DOCUMENT 00 01 09

SUMMARY BIDDING CALENDAR

NOTICE – THIS SUMMARY IS FOR INFORMATIONAL PURPOSES ONLY. The dates and times listed may not be relied upon or enforced. This summary does not form a part of the contract documents and does not establish contractual obligations.

NOTICE – THIS IS A SUMMARY ONLY AND DOES NOT LIST ALL DATES, TIMES OR TIME PERIODS CONTAINED IN THE BIDDING AND CONTRACT DOCUMENTS. All bidders and contractors must refer to the actual documents for all applicable dates, times and time periods.

Event	Date	Reference
Contract Documents Available	**December 21, 2016**	00 11 16 Notice to Bidders
Mandatory Pre-Bid Conference & Mandatory Site Visit	**January 4, 2017** **10:00AM** **Location:** **5325 Broder Blvd.,** **Dublin, CA 94568** **Meet at Main Entrance Ramp**	00 11 16 Notice to Bidders
Non-Mandatory Networking Meeting & Non-Mandatory Site Visit.	**January 5, 2017** **2:00PM** **Location:** **5325 Broder Blvd.,** **Dublin, CA 94568** **Meet at Main Entrance Ramp**	00 11 16 Notice to Bidders
Addendum #1 Issue Date (Issue List of Attendees at the Mandatory Pre-Bid Conference)	**January 6, 2017**	00 21 13 Instructions to Bidders
Last Day for GSA to receive any Final Bidder Questions	**January 6, 2017** **2:00PM**	00 21 13 Instructions to Bidders

Last Day for Receipt of Requests for Substitutions before Receipt of Bids	**January 6, 2017 2:00PM**	00 21 13 Instructions to Bidders
Addendum #2 Issue Date (Issue Responses to Bidder Questions)	**January 18, 2017**	00 21 13 Instructions to Bidders
Receipt of Bids and Bid Opening	**February 2, 2017, 2:00PM**	00 11 16 Notice to Bidders
Last Day for two lowest Bidders to submit outstanding Bid Documents and ECOP Documentation	**February 6, 2017, 2:00PM** (2 business days following the Bid Opening Date)	00 22 19 Supplementary Instructions to Bidders -Construction Outreach Program
Bid Evaluation Period	**February 7, 2017 to February 15, 2017**	00 21 13 Instructions to Bidders
Notice of Intent to Award	**February 15, 2017**	00 51 13 Notice of Intent to Award
Last Day to Submit Bid Protest	**February 23, 2017, 2:00PM** (5th Business Day from Date of Notice of Intent to Award)	00 21 13 Instructions to Bidders
Estimated Board Award of Contract	**March 7, 2017**	00 51 00 Notice of Award
Notice of Award	**March 7, 2017**	00 51 00 Notice of Award
Last Day to Sign & Submit Contract	**March 14, 2017** (7 Calendar days after Notice of Award)	00 11 16 Notice to Bidders 00 51 00 Notice of Award
Last Day to Submit Post-Award Documents	**March 14, 2017** (7 Calendar days after Notice of Award)	00 21 13 Instructions to Bidders
Last Day to Submit Escrow Bid Documentation	**March 14, 2017** (7 Calendar days after Notice of Award)	00 56 00 Escrow Bid Documentation

Issue Notice to Proceed	**March 21, 2017**	00 55 00 Notice to Proceed
Contract Duration	**112 Calendar Days**	00 52 13 Agreement Form – Stipulated Sum (Single Prime Contract)
Last Day Contract Duration Begins	**March 7, 2017**	00 55 00 Notice to Proceed
Last Day Contract Duration Ends	**June 26, 2017**	00 55 00 Notice to Proceed
Last Day to Submit Construction Schedule, etc. per Notice to Proceed	**April 4, 2:00PM** (10th Business Day following Notice to Proceed)	00 55 00 Notice to Proceed
Construction Start Date	**March 22, 2017**	00 55 00 Notice to Proceed
Construction Completion Date	**June 26, 2017**	00 55 00 Notice to Proceed

END OF DOCUMENT

SECTION 05 50 00

METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: General requirements for metal work, including as applicable:
   1. Inserts and anchorages for ~~decorative metal railings and~~ bollards.
   2. Miscellaneous framing and supports.

B. Related Requirements:
   1. Decorative Metal Railings: Section 05 73 00.
   2. Painting and Coating: Section 09 90 00.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Action and Informational Submittals shall be submitted in accordance with Section 01 33 00 Submittal Procedures.

B. Coordination:
   1. Furnish setting drawings, diagrams, templates, and directions for installing anchorages, including sleeves, inserts, anchor bolts, and items with integral anchors, to be embedded in concrete.
   2. Coordinate fabrication schedule with construction progress to avoid construction delays.
   3. Coordinate with other construction in order to ensure that actual dimensions correspond to established dimensions.

1.3 ACTION SUBMITTALS

A. Shop Drawings:
   1. Large-scale drawings for fabrication and erection of assemblies not completely shown by manufacturer's product data.
      a. Include, as appropriate, plans, elevations, complete details, thicknesses, sizes, types, grades, classes of metal, connecting and joining methods, anchorages.
      b. Show required field measurements and interface with work of other Sections.
      c. Welds, both shop and field, shall be indicated by AWS "Symbols for Welding, Brazing and Nondestructive Examination," A2.4.
      d. Indicate all required field measurements.
   2. Setting drawings, templates, instructions, and directions for installation of anchorage devices.

B. Product Data: Manufacturer's specifications for manufactured products to be used in the fabrication of work, including paint products, bolts, and other exposed hardware.
   1. Include Material Safety Data Sheets (MSDS).

1.4 INFORMATIONAL SUBMITTALS

A. Certification for each welder.

B. Completed “Procedure Qualification Record” (PQR) and “Welding Procedures Specification” (WPS) forms for the welds to be performed under this Specification in accordance wtih AWS D1.1. Weld procedure qualification shall be for the same paint to be welded through in project work.

C. Mill test reports certifying physical and chemical properties for each lot of A325 and A449 anchor bolts to be delivered to the site.

D. Engineering Data: Before any elements requiring additional framing, support or bracing are fabricated, submit calculations verifying compliance with structural design criteria by design engineer and showing reactions to structure. Although all calculations shall be submitted, only reactions to structure are subject to review.

E. Certification: Submittal drawings, if not signed by design engineer, shall be certified that structural portion of drawings are in compliance with design calculations.

1.5 QUALITY ASSURANCE

A. Design Engineer: Professional structural or civil engineer registered in the State of California or shall otherwise be acceptable to governing authorities. Design engineer shall be experienced in providing engineering services of the kind indicated.

B. Comply with recommended practices of the National Association of Architectural Metal Manufacturers (NAAMM) and Section 10 of the AISC Code of Standard Practice.

C. Welding:
1. Qualifications: Certified and qualified in accordance with AWS D1.1.
2. Procedures and operations shall comply with AWS "Standard for Welding Procedure and Performance Qualifications," B2.1.
3. Comply with AWS publication "Welding Zinc Coated Steel" for galvanized products.
4. Welding inspector's qualifications shall be in accordance with AWS D1.1.

D. Wedge-type and expansion-nut concrete anchors, resin/adhesive anchors, and headed concrete anchors shall be ICC-ES approved.

