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SECTION 00221 - COMMON PROVISIONS FOR WORK ZONE TRAFFIC CONTROL

Comply with Section 00221 of the Standard Specifications modified as follows:

00221.03 Traffic Safety and Operations - Replace the bullet that begins “When paving operations create...” with the following bullet:

- When paving operations create an abrupt or sloped edge drop off greater than 1 inch, protect traffic by installing signing according to the "2 Lane, 2 Way Roadway Overlay Area" detail shown on the Standard Drawings. Protect longitudinal and transverse Pavement joints by placing and maintaining an asphalt concrete wedge according to 00221.07(c)(1).

00221.06(d) Notification of Lane or Road Closures – Add the following subsection:

The Contractor shall publish notification of lane or road closures in The Chronicle newspaper. The Chronicle newspaper is only published on Wednesdays.

Notification must be submitted to The Chronicle via fax, 503-397-4093, or email, classified@thechronicleonline.com, by 5 pm the Friday prior to publication. Contractor must supply The Chronicle with contact name and number, billing address, and duration of notification publication.

The Contractor shall notify residents and businesses within an affected section of road by door hanger of road closures stating the date(s) of closure, limits of street closure, hours of construction, and detours. The door hangers shall be delivered no later than 24 hours prior to a lane closure. Prior to dissemination the Engineer shall approve the door hanger and present a copy to the City Engineer. For planning, a road is considered closed if nonemergency vehicles are delayed or delays are expected to be more than 5 minutes.

Contractor shall be responsible for informing the appropriate agencies operating within the area of the work of obstructions to either public or private roads caused by reason of Contractor’s operations.

The Contractor shall notify the following agencies of lane or street closures:

Agency	Address	Phone Number
Emergency Services (911)	McNulty Way	503.397.7255
Durham School Services	540 Milton Way	503.397.9072
Fire Department	270 Columbia Blvd.	503.397.2990
Police Department	150 S. 13th St	503.397.3333
Columbia County Sheriff	901 Port Avenue	503.366.4611
Oregon State Police	35851 Industrial Way, Suite A	503.397.0325
St. Helens School District	474 N. 16th St	503.397.3085

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Columbia County Education Service District	800 Port Avenue	503.397-0028 / 503.366.4100
St. Helens Post Office	1571 Columbia Boulevard	503.397.2613
Hudson Garbage Service	2115 Gable Rd	503.397.1534 / 800.422.9998
Columbia County Rider	1155 Deer Island Rd	503.366.8503 / 503.366.0159

All agencies listed, and any other potentially affected businesses or agencies, must be contacted at least one full week before construction is to begin. Calling the agency or business is recommended but does not substitute for personal notification. Door hangers for residences in the vicinity are also required. Minimum elements to be included in the notification include, but are not limited to:

- Map of construction area
- Approximate start and completion dates
- Hours of construction activities (8:00 am to 5:00 pm Mon-Fri if working in City limits)
- Alternate traffic route, if applicable
- Contractor's contact person's name and number

00221.07(c)(1) Paving - Replace this subsection, except subsection number and title, with the following:

When the longitudinal joint is greater than 1 inch in height, install additional TCD according to 00221.03. Complete the placing of ACP and construction of paving joints according to 00735.48, 00735.49, 00743.45, 00744.44, 00744.45, 00745.47, and 00745.48, as applicable.

00221.90(b) Temporary Protection and Direction of Traffic - Delete the bullet that begins "Moving temporary barrier to and from Contractor's stockpile areas".

00221.98 Payment, Method "B" - Replace the second paragraph with the following:

Payment for furnishing and installing temporary work zone traffic control will be made as percentage complete of contract per construction phase and shall include full compensation for furnishing, installing, moving, operating, maintaining, inspecting, and removing traffic control devices throughout the project area according to the standard drawings, the traffic control plan (TCP) for the Project or as directed, and includes all labor, materials, tools, equipment, incidentals, and for performing all work involved in preparing and submitting traffic control plans, providing, placing, maintaining, and removal of traffic control signs and safety equipment, providing, placing, maintaining, and removal of temporary routing of sidewalks impacted by the Work, temporary relocation of existing regulatory signs, changeable message boards, project and public notification signs, ~~flagging~~, transportation of flaggers and equipment, coordination efforts, and any other items necessary for vehicle and pedestrian traffic control per the Manual on Uniform Traffic Control Devices, and as specified in these Contract Documents, and no additional allowance will be made.

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SECTION 00330 - EARTHWORK

Comply with Section 00330 of the Standard Specifications modified as follows:

00330.03 Basis of Performance - Add the following paragraph to the end of this subsection:

Perform all earthwork under this Section on the excavation basis.

00330.14 Selected Granular Backfill - Delete the sentence that begins “Reclaimed glass meeting the requirements of Section 02695...”

00330.15 Selected Stone Backfill - Delete the sentence that begins “Reclaimed glass meeting the requirements of Section 02695...”

00330.41(a)(4) Excess Materials - Replace this subsection, except for the subsection number and title, with the following:

If the quantities of excavated materials are greater than required to construct embankments and to do all filling and backfilling, the Contractor may use the remaining materials to uniformly widen embankments or to flatten slopes in a manner satisfactory to the Engineer.

00330.41(a)(5) Waste Materials - Replace this subsection, except for the subsection number and title, with the following:

Dispose of waste materials according to Section 00236.

