READ THIS FIRST

This Project Spec Document may need additional modifications to suit your project. It is recommended that you proofread each section, paying attention to any “Notes” boxes such as this one--you should remove these “Notes” sections as you go. Also, do a search for all bracket characters “ [ ] “ as they are used to show you areas containing options or project specific details (you can use Microsoft Word’s Find feature {Ctrl-F} to jump to an open bracket “ [ “ character quickly). Again, these bracket characters should be removed.

It is important that every paragraph be numbered to allow for easy referencing. If you use the document’s built in styles and formatting your outline should be fine (turn on the formatting toolbar by going to View > Toolbars > Formatting). Most paragraphs will use the style “Numbered Material” and can be promoted (Shift) or demoted (Shift-Tab).

You should not have to manually enter extra spaces, carriage returns or outline characters such as A, B, C, or 1.01, 1.02; the formatting will do this for you. The entire document is 11 pt. Arial. If you paste items in, you may need to reapply the “Numbered Material” format.

1. GENERAL
   1. SUMMARY OF WORK
      1. The extent and location of the “Post-Installed Concrete Anchor” Work is indicated in the Contract Documents The post-installed anchors in concrete includes drilled and bonded dowels, expansion anchors, drop-in anchors, and other epoxy-based and mechanical anchors.
   2. GOVERNING CODES, STANDARDS, AND REFERENCES
      1. American Concrete Institute (ACI)
         1. ACI 301 - Specifications for Structural Concrete, latest edition (current edition)
         2. ACI 315 - Manual of Standard Practice for Detailing Reinforced Concrete Structures (current edition)
         3. ACI 318 - Building Code Requirements for Structural Concrete (current edition)
         4. ACI 355.2 – Qualification of Post-Installed Mechanical Anchors in Concrete (current edition)
      2. American Society of Testing and Materials (ASTM)
         1. ASTM-C881 “Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete” (current edition)
      3. International Code Council (ICC)
         1. International Building Code (IBC) as adopted by the [City of Seattle as the Seattle Building Code] [Seattle-Tacoma International Airport Building Department] [Authority Having Jurisdiction] [other] (current edition)
         2. ICC Evaluation Services (ICC-ES) Report for the selected systems
   3. SUBMITTALS
      1. Submit materials data in accordance with Section 01 33 00 - Submittals. Furnish manufacturers’ technical literature, standard details, product specifications, and installation instructions for all products.
      2. Submittals shall include the following:
         1. Manufacturer’s Literature
            1. Manufacturer’s name
            2. ICC-ES Report
            3. Complete material specifications
            4. Requirements for storage, handling and mixing of the product
            5. Manufacturer’s installation instructions, including specifications for this particular Work regarding surface preparation, installation, curing and any other requirement.
            6. Installer Qualifications & Procedures:

Installer qualifications and certifications.

Letter of procedure stating method of drilling, the product proposed for use, the complete installation procedure, manufacturer training date, and a list of the personnel trained on anchor installation.

* + - 1. Installer Qualifications
         1. List of certified installers for drilled and bonded dowels, including documentation of certification for type of installation Work found on the project
      2. Inspection and Testing Reports
         1. Reports per [Section 01 45 29 - Quality Control; Testing Laboratory Services] [Section 01 45 16.13 - Contractor’s Quality Control Program]

1. MATERIALS

A. If only one product is acceptable (single or sole source product), obtain an approved Competition Waiver and submit to the CPO Construction, Contract Administrator. The language shall read as: “Manufacturer Name, Product # XXXXX, No Equal.” Refer to CPO-6 Competition Waiver Policy for more information.

B. If a Competition Waiver is not approved or more than one product is acceptable, this section must list a minimum of 2 products plus the language “Or Approved Equal,” along with salient characteristics. Refer to CPO Construction’s Salient Characteristics Guidelines for more information.