E. Testing/inspection agencies shall be in conformance with ASTM E329.

F. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

G. At ramps, platforms, and landings, comply with the requirements of the CBC and ADA for striping. Coordinate with other Sections.
   1. Abrasive strips, if used, shall meet requirements of California Title 24.

H. Mockups: Provide metal fabrications for mockups specified in other Sections.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect steel from corrosion.

B. Store packaged materials in original unbroken package or container.

C. Comply with additional requirements specified in Section 01 43 00 Quality Assurance - Materials and Equipment and in Section 01 66 00 Delivery, Storage and Handling.

1.7 FIELD CONDITIONS

A. Field Measurements: Where metal fabrications are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on shop drawings. Allow for trimming and fitting wherever taking of field measurements before fabrication might delay work.

B. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabrication without field measurements.

PART 2 - PRODUCTS

2.1 DESIGN AND PERFORMANCE CRITERIA

A. Regulatory Requirements:
   1. Comply with the Americans with Disabilities Act (ADA).
   2. Comply with the CBC.

B. Design interface and connections to existing work in such a way as to minimize damage and defacement to existing construction.

2.2 METAL MATERIALS

A. Steel:
   1. Steel Shapes, Bars, and Plates: ASTM A36.
   2. Steel Plates to Be Bent or Cold Formed: ASTM A283, Grade C.
   3. Pipe: ASTM A53, Grade B, Schedule 40.
   4. Steel Bars and Bar-Size Shapes: ASTM A663, Grade 65, or ASTM A36.
   5. Cold-Drawn Steel Tubing: ASTM A500, Grade B.
   6. Hot-Rolled Carbon-Steel Bars: ASTM A575, grade as selected by fabricator.
   7. Steel Castings: ASTM A27, Grade 65-35, medium-strength carbon steel.

2.3 OTHER MATERIALS AND COMPONENTS

A. Pipe Fittings: Malleable iron ASTM A47, grade 32510.

B. Anchors and Anchor Bolts:
1. Headed: ASTM F1554, Grade 36.
2. Unheaded and Standard Hex Head Bolts with Hex Nuts: ASTM A307.
3. Additional Anchors: As indicated on the Structural Drawings.

C. Fasteners:
1. Provide zinc-coated fasteners with galvanizing complying with ASTM A153 for exterior use or where built into exterior walls.
2. Select fasteners for type, grade, and class required for installation.

D. Washers:
1. Plain Washers: ANSI B18.22.1, Type A-W.
2. Plain Hardened Washers: ASTM F436.
3. Beveled Washers: IFI B18.23.1.
4. Exterior standard washers shall be plated.

E. Welding:
1. Electrodes for Welding: In accordance with AWS Code.
2. Welding Filler Metal for Carbon Steel: AWS A5.1 or A5.5 E70XX for SMAW welding process, AWS A5.18 ER70S-X for GMAW welding process, AWS A5.17 or A5.23 F7X-EXXX for SAW welding process, and AWS A5.20 E7XT-X for FCAW welding process.

F. Nonmetallic Shrinkage-Resistant Grout: Premixed, nonmetallic, noncorrosive, nonstaining shrinkage-compensating, and with at least 8,000-psi compressive strength at 28 days; MBT “Sonogrout 10K” by BASF Construction Chemicals, or equal conforming to ASTM C1107.

2.4 GALVANIZING

A. Galvanizing: Provide zinc coating for items exposed to exterior atmosphere, shown on the Drawings, or specified to be galvanized using the hot-dip process after fabrication in accordance with ASTM A385.
1. Comply with ASTM A153 for galvanizing of iron and steel hardware.
2. Comply with ASTM A123 for galvanizing of rolled, pressed, and forged-steel shapes, plates, bars, and strips 1/8 inch thick and heavier.
3. Comply with ASTM A123 for galvanizing of assembled steel products.
4. Safeguarding against warping and distortion during hot-dip galvanizing of metal fabrications shall be in conformance with ASTM A384.

B. Newly galvanized items shall not be water quenched or chromate quenched after galvanizing if they are scheduled to receive a paint coating.

C. Exterior standard bolts, cast-in-place anchor bolts, turnbuckles, clevises, and nuts shall be galvanized.

2.5 PROTECTIVE COATINGS

A. Products:
1. Galvanizing-Repair Paint: Minimum 95 percent zinc-dust-content in dried film paint for regalvanizing welds in galvanized steel; “Z.R.C. Cold Galvanizing Compound” by ZRC Worldwide, “Cold Galv Primer” by Valspar, or equal. Where repaired galvanizing is to be left exposed, use repair paint that will closely match appearance of hot-dip galvanizing; “Galvilite” by ZRC Worldwide, or equal.
2. Shop Primer for Ferrous Metal - Not Galvanized:
   a. Interior: Modified alkyd; Tnemec Series "FD88 Azeron" or equal, 1.5 to 2.5 DFT.
   b. Exterior: Inorganic, zinc-rich: "Tneme-Zinc 90-97," or equal, 2.0 to 3.5 DFT.
3. Field-Applied Finish Paints: As specified in Section 09 90 00 Painting and Coating.

B. Galvanized Surfaces:
1. Repair zinc coating damaged after fabrication with specified repair paint in accordance with ASTM A780, AHDGA publication, "Recommended Practice for Touch-up of Damaged Galvanized Coatings," and manufacturer’s recommendations for application of repair paint.
2. Zinc-coated surfaces to be painted shall be chemically treated and finished painted as specified in Section 09 90 00 Painting and Coating.

C. Shop Priming:
1. Shop-prime work, except stainless steel, surfaces to be epoxy painted, galvanized, or epoxy-coated, surfaces and anchors encased in concrete, surfaces to be grouted against, and surfaces and edges to be field welded, unless otherwise indicated.
2. Primer paint shall be compatible with required finish coat.
3. Surface Preparation Prior to Priming:
   a. Galvanized Surfaces: SSPC No. 1.
   b. Concealed Items: SSPC No. 2 or No. 3.
   c. Exposed Items: SSPC No. 6.
4. Apply primer within 8 hours of preparation of surface or sooner if necessary to prevent rusting.
5. Primer shall be applied to a minimum dry film thickness of 2 mils.
6. Paint application shall be in accordance with SSPC PA1, “Shop, Field, and Maintenance Painting.”

D. Surfaces to be welded shall be protected from painting by use of masking. Inadvertent overspray on surfaces to be welded shall be removed by wire brushing.

E. Finish Painting: As specified in Section 09 90 00 Painting and Coating. Finish exposed fasteners to match adjacent metal.

F. Protective Coating Schedule: Confer with County's Representative for required coating at items not scheduled.
   1. Exterior Items: Galvanized and field finish painted with standard performance coating.

2.6 FABRICATED ITEMS

A. Miscellaneous Framing and Supports:
   1. Provide miscellaneous steel framing and supports as required to complete the Work.
   2. Fabricate to sizes, shapes, and profiles shown or required.
      a. Except as otherwise shown, fabricate from structural steel shapes, plates, and steel bars, of all-welded construction, using mitered corners, welded brackets and splice plates, and a minimum number of joints for field connection.
      b. Cut, drill, and tap units to receive items anchored to the Work.
   3. Galvanize miscellaneous framing and supports wherever indicated and used in an exterior location.

2.7 FABRICATION - GENERAL REQUIREMENTS

A. Use materials of size and thicknesses shown or required to produce adequate strength and durability in finished product for intended use.

