessary to prevent warping or misalignment.
   2. Exposed Welds: Uniformly grind smooth (no tolerance) all welds normally exposed to view and feel in the finished work.
   3. Faulty and Defective Welding: Chip out and replace all welding showing cracks, slag inclusion, lack of fusion, bad undercut or other defects ascertained by visual or other means of inspection. Replace and re-weld at no cost to Owner.
   4. Field Welding:

a. Procedure: Comply with AWS code of manual shielded metal-arc welding, appearance and quality of welds made, and methods used in correcting welding work. Cold Spray Galvanize when complete.
b. Protection: Protect all adjacent surfaces from damage due to weld sparks, spatter, or tramp metal.

N. Surface Treatment and Protective Coatings:
1. Cleaning:
a. Thoroughly clean all mill scale, rust, dirt, grease and other foreign matter from ferrous metal prior to any galvanizing, or painting.
b. Conditions that are too severe to be removed by hand cleaning, shall be cleaned using appropriate methods for solvent cleaning, power tool cleaning and brush-off blast cleaning.
2. Exterior Ferrous Metal:
a. Grind smooth all welds, burrs, and rough surfaces. Clean all coping from grease.
b. Shop coat iron metal items; using anti-rust primer (red color).
c. All welds to be painted with primer after appropriate connections and grinding has taken place. Touch-up all scratched primer prior to shotcrete application.

O. Coordination: Coordinate with work of Cast-In-Place Concrete Section.

P. Replacements: In the event of damage, immediately make all repairs and replacments necessary to the approval of the Owner's Representative and at no additional cost to the Owner.

Q. Coordination:
1. Templates and Built-ins: Furnish all anchors, fastenings, sleeves, setting templates and layouts affecting or installed in the work of other trades.
2. Delivery: Where items must be incorporated or built into adjacent work, deliver to trade responsible for such work in sufficient time that progress of work is not delayed. Be responsible for proper location of such items.
3. Approved sample(s) shall be used as the standard of workmanship and shall remain on site until work has been completed and approved by the Owner's Representative.

R. Clean-Up:
1. Keep all areas of work clean, neat and orderly at all times. Keep paved areas clean during installation.
2. Clean up and remove all debris from the entire work area prior to Final Acceptance to satisfaction of Owner's Representative.

3.04 TOLERANCES

A. Maximum Variation from Plumb: 1/4 inch per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch.

C. Maximum Out-of-Position: 1/4 inch.

PART 4 MEASUREMENT AND PAYMENT

4.01 SITE METAL

A. The contract lump sum price paid for Site Metal shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in Site Metal, including handrails and steel edging at metal picket fence, ball net posts & attachments complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the City’s Representative.

End of Section

Section 06 10 00
Rough Carpentry

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Wood retaining edge / wall at playground

B. Wood backstop

C. Redwood header

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Setting anchors in concrete.

1.03 REFERENCE STANDARDS

A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.

B. PS 20 - American Softwood Lumber Standard; 2010.

1.04 SUBMITTALS

A. See Section 01 33 00 - Submittals for submittal procedures.

B. Manufacturer's Certificate: Certify that wood products supplied for rough carpentry meet or exceed specified requirements.

1.05 DELIVERY, STORAGE, AND HANDLING

A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
   1. Species: Redwood, unless otherwise indicated.
   2. If no species is specified, provide species graded by the agency specified; if no grading agency is specified, provide lumber graded by grading agency meeting the specified requirements.
   3. Grading Agency: Grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee at www.alsc.org, and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.

2.02 EXPOSED DIMENSION LUMBER

A. Sizes: Nominal sizes as indicated on drawings.

B. Grade:
   1. Wood retainting egde / wal and Backstop: Construction Heart
   2. Redwood Header: Construction Common

C. Surfacing
   1. Wood retainting egde / wal and Backstop:S4S.
   2. Redwood Header: Rough

2.03 ACCESSORIES

A. Fasteners and Anchors:
   1. Metal and Finish: Hot-dipped galvanized steel complying with ASTM A153/A153M

PART 3 EXECUTION

3.01 INSTALLATION - GENERAL

A. Select material sizes to minimize waste.

B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.

PART 4 MEASUREMENT AND PAYMENT

4.01 SITE CARPENTRY

A. The contract lump sum price paid for Site Carpentry shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in Site Carpentry, including Wood Retaining Wall, Backstop and Redwood Header, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the City's Representative.

End of Section

Section 09 91 13
Exterior Painting

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Surface preparation.

B. Field application of paints and primer. .

C. Scope: Finish exterior wood work and metal work fencing, unless fully factory-finished and unless otherwise indicated, including the following:
   1. Existing Metal Fence Frames, Rails and Gates to be Retained.
   2. Wood Backstop
   3. Steel Edging at Metal Picket Fence

D. Do Not Paint or Finish the Following Items:
   1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
   2. Items indicated to receive other finishes.
   3. Items indicated to remain unfinished.
   4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
   5. Stainless steel, anodized aluminum, bronze, terne-coated stainless steel, zinc, and lead.
   6. Brick, glass unit masonry, architectural concrete, cast stone, integrally colored plaster and stucco.

1.02 RELATED REQUIREMENTS

A. Section 32 31 13 - Chain Link Fences and Gates

1.03 DEFINITIONS

A. Comply with ASTM D16 for interpretation of terms used in this section.

1.04 REFERENCE STANDARDS

A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.

B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2014.

C. South Coast Air Quality Management District (SCAQMD) Rule 1113.

D. SSPC-SP 1 - Solvent Cleaning; 2015.

E. SSPC-SP 2 - Hand Tool Cleaning; 1982 (Ed. 2004).

F. SSPC-SP 6 - Commercial Blast Cleaning; 2007.

1.05 SUBMITTALS

A. Product Data: Provide complete list of products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
   2. MPI product number (e.g. MPI #47).
   3. Manufacturer's installation instructions.
   4. Substitutions: See requirements in Contract Documents.

B. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches in size, illustrating range of colors available for each finishing product specified.
   1. Where sheen is specified, submit samples in only that sheen.
   2. Where sheen is not specified, discuss sheen options with Landscape Architect before preparing samples, to eliminate sheens not required.

C. Certification: By manufacturer that paints and finishes comply with VOC limits specified.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum three years experience and approved by manufacturer.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.08 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the paint product manufacturer's temperature ranges.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Do not apply exterior paint and finishes during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.

D. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide paints and finishes from the same manufacturer.

B. Manufacturers:
1. Dunn Edwards Paints, www.dunnedwards.com
2. Benjamin Moore, benjaminmoore.com.

C. Substitutions: See requirements in Contract Documents.

2.02 PAINTS AND FINISHES - GENERAL

A. Paints and Finishes: Ready-mixed, unless required to be a field-catalyzed paint.
1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
2. Supply each paint material in quantity required to complete entire project's work from a single production run.
3. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is described explicitly in manufacturer's product instructions.

B. Volatile Organic Compound (VOC) Content:
1. Provide paints and finishes that comply with the most stringent requirements specified in the following:
   a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
   b. Architectural coatings VOC limits of California.
2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.

C. Colors: To be selected from manufacturer's full range of available colors, if not indicated on the Drawings or herein.
1. Selection to be made by Landscape Architect after award of contract.
2. Allow for minimum of three colors for each system, unless otherwise indicated, without additional cost to City.

2.03 PAINT SYSTEMS - EXTERIOR

A. Exterior Surfaces to be Painted, Unless Otherwise Indicated: Including primed metal and wood.
1. Top Coat(s):; over primer.
   a. Metal Work / Galavanized Steel:
      1) 2 coats Aristoshield Interior / Exterior Semi-Gloss Paint ASHL50 (Dunn Edwards Paints)
      2) Color: Black
   b. Wood Backstop
      1) 2 coats Aura Exterior Paint Acrylic - semi gloss (Benjamin Moore)
      2) Color: TBD

2.04 PRIMERS

A. Primers: Provide the following primers for metal and wood work:

1. Metal / Galvanized Steel:
   a. (1) coats Ultra-Grip Premium Interior/Exterior Multi Surface Primer UGPR001l Primer (Dunn Edwards Paints)
   b. Color: per manufacturer.
2. Wood Fence
   a. No primer needed / top coat is self priming.

B. Substitutions: See requirements in Contract Documents.

2.05 ACCESSORY MATERIALS

A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.

B. Patching Material: Latex filler.

C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.

C. Test shop-applied primer for compatibility with subsequent cover materials.

D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
   1. Exterior Wood: 15 percent, measured in accordance with ASTM D4442.

3.02 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces for finishing.

D. Seal surfaces that might cause bleed through or staining of topcoat.

E. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

F. Galvanized Surfaces:
   1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1. and manufacturers product sheet. In conflict in direciton occurs, seek clarification from owners representative.
   2. Prepare surface according to SSPC-SP 2 and manufactures product sheet for primer. If conflict in direction occurs, seek clarification from owners representative.
   3. New galvanized metal work surface to be made slightlyh rough with scour pad and then wiped down before primer paint is applied.

G. Ferrous Metal:
   1. Remove surface contamination and oils and wash with solvent cleaner according to SSPC-SP 1. and manufactures product sheet for primer. If conflict in direction occurs, seek clarification from owners representative.
   2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.
   3. Remove rust, loose mill scale, and other foreign substances using using methods recommended in writing by paint manufacturer
   4. Remove rust, loose mill scale, and other foreign substances using using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 "Commercial Blast Cleaning". Protect from corrosion until coated.

H. Exterior Wood Surfaces to Receive Opaque Finish: Remove dust, grit, and foreign matter. Seal knots, pitch streaks, and sappy sections.

3.03 APPLICATION

A. Apply products in accordance with manufacturer's written instructions / product information sheet. .

B. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

C. Apply each coat to uniform appearance.

D. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

E. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 CLEANING

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.05 PROTECTION

A. Protect finishes until completion of project.

B. Touch-up damaged finishes after Substantial Completion.

PART 4 MEASUREMENT AND PAYMENT

4.01 PAINTING

A. The contract lump sum price paid for Painting shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in Painting, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the City’s Representative.

End of Section

Section 11 68 13

Playground Equipment

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Playground layout (staking).

B. Manufactured playground equipment.

C. Location of each item of playground equipment is indicated on drawings.

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Footings for playground equipment.

B. Section 32 18 16.13 - Playground Protective Surfacing: Protective surfacing in playground area.

1.03 REFERENCE STANDARDS

A. ASTM F1292 - Standard Specification for Impact Attenuation of Surface Systems Under and Around Playground Equipment; 2009.

B. ASTM F1487 - Standard Consumer Safety Performance Specification for Playground Equipment for Public Use; 2011.

C. CPSC Pub. No. 325 - Public Playground Safety Handbook; 2010.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meetings: Convene a meeting one week before starting earthwork for playground to discuss coordination between various installers.
   1. Require attendance by personnel responsible for grading and installers of playground equipment, protective surfacing, footings, and adjacent work.
   2. Include representatives of Contractor.
   3. Notify Landscape Architect at least 2 weeks prior to meeting.

1.05 SUBMITTALS

A. See Section 01 33 00 - Submittals, for submittal procedures.

B. Proposals for Substitutions:
   1. Substitutions that will increase the fall height, platform height, or maximum equipment height will not be considered; submit shop drawings with proposed modifications clearly identified and sufficient information to determine compliance with specified criteria.
   2. Substitutions that require changes to site design will not be considered.
   3. Substitutions that, in the opinion of the City, are not equivalent in play value, architectural aesthetic, or quality, will not be considered.

C. Product Data: For manufactured equipment, provide manufacturer's product data showing materials of construction, compliance with specified standards, installation procedures, safety limitations, and the number of users permitted.

D. Shop Drawings: Detailed scale drawings showing play event layout, Use Zone perimeters, and fall height for each play event, including custom elements:
   1. Show locations and dimensions of footings and anchorage points.
   2. Show locations of related construction such as walkways and roadways, fences, site furnishings, edges and plantings.
   3. Structural calculations.
   4. Submit a minimum of two (2) sets of submitted drawings and two (2) sets of structural calculations signed and sealed by a professional engineer licencsed in the State of California.

E. Deferred Permit Submittal: Footing design for large playground equipment stuctures.

F. Samples: For each item that a color must be selected, provide physical color chips showing full range of colors and finishes for selection by Landscape Architect.

G. Maintenance Data: Provide manufacturer's recommended maintenance instructions and list of replaceable parts for each equipment item, with address and phone number of source of supply.

H. Warranty: Submit manufacturer warranty and ensure that forms have been completed in City's name and registered with manufacturer.

1.06 QUALITY ASSURANCE

A. Maintain one copy of the latest edition of ASTM F1487 and CPSC Pub. No. 325 at project site.

B. Installer Qualifications: Company specializing in playground construction shall perform the work in this Section.
   1. Provide documentation that company has installed at least 5 playgrounds of a similar scale for public agencies, that have been in successful service for a minimum of 5 years; provide addresses and contact person(s) for each.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver, handle, and store equipment to project site in accordance with manufacturer's recommendations.

B. Store materials in a dry, covered area, elevated above grade.

1.08 WARRANTY

A. See Section 01 77 00 - Closeout Procedures, for additional warranty requirements.

B. Equipment Warranty is:Berliner Equipment Warranty:
   1. Berliner: Various Warranty Periods Per Specific Part. Refer to Berliner Warranty Certificate.
   2. Burke: Various Warranty Periods Per Specific Part. Refer to BCI Burke Generations Warranty
   3. Landscape Structures: Various Warranty Periods Per Specific Park. Refer to Landscape Structures Warranty Certificate.
   4. Spaces For Play: Warranty Periods Per Specific Part. Refer to Spaces for Play Warranty Certificate.

PART 2 PRODUCTS

2.01 PLAYGROUND EQUIPMENT - GENERAL

A. Design Assumptions: Because the safety of the playground depends on strict compliance with design criteria, this information is provided for Contractor's information.
   1. Playground has been designed for children ages 2 through 12.
   2. If deviations from specified dimensions, especially fall heights, is required, obtain approval prior to proceeding.

B. Mount equipment on concrete footings, unless otherwise indicated.
   1. Playground protective surfacing constitutes a resilient layer installed over a subbase (non-resilient) that is installed over subgrade; top of footings and anchorage devices is to be covered by full depth of resilient portion of protective surfacing.
   2. Unless otherwise noted in the Drawings, footings shall be per the manufacturer's details, and shall be included in Contractor's scope of work at no extra cost to the City.

C. Provide supports as required to mount equipment at proper height above finish and sub-grades to allow installation of sufficient depth of protective surfacing; portion of support below top of surfacing must comply with specified requirements for equipment.

D. Paint portion of support that is intended to be installed below top surface of protective surfacing a different color, or mark in other permanent way, so that installers and maintainers of protective surfacing can easily determine whether sufficient depth has been installed.

E. Adhere manufacturer's label for each equipment item stating age group that equipment was designed for, manufacturer identification, and warning labels in accordance with ASTM F1487.

F. If not specified within Manufacturer's quote, Landscape Architect to select all play equipment colors.

2.02 MANUFACTURED PLAYGROUND EQUIPMENT

A. Manufacturer: Berliner - www.berliner-playequipment.com/us/
   1. Contact/Sales Representative: Chris Olsen, SPEC, Cell (650)769 0775
   2. Quote Reference: Estimate # 2464
      a. Quote number represents multiple items, as described below.
      b. Play equipment colors dictated by Manufacturer's quote number
   3. Play Components - 5-12 Area (model number in parentheses where applicable)
      a. Berliner Tower L.04 Combi as per drawings including: Sliding Pole, Sculptura. 01, Sculptura.02, Chin Up Bar, H.O.H Ladder w Balance Cable, H.O.H Loop & Stainless Steel Slide
      b. Berliner: Elbow swings x 2

B. Manufacturer: Burke - www.bciburke.com
   1. Contact/Sales Representative: Chris Olsen, SPEC, Cell (650)769 0775
   2. Quote Reference: Estimate # 2464
      a. Quote number represents multiple items, as described below.

b. Play equipment colors dictated by Manufacturer's quote number.

3. Play Components 5-12 Area (model number in parentheses where applicable)
   a. Burke: 18' Dual Kid Koaster #670-0389
   b. Burke: Step Spot Pod #560-0458

C. Manufacturer: Landscape Structures - Inc; www.playsi.com
   1. Contact/Sales Representative: Alex Hailey, alex@rossrec.com
   2. Quote Reference: Quote Number # 00035949
   3. Play Components - 2-5 Area (model number in parentheses where applicable)
      a. Landscape Structures: 2-5yr structure Hedra Design #1156687-01-06M including Hedra Scout w/ Linked Play Features (Turning Bar, Horizontal Ladder, Pod Climber, Facet Balance Beam)
      b. Landscape Structures: Toddler Swing
      c. Landscape Structures: DigiRider Rocket Ship
      d. Landscape Structures: T-Rex Bonds Fossil Dig

D. Manufacturer: Spaces For Play Inc: www.spacesforplay.com
   1. Contact/Sales Representative: Sara Kreiss, sara@spacesforplay.com
   2. Quote Reference: Dated 5-25-22
   3. Play Components - 2-5 Area
      a. 7' Sand Activity Wall with Curved Wheel w / 2 Posts
      b. Posts to be recycled plastic material.

PART 3 EXECUTION

3.01 VERIFICATION OF CONDITIONS

A. Verify that playground area has been graded to subgrade elevations required and that excess soil, rocks, and debris have been removed.

B. Verify that playground equipment footings have been installed in proper locations and at proper elevations.

C. Verify location of underground utilities and facilities in playground area; damage to underground utilities and facilities will be repaired at Contractor's expense.

3.02 PREPARATION

A. Stake layout of entire Use Zone perimeter before starting any work and before subbase under resilient surfacing and engineered wood fiber (EWF) is laid or installed. .
   1. Verify that Use Zone perimeters do not overlap hard surfaces, whether currently installed or not.
   2. Verify that Use Zones are free of obstructions that would extend into resilient portion protective surfacing.
   3. Verify that there are no conflicts with existing trees and existing tree roots.
   4. If conflicts or obstructions exist, notify Landscape Architect.
   5. Do not proceed until revised drawings have been provided, showing corrected layout, and obstructions have been removed.

3.03 INSTALLATION

A. Coordinate work with preparation for and installation of protective surfacing specified in Section 32 18 16.13; install resilient portion of protective surfacing after playground equipment installation.

B. Install in accordance with CPSC Pub. No. 325, ASTM F1487, manufacturer's instructions, and requirements of authorities having jurisdiction (AHJ).

C. Anchor equipment securely below bottom elevation of resilient surfacing layer.

D. Install without sharp points, edges or protrusions, entanglement hazards, pinch, crush, or shear points.

E. Do not modify play events on site without written approval of manufacturer.

F. Install required signage if not factory-installed. Playground manufacturer to provide signage.

G. Coordinate with work of other sections that is integral to play areas and components.

3.04 FIELD QUALITY CONTROL

A. The contractor will hire (at their expense) a 3rd party Certified Playground Safety Inspector (as certified by the National Playground Safety Institute) to inspect the playground equipment layout after installation and provide City with a report verifying that the playground meets all current specified design safety and accessibility requirements. Any coorections necessary shall be paid for by the Contractor and to the satisfaction of the Landscape Architect and the Certified Playground Safety Inpsector. Any and all corrections shall be made prior to the occupany by the general public.

B. Repair or replace rejected work until compliance is achieved.

3.05 CLEANING

A. Restore adjacent existing areas that have been damaged from the construction.

B. Clean playground equipment of construction materials, dirt, stains, filings, and blemishes due to shipment or installation; clean in accordance with manufacturer's instructions, using cleaning agents as recommended by manufacturer.

C. Clean playground area of excess construction materials, debris, and waste.

D. Remove excess and waste material and dispose of off-site in accordance with requirements of authorities having jurisdiction (AHJ).

3.06 PROTECTION

A. Protect installed products until Date of Substantial Completion.

B. Replace damaged products before Date of Substantial Completion.

PART 4 MEASUREMENT AND PAYMENT

4.01 PLAYGROUND EQUIPMENT

A. The contract lump sum price paid for Playground Equipment shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in Playground Equipment, including playground equipment, concrete foundations, inspection by a 3rd party Certified Playground Safety Inspector, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the City’s Representative.

End of Section

SECTION 26 52 00

SITE ELECTRICAL WORK

Part I - GENERAL

1.01 SCOPE

A. Furnish and install all labor and materials for complete installation of City provided MUSCO Control-link controller, together with related conductors, conduits, outlet boxes, and demolition work, as shown on Drawings.

B. Contractor shall visit the site prior to submission of their bid, verify all conditions that will affect the performance of their work, make all necessary measurements, and notify the City Engineer of any discrepancies between the plans and the actual field conditions, prior to bidding.

