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 “Precast Concrete” Work is shown in the Contract Documents.
   2. GOVERNING CODES, STANDARDS, AND REFERENCES
      1. American Concrete Institute (ACI)
         1. ACl 301 - Specifications for Structural Concrete (current edition)
         2. ACl 318 – Building Code Requirements for Structural Concrete (current edition)
      2. American Welding Society
         1. AWS D1.1 – Structural Welding Code – Steel (current edition)
         2. AWS D1.4 – Structural Welding Code – Reinforcing Steel (current edition)
      3. Precast/Prestressed Concrete Institute (PCI)
         1. PCI MNL-116 – Manual for Quality Control for Plants and Production of Structural Precast Concrete Products (current edition)
   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. Mix Design:
            1. Mix design for use in precast concrete elements in accordance with Section 03 30 00 - Cast-In-Place Concrete of these specifications, including seven-day test results bearing the seal of an Independent Testing Agency.
         2. Concrete Delivery Slip:
            1. A record at the casting site showing the following:

Time and place of each pour of concrete.

Mix delivery slip certifying the contents of the mix.

* + - 1. Finish Sample:
         1. [Four] samples, each 2 feet by 2 feet, to illustrate different finish techniques or materials.
      2. Shop Drawing:
         1. Plans, elevations and other drawing views showing the following:

Member piece marks locating and defining products furnished by the manufacturer.

Location and size of openings [that cut prestressing strands or require the location of prestressing strands to miss field cut openings].

Relationships to adjacent material.

Joints and openings between members and between members and other construction.

Location of field installed anchors.

Location of lifting and erection inserts.

Erection sequences and handling requirements.

[Areas receiving toppings and magnitude of topping thickness. Identify areas where topping is an integral part of the structural capacity of the precast members.]

* + - 1. Structural Calculation:
         1. Structural calculations of lift point design stamped by a Professional Engineer licensed in the State of Washington, including all dead, live, handling, erection and other applicable loads used in the design.
      2. Inspection and Testing Report
         1. Reports per [Section 01 45 29 - Quality Control; Testing Laboratory Services] [Section 01 45 16.13 - Contractor’s Quality Control Program].
      3. Unless shown otherwise on the drawings, inserts shall be standard metal fittings specially designed for use in [tilt-up concrete operations] [precast beams] [\_\_\_] and shall be selected by the Contractor subject to the approval of the Engineer.
      4. Prestressed Concrete Piling
         1. Manufacturer or fabricator of piling materials.
         2. Certificates of treatment or quality of materials.
         3. Casting dates for precast piles.
         4. Test cylinder results for concrete piles.