* 1. PROJECT INFORMATION
  2. PREPARATION FOR MATERIALS
  3. FABRICATION, PRODUCTION, & SUPPLY OF MATERIALS
  4. MATERIAL REQUIREMENTS
     1. Material
        1. Bolts and Studs: ASTM A307; ASTM A449 where “high strength” is indicated on the Drawings.
        2. Carbon and Alloy Steel Nuts: ASTM A563.
        3. Carbon Steel Washers: ASTM F436.
        4. Carbon Steel Threaded Rod: ASTM A36
        5. Wedge Anchors: ASTM A510; or ASTM A108.
        6. Stainless Steel Bolts, Hex Cap Screws, and Studs: ASTM F593.
        7. Stainless Steel Nuts: ASTM F594.
        8. Zinc Plating: ASTM B633.
        9. Hot-Dip Galvanizing: ASTM A153.
        10. Reinforcing Dowels: ASTM A615, Grade 60
     2. Screw Anchors: Unless noted otherwise, screw anchors shall comply with the following:
        1. Material: Carbon steel, heat treated.
        2. Finish: Zinc plated or mechanical galvanized.
        3. Provide anchors with a diameter and anchor length marking on the head.
        4. Provide one of the following: Hilti “HUS-H”, Simpson “TITEN HD”, Dewalt “Screw-Bolt” Or Approved Equal.
     3. Mechanical anchors: Unless noted otherwise, expansion anchors shall comply with the following:
        1. Compliant with ACI 355.2 and ICC-ES approved, with confirming evaluation report.
        2. ICC-ES approved for use in cracked concrete, unless otherwise approved by the Engineer.
        3. ICC-ES approved for use in seismic conditions, unless otherwise approved by the Engineer.
        4. Provide anchors with length identification markings conforming to ICC ES AC01 or ICC ES AC193.
        5. Interior Use: Unless otherwise indicated on the Drawings, provide carbon steel anchors with zinc plating in accordance with ASTM B633, Type III Fe/Zn 5 (SC1).
        6. Exterior Use:
           1. Provide stainless steel anchors. Stainless steel anchors shall be AISI [Type 304] [and] [Type 316] stainless steel provided with stainless steel nuts and washers of matching alloy group and minimum proof stress equal to or greater than the specified minimum full-size tensile strength of the externally threaded fastener.
           2. Stainless steel nuts shall conform to ASTM F594 unless otherwise specified.
           3. Avoid installing stainless steel anchors in contact with galvanically dissimilar metals.
     4. Drilled and Bonded Dowels and Anchors:
        1. Dowels shall conform to the requirements for concrete reinforcement as specified in Section 03 21 00 – Concrete Reinforcement.
        2. Anchors shall be ICC-ES approved, with confirming evaluation report.
        3. Epoxy adhesive for bonding dowels and anchors to concrete shall conform to ASTM-C881, “Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete.” Type, grade and class of the system shall be as selected by the Contractor for the specific application and ambient temperature conditions.
        4. Epoxy adhesive for bonding dowels and anchors to concrete shall have ICC-ES approval for compliance with the IBC using the selected dowel or anchor in the following conditions:
           1. Shear and tensile loads
           2. Cracked and uncracked normal-weight concrete
        5. Interior Use:
           1. Unless otherwise indicated on the Drawings, provide carbon steel threaded rods conforming to ASTM A36.
        6. Exterior Use:
           1. Provide stainless steel anchors. Stainless steel anchors shall be AISI [Type 304] [and] [Type 316] stainless steel provided with stainless steel nuts and washers of matching alloy group and minimum proof stress equal to or greater than the specified minimum full-size tensile strength of the externally threaded fastener.
           2. All nuts shall conform to ASTM F594 unless otherwise specified.
           3. Avoid installing stainless steel anchors in contact with galvanically dissimilar metals.
        7. Reinforcing dowels shall be A615 Grade 60.
  5. MATERIAL HANDLING, DELIVERY, & STORAGE
     1. Materials shall be handled and stored in strict accordance with the Manufacturer’s recommendations, including humidity and temperature conditions.
     2. Epoxy adhesives used shall be within their shelf-life as noted on the packaging.
  6. DELIVERABLES
  7. QUALITY ASSURANCE
     1. Certifications: Unless otherwise authorized by the Engineer, anchors shall have one of the following certifications:
        1. ICC ES Evaluation Report indicating conformance with current applicable ICC ES Acceptance Criteria.