C. Contractor shall secure all necessary permits. There shall be no charge for permits that are issued by the City.

D. Contractor shall coordinate their work with the other trades, reviewing areas of possible conflict of space.

1.02 SUBMITTALS

A. Prior to ordering any materials, Contractor shall furnish the Landscape Architect with manufacturer's literature and catalog sheets, per General Requirements section, and/or manufacturer's data sheets for the following items:
   1. Conductors
   2. Conduit, fittings, and boxes

1.03 STANDARDS

A. Unless otherwise indicated or specified, all materials and methods shall conform to the appropriate current sections of:
   1. State of California, latest edition of the Department of Transportation Standard Specifications (DTSS), except for measurement and payment requirements.
   2. Applicable ASTM specifications as they reasonably apply to this work, except for measurement and payment requirements.
   3. Where conflicts occur, most stringent requirements apply.

B. All materials shall be new with the Underwriter's acceptance label attached.

C. All work shall conform to the requirements of the California Electrical Code 2019, amended 2017 edition of the National Electrical Code, OSHA, and California State Safety Orders.

D. The complete electrical installation shall be permanently grounded per the CEC and local regulations.

1.04 RECORD DRAWINGS

A. Contractor to keep accurate and scaled reproducible record plans of the entire electrical installation. Deviations and changes from the Contract Drawings shall be noted on this drawing. All work that is installed under this Contract shall be included on these drawings.

1.05 GUARANTEES

A. Contractor shall guarantee, in writing, for a period of one (1) year from date of acceptance, that all work installed shall be free from defects in workmanship and materials. If during this period of one (1) year any such defects appear, the Contractor shall, without cost to the City, remedy such defects. If the Contractor defaults on this guarantee, the City may have such work done and charged to the Contractor.

B. MUSCO Control-link controller is not covered under contractor's guarantee responsibilities.

Part 2 - PRODUCTS

2.01 CONDUCTORS

A. Shall be copper, thermoplastic insulated, 600V, types THHN, as manufactured by Southwire, Rome, Phelps Dodge, or equal.

B. Color coding: Conductors shall be identified as to phase connections by means of color impregnated insulation or approved colored marking tapes as follows:

VOLTAGE	A-PH.	B-PH.	C-PH	NEUTRAL	GROUND
240/120V 1phase	Black	Red	-----	White	Green

2.02 CONDUITS

A. Metallic: for use above ground, electro metallic tubing, as manufactured by Allied, Appleton, or approved equal.

2.03 OUTLET BOXES

A. Metal outlet boxes, drawn steel, for interior wiring, as manufactured by Raco, Bowers, or approved equal.

PART 3 – EXECUTION

3.01 CONDUCTORS

A. All conductor splices and terminations shall be completely made secured using standard

3.02 CONDUITS

A. Separate conduit runs not less than one foot horizontally and one foot vertically from gas, water sewer and drain lines.

B. Place WARNING-ELECTRIC marker strips the continuous length of trench, down 12" from finish grade. Strips shall be installed over all lighting and power conduits.

3.03 MUSCO CONTROL-LINK CONTROLLER

A. Install controller in Clubhouse on wall indicated on plans. Top of controller cabinet shall not exceed 72” to finished floor. Make wiring connections per manufacturer’s wiring diagram and as indicated on plans.

B. Notify City representative when wire connections are complete, so that they can advise MUSCO to send their field technician to initialize and program unit for required operation.

C. City will be responsible for coordinating with MUSCO for any required training in the operation of the controller.

3.04 TESTS

A. Tests shall be conducted during the construction period and at completion to determine conformity with applicable codes and with these specifications. Tests shall be performed in the presence of the City representative.

B. Tests shall include, but are not limited to, the following:

1. Circuits Continuity: Test branch for continuity. Test all neutral for improper grounds.

2. Grounds: Perform ground continuity of equipment grounding conductors.

PART 4 – MEASUREMENT AND PAYMENT

4.01 SITE ELECTRICAL

A. The contract lump sum price paid for Site Electrical shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in Site Electrical work, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the City’s Representative.

END OF SECTION 26 52 00

Section 31 10 00

Site Clearing

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Clearing and protection of vegetation.

B. Removal of existing debris.

1.02 RELATED REQUIREMENTS

A. Section 01 57 00 Temporary Controls

B. Section 01 74 19 - Construction Waste Management and Disposal: Limitations on disposal of removed materials; requirements for recycling.

C. Section 31 22 00 - Grading: Topsoil removal.

D. Section 31 23 23 - Fill: Fill material for filling holes, pits, and excavations generated as a result of removal operations.

1.03 SUBMITTALS

A. See Section 01 33 00 - Submittal Procedures, for submittal procedures.

B. Site Plan: Showing:
   1. Areas for temporary construction and field office (if part of construction operation).

PART 2 PRODUCTS -- NOT USED

PART 3 EXECUTION

3.01 SITE CLEARING

A. Minimize production of dust due to clearing operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.

3.02 EXISTING UTILITIES AND BUILT ELEMENTS

A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.

B. Protect existing utilities to remain from damage.

C. Do not disrupt public utilities without permit from authority having jurisdiction.

D. Protect existing structures and other elements that are not to be removed.

3.03 VEGETATION

A. Vegetation Removed: Do not burn, bury, landfill, or leave on site, except as indicated.
   1. Clear and grub areas dictated by Demolition plan.

B. Restoration: If vegetation outside removal limits or within specified protective fences is damaged or destroyed due to subsequent construction operations, replace at no cost to City.

3.04 DEBRIS

A. Remove and properly dispose of debris, junk, and trash from site.

B. Leave site in clean condition, ready for subsequent work.

C. Clean up spillage and wind-blown debris from public and private lands.

PART 4 MEASUREMENT AND PAYMENT

4.01 SITE CLEARING

A. Full compensation for Site Clearing shall be considered as included in the contract lump sum or unit price paid for the items involved, and no additional compensation shall be made therefor.

End of Section

PAGE NOT USED

Section 31 22 00

Grading

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Removal of topsoil.

B. Rough grading the site for site structures, and landscaped areas.

C. Finish grading.

1.02 RELATED REQUIREMENTS

A. Section 31 10 00 - Site Clearing.

B. Section 31 23 16 - Excavation.

C. Section 31 23 23 - Fill: Filling and compaction.

D. Section 32 92 19 - Seeding: Finish ground cover.

E. Section 32 92 23 - Sodding: Finish ground cover.

1.03 SUBMITTALS

A. See section 01 33 00 Submittal Procedures.

B. Project Record Documents: Accurately record actual locations of utilities remaining by horizontal dimensions, elevations or inverts, and slope gradients.

PART 2 PRODUCTS

2.01 MATERIALS

A. Topsoil: See Section 32 92 23 Sodding.
   1. Graded
   2. Free of roots, rocks larger than 1/2 inch, subsoil, debris, large weeds and foreign matter.

B. Other Fill Materials: See Section 31 23 23.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that survey bench mark and intended elevations for the Work are as indicated.

B. Verify the absence of standing or ponding water.

3.02 PREPARATION

A. Identify required lines, levels, contours, and datum.

B. Stake and flag locations of known utilities.

C. Locate, identify, and protect from damage above- and below-grade utilities to remain.

D. Notify utility company to remove and relocate utilities.

E. Provide temporary means and methods to remove all standing or ponding water from areas prior to grading.

F. Protect site features to remain, including but not limited to bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs, from damage by grading equipment and vehicular traffic.

G. Protect trees to remain. Refer to plans and see Section 32 31 15 - Tree Protection and Temporary Fencing.

3.03 ROUGH GRADING

A. Remove topsoil from areas to be further excavated, re-landscaped, or re-graded, without mixing with foreign materials.

B. Do not remove topsoil when wet.

C. Remove subsoil from areas to be further excavated, re-landscaped, or re-graded.

D. Do not remove wet subsoil, unless it is subsequently processed to obtain optimum moisture content.

E. Excavating through roots, refer to Tree Protection Plan and Section 32 31 15 - Tree Protection and Temporary Fencing.

F. Stability: Replace damaged or displaced subsoil to same requirements as for specified fill.

G. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack surface water control.

3.04 SOIL REMOVAL

A. Stockpile excavated topsoil on site.

B. Stockpile subsoil to be re-used on site; remove remainder from site.

C. Stockpiles: Use areas designated on site; pile depth not to exceed 6 feet; protect from erosion.

3.05 FINISH GRADING

A. Before Finish Grading:
   1. Verify trench backfilling have been inspected.
   2. Verify subgrade has been contoured and compacted.

B. Remove debris, roots, branches, stones, in excess of 1 inch in size.

C. Where topsoil is to be placed, scarify surface to depth of 12 inches.

D. In areas where vehicles or equipment have compacted soil, scarify surface to depth of 12 inches.

E. Place topsoil in areas indicated on plans as turf to min 4" deep.

F. Place topsoil where required to level finish grade.

G. Place topsoil during dry weather.

H. Remove roots, weeds, rocks, and foreign material while spreading.

I. Near plants and tree roots spread topsoil manually to prevent damage.

J. Fine grade topsoil to eliminate uneven areas and low spots. Maintain profiles and contour of subgrade.

K. Lightly compact placed topsoil.

L. Maintain stability of topsoil during inclement weather. Replace topsoil in areas where surface water has eroded thickness below specifications.

3.06 REPAIR AND RESTORATION

A. Existing Facilities, Utilities, and Site Features to Remain: If damaged due to this work, repair or replace to original condition.

B. Trees to Remain: If damaged due to this work, trim broken branches and repair bark wounds; if root damage has occurred, obtain instructions from Landscape Architect as to remedy.

C. Other Existing Vegetation to Remain: If damaged due to this work, replace with vegetation of equivalent species and size.

3.07 CLEANING

A. Remove unused stockpiled topsoil and subsoil. Grade stockpile area to prevent standing water.

B. Leave site clean and raked, ready to receive landscaping.

PART 4 MEASUREMENT AND PAYMENT

4.01 EARTHWORK AND SUBGRADE PREPARATION

A. The contract lump sum price paid for Earthwork and Subgrade Preparation shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in Earthwork and Subgrade Preparation, including grading, excavation, fill, trenching, and disposal, as shown on the plans, complete in place, as specified in the Standard Specifications and these special provisions, and as directed by the City’s Representative.

4.02 GRADING

A. Full compensation for Grading shall be considered as included in the contract price paid for Earthwork and Subgrade Preparation, and no separate compensation will be allowed therefor.

End of Section

Section 31 23 16
Excavation

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Excavating for footings, paving, site structures, and walls.

B. Trenching for utilities.

1.02 RELATED REQUIREMENTS

A. Section 31 23 16.13 - Trenching

B. Section 31 23 23 - Fill: Fill materials, backfilling, and compacting.

1.03 REFERENCE STANDARDS

A. City of Berkley Standard Specifications

B. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.

PART 2 PRODUCTS -NOT USED

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that survey bench mark and intended elevations for the work are as indicated.

3.02 PREPARATION

A. Identify required lines, levels, contours, and datum locations.

B. See Section 31 22 00 for topsoil removal.

C. Locate, identify, and protect utilities that remain and protect from damage.

D. Protect bench marks, survey control points, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

E. Grade top perimeter of excavation to prevent surface water from draining into excavation. Provide temporary means and methods, as required, to maintain surface water diversion until no longer needed, or as directed by Landscape Architect.

3.03 EXCAVATING

A. Excavate to accommodate new structures and construction operations.

B. Notify Landscape Architect of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.

C. Provide temporary means and methods, as required, to remove all water from excavations until directed by Landscape Architect. Remove and replace soils deemed suitable by classification and which are excessively moist due to lack of dewatering or surface water control.

3.04 SHORING AND BRACING

A. Provide materials for shoring and bracing as may be necessary for safety of personnel, protection of work, and compliance with requirements of governmental agencies having jurisdiction.

B. Maintain shoring and bracing in excavations regardless of the time period excavations will be open.

C. Carry shoring and bracing down as excavation progresses.

3.05 CLEANING

A. Stockpile excavated material to be re-used in area designated on site in accordance with Section 31 22 00.

B. Remove excavated material that is unsuitable for re-use from site.

C. Remove excess excavated material from site.

3.06 PROTECTION

A. Divert surface flow from rains or water discharges from the excavation.

B. Prevent displacement of banks and keep loose soil from falling into excavation; maintain soil stability.

C. Protect open excavations from rainfall, runoff, freezing groundwater, or excessive drying so as to maintain foundation subgrade in satisfactory, undisturbed condition.

D. Keep excavations free of standing water and completely free of water during concrete placement.

PART 4 MEASUREMENT AND PAYMENT

4.01 EXCAVATION

A. Full compensation for Excavation shall be considered as included in the contract price paid for Earthwork and Subgrade Preparation, and no separate compensation will be allowed therefor.

End of Section

Section 31 23 16.13
Trenching

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Backfilling and compacting for utilities as discovered.

1.02 RELATED REQUIREMENTS

A. Section 31 22 00 - Grading: Site grading.

1.03 DEFINITIONS

A. Finish Grade Elevations: Indicated on drawings.

1.04 REFERENCE STANDARDS

A. AASHTO T 180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54 kg (10-lb) Rammer and a 457 mm (18 in.) Drop; 2015.

B. ASTM C136/C136M - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates; 2014.

C. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)); 2012.

D. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN m/m3)); 2012.

1.05 SUBMITTALS

A. See Section 01 33 00 - Submittal Procedures.

B. Materials Sources: Submit name of imported materials source.

C. Compaction Density Test Reports.

1.06 DELIVERY, STORAGE, AND HANDLING

A. When necessary, store materials on site in advance of need.

PART 2 PRODUCTS

2.01 FILL MATERIALS

A. Refer to Section 31 23 23.

B. For Trenching in roadway, see City of Berkeley Standard Detail for Trench Excavation and Surface Restoration on plans.

C. General Fill: Subsoil excavated on-site.
   1. Free of lumps larger than 4 inches, rocks larger than 2 inches, and debris.

D. Granular Fill - Gravel: Pit run washed stone; free of shale, clay, friable material and debris.
   1. Graded in accordance with ASTM C136/C136M, within the following limits:
      a. No. 4 sieve: 90 to 100 percent passing.
      b. No. 200: 0 to 10 percent passing.

2.02 SOURCE QUALITY CONTROL

A. Soil tests to be provided for all imported soils and fills.

B. If tests indicate materials do not meet specified requirements, change material and retest.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that survey bench marks and intended elevations for the work are as indicated.

3.02 PREPARATION

A. Identify required lines, levels, contours, and datum locations.

B. See Section 31 22 00 for additional requirements.

C. Grade top perimeter of trenching area to prevent surface water from draining into trench. Provide temporary means and methods, as required, to maintain surface water diversion until no longer needed, or as directed by the Landscape Architect.

3.03 TRENCHING

A. Notify Landscape Architect of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.

B. Slope banks of excavations deeper than 4 feet to angle of repose or less until shored.

C. Cut trenches wide enough to allow inspection of installed utilities.

D. Hand trim excavations. Remove loose matter.

E. Remove excavated material that is unsuitable for re-use from site.

F. Remove excess excavated material from site.

G. Provide temporary means and methods, as required, to remove all water from trenching until directed by the Landscape Architect. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack of dewatering or surface water control.

H. Determine the prevailing groundwater level prior to trenching. If the proposed trench extends less than 1 foot into the prevailing groundwater, control groundwater intrusion with perimeter drains routed to sump pumps, or as directed by the Landscape Architect.

I. Provide Sheeting and Shoring necessary for protection of the Work and safety of personnel.
   1. Prior to backfilling, remove all sheeting
   2. Do not permit sheeting to remain in the trenches except when, in the opinion of the Engineer, field conditions or the type of sheeting or methods of construction such as use of concrete bedding are such as to make removal of sheeting impracticable. In such cases, the Engineer may permit portions of sheeting to be cut off and remain in the trench.

3.04 PREPARATION FOR UTILITY PLACEMENT

A. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill.

B. Compact subgrade to density equal to or greater than requirements for subsequent fill material.

C. Until ready to backfill, maintain excavations and prevent loose soil from falling into excavation.

3.05 BACKFILLING

A. Backfill to contours and elevations indicated using unfrozen materials.

B. Employ a placement method that does not disturb or damage other work.

C. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.

D. Maintain optimum moisture content of fill materials to attain required compaction density.

E. Correct areas that are over-excavated.
   1. Other areas: Use general fill, flush to required elevation, compacted to minimum 97 percent of maximum dry density.

F. Reshape and re-compact fills subjected to vehicular traffic.

G. For Trenching in roadway, see City of Berkeley Standard Detail for Trench Excavation and Surface Restoration on plans.

3.06 BEDDING AND FILL AT SPECIFIC LOCATIONS

A. For Trenching in roadway, see City of Berkeley Standard Detail for Trench Excavation and Surface Restoration on plans.

3.07 TOLERANCES

A. Top Surface of General Backfilling: Plus or minus 1 inch from required elevations.

3.08 FIELD QUALITY CONTROL

A. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D1557 ("modified Proctor"), AASHTO T 180, or ASTM D698 ("standard Proctor").

B. If tests indicate work does not meet specified requirements, remove work, replace and retest.

C. Frequency of Tests: One per per 250 lineal feet under paved surfaces, minimum one per trench.

3.09 CLEANING

A. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

PART 4 MEASUREMENT AND PAYMENT

4.01 TRENCHING

A. Full compensation for Trenching shall be considered as included in the contract price paid for Earthwork and Subgrade Preparation, and no separate compensation will be allowed therefor.

End of Section

PAGE NOT USED

Section 31 23 23
Fill

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Filling, backfilling, and compacting for footings, paving, and site structures

B. Backfilling and compacting for utilities outside the building to utility main connections.

C. Filling holes, pits, and excavations generated as a result of removal (demolition) operations.

1.02 RELATED REQUIREMENTS

A. Section 31 22 00 - Grading

B. Section 31 23 16.13 - Trenching

1.03 REFERENCE STANDARDS

A. AASHTO T 180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54 kg (10-lb) Rammer and a 457 mm (18 in.) Drop; 2015.

B. ASTM C136/C136M - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates; 2014.

C. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)); 2012.

D. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN m/m3)); 2012.

1.04 SUBMITTALS

A. See Section 01 30 30 - Submittal Procedures, for submittal procedures.

B. Materials Sources: Submit name of imported materials source.

C. Fill Composition Test Reports: Results of laboratory tests on proposed and actual materials used, including manufactured fill.

D. Compaction Density Test Reports.

PART 2 PRODUCTS

2.01 FILL MATERIALS

A. General Fill: Subsoil excavated on-site.
   1. Graded.
   2. Free of lumps larger than 3 inches, rocks larger than 2 inches, and debris.

B. Sand: Natural river or bank sand; free of silt, clay, loam, friable or soluble materials, and organic matter.
   1. Graded in accordance with ASTM C136/C136M; within the following limits:
      a. No. 4 sieve: 100 percent passing.
      b. No. 14 sieve: 10 to 100 percent passing.
      c. No. 50 sieve: 5 to 90 percent passing.
      d. No. 100 sieve: 4 to 30 percent passing.
      e. No. 200 sieve: 0 percent passing.

PART 3 EXECUTION

3.01 EXAMINATION

A. Identify required lines, levels, contours, and datum locations.

B. See Section 31 22 00 for additional requirements.

C. Verify subdrainage, dampproofing, or waterproofing installation has been inspected.

D. Verify areas to be filled are not compromised with surface or ground water.

3.02 PREPARATION

A. Scarify and proof roll subgrade surface to a depth of 6 inches to identify soft spots.

B. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill.

C. Compact subgrade to density equal to or greater than requirements for subsequent fill material.

D. Until ready to fill, maintain excavations and prevent loose soil from falling into excavation.

3.03 FILLING

A. Fill to contours and elevations indicated using unfrozen materials.

B. Employ a placement method that does not disturb or damage other work.

C. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.

D. Maintain optimum moisture content of fill materials to attain required compaction density.

E. Correct areas that are over-excavated.
   1. Other areas: Use general fill, flush to required elevation, compacted to minimum 90 percent of maximum dry density.

F. Compaction Density Unless Otherwise Specified or Indicated in the project Geotech Report:
   1. Under paving, slabs-on-grade, and similar construction: 90 percent of maximum dry density.
   2. At other locations such as under rubber and curbs: 95 percent of maximum dry density.
   3. Geotechnical Engineer shall test compaction recommendations are met on site per requirements in the Geotechnical report.

G. Reshape and re-compact fills subjected to vehicular traffic.

H. Maintain temporary means and methods, as required, to remove all water while fill is being placed as required, or until directed by the Landscape Architect. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack of dewatering or surface water control.

3.04 FILL AT SPECIFIC LOCATIONS

3.05 CLEANING

A. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

PART 4 MEASUREMENT AND PAYMENT

4.01 FILL

A. Full compensation for Fill shall be considered as included in the contract price paid for Earthwork and Subgrade Preparation, and no separate compensation will be allowed therefor.