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. Concrete
        1. All concrete for this portion of the Work shall conform to the provisions of Section 03 30 00 - Cast-In-Place Concrete of these specifications.
     2. Reinforcement
        1. All reinforcement for this portion of the Work shall conform to the provisions of Section 03 21 00 - Concrete Reinforcement of these specifications.
        2. Chairs shall be [plastic] or [aluminum] [\_\_\_].
     3. Inserts
        1. Contractor shall be responsible for the design, fabrication, and installation of lift point hardware.
        2. Lifting points shall be designated and marked as indicated on the drawings.
        3. Lift point design shall be completed by a Professional Engineer licensed in the State of Washington or other states if approved by the Engineer.
     4. Finish
        1. Precast units shall receive a U-4 finish as defined in Section 03 30 00 - Cast-In-Place Concrete unless indicated on the drawings as [\_\_\_] finish.
        2. The Engineer will select one of the submitted finish samples to be used as an example for the remainder of the Project.
     5. Other Materials
        1. All other materials not specifically described but required for a complete and proper installation of the Work of this section shall be as selected by the Contractor subject to the approval of the Engineer.
     6. Prestressed Concrete Piling
        1. Concrete shall meet the requirements of Section 03 30 00 - Cast-in-Place Concrete for Class A concrete.
        2. Reinforcing shall meet the requirements of Section 03 21 00 - Concrete Reinforcement of these specifications.
        3. Piles shall be manufactured by an approved fabricator of prestressed piles.
        4. Each pile shall be stamped or marked with:
           1. The date of its manufacture
           2. The length of pile
           3. The casting number
        5. Piles shall be reinforced as indicated to withstand handling and driving stresses.
        6. Elevations, sections and other details for each member showing the following:
           1. Dimensioned size and shape for each member with quantities, position and other details of reinforcing steel, anchors, inserts and other embedded items.
           2. Connections between members and connections between members and other construction.
           3. Connections for Work of other trades and cast-in items and their relation to other trades.
           4. Lifting, erection and other handling devices and inserts.
           5. Surface finishes of each member.
           6. Estimated cambers
        7. Grade and strength properties, as applicable, for concrete, steel and other materials.
        8. Description of loose, cast-in and field hardware.
        9. Schedule, including casting, transporting, and placing the precast units Test results validating accelerated curing methods, if used
        10. Methods for storage and transportation.
        11. [Magnitude, schedule and sequence of tensioning and detensioning prestressing strands.]
  5. MATERIAL HANDLING, DELIVERY, & STORAGE
     1. Handling:
        1. Do not lift or move precast units until the concrete has attained 80% of its design strength. Handle units by lifting eyes cast into the units or at lifting points designated on the shop drawings.
        2. Precast Piles
           1. Do not subject piles to any handling stress until a test cylinder, made from the concrete pour for the piles involved and cured with the piles, shows a strength of at least [4,200] [5,000] pounds per square inch for precast.
           2. The method of storing and handling shall be such as to eliminate the danger of fracture by impact or undue bending stresses in curing or transporting the piles from the forms and into the leads.
           3. Move concrete piles by means of a suitable bridle or sling attached to the pile at points indicated on the drawings.
           4. Lifting points shall be determined by the Contractor.
           5. Store all piles on level ground on timber blocking so that the axis of each pile is maintained in a straight line.

Locate the blocking of successive tiers exactly over the blocking below.

* + - 1. Prestressed Piles
         1. Do not subject piles to any handling stress until a test cylinder, made from the concrete pour for the piles involved and cured with the piles, shows a strength of at least [3,000] [3,300] pounds per square inch for other precast piles.
         2. The method of storing and handling shall be such as to eliminate the danger of fracture by impact or undue bending stresses in curing or transporting the piles from the forms and into the leads.
         3. Move concrete piles by means of a suitable bridle or sling attached to the pile at points indicated on the drawings.
         4. Lifting points shall be determined by the Contractor.
         5. Store all piles on level ground on timber blocking so that the axis of each pile is maintained in a straight line.

Locate the blocking of successive tiers exactly over the blocking below.

* + 1. Protection:
       1. Use all means necessary to protect the materials of this section before, during and after installation and to protect the installed Work and materials of all other trades.
    2. Replacements:
       1. In the event of damage, immediately make all repairs and replacements necessary to the approval of the Engineer at no additional cost to the Port.
  1. DELIVERABLES
  2. QUALITY ASSURANCE
     1. Independent Inspection and Testing:
        1. [Plants shall be certified by the PCI Plant Certification Program for Category [C1] [C2] [C3] [C4] Work as described in PCI MNL-116. At the Engineer's option, PCI Plant quality control program records shall be available for review.]
        2. [Where panels are manufactured by specialists in plants not currently enrolled in the PCI "Quality Control Program," provide a product quality control system in accordance with PCI MNL-116 and perform concrete and aggregate quality control testing using an approved, independent commercial testing laboratory. Submit test results to the Engineer.]
        3. [Where panels are manufactured by specialists in plants not currently enrolled in the PCI "Quality Control Program," the Port of Seattle will provide field or plant inspection and testing service to the satisfaction of the Engineer.
           1. 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.
           2. 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 04 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. 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:
          11. Reinforcement Materials:
          12. Reinforcement Placement:
    2. Qualification of Workers:
       1. Provide at least one person who shall be present at all times during execution of this portion of the Work. This person shall be thoroughly trained and experienced in placing the types of concrete specified and shall direct all Work performed under this section.
       2. Thoroughly trained and experienced journeyman concrete finishers shall be [employed] [responsible] for finishing of exposed surfaces.
    3. Codes and Standards:
       1. In addition to complying with all pertinent codes and regulations, comply with all pertinent recommendations of “Specifications for Structural Concrete,” publication ACl 301.