00330.92 Kinds of Incidental Earthwork - Add the following bullets to the end of the bullet list:

- Excess material used to widen embankments or flatten slopes according to 00330.41(a)(4).
- Earthwork required for driveways and road approaches. Earthwork for driveways and road approaches will be that which is outside the Neat Line limits shown on the typical sections.

00330.93 Excavation Basis Payment – Add the following to the end of this section:

Base quantities of earthwork:

- Excavation: 3,859 cy
- Embankment: 449 cy

Add 1 quantities of earthwork:

- Excavation: 3,182 cy
- Embankment: 2,851 cy

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SECTION 00405 - TRENCH EXCAVATION, BEDDING, AND BACKFILL

Comply with Section 00405 of the Standard Specifications and Section 0320 of the City's Technical Specifications.

00405.90 Payment – Add the following pay items:

(d) Franchise Utility Trench.....LF

SECTION 00445 - SANITARY, STORM, CULVERT, SIPHON, AND IRRIGATION PIPE

Comply with Section 00445 of the Standard Specifications modified as follows:

00445.11 (h) Conduit Pipe, 2-inch and 3-inch – Use polyvinyl chloride pipe per Section 2415.50.

00445.40(d) Laying Pipe on Curves - Replace this subsection, except for the subsection number and title, with the following:

Lay pipe on horizontal or vertical curves as shown or approved. When deflecting the pipe from a straight line, either in the vertical or horizontal plane, or when long radius curves are shown, the amount of deflection allowed shall not exceed 50% of the manufacturer's recommendation.

00445.72(b) Hydrostatic Testing – Add the following to the end of this section:

All force mains shall be given a hydrostatic test of at least 1.5 times the shutoff head of the connected pumps or 150 psi, whichever is greater. Loss of water pressure during test shall not exceed 5 psi in a 2-hour period. Where practicable, pipelines shall be tested between line valves or plugs in lengths of not more than 1500 feet.

Conduct the tests after the trench has been backfilled or partially backfilled. Where any section of pipe is provided with concrete reaction blocking, do not make the pressure tests until at least five days have elapsed after the concrete thrust blocking is installed. If high-early cement is used for the concrete thrust blocking, the time may be cut by two days or as permitted by the engineer.

00445.73 Deflection Testing for Flexible Pipe – Replace the last sentence in the first paragraph in this section with the following:

The diameter of the mandrel shall be 95 percent of the nominal pipe diameter. The mandrel shall be a rigid, nonadjustable, odd numbering leg (nine legs minimum) mandrel having an effective length of not less than its nominal diameter.

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Replace the first sentence in the second paragraph with the following sentence:

Conduct testing on a manhole-to-manhole basis after the line has been completely balled and flushed out with water.

00445.91 Payment – Add the following pay items:

- (m) 2-inch Conduit.....LF
- (n) 3-inch Conduit.....LF

Add the following to the end of this section:

Franchise utility trenching for items (m) and (n) will be paid for according to 00405.90 (d).

SECTION 01040 - PLANTING

Comply with Section 01040 of the Standard Specifications modified as follows:

1040.13 Soil Testing – Replace the subsection below with the following:

(a) Sampling and Testing - Submit two (2) samples of Imported topsoil. Send one (1) set to the soil lab for testing and send other set the Engineer for approval. Instruct the lab that their soil recommendations are needed for ornamental landscapes and for seeded meadow.

Soil testing by A & L Western Laboratories or approved equal. The report is to contain the following:

- (1) Name and address of laboratory
- (2) Phone, name and e-mail address of point of contact at lab.
- (3) Test date, including the name and date of the test procedures.
- (4) Soil Test Data in Graphic Format
- (5) Complete soil fertility analysis including macro- and micro-nutrients, pH, cation exchange capacity and organic matter
- (6) Soil texture (% sand, % silt and % clay)

The Analysis shall make all amendment recommendations necessary to achieve the optimum condition for use for ornamental landscape plants and seeded meadow.

Soil Lab Contact Information: A&L Western Laboratories, Inc. 10220 SW Nimbus Ave. Bldg. K-9, Portland, OR 97223, Phone: (503) 968-9225

Submit the lab results to Engineer for approval. Submit reports at least three weeks prior to beginning soil amendment work. The results must include the laboratory's recommendations for soil amendments and fertilizers required to meet the specifics of each planting area as outlined in this specification.

01040.14(a) Selected Topsoil – Remove this subsection. All planting topsoil on the project shall be imported, see subsection 01040.14(b).

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Add the following subsection:

01040.14(d) Planting Soil - Imported mix or blended onsite materials that approximately consists of 60 to 80 percent loamy soil according to USDA textures, and 20 to 35 percent compost by volume. Coarse sand amendment may be required for soils with excessive clay content. Estimated material percentages are provided as a general guideline to achieving the final planting soil mixture and may require modifications or additional testing. All materials furnished shall be free of plants designated by the Oregon Department of Agriculture as Type "A" or Type "B" weeds. Additional requirements:

(1) Topsoil – Unscreened and friable with clumps, clods and soil fragments (peds) intact that does not exceed 6 inches in any dimensions. Topsoil can come from a single source or combination of sources such as existing on-site or imported. Topsoil shall conform to the requirements of 01040.14.

(2) Compost – Commercially manufactured compost according to Section 01040.15(b) with a “fine” composition type and 98 percent of particles passing through a 1/2-inch sieve.