B. Work to dimensions shown on the Drawings or accepted on shop drawings within the allowable tolerances as defined in referenced AISC Code.

C. Use type of materials shown or specified for various items of work.

D. Castings shall be sound and free of warp, cracks, blowholes, or other defects that impair strength or appearance.

E. Form exposed work true to line and level with accurate angles and surfaces and straight, sharp edges. Form bent metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

F. Weld in accordance with recommendations of AWS.
   1. Welding shall be done in a sequence, which minimizes distortion and shrinkage.
   2. Electrodes preheat and welding process shall meet AWS prequalification requirements and the electrode manufacturer's written recommendations for specific applications.
   3. Headed concrete anchors and deformed bar anchors shall be shop welded in accordance with AWS C5.4 and AWS D1.1

G. Provide anchorage devices and fixings where necessary for securing metal fabrications to in-place construction, including threaded fasteners for concrete and masonry inserts, through bolts, lag bolts, and other connectors as required.

H. Fabricate and space anchoring devices as shown and required to provide adequate support for intended use of work.

I. Metal fabrications shall be fabricated completely in the shop except as otherwise specified or shown on the Drawings.

J. Sheared and flame cut edges shall be true to line and free from rough corners and projections.

K. Reentrant cuts/corners shall be filleted to a radius of not less than 1/2 inch.

L. Holes:
   1. Holes shall be punched, subpunched, and reamed, or drilled in accordance with referenced AISC Specifications. Holes shall not be made by flame cutting.
   2. Holes shall be 1/16 inch larger than the nominal bolt diameter, except holes for cast-in-place anchor bolts and inserts which shall be 3/16 inch larger than the nominal bolt diameter and as otherwise shown on the Drawings.
   3. Fabrication holes and notches not required, oversized, or slotted and not shown on the Drawings shall be subject to prior review by County's Representative.

M. Bent plate shall be in accordance with AISC minimum radius for bending.

N. Fabricated threads shall comply with ANSI B1.1 UNC-2A.

2.8 SOURCE QUALITY CONTROL

A. Metal fabrications shall be inspected after fabrication.

B. Inspection of welding shall be in accordance with AWS D1.1 and the special inspection requirements of the CBC with all welds visually inspected.
   1. Ultrasonic testing shall be in accordance with AWS D1.1.
   2. Magnetic particle testing shall be in accordance with ASTM E709.
   3. Dye penetrant testing shall be in accordance with ASTM E165.
   4. A minimum of 10 percent of indicated welds shall be tested.
   5. Acceptance of welding inspection results shall be in accordance AWS D1.1.

C. Inspection of headed concrete anchor and deformed bar anchor welding shall be in accordance with AWS D1.1 and the special inspection requirements of the CBC.

D. Hot-dip galvanizing shall be inspected after galvanizing in accordance with AHDGA "Inspection of Products Hot-Dip Galvanized after Fabrication."

E. Acceptance of blast cleaning inspection shall be in accordance with SSPC VIS-1, "Pictorial Surface Preparation Standards for Painting Steel Surfaces."

PART 3 - EXECUTION

3.1 FIELD PREPARATION

A. At the time of connecting, bearing surfaces shall be free from loose or non-adherent rust, loose mill scale, oil, grease, dirt, mud, and any foreign matter, coating, or defect that adversely affects the connection.

B. Surface preparation for welding shall be in accordance AWS D1.1, except loose or non-adherent rust, loose mill scale, and paint shall be removed by wire brushing.

3.2 INSTALLATION

A. Install metal fabrications as shown on the Drawings in accordance with reviewed submittals and referenced standards including allowable tolerances as defined in the AISC "Code of Standard Practice for Steel Buildings and Bridges."

B. Cut, drill, and fit as required for installation.

C. Provide temporary bracing or anchors in formwork for items that are to be built into concrete.

D. Set work accurately in location, alignment, and elevation; plumb, level, true, and free of rack; measured from established lines and levels.

E. Adjust items prior to securing in place so as to ensure proper matching of components and correct alignment.

F. Anchors and Fastening:
   1. Connections shall be as shown on the Drawings. Connections and splices not shown on the Drawings shall be subject to prior review by County's Representative.
   2. Anchor bolts shall be placed within the allowable tolerances as defined in the AISC Code of Standard Practice for Steel Buildings and Bridges.
   3. Cast-in-place miscellaneous metals and fasteners shall be installed and set by template prior to concrete placement.
   4. Concrete anchors shall be installed and tightened to proper torques using proper initial head clearances at expansion nut-type concrete anchors and with nuts initially flush with the end of the bolt at wedge and sleeve-type concrete anchors in accordance with the manufacturer's written instructions and specifications.
   5. Resin/adhesive anchors shall be fully cured prior to use.
   6. Connection parts in connections not slip joints shall be properly drawn together and the bolts tightened to the snugtight condition.

7. Bolts in slip-joint connections shall be provided with lock nuts and initially tightened to the snugtight condition, then backed off half turn.
8. Standard bolt heads and nuts at oversized and slotted holes shall be provided with plain washers.
9. High-strength bolt heads and nuts at oversized and slotted holes shall be provided with plain hardened washers.
10. Bolt heads and nuts at sloped surfaces shall be provided with beveled washers.

G. Holes that require enlarging to admit bolts shall be reamed. Holes shall not be enlarged by flame cutting.

H. Field Welding:
1. Comply with applicable AWS specification for procedures of manual shielded metal arc welding, for appearance and quality of welds, and for methods used in correcting welding work.
2. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations.
3. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are intended for bolted or screwed field connections.
4. Protect and clean areas surrounding welds.
5. Welding shall be done in a sequence, which minimizes distortion and shrinkage

I. Field correcting by flame cutting shall not be permitted without prior review by County's Representative.

J. Filler and/or shim plates shall be furnished and installed by the Contractor to provide alignment of members where required due to mill and/or fabrication tolerances.

3.3 FIELD QUALITY CONTROL

A. Metal fabrications and fasteners shall be inspected after installation.

B. Cast-in-place anchor bolts and miscellaneous metal fabrications shall be inspected after they have been placed and prior to concrete placement.

C. Wedge and expansion nut-type concrete anchor and resin/adhesive anchor installation shall be inspected in accordance with special inspection requirements of the CBC.

D. Inspection of welding shall be in accordance with AWS D1.1 the special inspection requirements of the CBC with all welds visually inspected. Acceptance of welding inspection results shall be in accordance with of AWS D1.1.
1. Ultrasonic testing shall be in accordance with AWS D1.1.
2. Magnetic particle testing shall be in accordance with ASTM E709.
3. Dye penetrant testing shall be in accordance with ASTM E165.
4. A minimum of 10 percent of indicated welds shall be tested.
5. Acceptance of welding inspection results shall be in accordance AWS D1.1.

E. A minimum of 10 percent of slip-joint connections shall be inspected.

F. A minimum of 10 percent of all concrete anchor connections shall be tested using a calibrated torque wrench in accordance with the ICC-ES Report.

3.4 ADJUSTMENT AND TOUCH-UP

A. Inspect installed work. Correct deficiencies.

B. Immediately after erection, touch up abraded areas of shop paint, and paint all exposed areas with same material as used for shop painting.
   1. Apply by brush or spray.
   2. Touch up galvanized surfaces as specified.