End of Section

Section 32 01 90

Maintenance of Landscape

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Maintain plants in manner that promotes health, growth, color and appearance, to quality levels specified; replace dead, dying, and damaged plants at no extra cost to City.
   1. It is Contractor's responsibility to determine type and quantity of soil amendments and fertilizer required.
   2. Perform soil analysis to determine type and quantity of soil amendments; test enough soil samples to obtain a comprehensive analysis; submit reports.

B. Maintain newly planted landscape plants, including turf (lawns), trees, shrubs, ground cover, and perennials.

C. Maintain established landscape plants, including turf (lawns), trees, shrubs, and ground cover.

D. Renovate the following established landscape plants within the project boundaries: turf (lawns).

E. Operate permanent irrigation system.

F. Clean up landscaped areas.

G. Maintenance Period: The time frame covered by these requirements is 60 days:
   1. Start Date: Maintenance of landscape period will not start until all of elements of the Project that impact the landscape are completed in accordance with the Contract Documents.

1.02 RELATED REQUIREMENTS

A. Section 32 84 23 - Irrigation System.

B. Section 32 92 19 - Seeding.

C. Section 32 92 23 - Sodding.

1.03 REFERENCE STANDARDS

A. ANSI A300 Part 1 - American National Standard for Tree Care Operations -- Tree, Shrub and Other Woody Plant Maintenance -- Standard Practices; 2008.

B. ANSI Z133.1 - American National Standard For Arboricultural Operations - Pruning, Repairing, Maintaining, And Removing Trees, And Cutting Brush - Safety Requirements; 2012.

C. ASTM D4972 - Standard Test Method for pH of Soils; 2013.

1.04 SUBMITTALS

A. See Section 01 33 00 - Submittals, for submittal procedures.

B. Product Data: Manufacturer's data sheets on each fertilizer, herbicide, pesticide, and other chemical material to be used, showing trade name, chemical composition, mixing instructions, recommended application rate, storage and handling instructions, and application instructions.
   1. Pesticides and Herbicides: Also include U.S. EPA registration number and Material Safety Data Sheets.

C. Certificates: Certification of composition of the following as delivered:
   1. Fertilizer.
   2. Mulch.
   3. Pesticides.
   4. Herbicides.
   5. Other chemical materials.

D. Installer Qualifications: As specified.

1.05 QUALITY ASSURANCE

A. Installer Qualifications:
   1. Maintenance Contractor: The contractual entity that performed the planting installation.
   2. Pesticide Applicators: Certified by authorities having jurisdiction.
   3. Herbicide Applicators: Certified by authorities having jurisdiction.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver U.S. EPA-controlled materials to site in original containers with legible labels indicating registration number and registered uses.

B. Deliver fertilizer and manufactured soil amendments to site in original containers bearing manufacturer's chemical analysis, name, trade name or trademark, and indication of compliance with applicable state and federal laws and regulations; alternatively, bulk delivery with equivalent certificate is acceptable.

C. Store fertilizer, soil amendments, and mulch in dry locations away from contaminants.

D. Do not store pesticides, herbicides, or other chemical treatment materials in locations where they could damage seeds or plants.

PART 2 PRODUCTS

2.01 FERTILIZERS AND SOIL AMENDMENTS

A. Fertilizers: Free flowing granular organic type containing nitrogen, phosphorus, and potassium, plus trace minerals and micro-nutrients; controlled release type is preferred.
   1. Determine type and quantity based on soil analysis.

B. Soil Amendments: Type and quantity as required to achieve specified results, based on soil analysis.

2.02 APPLIED MATERIALS

A. Organic Mulch: Maintain general appearance of existing mulched areas; use one of the following types:
   1. Wood chips ranging in size from 1/2 inch to one inch.

PART 3 EXECUTION

3.01 EXAMINATION

A. If soil analysis has not already been performed, take sufficient samples to obtain a comprehensive analysis; perform analysis in accordance with ASTM D4972.

3.02 LANDSCAPE MAINTENANCE - GENERAL

A. Protect existing vegetation, pavements, and facilities from damage due to maintenance activities; restore damaged items to original condition or replace, at no extra cost to City.

B. General Cleanup: Remove debris from all landscape areas at least once a week and from turf areas before each mowing.
   1. Debris consists of trash, rubbish, dropped leaves, downed branches and limbs of all sizes, dead vegetation, rocks, and other material not belonging in landscaped areas.
   2. Remove debris from site and dispose of properly.

C. Watering, Soil Erosion, and Sedimentation Control: Comply with federal, state, local, and other regulations in force; prevent over-watering, run-off, erosion, puddling, and ponding.
   1. Site grading and planting have been designed to resist erosion once fully grown, with temporary measures in place during establishment period.
   2. Repair temporary erosion control mechanisms provided by others.
   3. Repair eroded areas and replant, when caused by inadequate maintenance.
   4. Prevent sediment from entering storm drains.

D. Trees: Exercise care to avoid girdling trees; provide protective collars if necessary; remove protective collars at end of maintenance period.

E. Fertilizing: Apply fertilizer only when necessary.

F. Drainage Channels: Remove obstructions in gutters, catch basins, storm drain inlets, yard drains, swales, ditches, and overflows.
   1. Remove grates from catch basins to clean.
   2. Prevent encroachment of other vegetation on turfed surface drainage channels.

G. Health Maintenance: Inspect all plants regularly for health:
   1. Eradicate diseases and damaging pests, regardless of severity or speed of effect.
   2. Treat accidental injuries and abrasions.
   3. If a plant is unhealthy but not yet dead, according to specified definitions, determine reason(s) and take remedial action immediately.
   4. Remove dead plants immediately upon determining that they are dead.

H. Pesticide and Herbicide Application: Comply with manufacturer's instructions and recommendations and applicable regulations.
   1. Obtain City's approval prior to each application.
   2. Apply in manner to prevent injury to personnel and damage to property due to either direct spray or drifting, both on and off City's property.
   3. Use backflow preventers on hose bibbs used for mixing water; prevent spills.

4. Inspect equipment daily before application; repair leaks, clogs, wear, and damage.
5. Do not dispose of excess mixed material, unmixed material, containers, residue, rinse water, or contaminated articles on site; dispose of off site in legal manner.
6. Rinse water may be used as mix water for next batch of same formulation.
7. Contractor is responsible for all recordkeeping, submissions, and reports required by laws and regulations.

I. Replanting: Perform replacement and replanting immediately upon removal of dead plant.

3.03 IRRIGATION

A. Irrigation: Do not allow plants to wilt; apply water as required to supplement rainfall; do not waste water; do not water plants or areas not needing water; do not water during rainfall; shut off water flow when finished; repair leaks.
1. New & rennovated automatic irrigation system may be used.
2. City's water source may be used.
3. Do not drive water trucks over turf, seeded areas, or planting beds.
4. Provide backflow preventers on hose bibbs used for irrigation hoses.

B. Automatic Irrigation System: Obtain and follow manufacturer's operating and maintenance instructions.
1. Adjust to water landscape areas only.
2. Adjust sprinkler heads, drippers, valves, pumps, and controllers as required for optimum operation.
3. During system warranty period notify Landscape Architect and system installer promptly of defects and leaks that adversely affect irrigation performance.
4. After end of system warranty period, service and repair all defects and leaks.

3.04 RENOVATION OF ESTABLISHED TURF

A. Remove turf from around trees to radius of 18 inches from base of tree trunk. Cut turf out and remove; do not simply mow. Trim turf edge as specified.

B. Trim perimeter of turf area and around intervening objects as specified under Turf Maintenance.

C. Eliminate undesirable grasses and weeds. Remove as much thatch as possible.

D. Apply fertilizer over entire aerated area.

E. Water as soon as possible after planting. Do not allow newly planted material to become dry.

F. Begin normal mowing once grass reaches 1-1/2 times specified mowing height.

3.05 TURF MAINTENANCE

A. Maintain turf in manner required to produce turf that is healthy, uniform in color and leaf texture, and free from weeds and other undesirable growth.
1. Bare Spots - Lawns: 2 percent of total area, maximum; 6 inches square, maximum.
2. Keep turf relatively free of thatch, woody plant roots, diseases, nematodes, soil-borne insects, stones larger than 1 inch in diameter, and other materials detrimental to grass growth.
3. Limit broadleaf weeds and patches of foreign grass to a maximum of 2 percent of the total area.
4. When new grass is planted in existing turf areas, quality will be evaluated when grass is 1 inch high.
5. Mower type used by contractor shall not create depressions, ruts, or settlement of sod surface.

B. Mowing: During growing season(s) mow turf to uniform height, in manner that prevents scalping, rutting, bruising, and uneven or rough cutting.
1. Prior to mowing clean all debris and leaves from turf surface.
2. Schedule frequency of mowing so that no more than one-quarter to one-third of grass leaf length is removed during a cutting.
    a. Maximum grass height before mowing: 4 inches.
    b. Height of turf is measured from the soil surface.
3. Make each successive mowing at approximately 45 degrees to the previous mowing, if practical.
4. Cool Season Grasses:
    a. Reduce mowing height in fall and spring.
    b. Use rotary type mowers; mulcher type mowers may be used.

C. Trimming: Immediately after each mowing, neatly trim perimeter of each turf area and around obstructions within turf area; match height and appearance of adjacent turf.
1. Adjacent to Pavements: Cut edges of turf to form a distinct, uniform turf edge.
2. Adjacent to Planting Beds and Permanently Mulched Areas: Cut edges of turf to form a distinct, uniform turf edge.

3. Around Other Trees and Poles: Where no planting bed or mulched area exists, trimming with string trimmer is acceptable.
4. At Fences: Trim on both sides of fence.
5. Irrigation Heads and Valve Boxes: Trim neatly so grass doesn't interfere with operation.

3.06 PLANTING BED MAINTENANCE

A. Planting beds include all planted areas except turf.

B. Begin maintenance immediately after plants have been installed; inspect at least once a week and perform needed maintenance promptly.

C. Keep planting beds free of pests; remove weeds and grass by hand before reaching 1 inch height.

D. Do not allow climbing, twining, or creeping plants to encroach into other species.

E. Ground Cover and Vines:
1. Trim to encourage dense, well-developed growth covering intended areas.
2. Do not allow plants to grow up trees, shrubs, or vines or encroach into turf or drainage channels, unless the drainage channel is intended to be planted with ground cover.
3. Remove existing plants grown up trees, shrubs, and vines.

F. Replace mulch as required and remove debris.

3.07 TREE AND SHRUB MAINTENANCE

A. Trees will be considered dead when main leader has died back or when 25 percent or more of crown has died; except as otherwise indicated for palm trees.

B. Shrubs will be considered dead when 25 percent or more of plant has died.

C. Inspect woody plants for health by scraping up to 1/16 inch square area of bark; no green cambium layer below bark shall be evidence of death.

D. Adjust stakes, guys and turnbuckles, ties, and trunk wrap as required to promote growth and avoid girdling.

E. Fertilizing: Fertilize all trees at least once during maintenance period, preferably in the Fall; use accepted standards for determining type and method of fertilization.

F. Pruning: Unless otherwise indicated, prune only to maintain balanced natural shape; follow recommendations of ANSI A300 and ANSI Z133.1 and best local practices for species involved.

G. Shrubs: Prune at least once during maintenance period at best time to influence ultimate shape and size for the particular species.
1. Prune to balance the plant's form and according to its natural growth characteristics.
2. Remove water shoots, suckers, and branches not complying with desired shape and size.

H. Young Trees: Prune at least once during maintenance period at best time to influence ultimate shape and size for the particular species; do not remove or cut off leader.

3.08 CLEANING

A. Remove fallen deciduous leaves in Fall; removal may wait until all leaves have fallen.

B. Clean adjacent pavements of plant debris and other debris generated by maintenance activities.

C. Remove and dispose of general cleanup debris and biodegradable debris in a proper manner; City's trash collection facilities may be used.

D. Remove and dispose of general cleanup debris and biodegradable debris in a proper manner.
1. Biodegradable Debris: City will designate a compost pile on site where biodegradable debris may be deposited; branches and bark are not considered biodegradable.
2. Branches and Bark: City will designate a wood chip storage area; machine-chip all branch and bark debris.
3. Non-Biodegradable Debris: City's trash collection facilities may be used.

3.09 CLOSEOUT ACTIVITIES

A. 10 days prior to end of maintenance period, submit request for final inspection.

B. Final inspection will be conducted by City.

PART 4 MEASUREMENT AND PAYMENT

4.01 MAINTENANCE OF LANDSCAPE

A. Full compensation for Maintenance of Landscape shall be considered as included in the contract lump sum or unit price paid for the items involved, and no additional compensation shall be made therefor.

End of Section

PAGE NOT USED

Section 32 11 23

Aggregate Base Courses

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Aggregate base course.

1.02 RELATED REQUIREMENTS

A. Section 31 22 00 - Grading: Preparation of site for base course.

B. Section 32 13 13 - Concrete Paving: Finish concrete surface course.

1.03 REFERENCE STANDARDS

A. ASTM C136/C136M - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates; 2014.

B. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method; 2007.

C. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method; 2008.

D. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System); 2011.

E. ASTM D6938 - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth); 2010.

F. Caltrans Standard Specifications 2018

1.04 SUBMITTALS

A. See Section 01 30 30 - Submittal Procedures, for submittal procedures.

B. Materials Sources: Submit name of imported materials source for recycled aggregate.

C. Aggregate Composition Test Reports: Results of laboratory tests on proposed and actual materials used.

1.05 DELIVERY, STORAGE, AND HANDLING

A. When necessary, store materials on site in advance of need.

B. When aggregate materials need to be stored on site, locate where directed by City.

PART 2 PRODUCTS

2.01 MATERIALS

A. Class 2 Aggregate Base conforming to Caltrans Standard Specifications section 26 Aggregate Bases.

B. Permeable Class 2: Natural Washed stone, free of shale, clay, afiable material and debris.
   1. Graded in the following limits:
      a. 1 inch sieve: 100 percent passing.
      b. 3/4 inch sieve: 90-100 percent passing.
      c. 3/8 inch sieve: 40-100 percent passing
      d. No. 4 sieve: 25 to 40 percent passing
      e. No. 8 sieve: 18 to 33 percent passing.
      f. No. 30 sieve: 5 to 15 percent passing.
      g. No. 50 sieve: 0 to 7 percent passing.
      h. No. 200 sieve: 0 to 3 percent passing.

C. 3/4 inch drain rock:
   1. Crushed, washed
   2. Max size: 1 inch
   3. Minimum size: 3/8 inch

D. Use of recycled concrete aggregate is prohibited

2.02 SOURCE QUALITY CONTROL

A. Where aggregate materials are specified using ASTM D2487 classification, test and analyze samples for compliance before delivery to site.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that survey bench marks and intended elevations for the work are as indicated.

B. Verify substrate has been inspected, gradients and elevations are correct, and is dry.

3.02 PREPARATION

A. Correct irregularities in substrate gradient and elevation by scarifying, reshaping, and re-compacting.

B. Do not place aggregate on soft, muddy, or frozen surfaces.

3.03 INSTALLATION

A. Place aggregate in maximum 3 inch layers and roller compact to specified density.

B. Level and contour surfaces to elevations and gradients indicated.

C. Add small quantities of fine aggregate to coarse aggregate as appropriate to assist compaction.

D. Add water to assist compaction. If excess water is apparent, remove aggregate and aerate to reduce moisture content.

E. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

3.04 TOLERANCES

A. Flatness: Maximum variation of 1/4 inch measured with 10 foot straight edge.

B. Scheduled Compacted Thickness: Within 1/4 inch.

C. Variation From Design Elevation: Within 1/2 inch.

3.05 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements for general requirements for field inspection and testing.

B. Compaction density testing will be performed on compacted aggregate base course in accordance with ASTM D1556, ASTM D2167, or ASTM D6938.

C. If tests indicate work does not meet specified requirements, remove work, replace and retest.

D. Proof roll compacted aggregate at surfaces that will be under slabs-on-grade.

3.06 CLEANING

A. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

PART 4 MEASUREMENT AND PAYMENT

4.01 AGGREGATE BASE COURSES

A. Full compensation for Aggregate Base Courses shall be considered as included in the contract lump sum or unit price paid for the associated item and no additional compensation shall be made therefor.

End of Section

Section 32 12 16
Asphalt Paving

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Aggregate base course.

B. Single course bituminous concrete paving.

C. Double course bituminous concrete paving.

D. Surface sealer.

1.02 RELATED REQUIREMENTS

A. Section 32 13 13 - Concrete Paving.

1.03 REFERENCE STANDARDS

A. AI MS-2 - Mix Design Methods for Asphalt Concrete and Other Hot-Mix Types; 1997.

B. AI MS-19 - A Basic Asphalt Emulsion Manual; Fourth Edition.

C. ASTM D946 - Standard Specification for Penetration-Graded Asphalt Cement for Use in Pavement Construction; 2009a.

D. Caltrans Standard Specifications, 2018

1.04 QUALITY ASSURANCE

A. Perform work in accordance to all applicable laws, codes and regulations required by the City Berkeley, County of Alameda and the State of California.

B. Obtain materials from same source throughout.

1.05 FIELD CONDITIONS

A. Do not place asphalt when ambient air or base surface temperature is less than 40 degrees F, or surface is wet or frozen.

B. Place bitumen mixture when temperature is not more than 15 F degrees below bitumen supplier's bill of lading and not more than maximum specified temperature.

PART 2 PRODUCTS

2.01 MATERIALS

A. Asphalt Cement: ASTM D946.

B. Aggregate for Base Course In accordance with Caltrans Standard Specifications.

C. Asphalt Concrete Sufacing shall consist of a mixture of mineral aggregate and paving asphalt, mixed at a a central mixing plant.

D. Grade of asphlat shall be PG64-16

E. Density shall be 95% of maximum laboratory density as determined by Caltrans Standard Specifications.

F. Mineral Grade shall be Type A, 1/2" maximum size aggregate, medium grading and shall conform to the requirements set forth in Section 39 of the Caltrans Standard specifications.

G. Provide a dry, free flowing, dust free chemical compound, soluble in water, capable of inhibiting growth of vegetation. Use Amspray Corp "pavex" or approved equal.

H. Tack Coat: Homogenous, medium curing, liquid asphalt.

2.02 ASPHALT PAVING MIXES AND MIX DESIGN

A. Asphalt Base Course: 3.0 to 6 percent of asphalt cement by weight in mixture in accordance with AI MS-2.

B. Asphalt Wearing Course: 5 to 7 percent of asphalt cement by weight in mixture in accordance with AI MS-2.

2.03 SOURCE QUALITY CONTROL

A. Test mix design and samples in accordance with AI MS-2.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that compacted subgrade is dry and ready to support paving and imposed loads.

B. Verify gradients and elevations of base are correct.

3.02 AGGREGATE BASE COURSE

A. Install per Section 32 11 23 - Aggregate Base Courses.

3.03 PREPARATION - PRIMER

A. Apply primer in accordance with manufacturer's instructions.

B. Apply primer on aggregate base or subbase at uniform rate of 1/3 gal/sq yd.

C. Apply primer to contact surfaces of curbs, gutters.

D. Use clean sand to blot excess primer.

3.04 PREPARATION - TACK COAT

A. Apply tack coat in accordance with manufacturer's instructions.

B. Apply tack coat on asphalt or concrete surfaces over subgrade surface at uniform rate of 1/3 gal/sq yd.

C. Apply tack coat to contact surfaces of curbs, gutters and other concrete and existing asphalt edges.

3.05 PLACING ASPHALT PAVEMENT - SINGLE COURSE

A. Install work in accordance with Caltrans Standard Specifications.

B. Place asphalt within 24 hours of applying primer or tack coat.

C. Install gutter drainage grilles and frames in correct position and elevation.

D. Compact pavement by rolling to specified density. Do not displace or extrude pavement from position. Hand compact in areas inaccessible to rolling equipment.

E. Perform rolling with consecutive passes to achieve even and smooth finish without roller marks.

3.06 PLACING ASPHALT PAVEMENT - DOUBLE COURSE

A. Place asphalt binder course within 24 hours of applying primer or tack coat.

B. Place asphalt wearing course within two hours of placing and compacting binder course.

C. Compact pavement by rolling to specified density. Do not displace or extrude pavement from position. Hand compact in areas inaccessible to rolling equipment.

D. Perform rolling with consecutive passes to achieve even and smooth finish, without roller marks.

3.07 SEAL COAT

A. Apply seal coat to surface course and asphalt curbs in accordance with AI MS-19. and State of California Standard Specifications.

3.08 TOLERANCES

A. Flatness: Maximum variation of 1/4 inch measured with 10 foot straight edge.

B. Variation from True Elevation: Within 1/2 inch.

3.09 FIELD QUALITY CONTROL

A. See Section 01 45 00 Testing and Inspection for general requirements for quality control.

B. Provide field inspection and testing. Take samples and perform tests in accordance with AI MS-2.

3.10 PROTECTION

A. Immediately after placement, protect pavement from mechanical injury for 7 days or until surface temperature is less than 140 degrees F.