(3) Coarse Sand – Coarse concrete sand that is washed, clean, free of toxic contaminants; sharp natural sand free of limestone shale, slate particles and is not manufactured conforming to ASTM C33 with a Fines Modulus Index of 2.8 and 3.2. The gradation of coarse sand is to meet the following criteria:

<u>Sieve Size</u>	<u>Percent Passing</u>
3/8 inch	100
No. 4	95 - 100
No. 8	80 - 100
No. 16	50 - 85
No. 30	25 - 60
No. 50	10 - 30
No. 100	2 - 10
No. 200	2 - 5

(4) Blended Materials – An analysis according to ASTM D5268 or approved testing method is to be conducted for the final soil mix proposed. Planting Soil mix of all blended materials including Topsoil, compost, and coarse sand shall meet the following USDA Soil Classification System:

<u>Texture Class</u>	<u>Percent Range</u>
Sand	20 - 55
Silt	20 - 50
Clay	7 - 30

In addition, the blended materials shall meet the following requirements:

- Loose and friable
- pH: 6 to 8

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- Organic matter content (loss on ignition): 6 to 10 percent
- Topsoil shall have less than 1 percent inert debris by volume
- Free of hazardous materials or pathogens and heavy metals by state and federal standards
- Soluble salt concentration less than 3.0 mmhos/cm (dS/m)
- No visible free water and materials not to be worked together when saturated
- Gravel, Rock, sticks, and roots may not comprise more than 10 percent of the soil mix and may not be larger than 6 inches in any dimension

Add the following subsection:

01040.15(d) Biochar – Furnish commercially manufactured soil amendment sustainably sourced biomass charcoal generated from pyrolysis. Additional requirements of biochar to include:

- Cationic exchange capacity: 25 to 45 millieq/l
- Carbon: 85 wt percent C
- Moisture: 15 wt percent H₂O
- pH: 7
- Manufacturer: CoolTerra or approved equal.

01040.19(e) Availability – Modify the first sentence of this subsection to read:

Furnish a list of nursery sources for all specified plants within 60 Calendar Days after the execution of the Contract.

01040.20 Mulch – Replace the subsections below with the following:

(a) Bark Mulch – Ground or shredded particles from the bark of fir and/or hemlock trees which is free of non-bark debris, harmful bacteria, disease spores, pests, and substances toxic to plant growth. Provide mulch that is ¾" minus.

01040.43(b) Subsoil Preparation – Replace the subsection to read:

Grade and finish areas that are to receive planting soil. Ensure exposed subgrade elevations are at the appropriate level to accommodate the full planting soil depth. Prepare the subgrade by scarifying, tilling and/or ripping the subsoil to 6 inch depth. Remove stones larger than 3 inches in any dimension. Remove sticks and roots larger than 5 inches in any dimension. Remove all trash and construction debris and obtain approval from the Owner's Representative before hauling and spreading soil materials.

01040.43(c) Hauling and Spreading – Replace subsection with the following:

Depending on Project conditions and following the requirements of 01040.48, planting Soil may be installed by any of the following:

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- Mixing the bulk of materials such as Topsoil, Soil conditioners, coarse sand and other amendments at a designated location on-site but away from its final installed location. Once blended the planting soil is hauled and spread.
- Imported from off-site as homogeneously blended planting soil mix and spread.

Coordinate any Soil installation requirements and locations that impact the Project with the Engineer prior to installation. Avoid excessive and unnecessary movement or handling of Soil materials. Do not overly compact any soil material or subsoil that may receive plantings when handling, hauling and spreading soil materials. Protect from damage any surrounding objects, Pavement, Structures and areas that are traveled, crossed, or mounted by Equipment.

Smoothly spread any Soil material over the specified areas to the thicknesses, grades, and slopes shown or directed. Avoid wasting Topsoil and do not place material during wet conditions. Do not work saturated soils in any manner. Material placed contrary to Agency instructions or in undesignated places will not be paid for and removal may be required at the discretion of the Agency.

01040.48(a) Method "A" (Cultivated Planting Areas – Non-lawn) – Replace subsection with the following:

Placing Planting Soil Over Exposed Subgrade:

- Install planting Soil mixed prior to depths indicated on the Plans in two equal lifts after the subsoil has been prepared and accepted. Compact each lift to 75 to 85 percent of maximum Standard Proctor density according to ASTM D698. Incorporate into the planting Soil any Soil amendments, Soil bio-amendments and fertilizers as recommended by testing analysis.

01040.48 Planting Area Preparation - Revise/amend (c) with the following:

Method "C" (Native Meadow Areas and Lawn Areas).

01040.49 General Planting – Modify the ninth bulleted item to read:

- Balled and burlapped plants are to be placed with tie wire, string or twine removed from the root ball package prior to any backfilling. The bottom portion of the root ball as it rests in the bottom of the excavation may have its burlap left in the planting hole if the material is natural and fully biodegradable. If root ball is falling apart or cracked, remove the top portion of burlap as indicated in the Plans. Materials that are not biodegradable may not be left on the root ball package or within the planting bed.

01040.49 General Planting – Modify the eleventh bulleted item to read:

Apply bark mulch of the type and depth as indicated in 01040.53.

01040.49 General Planting – Modify the fourteenth bulleted item to read:

Water all planting materials in as indicated in the Special Provisions.