C. Restore finishes damaged during installation and construction period so that no evidence of correction work remains.

D. Wet storage stains on galvanized steel shall be removed after installation.

3.5 PROTECTION

A. Protect finishes of metal fabrications from damage during construction period as required.

END OF SECTION 05 50 00

SECTION 05 73 00

DECORATIVE METAL RAILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Railings and guardrails at ramps and landings as shown on the Drawings, as follows:
   1. Viva Railings or Equal, TEE System, all stainless steel with cable infill and shop-applied NAAMM No. 4 satin finish.
      a. Cable Infill: 3/16 inch stainless steel cable at 3.25 inches on center.

B. Related Requirements:
   1. Metal Fabrications: Section 05 50 00;
      ~~a. Embedded steel supports and anchorages for decorative metal railings.~~
      ~~b.~~**a.** General requirements for fabrication and installation of metal work.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Action and Informational Submittals shall be submitted in accordance with Section 01 33 00 Submittal Procedures.

B. Coordination:
   1. Coordinate installation of anchorages. Furnish setting drawings, diagrams, templates, and directions for installing anchorages, including sleeves, inserts, anchor bolts, and items with integral anchors, to be embedded in concrete.
   2. Coordinate sequence of installation with Sections whose work adjoins decorative metal railings.

C. Pre-installation Meeting: Prior to installation of decorative metal railings, Contractor, County's Representative, representative of metal fabricator, installer, and others whose work interfaces with decorative metal work or may affect its quality shall meet at the Project site to coordinate related requirements.
   1. Notify participants at least 5 working days before conducting meeting.
   2. Review material selections and procedures to be followed in performing the work.
   3. Review in detail job conditions, schedule, construction sequence, installation requirements, and quality of completed installation.
   4. Review in detail the means of protecting completed work during remainder of construction period.
   5. Record discussions of meeting and any conflict, incompatibility or inadequacy. Furnish a copy of record to each participant.

D. In addition, attendance is required at pre-installation meetings specified in other Sections whose work interfaces with work of this Section.

1.3 ACTION SUBMITTALS

A. Shop Drawings:
   1. Large-scale drawings for fabrication and erection of assemblies not completely shown by manufacturer's product data.
      a. Include, as appropriate, plans, elevations, complete details, thicknesses, sizes, types, grades, classes of metal, connecting and joining methods, anchorages.
      b. Show required field measurements and interface with work of other Sections.
      c. Welds, both shop and field, shall be indicated by AWS "Symbols for Welding, Brazing and Nondestructive Examination," A2.4.
      d. Indicate all required field measurements.
   2. Setting drawings, templates, instructions, and directions for installation of anchorage devices.
   3. Coordinate with shop drawing requirements of other Sections whose work adjoins decorative metal railings.
   4. Provide shop drawings for mockups specified below.

B. Product Data: Manufacturer's specifications and installation instructions for manufactured products to be used in the fabrication of work, including paint products, cabling components, fence components, bolts, tie rod ends, and other exposed hardware.

C. Samples:
   1. Exposed metals in selected finishes, 12 inches x 6 inches, or 12 inches long as applicable.
   2. Specified railing assembly, showing specified rail profile. These samples, if accepted, may be installed as mockups and as part of finished construction.
   3. Each type of exposed fastener or hardware.
   4. Full-size samples of castings and forgings.
   5. For products involving selection of texture or design including mechanical finishes.
   6. Additional samples as requested by the County’s Representative.

1.4 INFORMATIONAL SUBMITTALS

A. Qualifications as specified.

B. Report on pre-installation meeting.

C. Welding:
   1. Statement of qualifications for fabricator, installer, and welders.
   2. Completed “Procedure Qualification Record” (PQR) and “Welding Procedures Specification” (WPS) forms for the welds to be performed under this Section.

D. Delegated-Design Services: Engineering data for railings and guardrails.
   1. Calculations verifying compliance with structural design criteria by design engineer and showing reactions to structure.

2. Drawings shall be signed by design engineer, or certification that structural portion of drawings are in compliance with design calculations shall be submitted.
3. Although all calculations shall be submitted, only reactions to structure are subject to review.

E. Certification: Submittal drawings and engineering data shall be signed by design engineer, or certification that structural portion of drawings are in compliance with design calculations shall be submitted.

1.5 QUALITY ASSURANCE

A. Qualifications:
1. Design engineer shall be a structural or civil engineer registered in the State of California.
2. Fabricator/Installer: Documented experience in fabrication and installation of decorative metal railings similar to those indicated for this Project, and with a record of successful in-service performance.
3. Welders: Certified and qualified in accordance with procedures specified in American Welding Society Standard in accordance with AWS D1.1, using procedures, materials, and equipment of the type required for the work.

B. Welding procedures and operations shall comply with AWS B2.1, "Standard for Welding Procedure and Performance Qualifications."

C. Mockups:
1. Provide a full-size mockup of specified railing assembly for review and approval by County's Representative.
2. In addition, first installed example of each configuration of railing, and each installation condition, if not illustrated by above mockup, shall serve as a mockup for review and approval by County's Representative of workmanship, visual effect, and interface with adjacent construction.
3. Each mockup shall consist of a typical assembly in specified finish, complete with mounting devices, and shall be sufficiently large and complete to demonstrate installation and aesthetic effect of completed assembly.
4. If requested by County's Representative, install mockup as directed.
5. If requested, make modifications to mockups without additional charge to County.
6. Do not proceed with remainder of installation until mockups have been approved.
7. Where appropriate and acceptable to County's Representative, approved mockups may become part of the completed Work.

1.6 FIELD CONDITIONS

A. Field Measurements: Where decorative metal is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on shop drawings.
1. Allow for trimming and fitting wherever taking of field measurements before fabrication might delay work.

2. Coordinate fabrication schedule with construction progress so as to avoid construction delays.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect steel from corrosion.

B. Store packaged materials in original unbroken package or container.

C. Comply with additional requirements specified in Section 01 43 00 Quality Assurance - Materials and Equipment and in Section 01 66 00 Delivery, Storage and Handling.

PART 2 - PRODUCTS

2.1 DESIGN AND PERFORMANCE REQUIREMENTS

A. Decorative steel shall be considered Architecturally Exposed Steel (referred to as "AES" or "AESS") and shall conform to the recommended practices of the Architectural Products Division (AMP) of the National Association of Architectural Metal Manufacturers (NAAMM), Section 10 of the AISC Code of Standard Practice, and the additional requirements of this Section.

B. Structural Performance of Railing Assemblies, Handrails, and Guardrails:
   1. In engineering stainless steel railing components to withstand structural loads indicated, determine allowable design working stresses of railing materials based on 60 percent of minimum yield strength.
   2. Handrails and Top Rails of Guards:
      a. Uniform load of 50 lb/ft applied in any direction.
      b. Concentrated load of 200 lb applied in any direction.
      c. Uniform and concentrated loads need not be assumed to act concurrently.
   3. Infill:
      a. Concentrated load of 50 lb applied horizontally on an area of 1 square foot.
      b. Infill load and other loads need not be assumed to act concurrently.

C. Industry Standards:
   1. Comply with "Metal Rail Manual" of National Ornamental and Miscellaneous Metals Association (NOMMA).
   2. Comply with "Pipe Railing Manual" of National Association of Architectural Metal Manufacturers (NAAMM).