PART 4 MEASUREMENT AND PAYMENT

4.01 ASPHALT CONCRETE PAVING

A. The contract lump sum price paid for Asphalt Concrete Paving shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in Asphalt Concrete Paving, including forms, reinforcement, joints, accessories, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the City's Representative.

End of Section

PAGE NOT USED

Section 32 13 13
Concrete Paving

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Concrete flat work.

B. Joints.

1.02 RELATED REQUIREMENTS

A. Section 03 10 00 - Concrete Forming and Accessories.

B. Section 03 20 00 - Concrete Reinforcing.

C. Section 03 30 00 - Cast-in-Place Concrete.

D. Section 31 22 00 - Grading: Preparation of site for paving and base.

E. Section 31 23 23 - Fill: Compacted subbase for paving.

F. Section 32 11 23 - Aggregate Base Courses: Base course for paving.

1.03 REFERENCE STANDARDS

A. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; 1991 (Reapproved 2009).

B. ACI 301 - Specifications for Structural Concrete; 2010 (Errata 2012).

C. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; 2000.

D. ACI 305R - Hot Weather Concreting; 2010.

E. ACI 306R - Cold Weather Concreting; 2010.

F. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon Steel Bars for Concrete Reinforcement; 2015.

G. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2016.

H. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2015a.

I. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2015.

J. ASTM C150/C150M - Standard Specification for Portland Cement; 2016.

K. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; 2010a.

L. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 2011.

M. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2013.

N. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete; 2015.

O. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types); 2004 (Reapproved 2013).

P. Caltrans Standard Specifications, 2018

1.04 SUBMITTALS

A. See Section 01 33 00 - Submittals, for submittal procedures.

B. Product Data: Provide data on joint filler, admixtures, and curing compound.

C. Samples for Pigment Color Selection: Submit manufacturer's complete sample chip set, including pigment number and required dosage rate for each color.

D. Concrete mix design.

PART 2 PRODUCTS

2.01 FORM MATERIALS

A. Form Materials: As specified in Section 03 10 00, comply with ACI 301.

2.02 REINFORCEMENT

A. Reinforcing Steel and Welded Wire Reinforcement: Types specified in Section 03 20 00.

B. Dowels: ASTM A615/A615M, Grade 40 - 40,000 psi yield strength; smooth billet steel bars; unfinished finish.

2.03 CONCRETE MATERIALS

A. Obtain cementitious materials from same source throughout.

B. Cement: ASTM C150/C150M, Normal - Type I Portland cement, gray color.

C. Fly Ash: ASTM C618, Class C or F.

D. Water: Clean, and not detrimental to concrete.

E. Air-Entraining Admixtures: ASTM C260/C260M.

F. Chemical Admixtures: ASTM C494/C494M, Type A - Water Reducing, Type C - Accelerating, and Type G - Water Reducing, High Range and Retarding.

G. Color Additives: Pure, concentrated mineral pigments specifically intended for mixing into concrete and complying with ASTM C979/C979M.
   1. Concentration: Base dosage rates on weight of Portland cement, fly ash, silica fume, and other cementitious materials but not aggregate or sand.
   2. Color(s) Lamp Black: 1.5 lbs per cubic yard. Per City of Berkeley standard details.
   3. Color: To match Landscape Architect's sample(s) when incorporated into specified mix design.

2.04 ACCESSORIES

A. Control Joint Sealant:
   1. Manufacturer: Sika. www.usa.sika.com.
   2. Product: Sikaflex 1c SL.

2.05 CONCRETE MIX DESIGN

A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.

B. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended by manufacturer.

C. Concrete Properties:
   1. Compressive strength, when tested in accordance with ASTM C39/C39M at 28 days; 3,000 psi.
   2. Fly Ash Content: Maximum 15 percent of cementitious materials by weight.
   3. Maximum Slump: 3 inches.

2.06 MIXING

A. Transit Mixers: Comply with ASTM C94/C94M.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify compacted subgrade is acceptable and ready to support paving and imposed loads.

B. Verify gradients and elevations of base are correct.

3.02 SUBBASE

A. See Section 32 11 23 for construction of base course for work of this Section.

3.03 PREPARATION

A. Moisten base to minimize absorption of water from fresh concrete.

3.04 FORMING

A. Place and secure forms to correct location, dimension, profile, and gradient.

B. Assemble formwork to permit easy stripping and dismantling without damaging concrete.

C. Place joint filler vertical in position, in straight lines. Secure to formwork during concrete placement.

3.05 REINFORCEMENT

A. Place reinforcement as indicated.

3.06 COLD AND HOT WEATHER CONCRETING

A. Follow recommendations of ACI 305R when concreting during hot weather.

B. Follow recommendations of ACI 306R when concreting during cold weather.

C. Do not place concrete when base surface temperature is less than 40 degrees F, or surface is wet or frozen.

3.07 PLACING CONCRETE

A. Place concrete in accordance with ACI 304R.

B. Do not place concrete when base surface is wet.

C. Ensure reinforcement, inserts, embedded parts, formed joints are not disturbed during concrete placement.

D. Place concrete continuously over the full width of the panel and between predetermined construction joints.

3.08 JOINTS

A. Place 3/8 inch wide expansion joints at locations indicated on Drawings and to separate paving from vertical surfaces and other components and in pattern indicated.
   1. Secure to resist movement by wet concrete.
   2. Caulk with joint sealer per manufacturer's instructions.

B. Provide weakened plan joints joints as indicated on Drawings. Refer to City of Berkeley Public Works Standard Details Concrete Notes Plan 8144.

3.09 FINISHING

A. Area Paving: medium broom finish.

3.10 TOLERANCES

A. Maximum Variation of Surface Flatness: 1/4 inch in 10 ft.

B. Maximum Variation From True Position: 1/4 inch.

3.11 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 4500 Testing and Inspection
   1. Provide free access to concrete operations at project site and cooperate with appointed firm.
   2. Tests of concrete and concrete materials may be performed at any time to ensure compliance with specified requirements.

B. Maintain records of placed concrete items. Record date, location of pour, quantity, air temperature, and test samples taken.

3.12 PROTECTION

A. Immediately after placement, protect pavement from premature drying, excessive hot or cold temperatures, and mechanical injury.

B. Do not permit pedestrian traffic over pavement until 75 percent design strength of concrete has been achieved.

PART 4 MEASUREMENT AND PAYMENT

4.01 CONCRETE PAVING

A. Full compensation for Concrete Paving shall be considered as included in the contract price paid for Site Concrete, and no separate compensation will be allowed therefor.

End of Section

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Section 32 15 25

Infield Surfacing & Decomposed Granite Paving

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Supply and installation of a complete infield skin surface, and warning track mixes including:
   1. PROGold Standard Infield Mix
   2. Decomposed Granite Paving - Permeable / Non Stabilized (adjacent to playground and to warning track)
   3. Decoposed Granite Paving - Stabilized Non Vehicular (south-west entry path to ball field and adjacent to playground)
   4. The terms "Decomposed Granite" and "D.G." are used interchangeably herein and on the Drawings.

1.02 RELATED REQUIREMENTS

A. Section 31 22 00 - Grading

B. Section 32 31 13 - Chain Link Fences and Gates and Gates

C. Section 32 92 23 - Sodding

D. Section 32 92 19 - Seeding

1.03 REFERENCES

A. ASTM F-1632: Standard Test Method for Particle Size Analysis

B. ASTM D- 422: Standard Test Method for Fine Particle Size Analysis

C. ASTM C136 – Sieve Analysis of Fine and Coarse Aggregates.

D. ASTM D2419 – Sand Equivalent Value of Soils and Fine Aggregates.

1.04 SUBMITTALS

A. Submit in accordance with Section 01 33 00 - Submittal Procedures.

B. Manufacturer’s product data sheet and installation instructions for each product to be used.
   1. 5-pound sample for each product to be used along with a private lab test indicating the particle size analysis of the material. All tests shall be performed in accordance with ASTM F-1632.
   2. Manufacturer’s maintenance and cleaning instructions for each product to be used.

1.05 PROJECT/ SITE CONDITIONS

A. All Earthwork shall be performed in accordance with the preceding sections.

B. Subbase material shall be uniformly graded and compacted, and shall mirror finish grade contours to ensure an even depth of material.

C. Survey subgrade elevations prior to placement of material.

D. Construct skin surfaces with a finish grade that provides adequate surface drainage, ideally 0.5 to 1.5% slope away from the center of the infield.

E. Reuse existing salvaged infiled mix.

PART 2: PRODUCTS

2.01 MATERIALS

A. PROGold Standard Infield Mix (or City approved equal), Premium Warning Track Mix engineered soil products produced by Gail Materials, Corona, CA; phone 951-667-6106; fax 951-667-6102; www.gailmaterials.net.
   1. PROGold Standard Infield Mix is +/- 70% sand, and +/- 30% combined silt and clay:
      a. Gradation: A minimum of 98% of particles shall pass the 2.00 mm sieve with the highest portion of sand particles in the medium to very fine range. Silt and Clay distribution shall be relatively equal with the ratio of silt to clay .5 - 1.2. The final soil classification based on USDA criteria shall be a “sandy loam - sandy clay loam”.
      b. Color: “Gold” to “Reddish Gold”.

2.02 DECOMPOSED GRANITE

A. Sand and crushed stone shall consist of inert materials that are hard and durable, with stone free from surface coatings and deleterious materials. Gradation requirements shall be as follows:

B. Crushed Stone Sieve Analysis Percentage of Weight Passing a Square Mesh Sieve AASHTO T11-82 and T2782

Sieve Size	Percent Passing
3/8"	100
#4	90-100
#8	75-80
#16	55-65
#30	40-50
#50	25-35
#100	15-20
#200	10-15

C. Sand Equivalent: 30 minimum in accordance with ASTM D2419.

D. Color: California gold.

2.03 BINDER / STABILIZED DECOMPOSED GRANITE

A. Location: South-west entry path to ball field.

B. Use Stablized Sunset Gold Path Fines from Lyngso Garden Materials or approved equivalent.

C. Binder used in Lyngso Stabilized Sunset Gold Path Fines is Gator Stone Pathway Stabilizer.

2.04 ACCESSORIES

A. Water: Free from contaminants that would discolor or be deleterious to stabilized decomposed granite surfacing.

B. Geosynthetic Fabric: Comply with Greenbook Section 213-2 – “Geosynthetics”, Type N90. Only install at permeable decomposed granite.

PART 3: EXECUTION

3.01 PLACEMENT

A. Surfacing Placement
   1. Infield surfacing and warning track surfacing shall be installed in strict conformance with the manufacturer’s specifications to the lines and grades as shown in the Drawings.
   2. Place material to a final minimum depth as shown on Drawings when finished and compacted. The final grade should be leveled and sloped according to standard infield construction specifications. Allow for +/- 1 inch for compaction.

B. Watering
   1. After leveling the infield skin thoroughly water the entire infield surface until the complete depth of the infield mix is moistened. After a period of +/- 4 hours compact with a minimum 2000 lb. static drum roller. If low areas are present, scarify and level low areas with additional infield mix.

C. Inspection
   1. The finished surface of the infield shall be smooth and free from any visible dips, humps, bumps for other blemishes which would hinder the removal of water through positive surface drainage. Correct irregularities to the satisfaction of the Landscape Architect.
   2. Conduct finished elevation survey to assure proper installation.

D. Topdressing
   1. Following successful inspection, topdressing may be applied, consisting of a calcified clay product added at a rate of one 50-pound bag per 100 square ft.

PART 4 MEASUREMENT AND PAYMENT

4.01 INFIELD SURFACING AND DECOMPOSED GRANITE PAVING

A. The contract lump sum price paid for Infield Surfacing and Decomposed Granite Paving shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in Infield Surfacing and Decomposed Granite Paving, complete in place, as shown on the

plans, as specified in the Standard Specifications and these special provisions, and as directed by the City's Representative.

End of Section

PAGE NOT USED

Section 32 17 23.13

Painted Pavement Markings

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Dugout markings, including handicapped symbols.

1.02 RELATED REQUIREMENTS

1.03 REFERENCE STANDARDS

A. FS TT-P-1952 - Paint, Traffic Black, and Airfield Marking, Waterborne; Rev. E, 2007.

B. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association; current edition, www.paintinfo.com.

C. FHWA MUTCD - Manual on Uniform Traffic Control Devices for Streets and Highways; U.S. Department of Transportation, Federal Highway Administration; Current Edition.

1.04 SUBMITTALS

A. See Section 01 33 00 - Submittals, for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

C. Certificates: Submit for each batch of paint stating compliance with specified requirements.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver paint in containers of at least 5 gallons accompanied by batch certificate.

B. Store products in manufacturer's unopened packaging until ready for installation.

C. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

PART 2 PRODUCTS

2.01 MATERIALS

A. Line and Zone Marking Paint: MPI (APL) No. 97 Latex Traffic Marking Paint; color(s) as indicated.
   1. Handicapped Symbols: Blue.

PART 3 EXECUTION

3.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Landscape Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

A. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

B. Clean surfaces thoroughly prior to installation.
   1. Remove dust, dirt, and other granular surface deposits by sweeping, blowing with compressed air, rinsing with water, or a combination of these methods.

C. Where oil or grease are present, scrub affected areas with several applications of trisodium phosphate solution or other approved detergent or degreaser, and rinse thoroughly after each application; after cleaning, seal oil-soaked areas with cut shellac to prevent bleeding through the new paint.

D. Establish survey control points to determine locations and dimensions of markings; provide templates to control paint application by type and color at necessary intervals.

E. Temporary Pavement Markings: When required or directed by Landscape Architect, apply temporary markings of the color(s), width(s) and length(s) as indicated or directed.
   1. After temporary marking has served its purpose, remove temporary marking by carefully controlled sandblasting, approved grinding equipment, or other approved method so that surface to which the marking was applied will not be damaged.

2. At Contractor's option, temporary marking tape may be used in lieu of temporary painted marking; remove unsatisfactory tape and replace with painted markings at no additional cost to City.

3.03 INSTALLATION

A. Begin pavement marking as soon as practicable after surface has been cleaned and dried.

B. Do not apply paint if temperature of surface to be painted or the atmosphere is less than 50 degrees F or more than 95 degrees F.

C. Apply in accordance with manufacturer's instructions using an experienced technician that is thoroughly familiar with equipment, materials, and marking layouts.

D. Comply with FHWA MUTCD manual (http://mutcd.fhwa.dot.gov) for details not shown.

E. Apply markings in locations determined by measurement from survey control points; preserve control points until after markings have been accepted.

F. Apply uniformly painted markings of color(s), lengths, and widths as indicated on drawings true, sharp edges and ends.
   1. Apply paint in one coat only.
   2. Wet Film Thickness: 0.015 inch, minimum.
   3. Width Tolerance: Plus or minus 1/8 inch.

G. Symbols: Use a suitable template that will provide a pavement marking with true, sharp edges and ends, of the design and size indicated.

3.04 DRYING, PROTECTION, AND REPLACEMENT

A. Protect newly painted markings so that paint is not picked up by tires, smeared, or tracked.

B. Provide barricades, warning signs, and flags as necessary to prevent traffic crossing newly painted markings.

C. Allow paint to dry at least the minimum time specified by the applicable paint standard and not less than that recommended by the manufacturer.

D. Remove and replace markings that are applied at less than minimum material rates; deviate from true alignment; exceed length and width tolerances; or show light spots, smears, or other deficiencies or irregularities.

E. Remove markings in manner to avoid damage to the surface to which the marking was applied, using carefully controlled sand blasting, approved grinding equipment, or other approved method.

F. Replace removed markings at no additional cost to City.

PART 4 MEASUREMENT AND PAYMENT

4.01 PAINTED PAVEMENT MARKINGS

A. The contract lump sum price paid for Painted Pavement Markings shall include full compensation for funishing all labor, materials, tools, equipment, and incidentals and for doing all work involved in Painted Pavement Markings, complete in place, as shown on the plans, as specified in Standard Specifications and these special provisions, and as directed by the City's representative.

End of Section

Section 32 18 16.13

Playground Protective Surfacing

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Protective surfacing for playground area:
   1. Poured-in-Place Rubber.
   2. Engineered Wood Fiber (EWF).
   3. Sand Fill.

B. Accessories.

C. Subbase under resilient surfacing.

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Containment curbs.

B. Section 11 68 13 - Playground Equipment: Playground layout (staking).

C. Section 32 11 23 - Aggregate Base Courses: Subbase for poured-in-place rubber.

D. Section 32 13 13 - Concrete Paving: Subbase for poured-in-place rubber.

1.03 REFERENCE STANDARDS

A. ASTM C136/C136M - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates; 2014.

B. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN m/m3)); 2012.

C. ASTM D2047 - Standard Test Method for Static Coefficient of Friction of Polish-Coated Floor Surfaces as Measured by the James Machine; 2011.

D. ASTM F1292 - Standard Specification for Impact Attenuation of Surface Systems Under and Around Playground Equipment; 2009.

E. ASTM F1487 - Standard Consumer Safety Performance Specification for Playground Equipment for Public Use; 2011.

F. ASTM F2075 - Standard Specification for Engineered Wood Fiber for Use as a Playground Safety Surface Under and Around Playground Equipment; 2010a.

G. CPSC Pub. No. 325 - Public Playground Safety Handbook; 2010.

1.04 DEFINITIONS

A. Use Zone: The area beneath and immediately adjacent to a play structure or equipment (play event) that is designated for unrestricted circulation around equipment, and on whose surface it is predicted that a user would land when falling from or exiting the equipment.

B. Critical Fall Height: The maximum fall height at which the protective surfacing meets the requirements of ASTM F1292.

C. Fall Height: The vertical distance between the finished elevation of the designated play surface and the finished elevation of the protective surfacing beneath it as defined by ASTM F1487.

D. Protective Surfacing: Resilient ground surfacing. The characteristics of the protective surfacing are based on the fall height of the playground equipment. Changes in either the surfacing or the fall height, particularly reducing the resilience of the protective surfacing or increasing the fall height, will reduce safety-related performance.

E. Subbase: A layer under the resilient layer of the protective surfacing but over the subgrade; may be rigid, as in concrete or bituminous, or aggregate.

F. Subgrade: The surface of the ground on which the protective surfacing is installed.

1.05 SUBMITTALS

A. See Section 01 33 00 - Submittal Procedures - Administrative Requirments, for submittal procedures.

B. Product Data: For all manufactured surfacing products, provide manufacturer's product data showing materials of construction, compliance with specified standards, installation procedures, and safety limitations.
   1. Include IPEMA certifications where required.

C. Samples: For colored wearing course, provide actual material samples for full range of colors.

1. Rubber, colored wearing course: actual material samples of manufacturer's full color range.
2. EWF: actual material sample in (2) quart-size zip-lock bags.
3. Sand: actual material sample in (2) quart-size zip-lock bags.

D. Documentation/evidence of manufacturer and installer qualifications.

1.06 QUALITY ASSURANCE

A. Maintain one copy of the latest edition of ASTM F1487 and CPSC Pub. No. 325 at project site.

B. Manufacturer Qualifications: Company regularly engaged in manufacturing products specified in this section, with not less than 10 years of documented experience.
1. Surfacing installed in minimum 20 sites and been in successful service minimum 7 years.

C. Installer Qualifications: Company certified by manufacturer for training and experience installing the protective surfacing; provide installer's company name and address, and training and experience certificate.

1.07 PRE-INSTALLATION MEETING

A. Convene a meeting one week before starting earthwork for playground to discuss coordination between various installers.
1. Require attendance by personnel responsible for grading and installers of playground equipment, protective surfacing, footings, and adjacent work.
2. Include representatives of Contractor.
3. Notify Landscape Architect at least 2 weeks prior to meeting.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver, handle, and store protective surfacing to project site in accordance with manufacturer's recommendations.

B. Store materials in a dry, covered area, elevated above grade.

1.09 WARRANTY

A. Provide minimum 7 year warranty for playground surfacing.

PART 2 PRODUCTS

2.01 Performance CRITERIA

A. Because the safety of the playground depends on strict compliance with the performance criteria, this information is provided for Contractor's information.
1. The protective surfacing constitutes a resilient layer installed over a non-resilient layer, which is installed over the subgrade, with the top of playground equipment footings and anchorage devices covered by full depth of the resilient portion of the protective surfacing.

B. If deviation from specified depth is required, it is the Contractor's responsibility to make all changes required to maintain specified top elevation and required impact attenuation at no extra cost to City; obtain approval prior to proceeding; follow approval request procedure as specified for substitutions.