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01040.50(h) Special Planting Requirements – Add the following to the subsection:

Water all planting materials in as indicated in the Special Provisions.

01040.70 General – Replace the first sentence with the following:

The Contractor is responsible for the survival of all plant material until the end of a plant Establishment Period of 2 calendar years. Refer to City’s Technical Specifications Section 0171.

01040.77(a) Watering – Modify the first sentence to read:

Water all plants as necessary for plant health using the installed permanent or temporary irrigation system, or such means as has been established for the Project.

01040.80(d) Plant Materials – Replace the bullet that begins “Average Area...” with the following:

- **Average Area** – Under this method, plant Materials will be measured on an area basis.

01040.80(d) Plant Materials – Remove the fourth bullet that begins “1 to 5 percent...”.

SECTION 01069 - METAL HANDRAIL AND ~~PEDESTRIAN FENCE~~GUARDRAIL

Section 01069, which is not a Standard Specification, is included in this Project by Special Provision.

Description

01069.00 Scope - This Work consists of furnishing and installing metal handrails and guardrails as shown or directed.

01069.02 Quality Assurance

Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication to ensure proper fitting of work.

Fabricator Qualifications: Firm experienced in successfully producing the metalwork indicated for this project and with sufficient production capacity to produce the required units without impacting construction schedule.

Qualify welding processes and welding operators in accordance with AWS D1.1 “Structural Welding Code” modified for weathering steel welding procedures as required.

01069.04 Submittals

Submit qualification data for firms and persons specified “Quality Assurance” article to demonstrate their capabilities and experience.

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Product Data: Provide data indicating all steel and accessory materials. Include manufacturers, fabricators and finisher's specifications and installation instructions.

Shop Drawings: Submit detailed shop drawings for fabrication, erection, supports and footings of metalwork. Include plans, elevations, and detail sections to include location of supporting devices. Indicate anchor and joint locations, connections, transitions, and terminations. Furnish setting diagrams and templates for items set in other work. Do not use drawings prepared by the architect (owner) for installation drawings.

(a) Samples - Materials & Finish Samples: Submit samples of each component material showing finishes, colors and surface textures

- Weathering steel: Submit three 6 inch x 6 inch samples of pre-weathered steel of specified thickness meeting Shop Finish and Metal Coating herein. Apply the three anti-graffiti coatings specified herein (or equal) on each sample. Indicate the coating on each sample.

Maintenance Data: Include metal cleaning recommendations for each metal anti-graffiti coatings and each coating's graffiti removal method.

01069.05 Mock-up

Construct a full scale mock-up assembly incorporating representative features of the weathering steel guardrail panel for fabrication observation in the shop. The mock-up must be approved before fabrication of additional guardrail panels. Include all plates, welds, attachments, hardware, supports and posts at dimensions and angles shown on the Drawings. Construct mock-up with pre-weathered steel with approved anti-graffiti coating described herein.

If approved the mock-up to remain as control sample.

01069.06 Delivery Storage and Handling

- Deliver materials in factory provided protective coverings and packaging.
- Provide strippable protective coating or wrapping
- Protect materials against damage during transit, delivery, storage and installation at site.
- Inspect all materials upon delivery for damage. Repair damage to be indistinguishable from undamaged areas; if damage cannot be repaired to be indistinguishable from undamaged parts and finishes, replace damaged items.
- Prior to installation, store material under cover, in a dry place.

01069.07 Warranty

Warranty: Manufacturer's standard one year warranty against defects in materials, fabrication, finishes, and installation commencing on Date of Substantial Completion.

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01069.10 Materials - Furnish Materials meeting the following requirements:

Commercial Grade Concrete.....	00440
Metal Handrail	02830

01095.11 Metals

(a) Steel - Provide steel in form that have been selected for their surface flatness, smoothness, consistency and freedom from surface blemishes wherever exposed to view in the finish unit and complying with the following American Society for Testing Materials (ASTM) requirements:

- Tube: ASTM A 500, Grade B
- Shapes and Plates: ASTM A 36
- Sheet: ASTM A 240, Type 304

(b) Weatering Steel - Provide weathering steel plates, shapes and bars in the form indicated complying with ASTM A 588, Grade A or A242.

1095.12 Miscellaneous Products and Materials

Fasteners: Of same basic metal and alloy as fastened metal, unless otherwise indicated. Do not use metals that are corrosive or otherwise incompatible with metals joined.

- Fastening devices between dissimilar materials shall be galvanized and painted to match weathering steel finish. Color TBD through sampling.
- Material: Galvanically compatible with adjacent materials.
- Finish: Where exposed to view match adjacent material.
- Provide concealed fasteners for interconnection of metal work components and for their attachment to other work except where exposed fasteners are indicated on the drawings.
- Provide socket flat-head machine screws or bolts for exposed fasteners, unless otherwise indicated.

(a) 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 the fabricated items.

1095.13 Metal Fabrication

Fabricate items to sizes, shapes and dimensions as shown and required. Except as otherwise noted, fabricate units from structural steel shapes, plates and bars, with continuously welded joints and smooth exposed edges. Use concealed field splices wherever possible. Provide cutouts, fittings and anchorages as required for coordination of assembly and installation with other work

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Use materials of size and thickness indicated or, if not indicated, as required to produce strength and durability in finished product for use intended. Work to dimensions shown or accepted on shop drawings, using proven details of fabrication and support. Use type of materials shown or specified for various components of work.

Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels and other miscellaneous steel shapes as required for supporting of metal work

For exposed work fabricate true to line and level with accurate angles and surfaces and straight edges. Exposed edges shall be square unless otherwise shown.

Provide metal work composed of metals of the forms and types which comply with requirements of referenced standards and which are free from surface blemishes where exposed to view in the finished unit. Exposed-to-view surfaces exhibiting pitting, seam marks, roller marks, "oil canning", stains, discolorations or other imperfections on finished units will not be accepted.

Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type shown or, if not shown, socket flat-head screws or bolts.

Provide for anchorage of type shown, coordinated with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use.

Cut, reinforce, drill and tap miscellaneous metal work as indicated to receive finish hardware and similar items. Remove all sharp edges and burrs.

Provide holes required for securing work to structural system, and for the passage of work through steel members, as shown on the final shop drawings.

Provide threaded nuts welded to framing, and other specialty items as shown to receive other work.

Cut, drill or punch holes perpendicular to metal surfaces. Do not flame cut holes or enlarge holes by burning

01095.15 Welded Construction

Weld connections and seams continuously and on the back sides out of final view.

Select type of weld for best appearance. Use concealed and plug welds wherever possible.

Comply with American Welding Standards (AWS) Code for procedures, appearance and quality of welds, and methods used in correcting welding work.

Select weld sizes, sequence and equipment to limit distortions to allowable tolerances. Surface "bleed" of backside welding on exposed surfaces will not be accepted.

Assemble and weld structural system by methods that will produce true alignment of axes without warp. Grind butt welds flush; dress all exposed welds, feather edges onto base material and polish as required for smooth painted surfaces.

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All exposed welds shall be clean, consistent and uniform in appearance. Grind and finish exposed welds to match adjacent contours and finish.

Remove loose rust, mill scale, and spatter, slag or flux deposits.

01095.16 Anti-graffiti Coating – High performance coating for exterior weathering steel.

- Sculpt Nouveau, Inc. www.sculptnouveau.com, Shields Up, satin or matte finish TBD through sampling.
- Peacock Laboratories, Inc. www.peacocklabs.com, Permalac Clear Coat, satin finish
- Wearlon, Inc. <http://www.wearloncorp.com>, Coating #711/722
- Approved equal.

Construction

01069.40 Metal Handrail and ~~Pedestrian Fence~~Guardrail:

(a) **Handrail** - Fabricate and install imbedded metal handrail as shown.

(b) **Guardrail** – Fabricate and install metal guardrail as shown.

01069.41 Welding - Welding, welder qualifications, prequalification of weld details and inspection of welds shall conform to AWS D1.1 or AWS D1.2. Submit all welding procedure specifications 7 Days prior to fabrication to the Engineer for approval.

01069.42 Concrete Footings - Dimensions of footings shall not be less than shown and shall fill the excavated areas. Place the concrete with contact against firm Soil at the sides and bottom and tamp around the posts and brace ends after the posts and braces have been brought to and firmly held in proper position. Strike off, slope or crown and smooth the surface of the concrete at the ground level to shed water. Allow to cure for at least 5 Calendar Days before subjecting the posts to strain.

Excavate for concrete footings to reasonably Neat Lines, but not less than the specified dimensions in Soil, or not less than 18 inches deep in Rock. Prevent disturbance of original ground at the sides and bottom of the excavation.

Dispose of Materials removed under these provisions, including excess excavation, in a satisfactory manner.

01095.43 Shop Assembly

Fabricate units to configurations indicated on reviewed shop drawings and mockup.

Preassemble and finish metal in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

01095.44 Shop Finishes

Comply with National Association of Architectural Metal Manufacturers (NAAMM) "Metal Finishes Manual" for finish designations and application recommendations to match sheet finish specified above, except where more stringent requirements are indicated.

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Complete cutting, fitting, forming, drilling and grinding of metal work prior to cleaning, finishing, surface treatment and application of finishes.

Finish all joints, bends, abrasions, and other surface blemishes.

Finish free of tool or construction marks or dents.

Discoloration of metal from fabrication and installation will not be accepted.

(a) Weathering Steel Finish

- Thoroughly and completely remove 100% of the mill scale.
- Thoroughly pre-rust weathering steel in vinegar bath(s) or other methods.
- Apply anti-graffiti coating per manufacturer's instructions.
- Performance: Provide a smooth and consistent color, matte sheen, with no pitting, staining, splotches, freckles across all plates and posts to the approval of the Agency.

01095.45 Installation

Comply with approved shop drawings and written instructions.

Install components plumb and level, accurately fitted, free from distortion or defects and with tight joints, to locations, grades and tolerances as indicated on the Drawings and per field conditions.

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

Provide anchorage devices and fasteners for securing gateway feature in-place during construction and to adjacent plates and footings.

01095.46 Metal Protection & Repair

Where installation requires contact between dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose.

Do not make field repairs to welds, shapes, holes or finishes. Field adjustment can include fasteners, bolts, fittings and other similar miscellaneous metals.

01095.47 Cleaning

Remove protective film from panels.

Clean finished steel assemblies with potable water and mild detergent, in accordance with manufacturer's or fabricator's recommendations; do not use abrasive materials or chemicals, detergents or other substances that may damage the material or finish.