D. Regulatory Requirements:
   1. Comply with the Americans with Disabilities Act (ADA).
   2. Comply with the CBC.

E. If modifications to designs indicated are proposed in order to meet code requirements, indicate them as such on shop drawing submittals. Work with County's

Representative to arrive at an acceptable design that is sufficiently similar to the design indicated.

F. Design interface and connections to existing work in such a way as to minimize damage and defacement to existing construction.

2.2 METAL MATERIALS

A. General: Metal surfaces exposed to view shall not exhibit pitting, seam marks, roller marks, splice marks, mill identification markings, stains, discolorations, or other blemishes and imperfections.

B. Stainless Steel:
1. Alloy: Type 304 at interior, Type 316 at exterior, unless otherwise indicated or specified.
2. Sheet and Plate: ASTM A167 or A240.
3. Bars: ASTM A276.
4. Tubing for Railings and Guardrails: ASTM A554.
5. Finish: American Iron and Steel Institute (AISI) No. 4, satin directional brushed, unless otherwise noted.

C. Cable Infill:
1. Material: 1 x 19, Type 316 stainless steel strand, left-hand lay, per dimensional properties contained in MIL-W-87161.
2. Finish: Mill.
3. Diameter: 3/16 inch, minimum breaking strength of 4000 pounds.
4. Orientation: As indicated on Drawings; typically parallel to handrail and ramp surface.
5. Spacing: Maximum 3.25 inches on center.
6. Cable Hardware Components: Hardware substantially concealed inside end posts wherever practical.

2.3 ADDITIONAL MATERIALS

A. Resilient Pads: Closed-cell neoprene complying with ASTM C864, in black color.

B. Anchor Bolts: ASTM A307, nonheaded type, unless otherwise indicated.

C. Fasteners: Use fasteners of same basic metal as fastened metal, unless otherwise indicated. Do not use metals that are corrosive or incompatible with materials joined.
1. Fasteners for Exterior Stainless Steel Items: Stainless steel.
2. Provide concealed fasteners for interconnecting decorative metal components and for attaching them to other work, unless exposed fasteners are unavoidable or are the standard fastening method. Exposed fasteners shall be indicated on required submittals.
3. Provide turnbuckles, sleeves, spacers, and other hardware items as indicated.

4. Provide anchorage devices and fasteners where necessary for securing decorative metal to in-place construction.

D. Welding Electrodes and Filler Metal: Type and alloy of filler metal and electrodes as recommended by producer of metal to be welded, complying with applicable AWS specifications, and as required for color match, strength, and compatibility in fabricated items.

E. Non-Metallic Shrinkage-Resistant Grout: As specified in Section 05 50 00, "Metal Fabrications."

F. Adhesive, Stainless Steel to Other Materials: Epoxy resin type, unless otherwise recommended by metal manufacturer and fabricator.

2.4 DECORATIVE METAL FABRICATIONS AND COMPONENTS

A. Posts and Handrail Brackets: Stainless steel; manufacturer's standard for system specified.

B. Handrails: 1.5 inch diameter round stainless steel with shop-applied NAAMM No. 4 satin finish.

2.5 FABRICATION METHODS - GENERAL

A. Form decorative metal to required shapes and sizes, with true lines and angles. Provide components in sizes and profiles indicated.

B. Use special care so as to avoid bending, twisting, or otherwise distorting individual members.

C. Castings, if used, shall be sound and free of warp, cracks, blowholes, or other defects that impair strength or appearance. Grind, wire-brush, sandblast, and buff castings to remove seams, gate marks, casting flash, and other casting marks.

D. Provide rebates, lugs, and brackets as required to assemble units and to attach to other work. Drill and tap for required fasteners, unless otherwise indicated. Use concealed fasteners, unless otherwise indicated on reviewed shop drawings.

E. Joints and Connections:
1. Shop-assemble items to greatest extent possible so as to minimize field splicing and assembly. Disassemble only as necessary for shipping and handling limitations. Clearly mark items for reassembly and coordinated installation.
2. Use connections that maintain structural value of joined pieces.
3. Detail connections to facilitate fabrication and erection in accordance with the referenced AISC code.
4. Mill joints to a tight, hairline fit. Cope or miter corner joints. Form joints exposed to weather so as to exclude water penetration.

5. Provide anchorage devices and fasteners where necessary for securing metal fabrications to in-place construction, including threaded fasteners for concrete and masonry inserts, toggle bolts, through bolts, lag bolts, and other connectors as required.
6. Fabricate and space anchoring devices as shown and required to provide adequate support for intended use.

F. Welding and Brazing: Comply with AWS-recommended practices.
1. Welds shall be continuous.
2. Weld and braze behind finished surfaces without distorting or discoloring exposed side.
3. Remove flux from exposed welded and brazed joints. Dress exposed and contact surfaces.

G. Finishing:
1. Finish exposed surfaces to smooth, sharp, well-defined lines and arris.
2. Welds, burrs, roller marks, seams, and rough surfaces shall be ground neat and smooth.
3. Mill markings shall be completely removed.
4. Gouges, dents, and other surface abuse shall be filled and ground smooth.
5. Stainless Steel: Use electrochemical or mechanical methods or abrasive cleaners to remove weld discoloration on exposed surfaces. Welded area shall match appearance of adjacent surface after cleaning.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Install decorative metal railings and related materials as shown on the Drawings in accordance with reviewed submittals and referenced standards.

B. Cut, drill, and fit as required for installation.

C. Set work accurately in location, alignment, and elevation; plumb, level, and true; and free of rack; measured from established lines and levels.

D. Adjust items prior to securing in place so as to ensure proper matching of components and correct alignment.

E. Field Welding:
1. Comply with applicable AWS specification for procedures of manual shielded metal arc welding, for appearance and quality of welds and for methods used in correcting welding work.
2. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations.
3. Grind exposed welded joints smooth, unless otherwise specified, and restore finish to match finish of adjacent surfaces.

F. Erection Tolerances:
   1. Variation from Slope Shown: Maximum 1/4 inch in any post to post space or 20-foot run, noncumulative.
   2. Offsets in End-to-End or Edge-to-Edge Alignment of Consecutive Members: 1/16 inch.

3.2 RAILING INSTALLATION

A. Cope neatly to fit.

B. Secure posts and rails to metal with welded or bolted connections and to concrete with non-metallic shrinkage-resistant grout as shown on the Drawings and specified in Section 05 50 00 Metal Fabrications.
   1. Longitudinal members shall be parallel to each other, to floor surface, or to slope of ramp as shown.
   2. Center line of members within each railing run shall be in same vertical plane.

C. Protect against galvanic action wherever dissimilar metals are in contact, using zinc-chromate primer on contact surfaces.

D. Adjust railings prior to securing in place to ensure proper matching at butting joints and correct alignment throughout their length.
   1. Plumb posts in each direction.
   2. Remove any burrs or protrusions that might snag fingers or clothing, and grind and polish smooth.

E. Cable Infill:
   1. Tension cables to minimum of 400 pounds each.
   2. Ensure that cables are parallel, without kinks and sags.

F. Installation Tolerances:
   1. Maximum variation from level or from indicated slopes: 1/4 inch in 10 feet, noncumulative.
   2. Maximum offset from true alignment of abutting members: 1/16 inch.