2.02 MATERIALS

A. Poured-In-Place Membrane Surfacing: Weather-resistant wear layer over impact attenuating substrate over aggregate subbase.
1. Wear Layer: Thermal Plastic Vulcanized (TPV) granules with an aliphatic binder formulated to produce an even, uniform, seamless surface.
2. Wear Layer Thickness: 1/2 inch, minimum.
3. Coefficient of Friction, when wet: 0.8, minimum, when tested in accordance with ASTM D2047.
4. Wear Layer Color(s): As selected from manufacturer's full range of bright / premium colors. See Materials Legend for colors. Submit samples.
5. Impact Attenuating Substrate: 100 percent recycled shredded styrene butadiene rubber (SBR) shreds or granules with 100 percent solids polyurethane binder to form a resilient porous material; do not use foam rubber.
6. Resilient Depth: As required to achieve specified Critical Fall Height as defined in ASTM F1292 but not more than depth indicated; maintain top elevation flush with adjacent grades.
7. Certification: Provide IPEMA certification of ASTM F1292 Critical Fall Height at thickness specified.
8. Products:
   a. "Tot Turf Supreme" Poured Rubber
      1) TPV 0.5 - 1.5mm granules with aliphatic urethane binder.
      2) Manufacturer: Robertson Recreational Surfaces: www.totturf.com.

(a) Contact: Frank Horwath. (510) 260-9025

b. Substitutions: See Section 01 25 00 - Substitutions Procedures.

B. Engineered Wood Fiber Fill: Manufactured for the purpose of protective surfacing; complying with ASTM F2075; do not use mulch manufactured from recycled pallets, or lumber containing nails or metal fasteners.
   1. Depth: As required to achieve specified Critical Fall Height as defined in ASTM F1292 but not more than depth indicated; maintain top elevation flush with adjacent grades.
   2. Certification: Provide IPEMA certification of ASTM F1292 Critical Fall Height at thickness specified.

C. Sand Fill: Uniformly graded (not "well graded"); washed; free of dust, clay, dirt, organic material, hazardous substances, and foreign objects; naturally or mechanically rounded particles; sieved in accordance with ASTM C136/C136M in the specified gradation range.
   1. Percent Passing Sieve Size No. 8: 100 percent.
   2. Percent Passing Sieve Size No. 16: 80 to 100 percent.
   3. Percent Passing Sieve Size No. 30: 40 to 75 percent.
   4. Percent Passing Sieve Size No. 50: 0 to 25 percent.
   5. Percent Passing Sieve Size No. 100: Less than 2 percent.
   6. Depth: As indicated on drawings.
   7. Sand to be reused / salvaged sand from existing on site playground sand.

D. Geotextile: Nonwoven polypropylene sheet.

E. Aggregate Subbase: See Section 32 11 23.

PART 3 EXECUTION

3.01 EXAMINATION

A. Playground equipment installer will perform playground layout prior to installation of footings; verify correctness of layout before starting this work.

B. Verify that playground equipment and site furnishings and irrigation system located within playground area are complete.

C. Verify location of underground utilities and facilities in the playground area. Damage to underground utilities and facilities will be repaired at Contractor's expense.

D. Verify that subgrades are at proper elevations and that smooth grading is complete.

E. Verify that proper depth of surfacing is marked on base supports of playground equipment.

3.02 PREPARATION

A. Correct subgrade irregularities to ensure that required depth of protective surfacing can be installed, and subgrade elevation is in accordance with manufacturer's requirements.

B. Inside Use Zones remove all obstructions that would extend into the resilient protective surfacing.

C. Remove rocks, debris, and other similar items.

3.03 SUBBASE

A. Install aggregate subbase as indicated on drawings and in Section 32 11 23. Compact aggregate to maximum 95 percent, in accordance with ASTM D1557.

B. Install with top surface of subbase no higher than grades and levels indicated and not more than 1/4 inch lower than grades and levels indicated.

C. Install in true, even plane, sloped to provide positive drainage.

D. Flatness Tolerance: 1/4 inch in 10 feet, maximum.

3.04 RESILIENT SURFACING LAYER

A. Install in accordance with CPSC Pub. No. 325, ASTM F1487, manufacturer's instructions, and requirements of authorities having jurisdiction (AHJ).

B. Install proper thickness throughout Use Zone(s).

C. Clean and dry surface of subbase.

D. Cover aggregate subbase with geotextile:
   1. Verify that aggregate is free of ruts or protruding objects.
   2. Lap minimum 4 inches width at seams. Adhere seams in accordance with manufacturer's recommendations.

3. Install smooth, and free of tensile stresses, folds, or wrinkles.
4. Protect from clogging, tears, or other damage during surfacing installation.
5. Repair or replace damaged geotextile in accordance with manufacturer's recommendations.

E. Poured In Place Surfacing:
1. Mix components mechanically on-site in accordance with manufacturer's directions; do not mix by hand.
2. Install seamlessly; ensure complete bond to subbase.
3. Cover footings and foundations and adhere tightly around penetrating elements.
4. Maintain full thickness of resilient layers within Use Zone; cover or abut containment curbs as indicated on drawings; completely cover tapered transition edges.
5. Hand trowel exposed surface to smooth, even finish.
6. Impact Attenuation Layer: Install entire layer in one continuous pour on the same day.
7. Wear Surface: Bond wear surface to substrate with adhesive. Apply adhesive in small quantities so that wear surface can be applied before adhesive dries.
a. Install surfacing seamlessly. When wear surface is composed of different color patterns, pour surface continuously and seamlessly.
b. When seams are required due to color change or field conditions, place adjacent wear surface as soon as possible, before initial pour has cured. Coat edge of initial pour with adhesive and apply wear surface mixture immediately.
c. Add a minimum of 1/16 inch depth to specified surfacing depth to ensure required impact attenuation performance is met.
d. Install wear surface to cover foundations and adhere tightly around elements penetrating the surface.

3.05 LOOSE FILL SURFACING

A. Install in accordance with CPSC Pub. No. 325, ASTM F1487, and requirements of authorities having jurisdiction (AHJ).

B. Cover Subgrade with Geotextile:
1. Lap minimum 4 inches width at seams. Adhere seams in accordance with manufacturer's recommendations.
2. Install smooth, and free of tensile stresses, folds, or wrinkles.
3. Protect from clogging, tears, or other damage during surfacing installation.
4. Repair or replace damaged geotextile in accordance with manufacturer's recommendations.

C. Install loose fill to depths indicated, with smooth even surface flush with tops of containment curbs.

D. Sand: Determine finished elevation after sand has been settled with water and percolating.

3.06 FIELD QUALITY CONTROL

A. City or City's representative will inspect playground surfacing after installation to verify that surfacing is of proper type and depth and that playground meets specified design safety and accessibility requirements.

B. Repair or replace rejected work until compliance is achieved.

3.07 CLEANING AND PROTECTION

A. Restore adjacent existing areas that have been damaged from the construction.

B. Clean playground equipment of construction materials, dirt, stains, filings, and blemishes due to shipment or installation. Clean in accordance with manufacturer's instructions, using cleaning agents as recommended by manufacturer.

C. Clean playground area of excess construction materials, debris, and waste.

D. Remove excess and waste material and dispose of off-site in accordance with requirements of authorities having jurisdiction.

E. Protect installed products until Date of Substantial Completion.

F. Replace damaged products before Date of Substantial Completion.

PART 4 MEASUREMENT AND PAYMENT

4.01 RESILIENT RUBBER SURFACING

A. The contract lump sum price paid for Resilient Rubber Surfacing shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in Resilient Rubber Surfacing, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the City’s Representative.

4.02 SAND SURFACING

A. The contract lump sum price paid for Sand Surfacing shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in Sand Surfacing, complete in place, including sifting, cleaning, and transporting surplus sand, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the City's Representative.

4.03 ENGINEERED WOOD FIBER SURFACING

A. The contract lump sum price paid for Engineered Wood Fiber Surfacing shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in Engineered Wood Fiber Surfacing, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the City's Representative.

End of Section

PAGE NOT USED

Section 32 31 13
Chain Link Fences and Gates

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Chainlink fences, posts, rails, frames and fabric.

B. Manual gates with related hardware.

C. Softball Backstop.

D. Net posts & nets

E. Accessories.

1.02 RELATED REQUIREMENTS

A. Division 01 - General Requirements.

B. Section 03 30 00 - Cast-in-Place Concrete: Concrete anchorage for posts.

C. Section 09 91 13 - Exterior Painting

1.03 REFERENCE STANDARDS

A. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2015.

B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.

C. ASTM A392 - Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric; 2011a.

D. ASTM F567 - Standard Practice for Installation of Chain-Link Fence; 2011.

E. ASTM F668 - Standard Specification for Polyvinyl Chloride (PVC) and Other Organic Polymer-Coated Steel Chain-Link Fence Fabric; 2011.

F. ASTM F1083 - Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures; 2013.

G. CLFMI CLF-SFR0111 - Security Fencing Recommendations; 2014.

1.04 SUBMITTALS

A. See Section 01 33 00 - Submittals, for submittal procedures.

B. Product Data: Provide data on fabric, posts, accessories, fittings, connections,cables, hardware and backstop components. Shop drawings to include layout plans, elevations, and details.

C. Shop Drawings: Indicate plan layout, spacing of components, post foundation dimensions, hardware anchorage, and schedule of components. See CLFMI CLF-SFR0111 for planning and design recommendations.

1. Shop drawings to be provided for the following:
    a. Softball backstop
    b. Fence type 1, 2, 3 and 4 typical
    c. Netting posts, nets and cables
    d. Gate Types 1 & 2
    e. Gate at stairs / west side of field.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

B. Fence Installer: Company with demonstrated successful experience installing similar projects and products, with not less than five years of documented experience.

1.06 WARRANTY

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Correct defective Work within a 2 year period after Date of Substantial Completion.

C. Provide 2 year manufacturer warranty for chain-link fences, gates, softball backstop, netting posts and associated accessories..

PART 2 PRODUCTS

2.01 FENCES, GATES, POSTS & SOFTBALL BACKSTOP

A. Fence Type 1 : 42" high chain link fence - Replace existing mesh and paint existing posts.
   1. Chainlink Fence: New vinyl covered 2" wire mesh.
      a. Color: Black.

B. Fence Type 2 - 5'-0" high chain link fence - Replace existing mesh, replace broken rails, paint metal work and install wind screens. Refer to dwgs.
   1. Chainlink Fence: New vinyl covered 2" wire mesh.
      a. Color: Black.
   2. Fence Rail: Replace broken / damaged rails. Match existing.

C. Fence Type 3 - 10'-0" high chain link fence - Replace existing mesh and paint existing posts. Replace and straighten some posts. Refer to dwgs.
   1. Chainlink Fence: New vinyl covered 2" wire mesh.
      a. Color: Black

D. Fence Type 4 - 18-'0" high chain link fence - Refer to dwgs.
   1. Chainlink Fence: New vinyl covered 2" wire mesh.
      a. Color: Black

E. Gate Type 1 - New ADA gate to north-west and north-east field entries.
   1. Chainlink: New vinyl covered 2" wire mesh.
      a. Color: Black.

F. Gate Type 2 - New ADA and vehicular gate at playground entry.
   1. Chainlink: New vinyl covered 2" wire mesh.
      a. Color: Black.

G. Gate Type 3 - South Pedestrian and Vehicular Gates.
   1. Chainlink: New vinyl covered 2" wire mesh
      a. Color: Black.

H. Softball Backstop and Net Posts - New softball backstop. Refer to dwgs and Specification Section 05 50 00 Metal Specifications.

2.02 MATERIALS

A. Posts, Rails, and Frames: ASTM F1083 Schedule 40 hot-dipped galvanized steel pipe, welded construction, minimum yield strength of 30 ksi.
   1. Line posts: 2-3/8 inch O.D.
   2. End, Corner, Pull posts: 3-1/2 inch O.D.
   3. Top, brace, bottom, and intermediate rails: 1-5/8" O.D.

B. Wire Fabric:
   1. ASTM A392 zinc coated steel chain link fabric.
   2. Top selvage: knuckle and closed.
   3. Bottom selvage: twist.
   4. Thickness: 9 gauge core.
   5. Size: varies, see fence types.
   6. Polymer coating: Class 2.
      a. Color: Black.

C. Ball Net Posts
   1. Refer to dwgs and Specification Section 05 50 00 Metal Specifications.

D. Softball Backstop
   1. Refer to dwgs and Specification Section 05 50 00 Metal Specifications.

E. Ball Containment Netting
   1. Manufacturer: West Coast Netting: https://westcoastnetting.com/
   2. Contact/Sales Representative: Dan Kirkland (928) 692-1144, dkirkland@westcoastnetting.com
   3. Netting: K21T Treated Black Netting with 1-3/4" opening, 3/8" polypropylene rope edge.
   4. Refer to drawings.

2.03 ACCESSORIES

A. Caps: Cast steel galvanized; sized to post diameter, set screw retainer.

B. Fittings: Sleeves, bands, clips, rail ends, tension bars, fasteners and fittings; steel.

2.04 FINISHES

A. Components and Fabric: Vinyl coated.

B. Accessories: Same finish as framing.

C. Color(s): Black.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verification of Conditions: Verify that areas are clear of obstructions or debris.

3.02 INSTALLATION

A. Install framework, fabric, accessories and gates in accordance with ASTM F567.

B. Set intermediate posts plumb. Slope top of concrete for water runoff.

C. Line Post Footing Depth Below Finish Grade: ASTM F567.

D. Corner, Gate and Terminal Post Footing Depth Below Finish Grade: ASTM F567.

E. Brace each gate and corner post to adjacent line post with diagonal truss rods. Install brace rail one bay from end and gate posts.

F. Provide top rail through line post tops and splice with 6 inch long rail sleeves.

G. Install center brace rail on corner gate leaves.

H. Do not stretch fabric until concrete foundation has cured 28 days.

I. Position bottom of fabric 2 inches above finished grade.

J. Attach fabric to end, corner, and gate posts with tension bars and tension bar clips.

K. Do not attach the hinged side of gate to building wall; provide gate posts.

L. Provide concrete center drop to footing depth and drop rod retainers at center of double gate openings.

3.03 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch.

B. Maximum Offset From True Position: 1 inch.

PART 4 MEASUREMENT AND PAYMENT

4.01 CHAIN LINK FENCES AND GATES (INCLUDING WIND SCREEN)

A. The contract lump sum price paid for Chain Link Fences and Gates (including softball backstop and other accessories) shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in Chain Link Fences and Gates, including netting, net poles, posts, frames, fabric, gates, related hardware, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the City's Representative.

End of Section

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Section 32 31 15

Tree Protection and Temporary Fencing

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Tree Protection.

B. Temporary Construction Fencing

1.02 SUBMITTALS

A. See Section 01 33 00 - Submittals, for submittal procedures.

B. Provide Data: Provide data on fabric, posts, accessories, fittings and hardware.

PART 2 PRODUCTS

2.01 Tree Protection Fencing

A. Manufacturer / Supplier: By Contractor.

B. Refer to drawings for product information.

2.02 Temporary Construction Fencing

A. Manufacturer / Supplier: By Contractor.

B. Refer to drawings for product information.

PART 3 EXECUTION

3.01 GENERAL

A. Contractor shall erect tree protective fencing and temporary construction fencing. Refer to drawings for layout.

3.02 DAMAGE TO EXISTING VEGETATION

A. Any trees damaged during construction shall be immediately repaired by a tree surgeon / arborist acceptable to the City at the Contractors expense.

B. Any tree judged by the accepted arborist to be damaged beyond repair shall be removed at contractors expense.

C. Contractor shall replace each damaged tree with nursery-grown material of similar size and of the same or approved species.

1. Replacement trees shall be the greater of a two (2)-inch caliper or size equivalent to the size of the damaged tree, balled and burlapped, and planted in accordance with City standards.

PART 4 MEASUREMENT AND PAYMENT

4.01 TREE PROTECTION AND FENCING

A. The contract lump sum price paid for Tree Protection and Temporary Fencing shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in Tree Protection and Temporary Fencing, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the City's Representative.

End of Section

PAGE NOT USED

Section 32 33 00

Site Furnishings

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Tables

B. Benches

C. Trash receptacles.

D. Grills.

E. Drinking Fountain.

F. Bat Rack

1.02 RELATED REQUIREMENTS

1.03 SUBMITTALS

A. See Section 01 33 00 - Submittal Procedures

B. See Section 00 63 25 Substitution Form.

C. Product Data: Provide manufacturer's specifications and descriptive literature, installation instructions, and maintenance information.

1.04 WARRANTY

A. Provide manufacturer's warranty against defects in materials or workmanship.

PART 2 PRODUCTS

2.01 Tables

A. Table
   1. Manufacturer: DuMor.
   2. Model: 298-60-2HS (ADA)
   3. Desciption: Table with two benches (ADA)
   4. Size: 6'
   5. Options:
      a. Color: Black.
      b. Mounting: Surface mount on concrete.

2.02 Bench

A. Bench - Type 1. (Benches at Playground and Surrounds)
   1. Manufacturer: Victor Stanley, or Approved equal
   2. Model: RBF-28-6
   3. Description: Metal bench with back and armrests.
   4. Size: 6ft long
   5. Options:
      a. Color: Black
      b. Mounting: Surface Mount

B. Bench - Type 2. (Sports Benches at Dugouts)
   1. Manufacturer: Wabash Valley.
   2. Model: SG406P
   3. Description:Metch bench with back.
   4. Size: 6' long
   5. Options:
      a. Color: Black.
      b. Mounting: Surface mount.

2.03 Trash Receptacles

A. Manufacturer:Urban Renaissance

B. Model: SLURB-36RB

C. Description: Receptacle with integrated Recycle Bin by Forms and Surfaces.

D. Size: 36 Gallon

E. Options:
   1. Powdercoat color: Black Gloss
   2. Mounting: Surface mounted.
   3. Opening: Side; Lid Type.
   4. Lid Type: Dome
   5. Updrop Grillwork
   6. Security Latch
   7. No drain hole in liner

2.04 Grills

A. Manufacturer: Pilot Rock: www.pilotrock.com.

B. Grill - Standard
   1. Model: N-24.
   2. Description: 432 square inch charcoal grill with adjustable cooking grate.
   3. Options:
      a. Finish: High temperature, heat resistant, nontoxic black enamel.
      b. Bolt on utility shelf.
      c. Mounting: bolt down base plate.

2.05 Drinking Fountains

A. Manufacturer: ELKAY, Inc.: www.elkay.com.

B. Model: LK4420BF1UDB.

C. Description: Powdercoated steel, pedestal-mounted drinking fountain, ADA compliant, with bottle filler and pet station.

D. Color: Evergreen

E. Mounting: Floor Mount

F. Valve Box:
   1. Manufacturer: Old Castle
   2. Prodcut: Cast In Place Concrete B03 Christy Utiltiy Box.

2.06 Bat Rack

A. Manufacturer: L.A. Steelcraft: www.lasteelcraft.com (or approved equal)

B. Description: Bat Rack

C. Model: BR-8SM

D. Options
   1. Mounting: Surface
   2. Galvanized Steel

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify proper installation of mounting surfaces, preinstalled anchor bolts, and other mounting devices; and ready to receive site furnishing items.

B. Do not begin installation until unacceptable conditions are corrected.

3.02 INSTALLATION

A. Install site furnishings in accordance with approved shop drawings, and manufacturer's installation instructions.

B. Provide level mounting surfaces for site furnishing items.

PART 4 MEASUREMENT AND PAYMENT

4.01 DRINKING FOUNTAIN

A. The contract unit price paid for Drinking Fountain shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in Drinking Fountain, complete in place, including sawcutting, trenching, excavation and backfill, connecting new pipe to existing or new facilities, pipes, and structures, drinking fountain, HDPE pipe, fittings, joints, valves, disinfection of water line, bedding and drainage well, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the City’s Representative.

4.02 SITE FURNISHINGS

A. The contract lump sum price paid for Site Furnishings shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in Site Furnishings, including tables, benches, grills, trash receptacles, bat racks, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the City's Representative.

End of Section

PAGE NOT USED

Section 32 84 23

Irrigation System

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Pipe and fittings, valves, sprinkler heads, emitters, bubblers, and accessories.

B. Control system.

1.02 DESCRIPTION

A. Provide all material, labor, equipment transportation, and services necessary for the furnishing and installation of the complete automatic sprinkler irrigation system as shown on the drawings and as specified herein. The work includes, but is not limited to:
   1. Trenching, stockpiling excavation materials and refilling trenches.
   2. Providing a complete system including piping, valves, fittings, sprinkler heads, emitters, automatic controls and final adjustment of heads to ensure complete coverage.
   3. Line voltage connections to all irrigation controllers; low voltage control wiring from controller to remote control valves.
   4. Cleanup, inspection and approval.
   5. Furnish and install items to be attached to, or embedded in, concrete work.
   6. Automatic controller assembly and installation including connection to Owner's central control system.
   7. Submittals, tests, as-built and record drawings.
   8. Erosion control and repair of damage due to over watering and erosion.
   9. Warranty replacement.