01095.48 Protection

Protect finishes from damage during construction period by use of temporary protective coverings. Remove protective covering at time of substantial completion. Protect adjacent surfaces from damage during field fabrication and installation.

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Restore finishes damaged during installation and construction period so that no evidence remains of correction work. Return items which cannot be refinished in the field to the shop; make required alterations and refinish entire unit, or provide new units as required.

Measurement

01069.80 Measurement - The quantities of Work performed under this Section will be measured according to the following:

- **Length Basis** - Metal handrail will be measured on the length basis, by measuring along the top rail member, from center of end post to center of end post.

Payment

01069.90 Payment - The accepted quantities of Work performed under this Section will be paid for at the Contract unit price, per unit of measurement, for the following items:

Pay Item	Unit of Measurement
(a) Metal Handrail.....	Foot
(b) Metal Guardrail	Foot

In the items above the number of rails will be inserted in the blank.

Payment will be payment in full for furnishing and placing all Materials, and for furnishing all Equipment, labor, and Incidentals necessary to complete the Work as specified.

SECTION 01095 - SITE FURNISHINGS

Section 01095, which is not a Standard Specification, is included in this Project by Special Provision.

Description

01095.00 Scope - This Work consists of constructing site furnishings such as benches, trash cans bicycle racks, specialty signs, pet waste bag dispensers, drinking fountains, basalt columns, traffic barrier arm, and other furnishings as shown or directed. This work also includes freestanding stone veneer seatwalls and end columns, with precast concrete caps and skate deterrent.

Materials

01095.10 General:

(a) **Benches** - Provide benches meeting the following requirements:

- Material: All-steel, welded construction with vertical slats, fully assembled with tamper-resistant anchoring hardware

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- Color: Black powder coated finish
- Size: 60" length
- Basis of Design: OCC Outdoors Products, 5ft Main Street Park Bench

(b) **Bicycle Racks** - Provide bicycle racks meeting the following requirements:

- Material: Steel tubing with pre-drilling surface mounting plates and tamper-resistant anchoring hardware
- Color: Black powder coated finish
- Size: 35" L x 2-1/2" W x 33" H
- Basis of Design: OCC Outdoors Products, Circle Style Surface Mount Bike Rack

(c) **Interpretive Panels** - Provide interpretive panels meeting the following requirements:

- Furnish completed fabricated sign using painted aluminum sheeting, steel supports and powder coated graphics as shown.
- Use artwork provided by Engineer.
- Color to conform to the City of St. Helens Branding and Wayfinding Master Plan.
- For stone veneer base requirements, see Section 01095.10(j) below.

(d) **Pedestrian Directional Sign** –

- Furnish completed sign using manufactured unit indicated in drawings.
- Use artwork provided by Engineer.
- Color to conform to the City of St. Helens Branding and Wayfinding Master Plan.

(e) **Basalt Column** - Provide basalt columns meeting the following requirements:

- Columbia Basin Basalt Columns, sourced locally.
- Size: 12-30" diameter, up to 36" length.

(f) **Drinking Fountain** - Provide drinking fountain meeting the following requirements:

- Pedestal steel drinking fountain with powder coat finish, corrosion resistant for outdoor use, with 2 stainless steel, ADA compliant drinking stations and 1 pet bowl.
- Includes tamper-proof anchor bolts for free-standing surface mount.
- Includes vandal-resistant bubblers, pushbutton activation, automatic stream height regulator, inlet strainer, water inlet, drain outlet, and access panel.
- Size: 42" height, 31" width overall
- Color: Submit color options for approval by Engineer.
- Basis of Design: Elkay Bi-Level, Tubular Pedestal Barrier-Free Fountain with Pet Fountain, Model LK4420DB.

(g) **Traffic Barrier Arm** - Provide custom traffic barrier arm per plans and meeting the following requirements:

- Permanent 2"x8" and 2"x10" Alaskan Yellow Cedar elements, grade A & better clear. Bolted to custom steel brackets.

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- Drop arm 2"x8" Alaskan Yellow Cedar, grade A & better clear. Bolted to custom steel bracket and counterweight.
- All steel components to be stainless steel.
- PIC concrete base with stone veneer and precast concrete top, see Section 01095(j).
- All wood components to receive two coats of non-toxic waterproofing following manufacturer's instructions. Use Internal Wood Stabilizer from TimberPro (<https://timberprocoatingsusa.com/products/internal-wood-stabilizer/>) or approved equal.

(h) **Trash Can** – Provide trash cans meeting the following requirements:

- Material: All-steel, welded construction with vertical slats, fully assembled, surface mounted with tamper-resistant anchoring hardware
- Color: Black powder coated finish
- Size: 42" H x 29-1/2" outer diameter
- Basis of Design: OCC Outdoors Products, 36-Gallon Colonial Trash Receptacle with Side Access

(i) **Pet Waste Bag Dispenser** - Provide pet waste bag dispensers meeting the following requirements:

- Material: Powder coated, aluminum, weather resistant, locking pet waste bag dispenser, designed to fit standard roll bags. Includes minimum of 2 dispenser keys, galvanized square post, and tamper-resistant mounting hardware.
- Size: 18" L x 11" W x 4" D
- Basis of Design: Zero Waste USA, Roll Bag Dispenser