1. EXECUTION
   1. PROJECT INFORMATION
   2. PREPARATION FOR EXECUTION OF WORK
      1. Inspections:
         1. Prior to all Work of this section, carefully inspect the installed Work of all other trades and verify that all such Work is complete to the point where this installation may properly commence.
         2. Verify that the Work of this section may be performed in strict accordance with all pertinent codes and regulations and the original design.
      2. Discrepancies:
         1. In the event of discrepancy, immediately notify the Engineer.
         2. Do not proceed with installation in areas of discrepancy until all such discrepancies have been resolved.
   3. EXECUTION OF WORK
      1. Forming
         1. Casting Surface:
            1. Casting beds or forms shall be specially constructed for that purpose.
            2. Casting slab or forms surfaces for precast units shall conform to the provisions of Section 03 30 00 - Cast-In-Place Concrete describing finish tolerances.
         2. Bond Breakers:
            1. Areas of the casting surface damaged by the placement of reinforcing steel, inserts, or frames shall be repaired and treated with bond breaker prior to pouring concrete.
            2. Exercise extreme care to prevent bond breaker from coating reinforcement, weld plates, or other inserts.
         3. Layout:
            1. The location and installation of lift points, special reinforcement required for lifting, and method shall be the responsibility of the Contractor.
            2. Lay out each unit such that each unit may be poured in one continuous pour with no construction joints.
      2. Reinforcement
         1. Furnish and install all reinforcement in strict accordance with the drawings and with the provisions of Section 03 21 00 - Concrete Reinforcement of these specifications.
      3. Concrete Placement
         1. General:
            1. Place all concrete in accordance with the drawings and the provisions of Section 03 30 00- Cast-In-Place Concrete of these specifications.
            2. Place all concrete for precast units within one hour after introduction of water into the mix.
            3. Finish all concrete in accordance with [the finish designation and tolerances established in Section 03 30 00 - Cast-In-Place Concrete.] [the sample unit approved by the Engineer.]
         2. Curing:
            1. Keep exposed surfaces of the precast units continuously wet with water for not less than [three] days after the concrete is placed. Accomplish curing by covering the surface with wet sand, cotton mats, burlap, or white polyethylene sheeting.
            2. Accelerated curing methods, such as the external heating of impervious concrete form and the introduction of saturated steam, may be used with prior approval of the Engineer. Such methods, outlining the entire technique of heating and cooling to avoid differential temperature stresses, must be submitted in detail for approval by the Engineer, including test results validating the adequacy of the results.
      4. Erection
         1. Prior to erection, and again after installation, precast [prestressed] members shall be checked for damage, such as cracking, spalling, and honeycombing. As directed by the Engineer, precast [prestressed] members that do not meet the surface finish requirements shall be repaired or removed and replaced with new precast [prestressed] members.
         2. The method and sequence of erection shall be the responsibility of the Contractor.
         3. Do not anchor the precast concrete units in a way which will restrain its normal volume change until at least [21] days after casting.
         4. Set all units in true alignment in all directions to a tolerance of 1 in [500] vertical and 1 in [1,000] horizontal for tilt-up panels. [\_\_\_] units shall be set to a tolerance of [\_\_\_].
         5. Perform all welding in strict accordance with Section 05 05 23 – Welding and with AWS D1.1/D1.4.
   4. DELIVERABLES
   5. QUALITY ASSURANCE
      1. Construction Records
         1. Complete construction records shall be kept of the manufacturing, handling, and erection of the precast-prestressed concrete members.
         2. Records shall be kept for, but not limited to, the following items:
            1. Specifications of material used in the manufacture of the members. b. Time-temperature history of the concrete members from casting to the transfer of the prestress force.
            2. Records of the tendon stressing operation including initial prestress force, measured elongation, how it was measured, and how the tendons were stressed and destressed.
            3. Records of inspection of the members before and after the prestress force is transferred to the members.
            4. Records of the inspection of the members each time they are moved.
            5. Records of any defects in the member and any corrective measures taken.
            6. Final placement locations and comparison to tolerances
2. 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

01/12/2025 Revised 2.07.A Independent Inspection and Testing