1.03 RELATED REQUIREMENTS

A. Section 31 23 16.13 - Trenching: Excavating for irrigation piping.

B. Section 31 23 23 - Fill: Backfilling for irrigation piping.

C. Section 32 92 19 - Seeding: Coordination with fine grading and soil preparation.

1.04 REFERENCE STANDARDS

A. ASTM A53: Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless

B. ASTM D1784 - Specification for Rigid PVC Compounds and CPVC Compounds.

C. ASTM D1785 - Standard Specification for PVC Plastic Pipe, Schedules 40, 80, and 120.

D. ASTM D 2241 - Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series); 2004b.

E. ASTM D2464 - Standard Specification for Threaded Poly Vinyl Chloride (PVC) Plastic Pipe Fittings, Schedule 80

F. ASTM D2466 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.

G. ASTM D2467 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.

H. ASTM D 2564 - Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems; 2004.

I. ASTM D3139 - Joints for Plastic Pressure Pipe Using Flexible Elastomeric Seals.

J. ASTM D3350 - Standard Specification for Polyethylene Plastics Pipe and Fittings Materials

K. ASTM F477 - Elastomeric Seals (Gaskets) for Joining Plastic Pipe

L. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); National Electrical Manufacturers Association; 2003.

1.05 DEFINITIONS

A. Extra Wire: Control wire that is intended for future valve.

B. Lateral Line: Pipe downstream of zone valve.

C. Mainline: Pipe from backflow device to zone valves.

D. Spare Control Wire: Control wire that is intended as a backup in case of faults or unknown conditions.

1.06 SYSTEM DESCRIPTION

A. Contractor shall provide and install a complete irrigation system with the intent of the Drawings and Specifications. System shall provide 100% coverage to all planted areas in a uniform manner.

1.07 SUBMITTALS

A. See Section 01 30 30 - Submittals, for submittal procedures including alternates/substitutions.

B. Shop Drawings: Prepare an submit the following fully dimensioned and labeled:
   1. Controller assemblies including electrical.
   2. Layout plan for controller area.

C. Product Data: Provide for all components incorporated into the Work and as requested to illustrate compliance with the plans and these specifications.

D. Samples: Provide as requested.

E. Record Documents: Record actual locations of all concealed components, piping system, conduit, and other items listed below. Dimension from two permanent points of reference, building corners, sidewalk, or road intersections, etc., the location of the following items:
   1. Connection to existing water lines.
   2. Connection to existing electrical power.
   3. Modifications to existing system.
   4. Gate valves.
   5. Routing of main line indicating all changes in direction and points along straight runs at intervals no more than 100'.
   6. Sprinkler control valves.
   7. Routing of control wiring.
   8. Quick coupling valves.
   9. Other related equipment as directed by the Landscape Architect.

F. Controller Charts: Provide color coded diagram of irrigation system as follows:
   1. Prepare at a scale that will fit inside of controller door or in standard size 3-ring binder or spiral bound as directed by City.
   2. Scale shall be legible and no less than 1" = 50'. Use multiple pages as required.
   3. Laminate all sheets with minimum 10 mil. plastic.
   4. Submit and obtain approval of Landscape Architect prior to requesting final observation of irrigation system.

G. Operation and Maintenance Data:
   1. Provide instructions for operation and maintenance of system and controls, seasonal activation and shutdown, and manufacturer's parts catalog.
   2. Provide schedule indicating length of time each valve is required to be open to provide a determined amount of water.

1.08 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than five years of documented experience.

B. Installer Qualifications: Company specializing in performing the work of this section with minimum five years of experience.

1.09 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Comply with manufacturer's instructions and requirements.

B. Coordinate on-site storage with City.

C. Handling of PVC Pipe and Fittings: Exercise care in handling, loading, unloading, storing and installation of PVC pipe and fittings. All PVC pipe shall be transported in a vehicle that allows the length of pipe to lie flat so as not to subject it to undue bending or concentrated external load at any point. Any section of pipe that has been dented or damaged will be discarded and, if installed, shall be replaced with new piping.

1.10 JOB CONDITIONS

A. The Contractor shall not willfully install the irrigation system as shown on the drawings when it is obvious in the field that obstructions, grade differences or discrepancies in area dimensions exist that might not have been considered in engineering. Such obstructions or differences should be brought to the

attention of the Landscape Architect. In the event this notification is not performed, the irrigation Contractor shall assume full responsibility for any revision necessary.

1.11 REGULATORY REQUIREMENTS

A. Requirements of Regulatory Agencies: All work and materials shall be in full conformance with the latest rules and regulations of the California Plumbing and Electric codes.

B. Manufacturer's Directions: Manufacturer's directions and detailed drawings shall be followed in all cases where the manufacturers of articles used in this contract furnish directions covering points not shown in the drawings and specifications.

C. Underwriters Laboratories: Electrical wiring, controls, motors, and devices shall be UL listed, and so labeled.

1.12 PRE-INSTALLATION MEETING

A. Convene one week prior to commencing work of this Section.

B. Schedule after major components have been initially staked.

1.13 COORDINATION

A. Coordinate the work with site backfilling, landscape grading and delivery of plant life.

1.14 SEQUENCING

A. Install all piping and provisions for equipment assemblies such as risers, swing joints, and nipples when subgrade has been established but prior to spreading any on-site or imported material over subgrade.

B. Stage installation of work in area of stock piled material as necessary.

1.15 MAINTENANCE SERVICES

A. Instruct City personnel on detailed operation of system.

1.16 EXTRA MATERIALS

A. Furnish extra components:
   1. Two valve keys for manual valves.
   2. Two valve box keys.
   3. Two keys for valve markers.
   4. Two wrenches for each type head core and for removing and installing each type head.

1.17 WARRANTY

A. The warranty for the sprinkler irrigation system shall be made in accordance with the following form.

B. A copy of the warranty form shall be included in the operations and maintenance manual.

C. The warranty form shall be retyped onto the Contractor's letterhead and contain the following information:

WARRANTY FOR SPRINKLER IRRIGATION SYSTEM

We hereby warrant that the sprinkler irrigation system we have furnished and installed is free from defects in materials and work quality, and the work has been completed in accordance with the drawings and specification. We agree to repair or replace any defects in material or work quality that may develop during the period of one year from the date of acceptance, except those that may be caused by ordinary wear and tear, unusual abuse or neglect. We also agree to repair or replace any damage resulting from the repairing or replacing of such defects at no additional cost to the City. We shall make such repairs or replacements within a reasonable time, as determined by the City, after receipt of written notice. In the event of our failure to make such repairs or replacements within a reasonable time after receipt of written notice from City, we authorize the City to proceed to have said repairs or replacements made at our expense, and we will pay the costs and charges therefore upon demand.

PROJECT: Grove Park Field and Playground Renovations

CONTRACTOR:
CONTRACTOR PHONE:
CONTRACTOR ADDRESS: BY:

DATE OF ACCEPTANCE: BY:

PART 2 PRODUCTS

2.01 PVC PIPE AND FITTINGS

A. PVC Materials: ASTM D1784, Type I Polyvinyl chloride plastic (PVC), cell classification 12454-B.

B. Class 200 PVC Pipe: ASTM D2241 listed with NSF-PW Standard 61 and Standard 14.

C. Class 315 PVC Pipe: ASTM D2241 listed with NSF-PW Standard 61 and Standard 14.

D. Schedule 40 PVC Pipe: ASTM D1785 listed with NSF-PW Standard 61 and Standard 14.

E. Flexible PVC Pipe: Agricultural Products Inc. 1174AG, Heavy Wall IPS Flex Vinyl (PVC) Pipe (C).
   1. 1/2” IPS: 0.840” O.D., 0.147” wall thickness
   2. 3/4” IPS: 1.05” O.D., 0.154” wall thickness
   3. 1” IPS: 1.315” O.D., 0.179” wall thickness

F. PVC, Schedule 40 Socket Fittings: ASTM D2466 listed with NSF-PW Standard 61 and Standard 14.

G. PVC, Schedule 80 Socket Fittings: ASTM D2467 and listed with NSF-PW Standard 61 and Standard 14.

H. PVC, Schedule 80 Threaded Fittings: ASTM D2464 and listed with NSF-PW Standard 61 and Standard 14.

I. Gasket Joints: Comply with ASTM F477 and ASTM D3139

2.02 STEEL PIPE AND FITTINGS

A. Galvanized Pipe: Standard weight Schedule 40. Comply with ASTM A53.

B. Steel Pipe Nipples: ASTM A 733, made of ASTM A 53/A 53M or ASTM A 106, Schedule 40, galvanized, seamless steel pipe with threaded ends.

C. Malleable-Iron Unions: ASME B16.39, Class 150, hexagonal-stock body with ball-and-socket, metal-to-metal, bronze seating surface, and female threaded ends.

D. Gray-Iron Threaded Fittings: ASME B16.4, Class 125, galvanized, standard pattern.

E. Cast-Iron Flanges: ASME B16.1, Class 125.

F. Cast-Iron Flanged Fittings: ASME B16.1, Class 125, galvanized.

G. Galvanized Fittings: 150lbs. malleable iron, threaded. Comply with ASTM A53

2.03 PIPE SCHEDULE

A. Water Service: Conform to County and EBMUD requirements.

B. Equipment Assemblies: Per referenced details.

C. Irrigation Mainline:
   1. NPS ½” to 2”: Schedule 40 PVC, solvent weld joints and fittings.
   2. NPS 2½” and 3": Class 200 PVC, solvent weld joints and fittings.
   3. NPS 4" and larger: Class 200 PVC bell-end gasketed joints, ductile iron fittings.

D. Lateral Lines:
   1. NPS ½” to 2”: Schedule 40 PVC, solvent weld joints and fittings.
   2. NPS 2½” and 3": As specified on the Drawings, solvent weld fittings.

E. Sleeves: Schedule 40 PVC, solvent weld joints. Inside diameter shall be twice the outside diameter of pipe for which it is used.

F. PVC Fittings: Schedule 40 PVC unless otherwise indicated.

G. Swing Joint Assembly: As specified in the Drawings, size and length as required. Manfacturer-assembled swing joint assemblies are not permitted.

2.04 EQUIPMENT

A. Remote Control Valves: As specified on the Drawings.

B. Ball Valves: As specified on the Drawings.

C. Gate Valves:
   1. As specified on the Drawings.
   2. 3" to 12": Comply with City Standards for water.

D. Quick Coupling Valves: As specified on the Drawings.

E. Master Valve: As specified on the Drawings.

F. Flow Sensor: As specified on the Drawings.

G. Controllers and controller enclosures:
   1. As specified on Drawings.

2.05 ACCESSORIES

A. Control Wire: Copper, UL rated for direct burial, Type UF. Conform to NEC. Common shall be white and pilot wire shall be red. Spare control wires shall be of a different color approved by the Engineer.
   1. Pilot Wire: 12 Gauge
   2. Common Wire: 10 Gauge

B. Control Wire Connectors: Water tight. Rain Bird Pen-Tite Connectors, 3M DBY ore DBR direct burial splice kits, or fusible heat shrinking tubing, as specified on the Drawings or as approved. Sized as required for wire size and quantities at each splice.

C. Valve boxes: As indicated below. Provide one (1) 12" extension per box, unless different size otherwise indicated, by same manufacturer as box and stamp cover with identification of equipment or valve and controller number as applicable.
   1. Master Valve: Christy B36
   2. Flow Sensor: Christy B3 Utility Box
   3. Quick Coupler Valves: Christy B3 Utility Box.
   4. Gate Valves: Carson 1220 with T-cover and Bolt Down Loc-Kit, green.
   5. Remote Control Valves: Rainbird VB-JMB-H.
      a. Extension: Rainbird VB-JMB-EXT-B.
   6. Stub-Outs: Christy N30 box with bolt down lid.

D. Primer: Weldon P-70 PVC, IAMPO-UPC and NSF listed.

E. Solvent Weld Cement:
   1. Comply with ASTM D2564, IAMPO-UPC and NSF listed. Compatible with pipe being joined and job site conditions.

F. Galvanized Pipe Paint: Carbon elastic Paint No. 2221 by American Tar Company or equal.

G. Thrust Blocks: As specified in the Drawings.

H. Pull line/cord: Polypropylene braided line or Let-line #232 or equal of 1/8” diameter with a minimum break strength of 200 pounds.

I. Remote Control Vavle ID Tag: All vinyl, with embossed lettering and tie for valve connection. Christie, Ewing or equal.

2.06 IRRIGATION HEADS

A. Gear-driven Rotor Heads: As specified on Drawings.

B. Pop-up Spray Heads: As specified on Drawings

C. Drip Assemblies: As specified on the Drawings.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify location of existing utilities.

B. Verify that required utilities are available, in proper location, and ready for use.

C. Verify that field conditions are acceptable and are ready to receive work.

D. Verify location of underground utilities and facilities. Drawings may show utilities in some locations but do not necessarily represent all underground utilities and facilities. Obtain locations prior to start of Work.

E. Verify that required utilities are available, in proper location, and ready for use.

F. Verify locations of existing sleeves. Notify Landscape Architect of discrepancies in existing sleeve locations and system requirements.

G. Beginning of installation shall signify acceptance of existing conditions.

H. Verification of Existing Pressure:
   1. Verify existing static pressure prior to ordering irrigation components. Submit test results to Landscape Architect for further direction.
   2. Should static pressure warrant, Landscape Architect will provide specification for booster pump.

3.02 PREPARATION

A. Call Underground Service Alert 48 hrs prior to start of work. Field mark underground utilities prior to excavation. Make provisions to protect underground utilities and facilities.

B. Piping layout indicated is diagrammatic only. Route piping to avoid plants, ground cover, utilities, and structures and as directed. Locate in landscape areas wherever possible

C. Layout and stake locations of system components.

D. Review layout requirements with other affected work. Coordinate locations of sleeves under paving to accommodate system.

E. Layout shall be reviewed by the Landscape Architect or City at pre-installation meeting prior to installation.

F. Drawings are generally diagrammatic and indicative of the work to be installed. Due to the scale of drawings, it is not possible to indicate all offsets, fittings, sleeves, etc., whichmay be required. The Contractor shall carefully investigate the structural and finished conditions affecting all of this work and plan accordingly, furnishing such fittings, etc., as may be required.

3.03 GENERAL

A. Install all equipment in compliance with applicable codes and regulations and manufacturer's printed instructions and specifications.

B. Provide all incidental materials, equipment, and components required for a complete and functional system even if such material, equipment, and components are not specifically included in the Drawings or Specifications.

3.04 TRENCHING

A. Trench and backfill in accordance with Section 31 23 16.13 and Section 31 23 23.

B. Trench bottom shall be flat to ensure piping is supported continuously on an even grade.

C. Where lines occur under paved areas, consider dimension to be below the subgrade.

D. Trench Size:
   1. Width: As indicated on the Drawings.
   2. Depth as required to provide for bedding and minimum cover as specified. Coordinate depths of various pipe runs as required to minimize conflict. Maintain consistent depths of each of line except as pre-approved by Landscape Architect.

E. Schedule of Minimum Pipe Cover:
   1. Water Service Line: Per City or other local Standards
   2. Mainline:
      a. Pipe Sizes Less Than 4 inches: 24 inches.
      b. Pipe 4 inches and Larger: 30 inches
   3. Lateral Lines: 18 inches.
   4. Control Wire: 24 inches
   5. All Pipe and Control Wire Under Paving: 36 inches minimum. Provide additional depth as required to provide a minimum of 12 inches cover to bottom of subgrade in new paving areas.

F. Trenching adjacent to existing trees shall be excavated by hand or machine boring as directed by the Landscape Architect. Comply with the City Standards.

G. Trench to accommodate grade changes .

H. Maintain trenches free of debris, material, or obstructions that may damage pipe.

3.05 PIPE INSTALLATION

A. General
   1. Comply with manufacturer's printed instructions and recognized industry standards.
   2. Pipe and equipment installed in trenches shall be fully supported by approved trench foundation material.
   3. Pipe and equipment installed above grade shall be properly and securely anchored and supported by approved devices and means.
   4. Pipe under paved areas shall be installed in PVC pipe sleeves.
   5. Line Clearance: All lines shall have a minimum clearance of 6 inches from each other and from lines of other trades. Comply with applicable regulations for clearance between irrigation lines and other trades.
   6. Parallel lines shall not be installed directly over one another.

7. Install pipe to allow for expansion and contraction without stressing pipe or joints.
8. Install trace wire as indicated in drawings.
9. Install 3" warning tape 12" above mainline.

B. PVC, Solvent-Cement Welded Joints
1. Comply with manufacturers' written specifications.
2. Comply with ASTM D2855 and ASTM F402

C. PVC, Threaded Joints:
1. Use teflon tape for plastic to plastic and plastic to galvanized joints. Hand tighten and use only light wrench pressure as required to produce sound, water tight joint.
2. Use pipe joint compound for galvanized to galvanized joints.

D. PVC, Gasket Joints:
1. Comply with manufacturers' written instructions.
2. Comply with ASTM D3139.

E. Galvanized Pipe:
1. Comply with industry standards.
2. Paint all below grade galvanized pipe with specified galvanized pipe paint.

F. Thrust Blocks:
1. Thrust blocks shall be cast-in-place concrete of the size and configuration appropriate for installation condition.
2. Comply with Standard Specifications and as indicated on the Drawings.
3. Leave thrust blocks exposed until pressure testing is complete.

3.06 EQUIPMENT INSTALLATION

A. Remote Control Valves:
1. Locate all valves a directed.
2. Install per applicable details.
3. Install after mainline has passed pressure test.
4. Flush mainline of all debris before installing valves.
5. Install each valve in a separate valve box.
6. After installation, re-pressurize mainline, check for leak, and eliminate all leaks.
7. Securely attach one ID tag per valve with number or lettering corresponding to vavles station on controller schedule.

B. Manual Drain Valves: Install at all low points in system.

C. Controller:
1. Locate as directed.
2. Install and wire in conformance with manufacturer's published instructions and specifications
3. Construct concrete footings as indicated and as required to support the controller cabinet.
4. Wire only one valve per station.
5. Make connection to electrical supply. Conform to applicable regulations and codes. Provide dedicated breaker of proper size for each controller. Provide one (1) additional duplex outlet at each controller. All electrical work shall be performed by properly licensed electrician.

D. Remote Control Valve Control Wiring:
1. Above grade wire shall be installed in approved conduit. Extend conduit to the full required depth of cover. Transition from vertical to horizontal alignment shall be made with a sweep elbow.
2. Lay control wire in mainline trench immediately adjacent to mainline wherever possible. Bundle wires with electrical tape at 10 feet intervals. Do not tape to mainline.
3. Run a separate pilot wire to each control valve.
4. Run a common ground for all control valves on a common controller. Provide a separate ground wire for each controller.
5. Make splices in valve boxes only. Use specified connectors. Provide a 36 inch loop at each valve.
6. Extra Control Wire: Install for future valves, if any, where indicated on the Drawings. Extra control wire shall not be used as spares without approval from Landscape Architect.
7. Spare Control Wires:
   a. Install one spare common wire the full length of the mainline.
   b. Install spare control wires at a ratio of 1 per each 6 valves the full length of the mainline. Provide a 36 inch loop at each valve.
8. Label ends of control wire indicating controller, valve number, and station. Use waterproof marker.

E. Valve Boxes

1. Excavate to required subgrade.
2. Place drain rock to specified depth and width prior to setting support blocks and valve box. At a minimum, drain rock shall be 12 inches deep and shall be the full width and length of the box extending 3 inches past the edges of the valve box.
3. Set valve boxes plumb and square with adjacent structures and adjacent boxes.
   a. Paved condition: Set box so that top of box is flush with adjacent paving.
   b. Turf: Set box so that top of box is 1/2" above adjacent finish grade.
   c. Landscape Condition: Set boxes so that top of box is 1" above adjacent finish grade.
4. Mark top of each box with approved designation of type of equipment housed within it. Use approved permanent means of marking. Identify zone number of remote control valves.

F. Sprinkler Heads
1. Comply with referenced details and City Standards.
2. Install swing joints, flush lines and cap for pressure testing.
3. After passing pressure test, lay swing joints down in trench, accurately record location as indicated above, and back fill excavation.
4. After soil preparation is complete and final grade has been established, expose swing joints, flush lines, and install heads.
5. Thoroughly flush lines before installing nozzles or emitters.

G. Quick Coupler
1. Locate 12" from paved surface unless approved otherwise.

3.07 FIELD QUALITY CONTROL

A. Identify the following scheduled observations in the Progress Schedule and provide notifications to Landscape Architect and City prior to each as follows:
1. Backflow assembly location: 48 hours.
2. Pressure supply line installation and testing: 48 hours.
3. Automatic controller location: 48 hours.
4. Control wire installation: 48 hours.
5. Lateral line and sprinkler installation: 48 hours.
6. Coverage test: 48 hours.
7. Final site review: 7 days.

B. When observations have been conducted by other than the Landscape Architect or City Representative, show evidence in writing of when and by whom these observations were made.