(j) **Stone Veneer Seatwalls and End Columns** – Provide freestanding stone veneer seatwalls and end columns, with precast concrete caps and skate deterrent that meet the following requirements:

- **Cast-in-place concrete:** Reinforced per drawings. See Section 00596C for additional requirements.
- **Stone Veneer:**
 - Material: locally sourced dark gray basalt, matching the historic stone veneer used on the St. Helens courthouse and City Hall ~~Camas Basalt stone, square and rectangular shapes, dark gray color, locally available.~~
 - Size: 3" nominal thickness. Widths and lengths to be 6" – 16", square and rectangular shapes, not to exceed 16". Saw cut back and sides with split face.
 - Quality Assurance: Obtain stone from a single quarry with resources to provide materials of consistent quality in appearance and physical properties. Engage an experienced installer who specializes in site stone layout and has completed projects using stone similar in material, design and extent to that indicated for the project that has resulted in construction within a ten-year record of successful in-service performance.
- **Precast Concrete Cap** – Provide precast concrete caps meeting the following requirements:

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- Material: Precast Architectural Concrete Units:
 - Comply with PCI MNL-120, PCI MNL-122, PCI MNL-123, PCI MNL-135, and ACI 318.
 - Unit Description: Prefabricated concrete caps for seatwalls, end columns and other stone veneer site furnishings. See Landscape Plans for size and location.
 - Concrete: Minimum 5000 psi, 28 day strength, air entrained to 5 to 7 percent; comply with ACI 301.
 - Portland Cement - ASTM C 150, Type I or Type III, gray, of same type, brand, and source. Standard gray Portland cement may be used for nonexposed backup concrete.
 - Coloring Admixture - ASTM C 979, synthetic mineral-oxide pigments or colored water-reducing admixtures, temperature stable, nonfading, and alkali resistant.
 - (1) Davis Color #5237 ('Sandstone') integral color pigment admixture, or approved equal
 - Normal-Weight Aggregates - Except as modified by PCI MNL 117, ASTM C 33, with coarse aggregates complying with Class 5S.
 - Grout Material - Premixed, nonmetallic, nonshrink, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, plasticizing and water reducing agents, complying with ASTM C 1107, or consistency suitable for application.
 - Concrete Mixes - When included in design mixes, add coloring admixtures to concrete mixes according to manufacturer's written instructions.
 - Mold Fabrication - Maintain molds to provide completed precast concrete cap units of shapes, lines, and dimensions indicated, within fabrication tolerances specified.
 - Edge and Corner Treatment: Uniformly chamfered.
 - Finishes –
 - Finish exposed-face surfaces of precast concrete cap units to match approved sample panels and as follows:
 - Smooth-Surface Finish: Provide all exposed surfaces free of pockets, sand streaks, and honeycombs, with uniform color and texture. Texture shall be smooth, steel trowel finish.
 - Finish exposed top, bottom, front, and back surfaces of precast concrete cap units to match face-surface finish. Provide surfaces free of pockets, sand streaks, and honeycombs, with uniform color and texture.
 - Fabrication
 - Cast-in Anchors, Inserts, Plates, Angles, and Other Anchorage Hardware: Fabricate anchorage hardware with sufficient anchorage and embedment to comply with design requirements. Accurately position for attachment of loose hardware, and secure in place during precast operations. Locate anchorage hardware

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- where it does not affect position of main reinforcement or concrete placement.
 - Furnish loose steel plates, clip angles, seat angles, anchors, dowels, cramps, hangers, and other hardware shapes for securing precast concrete cap units to supporting and adjacent construction.
 - Cast-in reglets, slots, holes, and other accessories in precast concrete cap units to receive windows, cramps, dowels, reglets, waterstops, flashings, and other similar work as indicated.
 - Reinforcement: Comply with recommendations in CRSI's "Manual of Standard Practice" and PCI MNL 117 for fabricating, placing, and supporting reinforcement.
 - Clean reinforcement of loose rust and mill scale, earth, and other materials that reduce or destroy the bond with concrete.
 - Accurately position, support, and secure reinforcement against displacement during concrete-placement and consolidation operations. Completely conceal support devices to prevent exposure on finished surfaces.
 - Place reinforcement to maintain at least 3/4-inch minimum coverage. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position while placing concrete. Direct wire tie ends away from finished, exposed concrete surfaces.
 - Install welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.
 - Reinforce precast concrete seatwall and end column cap units to resist handling, transportation, and erection stresses.
 - Mix concrete according to PCI MNL 117 and requirements in this Section. After concrete batching, no additional water may be added.
 - Discard precast concrete seatwall and end column cap units that are warped, cracked, broken, spalled, stained, or otherwise defective unless repairs are approved by Engineer.
 - Finish: Light gray concrete with light acid etch finish.
 - Quality Assurance:
 - Provide shop drawings and samples, see Section 01095.45.
 - Fabricator Qualifications:
 - Firm having at least 5 years of documented experience in production of architectural precast concrete of the type required.
 - Completed a minimum of 3 projects of similar size and scope.