3.3 ADJUSTMENT AND TOUCH-UP

A. Inspect installed work, with particular attention to handrails. Correct deficiencies.

B. Restore finishes damaged during installation and construction period so that no evidence of correction work remains.

C. Return items that cannot be refinished in the field to the shop. Make required alterations and refinish entire unit, or provide new units.

3.4 PROTECTION

A. Protect finishes of decorative metal from damage during construction period as required.

END OF SECTION 05 73 00

SECTION 32 05 23

PORTLAND CEMENT CONCRETE

1. GENERAL

1.1 SECTION INCLUDES

A. Materials for Portland cement concrete.

B. Aggregate and aggregate grading for Portland cement concrete.

C. Water for Portland cement concrete.

D. Admixtures for Portland cement concrete.

E. Proportioning for Portland cement concrete.

F. Mixing and transporting Portland cement concrete.

G. Formwork for cast in place Portland cement concrete.

H. Embedded materials for Portland cement concrete.

I. Steel reinforcement for Portland cement concrete.

J. Placing and finishing Portland cement concrete.

K. Curing Portland cement concrete.

L. Protecting Portland cement concrete.

1.2 RELATED SECTIONS

A. Section 31 11 00, Clearing and Grubbing

1.3 RELATED DOCUMENTS

A. ASTM:
1. A 82, Cold Drawn Steel Wire for Concrete Reinforcement.
2. A 185, Steel Welded Wire Fabric, Plain for Concrete Reinforcement.
3. A 615, Deformed and Plain Billet Steel Bars, for Concrete Reinforcement.
4. C 94, Specification for Ready-mixed Concrete.
5. C 114, Method for Chemical Analysis of Hydraulic Cement.
6. C 150. Portland Cement.
7. C 618, Fly Ash and Raw or Calcined Natural Pozzolan for use as Natural Admixture in Portland Cement.

8. C 1751, Preformed Expansion Joint Fillers for Concrete. Paving and Structural Construction (Non-extruded and Resilient Bituminous Types).

B. Caltrans Standard Specifications:
1. Section 51: Concrete Structures.
2. Section 73: Concrete Curbs and Sidewalks.
3. Section 90: Concrete.

1.4 DEFINITIONS

A. ASTM: American Society for Testing Materials

1.5 SUBMITTALS

A. Submittal procedure shall be as directed by Division 01.

B. Concrete Mix Design: Have all concrete mixes designed by a testing laboratory and approved by the County's Representative. Conform all mixes to the applicable building code requirement, regardless of other minimum requirements listed herein or on the drawings. Submit mix designs for review before use. Show proportions and specific gravities of cement, fine and coarse aggregate, and water and gradation of combined aggregates.

C. Mock Ups: To ensure consistency of the product, the Contractor shall:
1. Obtain each color, type, and variety of concrete, aggregates, sand, joint materials, and other materials, from a single source with resources to provide products and materials of consistent quality in appearance and physical properties without delaying the Work.
2. Prior to preparation of Field-Constructed Mock-up Samples, provide a 12" x 12" office sample of all colors and finishes to the County for approval.
3. ~~Prior to the installation of any Work as indicated herein this Section, the Contractor shall erect Field-Constructed Mock-Up~~ The Contractor shall erect Field-Constructed Mock-up Samples for each type and pattern of concrete required. Build Field-Constructed Mock-up Samples to comply with the following requirements, using materials and same base construction including special features for expansion joints, construction joints, form work, surface finishes, textures, color(s), and contiguous work as indicated for final unit of Work. Contractor shall provide additional test panels as described herein to determine final finish:
    a.
    b. Locate Field-Constructed Mock-up Samples on the Project Site in location as approved by the County Representative.
    c. Notify the County Representative, in writing, at least one (1) week in advance of the dates and times when Field-Constructed Mock-up Samples will be erected.
    d. Demonstrate quality and range of aesthetic effects and workmanship in the Field-Constructed Mock-up Samples that will be produced in final unit of Work. Arrange mock-up samples adjacent to mock-up samples of other paving materials and finishes that will be adjacent in the final work.

e. Obtain the County Representative's acceptance of Field-Constructed Mock-up Samples, in writing, before start of installation of Work.
f. Retain and maintain Field-Constructed Mock-up Samples during construction in an undisturbed condition as a standard for judging the completed unit of Work.
g. Each mock up paving sample within this Section shall measure a minimum of two feet (2') wide and two feet (2') long, to compare the aesthetics of material colors, textures, and finishes. The contractor shall assume 3 mock ups are necessary for the finishes specified in this Section.
h. All Field-Constructed Mock-up Samples shall be tested to verify all walk surfaces meet code requirements for slip resistance.

~~h. Prior to preparation of Field-Constructed Mock-up Samples, provide a 12" x 12" sample of all colors and finishes to the County for approval.~~

1.6 QUALITY ASSURANCE

A. Concrete shall be subject to quality assurance in accordance with Section 90 of Caltrans Standard Specifications.
1. Slump tests: Have available, at job site, equipment required to perform slump tests. Make one slump test for each cylinder sample, from same concrete batch. Allowable maximum slump shall be 4 inches for walls and 3 inches for slab on grade.

B. Certifications:
1. Provide County's Representative at the time of delivery with certificates of compliance signed by both Contractor and Supplier containing the following statements:
   a. Materials contained comply with the requirements of the Contract Documents in all respects.
   b. Proportions and mixing comply with the design mix approved by the County's Representative. Design mix shall have been field tested in accordance with the herein requirements of the Caltrans Standard Specifications and produces the required compressive strength under like conditions.
   c. Statement of type and amount of any admixtures.
2. Provide County's Representative, at time of delivery, with certified delivery ticket stating volume of concrete delivered and time of mixing, or time of load-out in case of transit mixers.

C. Conform to the applicable provisions of Section 51, 73 and 90 of the Caltrans Standard Specification and these Technical Specifications.
1. Conform construction of Portland cement concrete surface improvements (including curbs, gutters, medians, valley gutters, walks, pads) to the requirements of Section 73 of the Caltrans Standard Specifications unless otherwise required in these Technical Specifications or shown on the Plans.
2. Conform other construction of Portland cement concrete items to the requirements of Section 51 of the Caltrans Standard Specifications unless otherwise required in these Technical Specifications or shown on the Plans.

1.7 DESIGNATION

A. General: Whenever the 28-day compressive strength is designated herein or on the Plans is a 3,600psi or greater, the concrete shall considered to be designated by compressive strength. The 28-day compressive strength shown herein or on the plans which are less than a 3,600psi are shown for design information only and are not considered a requirement for acceptance of the concrete. Whenever the concrete is designated by class or as minor concrete herein or on the Plans, the concrete shall contain the cement per cubic yard shown in Section 90-1.01 of the Caltrans Standard Specifications.

B. Unless noted otherwise herein or on the Plans, the minimum compressive strength for Portland cement concrete at 28 days for this Project shall be 3,600 psi.

2. PRODUCTS

2.1 PORTLAND CEMENT

A. General: Type II (modified) cement conforming to section 90-2.01 of the Caltrans Standard Specifications.

B. Provide a coloring equivalent to ¼ pound of lampblack per cubic yard. Add to the concrete at the central mixing plant. Liquiblack concrete colorant or equal, may be used in lieu of lampblack. One pint of Liquiblack shall be considered equal to one pound of lampblack.