C. No site observations will commence without Record Drawing redline prints.

D. Pressure Testing:
1. General:
   a. All hydrostatic pressure tests in the presence of the Landscape Architect or City representative. No pipe shall be completely backfilled until it has been inspected, tested and approved in writing.
   b. Center load all pipe runs and secure as required to prevent damage to system during testing. Do not cover any joints or fittings.
   c. Fill pipe with water a minimum of 24 hours prior to testing.
   d. Furnish all force pumps and equipments required to conduct tests. Do not use system's booster pump to pressurize lines.
   e. Conduct all pressure tests prior to spreading any soil amendment material.
   f. Correct all deficiencies revealed by testing.
2. Mainline: Prior to installation of electrical control valves, quick couplers or any other equipment that might prevent a proper test from being performed pressurize mainline to 150 pounds per square inch and maintain pressure for a period of 6 hours.
3. Lateral Lines: Prior to installation of heads, cap risers and swing joints and pressurize to 100 pounds per square inch and maintain pressure for a period of 2 hours.
4. All Piping Under Paved Areas: pressurize to 150 pounds per square inch for a period of 2 hours and proved watertight prior to paving.

E. Coverage Test:When the sprinkler irrigation system is completed, perform a coverage test in the presence of the Landscape Architect or Designated Representative to determine if the water coverage for planting areas is complete and adequate. Furnish all materials and perform all work required to correct any inadequacies of coverage due to deviations from plans.
1. Perform in presence of Landscape Architect and City representative.
2. Run each zone for sufficient length of time to demonstrate coverage and uniform application.

3. Adjust system components as required to correct inadequate or non-uniform coverage.

F. All tests that fail will require additional testing at Contractor's expense, including Landscape Architect's time and expenses, until accepted by Landscape Architect.

G. Final Observation:
1. The Contractor shall operate each system in its entirety for the Landscape Architect or Designated Representative at time of final observation. Any items deemed not acceptable by the Landscape Architect or City, or not in compliance with these specifications and drawings, shall be reworked to the complete satisfaction of the Landscape Architect and City.
2. The Contractor shall show evidence to the Landscape Architect that the City has received all accessories, charts, record drawings, and equipment as required before final observation can occur.

3.08 BACKFILLING

A. Clean trenches of debris and deleterious material.

B. Backfill trench and compact to specified subgrade elevation. Protect piping from displacement.

C. Backfill only after specified tests have been performed and Engineer's acceptance has been obtained.

D. Clean trenches of debris and rocks.

E. Bed pipe as indicated on the Drawings.

F. Place initial fill of select material as indicated on Drawings.

G. Backfill with approved native soil free of rocks, sticks, debris and other deleterious material.

H. Compaction
1. In landscape areas match compaction of landscape area soil and as required to prevent settling.
2. Under areas to be paved compact to a minimum of 95% per ASTM D1557. Meet minimum compaction requirements for pavement section.

3.09 TEMPORARY REPAIRS

A. The City reserves the right to make temporary repairs as necessary to keep the sprinkler system equipment in operating condition. The exercise of this right by the City shall not relieve the Contractor of his responsibilities under the terms of the warranty as herein specified.

3.10 SYSTEMS STARTUP

A. Adjust control system to achieve time cycles required.

B. Adjust control system to achieve time cycles required to deliver proper precipitation rates for the various planting types. Adjust sequencing of stations such that the required watering can be accomplished during the Owner-specified watering time window.

C. Change head and nozzle types as directed and as required to achieve proper coverage and precipitation rates.

D. Adjust heads and valve pressures as required to provide proper irrigation coverage and precipitation rates.

E. Adjust all sprinkler heads to prevent as much as possible any overspray onto walks and roadways. No spray is permitted on buildings.

F. Radii shall not be reduced by more than 25% of the nozzle's radius as determined by manufacturer.

3.11 MAINTENANCE

A. The entire sprinkler irrigation system shall be under full automatic operation for a period of seven days prior to any planting.

B. The Landscape Architect or City Representative reserves the right to waive or shorten the operation period.

C. Refer to Specification section 32 01 90 Maintenance of Landscape.

3.12 CLEANUP

A. Cleanup shall be performed as each portion of the work progresses. Refuse and excess dirt shall be removed from the site, all walks and paving shall be broomed or washed down, and any damage sustained to the work of others shall be repaired and work returned to its original condition.

3.13 OPERATING INSTRUCTIONS

A. The Contractor shall train City’s maintenance personnel in proper operation of all major equipment. Provide written evidence of the person or persons so trained.

B. Coordinate and conduct a site meeting with drip line manufacturer sales representative and Owner's maintenance personnel to dicuss maintenance, operation and repair processes for drip line system.

3.14 DEMONSTRATION

A. Instruct City's personnel in operation and maintenance of system. Use operation and maintenance material as basis for demonstration.

PART 4 MEASUREMENT AND PAYMENT

4.01 IRRIGATION

A. The contract lump sum price paid for Irrigation System shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all work involved in Irrigation System, complete in place, as shown on the plans, as specified in Standard Specifications and these special provisions, and as directed by the City's representative.

End of Section

Section 32 92 19

Seeding

PART 1 GENERAL

1.01 SCOPE OF WORK

A. Provide all materials, labor and equipment necessary to complete all work as shown on the drawings and as specified herein, including, but not limited to, the following:
   1. Apply specified treatments to all turfgrass areas as specified on the plans.
   2. All other labor and materials reasonably incidental to the satisfactory completion of the work, including clean up of the site.

1.02 SECTION INCLUDES

A. Preparation of subsoil.

B. Placing topsoil.

C. Soil amendment.

D. Fertilizing.

E. Hydroseeding.

F. Maintenance.

1.03 RELATED REQUIREMENTS

A. Section 31 22 00 - Grading: Preparation of subsoil and placement of topsoil in preparation for the work of this section.

B. Section 31 23 23 - Fill: Topsoil material.

C. Section 32 01 90 - Maintenance of Landscape: Post-occupancy maintenance.

1.04 DEFINITIONS

A. Weeds: Includes Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass.

1.05 SITE CONDITIONS

A. It is the responsibility of the contractor to visit the site to determine existing conditions; including access, the nature and extent of existing improvements on the site and upon adjacent public and private property, and other factors that may affect the work of this section.

1.06 SUBMITTALS

A. See Section 01 33 00 - Submittals.

B. Certification: Submit certification of grass species and location of sod source.

C. The contractor shall submit letters of compliance, manufacturer’s literature, upon written request 10 working days in advance, samples for any of the following items:
   1. Seed Mixes (or individual items).
   2. Mulches.
   3. Binders/Tackifiers.
   4. Fertilizers.

D. Maintenance Data: Include maintenance instructions, cutting method and maximum grass height; types, application frequency, and recommended coverage of fertilizer.

E. Herbicides: Submit manufacturer's analysis. Schedule for application of herbicides must be approved by the Inspector.

F. All submittals for soil amendments and fertilizers must be accompanied by a letter on contractor's company stationary listing exact quantities in gallons, lbs, tons, cubic yards or cubic feet. These quantities will be checked for accuracy before construction and with delivery tickets during construction.

1.07 SOIL TESTING AND ANALYSIS

A. Existing site soil: City has already conducted soil testing of existing site soils. Full report will be made available to Contractor.
   1. Report No 20-006-0008 'Grove Park 2-Berkeley Job #801 prepared by Waypoint Analytical.

1.08 QUALITY ASSURANCE

A. Seed Supplier: Company specializing in seed production with minimum five years experience, and certified by the State of California.

B. Testing Laboratory: Recognized laboratory for soil and plant disease analysis for ornamental horticulture, approved by the Inspector. Testing laboratory is to perform all work in accordance with the current methods of the Association of Official Agricultural Chemists.

1.09 ANALYSIS OF SAMPLES AND TESTS

A. Samples: The owner reserves the right to take and analyze samples of materials for conformity to the specifications at any time. On request, seed shall deliver to owner 30 days prior to seeding so seed can be tested. Seed samples shall be drawn in accordance with procedures outlined in AOSA, Association of Official Seed Analysts.

B. Rejected material: Rejected materials shall be removed immediately from the site at the contractor's expense. Contractor shall pay the cost of testing replacement materials.

1.10 REGULATORY REQUIREMENTS

A. Comply with regulatory agencies for fertilizer and herbicide composition.

B. Provide certificate of compliance from authority having jurisdiction indicating approval of fertilizer and herbicide mixture.

1.11 DELIVERY, STORAGE, AND HANDLING

A. All products shall be delivered to the site in manufacturer's unopened standard containers bearing original labels showing quantity, analysis, and name of manufacturer.

B. All materials shall be stored in designated areas and in such a manner as to protect from weather or other conditions that might decrease the effectiveness of the product.

C. Fertilizer:
   1. Fertilizer: Deliver inorganic or chemical fertilizer to site in original unopened containers bearing manufacturer's guaranteed chemical analysis, name, trade name, trademark and conformance to state law, bearing name and warranty of producer.

1.12 PROJECT/SITE CONDITIONS

A. General: Do not perform work when climate and existing site conditions will not provide satisfactory results.

B. Vehicular accessibility on site shall be as directed by City authorized representative. Repair damage to prepared ground and surfaces caused by vehicular movement during work under this section to original condition at no additional cost to the City.

C. Perform soil preparation just prior to seeding operations and in accordance with final planting schedule. Coordinate with irrigation system installation to avoid damage to work of one by the other.

D. Utilities: Determine location of underground utilities (irrigation lines included) and perform work in a manner which will avoid damage, Hand excavate, as required.

1.13 FINAL ACCEPTANCE AND WARRANTY PERIOD

A. Upon completion of specified work, the owner shall accept each area. It shall be the right of the owner to inspect work for compliance to the specifications and advise the contractor, in writing, of any work that is found to deviate from specifications.

B. After 60 days the contractor may apply to the landscape architect and City to have the turfgrass accepted for maintenance. The warranty period shall be 60 days after the acceptance date, and the lawn shall be acceptable when all of the following criteria are met:
   1. A healthy active turf provides at least 95% coverage with no bare area greater than 18 inches in diameter.
   2. The turf has been mowed at least three times.
   3. The grass cover is essentially free of weeds.

PART 2 PRODUCTS

2.01 GENERAL

A. All products shall be in conformance with the specifications listed below. Any changes to products to be used shall be approved, in writing, by the owner or owner's representative prior to job site delivery.

2.02 SEED MIXES

A. Composition: "Bolero Plus", supplied by Delta Bluegrass. www.deltabluegrass.com

Species	Percent by Weight
Bolero Dwarf Fescue	90%
Bluegrass	10%

B. Application rate: 10 pounds per 1,000 square feet.

C. Quality: All seed shall be in conformance with the California State Seed Law of the Department of Agriculture. Each seed bag shall be delivered to the site sealed and clearly marked as to species, purity, percent germination, dealer's guarantee, and dates of test. Prior to seeding at the request of the owner, the contractor shall provide a letter of certification and the original Association of Official Seed Analysts (AOSA) seed test results.

2.03 MULCH

A. Mulch shall be composed of cellulose or wood fiber products with no growth or germination inhibiting substances, and shall be manufactured in such a manner that when thoroughly mixed with seed, fertilizer, organic stabilizer, and water, in the proportions specified, will form homogeneous slurry which is capable of being sprayed to form a porous mat. The fibrous mulch in its air-dry state shall contain no more than 15% by weight of water. The fiber shall have a temporary green dye and shall be accompanied by a certificate of compliance stating that the fiber conforms to these specifications.

2.04 ORGANIC STABILIZER/TACKIFIER

A. Shall be an organic substance supplied in powder form and shall be psilium-based and packed in clearly marked bags stating the contents of each package. The California Department of Food and Agriculture shall certify the material as an Auxiliary Soil Chemical.

2.05 EQUIPMENT

A. Equipment used for application of slurry shall be a commercial-type Hydro-Seeder and have a built-in agitation system with an operation capacity sufficient to agitate, suspend and homogeneously mix slurry.

B. Tank capacity shall be a minimum of 1,500 gallons and shall be mounted on a truck to allow access to the site.

C. Distribution Lines: Large enough to prevent stoppage and allow for even distribution of slurry over the site.

D. Pump shall be able to generate 150 psi at the nozzle.

2.06 FERTILIZER & STARTER FERTILIZER

A. Fertilizer shall be JR Simplot 'Best' 6-24-24-XB+ Ph (208)336-2110

B. Application rate: 5 lbs per 1,000 square feet.

2.07 TOPSOIL

A. Existing on-site soils
   1. Site top soil is to be reused for lawn areas.

B. Imported top-soil
   1. General: Sandy Loam Soil with 70-75% sand, silt 12.5-20%, clay 8%-15%
   2. All soils to be used in areas to be planted on the project shall be free of rocks over one inch in diameter, and free of foreign debris. Soil shall be free from sub-soil, refuse, plants or roots, clods, weeds, viable weed seeds, sticks, solvents, petroleum products, concrete, base rock, or other deleterious or extraneous material. Soil shall be free of soil-borne diseases, and capable of sustaining healthy plant life.
      a. Imported Topsoil:
         1) Make all arrangements for obtaining and testing imported topsoil. Submit test results of a representative sample of the proposed supply for approval by the Inspector well in advance of its scheduled delivery to the site. The approved sample will establish the standards to which all imported topsoil used on the job must conform.
         2) Do all work necessary to bring imported topsoil to standards specified above.

3) Transport imported topsoil directly from source to final position. If stockpiling is required, locations and amounts of stockpiles will be designated by the Inspector.
4) The Inspector reserves the right to take additional samples of imported topsoil at the site. If subsequent testing proves material to be at variance with the approved sample, remove rejected soil from the site and replace immediately at no additional cost to the City.
5) All topsoil shall be tested as outlined above. No turfgrass sod shall be placed on soil which has been treated with soil sterilants or herbicides until sufficient time has elapsed to permit the dissipation of toxic materials. The landscape contractor shall assume full responsibility for any loss or damage to turfgrass sod arising from improper use of sterilants or due to his or her failure to allow sufficient time to permit dissipation of toxic materials, whether or not such sterilants are specified herein.

2.08 ORGANIC COMPOSTED SOIL AMENDMENT

A. Compost must have the following characteristics - Amount per 1000 Square Feet - Organic
   1. 3 cubic yards - Composted greenwaste amendment
   2. 8 pounds - Blood Meal (12-0-0) organic
   3. 15 pounds - Steamed Bone Meal (3-15-0) organic

2.09 HERBICIDES AND PESTICIDES

A. General: products shall be listed as allowed by OMRI in its generic materials list: www.omri.org.

B. Synthetic herbicides and pesticides are not permitted.
   1. Shall be organic.
   2. Pre-Emergents: Organic, corn gluten or equal.
   3. Synthetic herbicides are not permitted.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that prepared soil base is ready to receive the work of this section, and that all areas of turf seeding treatments are free of vegetation, and other objectionable material.

B. Verity the soils analysis reports are adequate.

C. Verify that grades are final within standards specified.

D. All turf areas shall be uniformly compacted.

E. Verify adequate time has elapsed to allow herbicides to deplete enough from soils to avoid damage to seed.

3.02 PREPARATION

A. Prepare subgrade in accordance with Section 31 22 00 Grading.

B. Pre-emergent herbicide to be applied.

C. Place topsoil, amended as required in test report, in accordance with Section 31 22 00 Grading.

3.03 SEEDED TURFGRASS AREAS

A. Hydroseeding Preparation:
   1. Do all slurry preparation at the job site.
   2. Water, mulch, fertilizer, binder and other ingredients shall be added to the tank simultaneously so that the finished load is a homogenous mix of the specified ingredients.
   3. Seed shall be added last and shall be discharged within 2 hours. Loads held over 2 hours will be recharged with 1/2 the seed rate before application.
   4. Once fully loaded, the complete slurry shall be agitated for 3-5 minutes to allow for uniform mixing.

B. HydroSeeding Application: One Step Hydroseed

Lbs/Ac	Material
2,000 lbs	100% Cellulose or Wood Fiber
Per section 2.06 - Fertilizer	Fertilizer
Per section 2.02 - Seed Mixes	Seed Mix

   1. All hydroseed applications are to be applied in a sweeping motion to form a uniform application and form a mat at the specified rates.

2. Unused Loads: If mixture remains in tank for more than 8 hours it shall be removed from the job site at contractor’s expense.

3.04 FERTILIZING AND SOIL AMMENDMENT

A. Soil ammendment:
   1. Drainage of the root zone should be improved by first loosening the top 10 inches of any undisturbed or compacted soil. The ammendment material should tehn be evenly spread and thoroughly blended wit the top 6 inches of soil to form a homogenous layer.

B. Fertilizer
   1. Apply fertilizer in accordance with soils analysis results and manufacturer's instructions.
   2. Verify adequate time has elapsed to allow herbicides to deplete enough from soils to avoid damage to sod.
   3. Apply after smooth raking of topsoil and prior to installation of sod.
   4. Apply fertilizer no more than 48 hours before laying sod.
   5. Mix thoroughly into upper 2 inches of topsoil.
   6. Lightly water to aid the dissipation of fertilizer.

3.05 CLEAN-UP

A. General: All turf areas and staging areas shall be maintained in a neat and orderly condition. Keep paved area free of soil.

B. Hydro-Seeding Overspray: Installing contractor is responsible for washing or otherwise cleaning excess material off all area not intended to receive treatment.

C. Debris: Clean up and remove associated materials and debris from project site before Final Acceptance.

PART 4 MEASUREMENT AND PAYMENT

4.01 SEEDING

A. The contract unit price paid per square foot for Seeding shall include full compensation for funishing all labor, materials, tools, equipment, and incidentals and for doing all work involved in Seeding, complete in place, as shown on the plans, as specified in Standard Specifications and these special provisions, and as directed by the City's representative.

End of Section

PAGE NOT USED

Section 32 92 23
Sodding

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Preparation of subsoil.

B. Placing topsoil.

C. Fertilizing.

D. Sod installation.

E. Maintenance.

1.02 RELATED REQUIREMENTS

A. Section 31 22 00 - Grading: Preparation of subsoil and placement of topsoil in preparation for the work of this section.

B. Section 31 23 23 - Fill: Topsoil material.

1.03 DEFINITIONS

A. Weeds: Includes Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass.

1.04 REFERENCE STANDARDS

A. TPI (SPEC) - Guideline Specifications to Turfgrass Sodding; 2006.

1.05 SUBMITTALS

A. See Section 01 33 00 - Submittals, for submittal procedures.

B. Certificate: Certify grass species and location of sod source.

C. Maintenance Data: Include maintenance instructions, cutting method and maximum grass height; types, application frequency, and recommended coverage of fertilizer .

D. Herbicides: Submit manufacturer's analysis. Schedule for application of herbicides must be approved by the Inspector.

E. All submittals for soil amendments and fertilizers must be accompanied by a letter on contractor's company stationary listing exact quantities in gallons, lbs, tons, cubic yards or cubic feet. These quantities will be checked for accuracy before construction and with delivery tickets during construction.

1.06 SOIL TESTING AND ANALYSIS

A. Existing site soil: City has already conducted soil testing of existing site soils. Full report will be made available to Contractor.
   1. Report No 20-006-0008 'Grove Park 2-Berkeley Job #801 prepared by Waypoint Analytical.

1.07 QUALITY ASSURANCE

A. Sod Producer: Company specializing in sod production and harvesting with minimum five years experience, and certified by the State of California.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Sod:
   1. Deliver sod on pallets. Protect exposed roots from dehydration.
   2. Do not deliver more sod than can be laid within 24 hours.
   3. Notify Owner's Representative of delivery schedule in advance so material can be inspected upon arrival at project site. Immediately remove unacceptable material from project site.

B. Fertilizer:
   1. Fertilizer: Deliver organic fertilizer, approved by OMRI, to site in original unopened containers bearing manufacturer's guaranteed chemical analysis, name, trade name, trademark and conformance to state law, bearing name and warranty of producer.

1.09 PROJECT/SITE CONDITIONS

A. General: Do not perform work when climate and existing site conditions will not provide satisfactory results.

B. Vehicular accessibility on site shall be as directed by City authorized representative. Repair damage to prepared ground and surfaces caused by vehicular movement during work under this section to original condition at no additional cost to the City.

C. Perform soil preparation just prior to planting operations and in accordance with final planting schedule. Coordinate with irrigation system installation to avoid damage to work of one by the other.

D. Utilities: Determine location of underground utilities (irrigation lines included) and perform work in a manner which will avoid damage, Hand excavate, as required.

PART 2 PRODUCTS

2.01 MATERIALS

A. Sod Supplier: Delta Bluegrass,www.deltabluegrass.com

B. Sod Mix: 'Bolero Plus': 90% Bolero Dwarf Fescue, 10% Bluegrass.
   1. Field Turfgrass Sod quality; cultivated grass sod; type indicated in plant schedule on Drawings; with strong fibrous root system, free of stones, burned or bare spots; containing no more than 5 weeds per 1000 sq ft. Minimum age of 18 months, with root development that will support its own weight without tearing, when suspended vertically by holding the upper two corners.