1. EXECUTION
   1. PROJECT INFORMATION
   2. PREPARATION FOR EXECUTION OF WORK
      1. All Work shall be conducted in strict accordance with the manufacturer’s recommendations and ICC-ES Evaluation Report requirements. If those recommendations are in conflict with this Specification, the Contractor shall bring it to the attention of the Engineer for resolution prior to beginning this portion of the Work.
      2. Prior to start of dowel installation, carefully inspect the Work area. Verify that the conditions indicated on the drawings exist in the field. Immediately bring conflicts or changes to the attention of the Engineer, who shall resolve such conflicts.
      3. If reinforcing bars to be installed are epoxy-coated, embedment portion of bars shall be thoroughly cleaned of epoxy prior to installation. Bars may be sand-blasted or cleaned by other means that does not damage the reinforcing, but thoroughly removes all epoxy from the surface of the reinforcing bar.
   3. EXECUTION OF WORK
      1. Drilling Of Holes:
         1. Drill holes using a percussion-type drill. Provide the drill with an automatic device to stop at the required depth. In the absence of manufacturer-recommended criteria, use the following criteria:
            1. Do not allow the diameter of the drill hole to exceed the diameter of the dowel by less than 1/4 inch or more than 1/2.
            2. Ensure that the depth of the hole is within +1/2 inch and -0 inch of the depth indicated on the drawings.
         2. Core drilling will not be permitted.
         3. Locate holes to miss existing reinforcing steel as needed. If reinforcing steel is encountered such that specified embedment depth cannot be achieved, locate a new hole not closer than 3 inches away, or the minimum allowed anchor spacing as noted in the ICC-ES Evaluation Report, whichever is greater. Grout failed location solid with cementitious grout. Prior to re-drill, get approval of the proposed new location by the Engineer.
      2. Dowel And Anchor Installation
         1. Thoroughly clean and prepare drill holes per the epoxy manufacturers specifications. Remove loose or cracked pieces of concrete. Blow holes clear with oil-free compressed air to remove all dust, debris and water.
         2. Place and apply epoxy adhesive and dowel strictly per the epoxy manufacturer’s specifications. Strictly adhere to the manufacturer’s instructions regarding handling, mixing, pot life, and placement.
      3. Repair Of Defective Work
         1. Remove and replace misplaced or malfunctioning anchors.
         2. Fill empty anchor holes and patch failed anchor locations with high-strength non-shrink, nonmetallic grout per Section 03 30 00 – Cast-in-Place Concrete.
         3. Anchors that fail to meet proof load or installation torque requirements shall be regarded as malfunctioning.
   4. DELIVERABLES
   5. QUALITY ASSURANCE
      1. Conflicting Requirements
         1. In the event of conflict between pertinent codes and regulations and the requirements of the referenced standards or these specifications, the Engineer shall be notified and shall render a decision as to which requirements govern. The Contractor shall comply with the requirements selected by the Engineer as if they were the sole requirements of the contract. The Contractor shall not receive additional compensation for the requirements selected.
      2. Qualification of Workers
         1. Provide at least one (1) person who shall be present at all times during execution of this portion of the Work and who shall be thoroughly trained and with at least [three] years of experience in the use of post-installed anchors and who shall direct all Work performed under this section.
         2. For drilled and bonded dowels, installers shall be shall have successfully completed the ACI Adhesive Anchor Certification Program.
      3. Installer Training
         1. Conduct a thorough training with the manufacturer or the manufacturer’s representative for the [Contractor] [installer] on the project.
         2. Training to consist of a review of the complete installation process for drilled-in anchors, to include but not limited to:
            1. Hole drilling procedure.
            2. Hole preparation & cleaning technique.
            3. Adhesive injection technique & dispenser training / maintenance.
            4. Rebar dowel preparation and installation.
            5. Proof loading/torqueing.
      4. Independent Inspection and Testing
         1. At a minimum, periodic special inspection shall be conducted in accordance with Chapter 17 of the IBC Continuous special inspection shall be conducted if required by the selected product’s ICC-ES Evaluation.
         2. The Port of Seattle will provide field or plant inspection and testing service to the satisfaction of the Engineer. Sampling and testing to assure compliance with the contract provisions shall be in accordance with [Section 01 45 29 - Quality Control; Testing Laboratory Services] [Section 01 45 16.13 – Contractor’s Quality Control Program] of these specifications.
         3. The Contractor may obtain copies of results of tests performed by the Port of Seattle from the office of the Engineer at no cost.
         4. Tests conducted for the sole benefit of the Contractor shall be at the Contractor's expense.

Use “Independent Inspection and Testing” section above when the project does not utilize CQC. Coordinate closely with Section 01 45 29 - Quality Control; Testing Laboratory Services to assure Sampling and Testing on materials called for in that section agree with intent of this section.

OR

Use “Contractor Quality Control Testing and Inspection” section above when project utilizes CQC and Section 01 45 16.13 – Contractor’s Quality Control Program. Provide text for inspection and testing to be performed by the Contractor with specifics on frequency and scope.

* + 1. Contractor Quality Control Testing and Inspection
       1. At a minimum, periodic special inspection shall be conducted in accordance with Chapter 17 of the IBC Continuous special inspection shall be conducted if required by the selected product’s ICC-ES Evaluation.
       2. The Contractor shall perform the inspection and tests described below and, based upon the results of these inspections and tests, shall submit the specified reports to the Engineer, and shall take the action required by the Engineer.
          1. Sampling and Testing of Materials:
          2. Scales, Batching, and Recording:
          3. Batch Plant Control:
          4. Concrete Mixture:
          5. Inspection Before Placing
          6. Vibrators:
          7. Curing Inspection:
          8. Cold Water Protection:
          9. Mixer Uniformity:
          10. Reports:

1. MEASUREMENT AND PAYMENT
   1. GENERAL
      1. No separate measurement or payment will be made for the Work required by this section. The cost for this portion of the Work will be considered incidental to, and included in the payments made for the applicable bid items in the [Schedule of Unit Prices] [Lump Sum price bid for the Project].

End of Section

Revision History:

05/01/2014 Conversion to 2004 CSI Numbering System

10/15/2014 Added Sole Source and Salient Characteristics Note to Part 2

04/01/19 Added a manufacturer to Screw Anchors

01/12/2025 Revised 3.05 Quality Assurance