C. For decorative concrete mineral colorants shall be added to achieve color match of existing adjacent concrete.

2.2 AGGREGATE AND AGGREGATE GRADING

A. General: Conform to the requirements of Section 90-2.02, 2.02A and 2.02B of the Caltrans Standard Specifications.

B. Aggregate Size and Gradation: Conform to the requirements of Section 90-3 of the Caltrans Standard Specifications for 1-inch maximum combined aggregate.

2.3 WATER

A. General: Conform to the requirements of section 90-2.03 of the Caltrans Standard Specifications. For mixing and curing Portland cement concrete and for washing aggregates.

2.4 EXPANSION JOINT MATERIAL

A. Material for expansion joints in Portland cement concrete improvements shall be pre-molded expansion joint fillers conforming to the requirements of ASTM Designation D 1751. Expansion joint material shall be shaped to fit the cross section of the concrete

prior to being placed. Suppliers certificates showing conformance with this specification shall be delivered with each shipment of materials delivered to the job site. Unless noted otherwise herein or on the Plans expansion joint thickness shall be as follows:

1. Curbs, Curb Ramps, Sidewalks, and Gutter Depression: ¼-inch
2. Gutter Lining, Ditch Lining and Channel Lining: ½-inch.
3. Structures: As indicated.

2.5 SURFACE SET RETARDER

A. Ready-to-use, water-based solution, non-staining, non-corrosive, non-flammable, non-toxic, specifically formulated to retard the set of fresh concrete surfaces to expose the aggregates in the concrete mix.

1. Surface retarder shall be available in a range of grades to provide the desired level of exposure.
2. Provide grade to match approved mockup.
3. Products & Manufacturers: Grace Top-Cast Surface Retarder, or equal.

2.6 REINFORCEMENT AND DOWELS

A. Bar reinforcement for concrete improvements shall be deformed steel bars of the size or sizes called for on the plans conforming to the requirements of ASTM Designation A 615 for Grade 60 bars. Size and shape for bar reinforcement shall conform to the details shown or called for on the Plans. Substitution of wire mesh reinforcement for reinforcing bars will not be allowed.

B. Slip dowels, where noted or called for on the plans or detail drawings shall be smooth billet-steel bars as designated and conforming to the requirements of ASTM Designation A 615 for Grade 60 bars. Ends of bars inserted in new work shall be covered with a cardboard tube sealed with cork; no grease or oil shall be used.

C. Mesh for reinforcement for concrete improvements shall be cold drawn steel wire mesh of the size and spacing called for on the plans conforming to the requirements of ASTM Designation A 82 for the material and ASTM Designation A 185 for the mesh. Size and extent of mesh reinforcement shall conform to the details shown or called for on the plans.

D. Tie wire for reinforcement shall be eighteen (18) gauge or heavier, black, annealed conforming to the requirements of ASTM Designation A 82.

E. Suppliers certificates showing conformance with this specification shall be delivered with each shipment of materials delivered to the job site.

2.7 COLOR FOR DECORATIVE SURFACES

A. Pavement colors for decorative surfacing shall match approved samples and tested mockups. Colors for decorative surfacing shall be CHROMIX admixtures as

manufactured by the L. M. Scofield Company, Schedule A-312.05 or equal. ~~The specific color shall match the existing concrete paving at the adjacent slab.~~

2.8 ACCESSORY MATERIALS

A. Conform water stops and other items required to be embedded in of portland cement concrete structures to the applicable requirements of Section 51 of the Caltrans Standard Specifications unless otherwise specifically noted or called for on the Plans or detail drawings.

B. Curing Compounds:
1. Regular Portland Cement Concrete: "Non-Pigmented Curing Compound - Chlorinated Rubber Base-Clear" conforming to the requirements contained in Section 90-7.01B, of the Caltrans Standard Specifications.
2. Color Conditioned Decorative Portland Cement Concrete: LITHOCHROME colorwax as manufactured by the L. M. Scofield Company or equal.

2.9 FORMS

A. Conform to the requirements of Section 51-1.05 of the Caltrans Standard Specifications.

2.10 PRECAST CONCRETE STRUCTURES

A. Conform to the following Sections of Caltrans Standard Specifications:
1. 51-1.02, Minor Structures.
2. 70-1.02H, Precast Concrete Structures.

3. EXECUTION

3.1 STRUCTURAL EXCAVATION

A. Structural excavation may be either by hand, or by machine and shall be neat to the line and dimension shown or called for on the plans. Excavation shall be sufficient width to provide adequate space for working therein, and comply with CAL-OSHA requirements.

B. Where an excavation has been constructed below the design grade, refill the excavation to the bottom of the excavation grade with approved material and compact in place to 95% of the maximum dry density.

C. Remove surplus excavation material remaining upon completion of the work from the job site, or condition it to optimum moisture content and compact it as fill or backfill on the site, if the material is approved by the Geotechnical Consultant.

3.2 SOIL STERILANT

A. Furnish and apply to areas indicated in accordance with Section 31 23 00, Excavation and Fill.

3.3 BRACING AND SHORING

A. Conform to California and Federal OSHA requirements.

B. Place and maintain such bracing and shoring as may be required to support the sides of the excavations for the proper protection of workmen; to facilitate the work; to prevent damage to the facility being constructed; and to prevent damage to adjacent structures or facilities. Remove all bracing and shoring upon completion of the work.

C. Be solely responsible for all bracing and shoring and, if requested by the County's Representative, submit details and calculations to the County's Representative. The County's Representative may forward the submittal to the Geotechnical Consultant, the County's Representative and/or the California Division of Industrial Safety for their review. The Contractor's submittal shall include the basic design, assumed soils conditions and estimation of forces to be resisted, together with plans and specifications of the materials and methods to be used, and shall be prepared by a civil engineer or structural engineer registered in California. No excavations related to the proposed facility shall precede a response to the submittal by the County's Representative.

D. Be solely responsible for installing and extracting the sheathing in a manner which will not disturb the position or operation of the facility being constructed or adjacent utilities and facilities.

3.4 PLACING CONCRETE FORMS

A. Form concrete improvements with a smooth and true upper edge. Side of the form with a smooth finish shall be placed next to concrete. Construct forms rigid enough to withstand the pressure of the fresh concrete to be placed without any distortion.

B. Thoroughly clean all forms prior to placement and coat forms with approved form oil in sufficient quantity to prevent adherence of concrete prior to placing concrete.

C. Carefully set forms to the alignment and grade established and conform to the required dimensions. Rigidly hold forms in place by stakes set at satisfactory intervals. Provide sufficient clamps, spreaders and braces to insure the rigidity of the forms.

D. Provide forms for back and face of curbs, lip of gutters and edge of walks, valley gutters or other surface slabs that are equal to the full depth of the concrete as shown, noted or called for on the Plans. On curves and curb returns provide composite forms made from benders or thin planks of sufficient ply to ensure rigidity of the form.

3.5 PLACING STEEL REINFORCEMENT

A. Bars shall be free of mortar, oil, dirt, excessive mill scale and scabby rust and other coatings of any character that would destroy or reduce the bond. All bending shall be done cold, to the shapes shown on the plans. The length of lapped splices shall be as follows:

1. Reinforcing bars No. 8, or smaller, shall be lapped at least 45 bar diameters of the smaller bar joined, and reinforced bars Nos. 9, 10, and 11 shall be lapped at least 60 bar diameters of the smaller bars joined, except when otherwise shown on the plans.
2. Splice locations shall be made as indicated on the plans.