C. Soil materials, including amendments, compost and fertilizers, shall be per Section 32 93 00.

D. Existing on-site soils
   1. Site top soil is to be reused for lawn areas.

E. Imported Topsoil:
   1. General: Sandy Loam Soil with 70-75% sand, silt 12.5-20%, clay 8%-15%
   2. All soils to be used in areas to be planted on the project shall be free of rocks over one inch in diameter, and free of foreign debris. Soil shall be free from sub-soil, refuse, plants or roots, clods, weeds, viable weed seeds, sticks, solvents, petroleum products, concrete, base rock, or other deleterious or extraneous material. Soil shall be free of soil-borne diseases, and capable of sustaining healthy plant life.
      a. Imported Topsoil:
         1) Make all arrangements for obtaining and testing imported topsoil. Submit test results of a representative sample of the proposed supply for approval by the Inspector well in advance of its scheduled delivery to the site. The approved sample will establish the standards to which all imported topsoil used on the job must conform.
         2) Do all work necessary to bring imported topsoil to standards specified above.
         3) Transport imported topsoil directly from source to final position. If stockpiling is required, locations and amounts of stockpiles will be designated by the Inspector.
         4) The Inspector reserves the right to take additional samples of imported topsoil at the site. If subsequent testing proves material to be at variance with the approved sample, remove rejected soil from the site and replace immediately at no additional cost to the City.
         5) All topsoil shall be tested as outlined above. No turfgrass sod shall be placed on soil which has been treated with soil sterilants or herbicides until sufficient time has elapsed to permit the dissipation of toxic materials. The landscape contractor shall assume full responsibility for any loss or damage to turfgrass sod arising from improper use of sterilants or due to his or her failure to allow sufficient time to permit dissipation of toxic materials, whether or not such sterilants are specified herein.

F. Organic Compost
   1. Compost must have the following characteristics - Amount per 1000 Square Feet - Organic
      a. 3 cubic yards - Composted greenwaste amendment
      b. 8 pounds - Blood Meal (12-0-0) organic
      c. 15 pounds - Steamed Bone Meal (3-15-0) organic

2.02 FERTILIZER & STARTER FERTILIZER

A. Fertilizer shall be JR Simplot 'Best' 6-24-24-XB+ Ph (208)336-2110

2.03 HERBICIDES AND PESTICIDES

A. General: products shall be listed as allowed by OMRI in its generic materials list: www.omri.org.

B. Synthetic herbicides and pesticides are not permitted.
   1. Shall be organic.
   2. Pre-Emergents: Organic, corn gluten or equal.

3. Synthetic herbicides are not permitted.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that prepared soil base is ready to receive the work of this section.

B. Verity the soils analysis reports are adequate.

3.02 PREPARATION

A. Prepare subgrade in accordance with Section 31 22 00.

B. Pre-emergent herbicide to be applied.

C. Place topsoil in accordance wiht Section 31 23 23

3.03 FERTILIZING & SOIL AMMENDMENT

A. Soil ammendment:
   1. Drainage of the root zone should be improved by first loosening the top 10 inches of any undisturbed or compacted soil. The ammendment material should tehn be evenly spread and thoroughly blended wit the top 6 inches of soil to form a homogenous layer.

B. Fertilizer
   1. Apply fertilizer in accordance with soils analysis results and manufacturer's instructions.
   2. Verify adequate time has elapsed to allow herbicides to deplete enough from soils to avoid damage to sod.
   3. Apply after smooth raking of topsoil and prior to installation of sod.
   4. Apply fertilizer no more than 48 hours before laying sod.
   5. Mix thoroughly into upper 2 inches of topsoil.
   6. Lightly water to aid the dissipation of fertilizer.

3.04 LAYING SOD

A. Moisten prepared surface immediately prior to laying sod.

B. Lay sod immediately after delivery to site to prevent deterioration.

C. Lay sod smooth and tight with no open joints visible, and no overlapping; stagger end joints 12 inches minimum. Do not stretch or overlap sod pieces.

D. Where new sod adjoins existing grass areas, align top surfaces.

E. Where sod is placed adjacent to hard surfaces, such as curbs, pavements, etc., place top elevation of sod 1/2 inch below top of hard surface.

F. Water sodded areas immediately after installation. Saturate sod to 4 inches of soil.

G. After sod and soil have dried, roll sodded areas to ensure good bond between sod and soil and to remove minor depressions and irregularities.

3.05 MAINTENANCE

A. Provide maintenance at no extra cost to City; City will pay for water.

B. Provide maintenance of sodded areas for 60 days . Maintenance period will not start until all sodding is completed in accordance with the contract documents.

C. Mow grass at regular intervals to maintain at a maximum height of 2-1/2 inches. Do not cut more than 1/3 of grass blade at any one mowing.

D. Neatly trim edges and hand clip where necessary.

E. Water to prevent grass and soil from drying out.

F. Control growth of weeds. Apply herbicides in accordance with manufacturer's instructions. Remedy damage resulting from improper use of herbicides.

G. Immediately replace sod to areas that show deterioration or bare spots.

H. Contractor to keep sod alive until end established / end of maintenance period. Maintenace period is 60 days.

PART 4 MEASUREMENT AND PAYMENT

4.01 SODDING

A. The contract unit price paid per square foot for Sodding shall include full compensation for funishing all labor, materials, tools, equipment, and incidentals and for doing all work involved in Sodding, complete in

place, as shown on the plans, as specified in Standard Specifications and these special provisions, and as directed by the City's representative.

End of Section

Section 33 01 10.58

Disinfection of Water Utility Piping Systems

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Disinfection of site domestic water lines specified in Section 33 14 16.

1.02 RELATED REQUIREMENTS

A. Section 33 14 16 - Site Water Utility Distribution Piping.

B. East Bay Municipal Utility District Standard Specifications (current version)

1.03 REFERENCE STANDARDS

A. AWWA B300 - Hypochlorites; 2011.

B. AWWA B301 - Liquid Chlorine; 2010.

C. AWWA B302 - Ammonium Sulfate; 2010.

D. AWWA B303 - Sodium Chlorite; 2010.

E. AWWA C651 - Disinfecting Water Mains; 2005.

1.04 SUBMITTALS

A. See Section 01 33 00 - Administrative Requirements, for submittal procedures.

B. Test Reports: Indicate results comparative to specified requirements.

C. Certificate: Certify that cleanliness of water distribution system meets or exceeds specified requirements.

D. Disinfection report:
   1. Type and form of disinfectant used.
   2. Date and time of disinfectant injection start and time of completion.
   3. Test locations.
   4. Initial and 24 hour disinfectant residuals (quantity in treated water) in ppm for each outlet tested.
   5. Date and time of flushing start and completion.
   6. Disinfectant residual after flushing in ppm for each outlet tested.

1.05 QUALITY ASSURANCE

A. Water Treatment Firm: Company specializing in disinfecting potable water systems specified in this Section with minimum three years documented experience.

B. Testing Firm: Company specializing in testing potable water systems, certified by governing authorities of California.

PART 3 EXECUTION

2.01 EXAMINATION

A. Verify that piping system has been cleaned, inspected, and pressure tested.

B. Schedule disinfecting activity to coordinate with start-up, testing, adjusting and balancing, demonstration procedures, including related systems.

2.02 DISINFECTION

A. Use method prescribed by the applicable state or local codes, or health authority or water purveyor having jurisdiction, or in the absence of any of these follow AWWA C651.

B. Provide and attach equipment required to perform the work.

C. Inject treatment disinfectant into piping system.

D. Maintain disinfectant in system for 24 hours.

E. Flush, circulate, and clean until required cleanliness is achieved; use municipal domestic water.

F. Replace permanent system devices removed for disinfection.

PART 3 (NOT USED)

PART 4 MEASUREMENT AND PAYMENT

4.01 DISINFECTION OF WATER UTILITY PIPING SYSTEMS

A. Full compensation for Disinfection of Water Utility Piping Systems shall be considered as included in the contract price paid for Drinking Fountain, and no separate compensation will be allowed therefor.

End of Section

Section 33 05 61

Concrete Manholes

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Concrete Maintenance Holes (also known as Concrete Manholes) for utilities.

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete.

1.03 REFERENCE STANDARDS

A. AASHTO HB - Standard Specifications for Highway Bridges; Seventeenth Edition.

B. ASTM A48/A48M - Standard Specification for Gray Iron Castings; 2003 (Reapproved 2012).

1.04 SUBMITTALS

A. See Section 01 33 00 - Submittals, for submittal procedures.

B. Shop Drawings: Indicate manhole locations, elevations, piping sizes and elevations of penetrations.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

PART 2 PRODUCTS

2.01 Concrete Manholes

A. Weight Rating: H 10 according to AASHTO HB.

2.02 Accessories

A. Lid and Frame: ASTM A48/A48M, Class 30B Cast iron construction, machined flat bearing surface, removable lockable lid, closed lid design; live load rating of 280 psf; sealing gasket; lid molded with identifying name.

B. Steps: Formed galvanized steel rungs; 3/4 inch diameter. Formed integral with manhole sections.

PART 3 (NOT USED)

PART 4 MEASUREMENT AND PAYMENT

4.01 CONCRETE MANHOLES

A. Full compensation for Concrete Manholes shall be considered as included in the contract price paid for Storm Drainage, and no separate compensation will be allowed therefor.

End of Section

PAGE NOT USED

Section 33 14 16

Site Water Utility Distribution Piping

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Water pipe for site conveyance lines.

B. Pipe valves.

C. Pipe and fittings for site water lines including domestic water lines.

1.02 RELATED REQUIREMENTS

A. Section 31 23 16.13 - Trenching: Excavating, bedding, and backfilling.

1.03 REFERENCE STANDARDS

A. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; 2012.

B. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2013.

C. ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2014.

D. ASTM D2466 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40; 2013.

E. ASTM D2855 - Standard Practice for Making Solvent-Cemented Joints with Poly(Vinyl Chloride) (PVC) Pipe and Fittings; 1996 (Reapproved 2010).

F. ASTM D3139 - Standard Specification for Joints for Plastic Pressure Pipes using Flexible Elastomeric Seals; 1998 (Reapproved 2011).

G. AWWA C500 - Metal-Seated Gate Valves for Water Supply Service; 2009.

H. AWWA C504 - Rubber-Seated Butterfly Valves 3 In. (75 mm) Through 72 In. (1,800 mm); 2010.

I. AWWA C509 - Resilient-Seated Gate Valves for Water Supply Service; 2009.

J. AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe, 4 In. Through 12 In. (100 mm Through 300 mm), for Water Transmission and Distribution; 2007.

K. AWWA C901 - Polyethylene (PE) Pressure Pipe and Tubing, 1/2 In. (13 mm) Through 3 In. (76 mm), for Water Service; 2008.

1.04 SUBMITTALS

A. See Section 01 33 00 - Submittals, for submittal procedures.

B. Product Data: Provide data on pipe materials, pipe fittings, valves and accessories.

C. Project Record Documents: Record actual locations of piping mains, valves, connections, thrust restraints, and invert elevations. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.05 QUALITY ASSURANCE

A. Perform Work in accordance with EBMUD requirements.

PART 2 PRODUCTS

2.01 WATER PIPE

A. Copper Tubing: ASTM B88, Type K, Annealed:
   1. Fittings: ASME B16.18, cast copper, or ASME B16.22, wrought copper.
   2. Joints: Compression connection or AWS A5.8M/A5.8, BCuP silver braze.

B. Polyethylene Pipe: AWWA C901:
   1. Fittings: AWWA C901, molded or fabricated.
   2. Joints: Compression.

C. Trace Wire: Magnetic detectable conductor, clear plastic covering, imprinted with "Water Service" in large letters.

2.02 VALVES

A. Valves: Manufacturer's name and pressure rating marked on valve body.

B. Ball Valves Up To 2 Inches:

1. Brass body, Teflon coated brass ball, rubber seats and stem seals, Tee stem pre-drilled for control rod, AWWA inlet end, compression outlet with electrical ground connector, with control rod, valve key, and extension box.

2.03 BEDDING AND COVER MATERIALS

A. Bedding: As specified in Section 31 23 16.13.

B. Cover: As specified in Section 31 23 16.13.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that building service connection and municipal utility water main size, location, and invert are as indicated.

3.02 TRENCHING

A. See the sections on excavation and fill for additional requirements.

B. Hand trim excavation for accurate placement of pipe to elevations indicated.

C. Backfill around sides and to top of pipe with cover fill, tamp in place and compact, then complete backfilling.

3.03 INSTALLATION - PIPE

A. Route pipe in straight line.

B. Install pipe to allow for expansion and contraction without stressing pipe or joints.

C. Install trace wire 6 inches above top of pipe; coordinate with Section 31 23 16.13.

3.04 INSTALLATION - VALVES AND HYDRANTS

A. Set valves on solid bearing soil.

B. Center and plumb valve box over valve. Set box cover flush with finished grade.

3.05 SERVICE CONNECTIONS

A. Connect drinking fountain to existing adjacent EBMUD water supply hookup.

3.06 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

B. Perform field inspection and testing in accordance with Section 01 45 00

PART 4 MEASUREMENT AND PAYMENT

4.01 SITE WATER UTILITY DISTRIBUTION

A. Full compensation for Site Water Utility Distribution shall be considered as included in the contract price paid for Drinking Fountain, and no separate compensation will be allowed therefor.

End of Section

Section 33 31 13

Site Sanitary Sewerage Gravity Piping

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Connection of building sanitary drainage system to drinking fountain and drain box.

1.02 RELATED REQUIREMENTS

A. Section 31 23 16.13 - Trenching: Excavating, bedding, and backfilling.

B. Section 31 23 23 - Fill: Bedding and backfilling.

1.03 REFERENCE STANDARDS

A. ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120; 2015.

B. ASTM D2680 - Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) and Poly(Vinyl Chloride) (PVC) Composite Sewer Piping; 2001 (Reapproved 2014).

1.04 SUBMITTALS

A. See Section 01 33 00 - Submittals, for submittal procedures.

B. Product Data: Provide data indicating pipe, pipe accessories.

C. Project Record Documents:
   1. Record location of pipe runs, connections, manholes, cleanouts, and invert elevations.

PART 2 PRODUCTS

2.01 SEWER PIPE MATERIALS

A. Provide products that comply with applicable code(s).

B. Plastic Pipe: ASTM D3350, High Density Polyethylene (HDPE) Material 40; inside nominal diameter of 2 inches, thermal butt fusion joints and fittings in accordance with manufacturer's recommendations; pipe and fittings same material utilizing transition fittings when connecting to existing piping.

C. Fittings: Same material as pipe molded or formed to suit pipe size and end design, in required tee, bends, elbows, cleanouts, reducers, traps and other configurations required.

2.02 PIPE ACCESSORIES

A. Trace Wire: Magnetic detectable conductor, clear plastic covering, imprinted with "Sewer Service" in large letters.

2.03 BEDDING AND COVER MATERIALS

A. Pipe Bedding Material: As specified in Section 31 23 23.

B. Pipe Cover Material: As specified in Section 31 23 23.

PART 3 EXECUTION

3.01 GENERAL

A. Perform work in accordance with City of Berkley Standards.

3.02 TRENCHING

A. See Section 31 23 16.13 for additional requirements.

B. Backfill around sides and to top of pipe with cover fill, tamp in place and compact, then complete backfilling.

3.03 INSTALLATION - PIPE

A. Verify that trench cut is ready to receive work and excavations, dimensions, and elevations are as indicated on layout drawings.

B. Install pipe, fittings, and accessories in accordance with manufacturer's instructions. Seal watertight.
   1. Plastic Pipe: Also comply with ASTM D2321.

C. Lay pipe to slope gradients noted on layout drawings; with maximum variation from true slope of 1/8 inch in 10 feet.

D. Connect to drinking fountain and drain box, through installed sleeves.

E. Install trace wire 6 inches above top of pipe; coordinate with Section 31 23 16.13.

3.04 FIELD QUALITY CONTROL

A. Perform field inspection and testing in accordance with Section 01 40 00.

B. Deflection Test: Test in accordance with City of Berkely Standards.

3.05 PROTECTION

A. Protect pipe and bedding cover from damage or displacement until backfilling operation is in progress.

PART 4 MEASUREMENT AND PAYMENT

4.01 SITE SANITARY SEWERAGE GRAVITY PIPING

A. Full compensation for Site Sanitary Sewerage Gravity Piping shall be considered as included in the contract price paid for Drinking Fountain, and no separate compensation will be allowed therefor.

End of Section

Section 33 42 11
Stormwater Gravity Piping

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Stormwater drainage piping.

B. Stormwater pipe accessories.

C. Catch basins.

D. Connection to municipal storm drain.

1.02 RELATED REQUIREMENTS

A. Section 31 23 16.13 - Trenching: Excavating, bedding, and backfilling.

B. Section 31 23 23 - Fill: Bedding and backfilling.

1.03 REFERENCE STANDARDS

A. AASHTO M 252 - Standard Specification for Corrugated Polyethylene Drainage Pipe; 2009.

B. ASTM D2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications; 2014.

C. ASTM D3350 - Standard Specification for Polyethylene Plastics Pipe and Fittings Material; 2014.

1.04 SUBMITTALS

A. See Section 01 33 00 - Submittal Procedures.

B. Product Data: Provide data indicating pipe, pipe accessories, and catch basins.

C. Project Record Documents:
   1. Record location of pipe runs, connections, and invert elevations.

PART 2 PRODUCTS

2.01 PIPE MATERIALS

A. Plastic Pipe: ASTM D3350, High Density Polyethylene (HDPE) corrugated ouside wall pipe with integrally formed smooth liner; inside nominal diameter of 6 inch, meeting the requirements of AASHTO M 252, Type S, for diameters between 3 inches and 10 inches and AASHTO M 294, Type S, for diameters between 12 inches and 60 inches, soil-tight, bell and spigot joints with rubber gaskets, with pipe and fittings manufactured from virgin PE compounds with cell classification 3254420C. Pipe slope to be greater than 1%.

B. Perforated Pipe: High Density Polyethylene (HDPE) corrugated wall with perforations and wrap.

2.02 PIPE ACCESSORIES

A. Fittings: Same material as pipe molded or formed to suit pipe size and end design, in required tee, bends, elbows, cleanouts, reducers, traps and other configurations required.

B. Trace Wire: Magnetic detectable conductor, clear plastic covering, imprinted with "Stormwater Service" in large letters.

2.03 CATCH BASIN, TRENCH DRAIN, CLEANOUT, AND AREA DRAIN COMPONENTS

A. Drainage Inlet
   1. Inlet: Nyloplast Drain Basin, Christybox, or CITY-approved equal
   2. Grate: NDS Standard grate, Christy, or CITY-approved equal unless specified on plan; ductile iron;
   3. Adaptor: see manufacturer's specifications
   4. Connector: see manufacturer's specifications
   5. Frames and grates shall be vehicular rated and vandal proof

B. Geotextile Fabric: Nonwoven Polypropylene, Mirafi 140 N or approved equal.

2.04 BEDDING AND COVER MATERIALS

A. Bedding: As specified in Section 31 23 23.

B. Cover: As specified in Section 31 23 16.13.

PART 3 EXECUTION

3.01 TRENCHING

A. See Section 31 23 16.13 for additional requirements.

B. Hand trim excavation for accurate placement of pipe to elevations indicated.

C. Backfill around sides and to top of pipe with cover fill, tamp in place and compact, then complete backfilling.

3.02 INSTALLATION

A. Install pipe, fittings, and accessories in accordance with manufacturer's instructions. Seal watertight.
   1. Plastic Pipe: Also comply with ASTM D2321.

B. Lay pipe to slope gradients noted on layout drawings; with maximum variation from true slope of 1/8 inch in 10 feet.

C. Connect to park storm drainage system and utility/municipal system.

D. Install continuous trace wire 6 inches above top of pipe; coordinate with Section 31 23 16.13.

3.03 INSTALLATION - CATCH BASINS

A. Install per manufacturer's specifications

B. Form bottom of excavation clean and smooth to correct elevation.

C. Form and place cast-in-place concrete base pad, with provision for storm drain pipe end sections

D. Establish elevations and pipe inverts for inlets and outlets as indicated.

E. Mount lid and frame level in grout, secured to top cone section to elevation indicated.

F. Where lids (i.e. rims) are below FG, install geotextile fabric over top of lid to prevent sediment, debris, rock, and/or wood fibers from entering storm drain system. Flows should still enter storm drain structure. Do not use impermeable fabrics or liners to cover grated lids.

3.04 FIELD QUALITY CONTROL

A. Perform field inspection in accordance with Section 01 45 00

3.05 PROTECTION

A. Protect pipe and bedding cover from damage or displacement until backfilling operation is in progress.

PART 4 MEASUREMENT AND PAYMENT

4.01 STORM DRAINAGE

A. The contract lump sum price paid for Storm Drainage shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in Storm Drainage, complete in place, including sawcutting, trenching, excavation and backfill, connecting new pipe to existing or new facilities, pipes, manholes, and inlets, adjusting to grade, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the City’s Representative.

End of Section