B. Accurately place reinforcement as shown on the plans and hold firmly and securely in position by wiring at intersections and splices, and by providing precast mortar blocks or ferrous metal chairs, spacers, metal hangers, supporting wires, and other approved devices of sufficient strength to resist crushing under applied loads. Provide supports and ties of such strength and density to permit walking on reinforcing without undue displacement.

C. Place reinforcing to provide the following minimum concrete cover:
~~1. Surfaces exposed to water: 4 inches.~~
2. Surfaces poured against earth: ~~3 inches~~ 2-inches minimum.
3. Formed surfaces exposed to earth or weather: ~~2 inches~~ 1.5-inches minimum.
4. Slabs, walls, not exposed to weather or earth: ~~1 inch~~ 1.5-inches minimum.

D. Minimum spacing, center of parallel bars shall be two and one half (2-1/2) times the diameter of the larger sized bar. Accurately tie reinforcing securely in place prior to pouring concrete. Placing of dowels or other reinforcing in the wet concrete is not permitted.

3.6 MIXING AND TRANSPORTING PORTLAND CEMENT CONCRETE

A. Transit mix concrete in accordance with the requirements of ASTM Designation C 94. Transit mix for not less than ten (10) minutes total, not less than three (3) minutes of which shall be on the site just prior to pouring. Mix continuous with no interruptions from the time the truck is filled until the time it is emptied. Place concrete within one hour of the time water is first added unless authorized otherwise by the County's Representative.

B. Do not hand mix concrete for use in concrete structures

3.7 PLACING PORTLAND CEMENT CONCRETE

A. Thoroughly wet subgrade when concrete is placed directly on soil. Remove all standing water prior to placing concrete.

B. Do not place concrete until the subgrade and the forms have been approved.

C. Convey concrete from mixer to final location as rapidly as possible by methods that prevent separation of the ingredients. Deposit concrete as nearly as possible in final position to avoid re-handling.

D. Place and solidify concrete in forms without segregation by means of mechanical vibration or by other means as approved by the County's Representative. Continue

vibration until the material is sufficiently consolidated and absent of all voids without causing segregation of material. The use of vibrators for extensive shifting of fresh concrete will not be permitted.

E. Concrete in certain locations may be pumped into place upon prior approval by the County's Representative. When this procedure requires redesign of the mix, such redesign shall be submitted for approval in the same manner as herein specified for approval of design mixes.

3.8 PLACING ACCESSORY MATERIALS

A. Place water stops and other items required to be embedded in of Portland cement concrete structures at locations shown or required in accordance with Section 51 of the Caltrans Standard Specifications unless otherwise specifically noted or called for on the Plans.

B. Curing Compounds:
1. Regular Portland Cement Concrete: Apply "Non-Pigmented Curing Compound - chlorinated Rubber Base-Clear" in accordance with Section 90-7.01B, 7.01D and 7.03 of the Caltrans Standard Specifications.
2. Color Conditioned Decorative Portland Cement Concrete: Apply LITHOCHROME colorwax or equal, in accordance with the manufacturer's instructions.

3.9 EXPANSION JOINTS

A. Construct expansion joints incorporating pre-molded joint fillers at twenty (20) foot intervals in all concrete curbs, gutters, sidewalks, median/island paving, valley gutters, driveway approaches and at the ends of all returns. At each expansion joint install one-half inch by twelve inch (1/2" x 12") smooth slip dowels in the positions shown or noted on the detail drawings.

B. Orient slip dowels at right angles to the expansion joint and hold firmly in place during the construction process by means of appropriate chairs.

3.10 WEAKENED PLANE JOINTS

A. Construct weakened plane joints in concrete curbs, gutters, sidewalks, median/island paving and valley gutters between expansion joints at ten (10) foot intervals throughout, or as otherwise indicated. Depth of joint score depth to be one-fourth (25%) the thickness of the concrete.
1. Grooved Joints: Form weakened plane joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8-inch. Repeat grooving of weakened plane joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
2. Sawed Joints: Form weakened plane joints with power saws equipped with shatterproof abrasive or diamond-rimed blades. Cut 1/8-inch wide joints into concrete

when cutting action will not tear, abrade or otherwise damage surface and before concrete develops random contraction cracks.

3.11 FORM REMOVAL

A. Remove forms without damage to the concrete. Remove all shores and braces below the ground surface, before backfilling.

B. Do not backfill against concrete until the concrete has developed sufficient strength to prevent damage.

C. Leave forms for cast-in-place walls in place at least 72 hours after pouring.

D. Leave edge forms in place at least 24 hours after pouring.

3.12 CONSTRUCTION

A. Form, place and finish concrete curbs, walkways, valley gutters in conformance with the applicable requirements of Section 73-1.04, 73-1.05, 72-1.05A and 73-1.06 of the Caltrans Standard Specifications as modified herein.

B. Finish:
1. Provide the following finishes to all horizontal surfaces as shown on the Architectural Plans:
    a. Medium broom.
    b. Medium exposed aggregate.

C. ~~Construct new concrete curb, curb and gutter and valley gutters against existing asphalt concrete by removing a minimum of 12 inches of the asphalt concrete to allow placement of curb or gutter forms. Patch pavement with a 6-inch deep lift of asphalt concrete after gutter form is removed.~~

D. ~~Where monolithic curb, gutter and sidewalk is specified, separate concrete pours will not be allowed.~~

3.13 CONNECTING TO EXISTING CONCRETE IMPROVEMENTS

A. New curb, gutter, or sidewalk is to connect to existing improvements to remain by saw cutting to existing sound concrete at the nearest score line, expansion joint or control joint. Drill and insert ½-inch diameter by 12-inch long dowels at 24-inches on center into existing improvements. Install pre-molded expansion joint filler at the matching joint.

B. A cold joint to the existing curb is not acceptable.

3.14 DECORATIVE AND NON-DECORATIVE SURFACING CONSTRUCTION

A. Decorative (colored) surfacing concrete walks or other installations shall be formed and placed as a concrete slab conforming to the details shown or noted on the Architectural Plans.

B. All finished paving surfaces shall be "slip-resistant" and specialty finish(es) specified herein shall match samples and field-constructed mock-up samples as approved by the Engineer.

3.15 FIELD QUALITY CONTROL

A. Finish subgrade for concrete improvements shall be subject to approval prior to placement of forms.

B. No concrete shall be placed prior to approval of forms.

C. Concrete improvements constructed shall not contain areas that pond water and shall be smooth and ridge free.

D. Conform the finish grade at top of curb, flow line of gutter, and the finish cross section of concrete improvements to the design grades and cross sections.

E. Variation of concrete improvements from design grade and cross section as shown or called for on the plans shall not exceed the tolerances established in Sections 73-1.05 and/or 73-1.06 of the Caltrans Standard Specifications.

3.16 RESTORATION OF EXISTING IMPROVEMENTS

A. Replace in kind all pavement or other improvements removed or damaged due to the installation of concrete improvements.

B. Remove, landscaping or plantings damaged or disturbed due to the installation of concrete improvements. Replace in kind.

END OF SECTION 32 05 23