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- Fabricator to show plant has experienced personnel, physical facilities, established quality control procedures and management capability to produce required units without causing delay to project.
- Plant certified under Precast/Prestressed Concrete Institute Plant Certification Program; product group and category A1 - Architectural Precast Concrete. Plant certified under Architectural Precast Association Plant Certification Program for production of architectural precast concrete.
 - Mockups – Before installing precast concrete seat wall and end column cap units, build mockups to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for the completed Work:
 - Build mockups in the location and of the size as directed by Engineer.
 - Notify Engineer seven days in advance of dates and times when mockups will be constructed.
 - Obtain Engineer approval of mockups before starting fabrication.
 - In presence of Engineer damage part of an exposed face of an uninstalled sample for each finish, color, and texture, and demonstrate materials and techniques proposed for repairs to match adjacent undamaged surfaces.
 - Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- **Mortar** – PremiumPlus Thin-set Mortar with CustomFlex Ultra-Strength Thin-set Additive, or approved equal.
- **Grout** – Polyblend sanded grout, color to match stone.
- **Skate Deterrent** – Furnish skate deterrents meeting the following requirements:
 - Material: Stainless steel skate deterrent with locking pin for grout joint installation. Insert shall have a chamfer to match the chamfer of the precast concrete cap.
 - Basis of design: D135-12 for Chamfer, manufactured by Intelliccept Skatestoppers.
 - Contact information: Tel 619-447-6374, info@skatestoppers.com
- **Veneer Anchors** - Provide hot-dip galvanized steel corrugated-metal veneer anchors:
 - Dur-o-Wal #DA990 CWT - Corrugated Wall Ties, by Dayton Superior Corporation, Dur-O-Wall Division, or approved equal.
- **Anti-Graffiti Coating:** Provide a non-yellowing, non-sacrificial anti-graffiti coating in a flat finish by one of the following:
 - “AGS-1” aliphatic polyurethane Anti-Graffiti Coating System by US Coating Solutions - www.uscoatingsolutions.com; (800) 925-1840

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- ["VandlGuard Non-Sacrificial Anti-Graffiti Coating" by Rainguard - www.rainguard.com; Or, approved equal.](http://www.rainguard.com)

Construction

01095.40 General - Submit product information for site furnishings for approval in advance of installation. Install all benches, bike racks, trash cans and pet waste bag dispensers as shown and according to the manufacturer's recommendations.

01095.41 Specialty Signage – Includes Interpretive Panels and Pedestrian Directional Signage.

(a) Fabrication

- Shop Drawings – Take field measurements prior to preparation of shop drawings and fabrication to ensure proper fitting. Notify Engineer of conflicts.
- Product Data – Submit manufacturers product specifications for all products.
- Quality – Sign fabricator shall have a minimum of five year of experience completing similar work. Sign panels shall show no visual distortion, gaps or defects when viewed from a normal viewing distance in the installed position. Provide color and material samples prior to fabrication.
- Aluminum Fabrication – Provide aluminum in the form indicated complying with the following American Society for Testing Materials ASTM B 209, 5052-H32 for sheets. Aluminum shall be new material, cut to shape and size shown. Welds shall be concealed and ground smooth at sign exterior. Sign shall be free of buckles, warps, dents, burrs and defects resulting from fabrication.
- Steel Fabrication – Provide steel in form indicated complying with ASTM A 500, Grade B for tube supports.
- Powder Coated Aluminum Graphic Panel – Provide graphic embedded in clear powder coat as provided by the following manufacturers:
 - a. SH Immersive, Alto Product
 - b. Direct Embed Coating Systems
 - c. Gopher Sign Company
- Manufactured Units – Sternberg banner arm & sign blade as shown
- Fasteners – Of same basic metal and alloy as fastened metal, unless indicated. Do not use metals which are corrosive or otherwise incompatible with metals joined. Conceal fasteners when possible. Where exposed to view match adjacent material finish.
- Graphics – Graphics, symbols, text and colors shall be executed in such a manner that all edges and corners are true, clean and match provided artwork.

(b) Installation

- Obtain all necessary permits and inspections required by the governing authorities having jurisdiction over this work. Include associated fees in proposal. Furnish a certificate of approval from the inspection authority at the completion of the work prior to the application of payment.
- Construct stone veneer base per drawings and Section 01095.45.
- Deliver completed signs to project site when adjacent finishes are complete and ready for immediate installation.
- Protect finished products to not damage or mar surfaces in transit or installation.

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- Protect adjacent materials prior sign installation. Repair adjacent materials if damaged during installation.
- Erect all signs at the locations as staked or directed on site. Signs not mounted as directed will not be accepted.
- Install directional sign panels to be level and plumb at the height indicated. Align sign face with pathways.
- Provide cleaning and maintenance data including field paint repair and graffiti removal.

01095.42 Traffic Barrier Arm:

- Custom fabrication, submit shop drawings for approval prior to installation.
- See Section 01095.45 for fabrication and installation requirement for stone veneer and precast concrete components.

01095.43 Drinking Fountain – Install per manufacturer’s requirements. See add reference to plumbing section.

01095.44 Basalt Columns – See plans.

01095.45 Stone Veneer Seatwalls and Stone Veneer End Columns:

(a) Stone Veneer Seatwalls and Stone Veneer End Columns

- Submit one set of stone veneer samples illustrating minimum and maximum stone sizes, color range and texture. Submit mortar samples showing full range of colors expected in the finished construction.
- Construct cast-in-place concrete core with reinforcement per the drawings.
- Construct stone veneer as shown in drawings. Set stone veneer as follows:
 - Perform necessary field cutting as stone is set. Use hammer and chisel to split stone that is fabricated with split surfaces. Make edges straight and true, matching similar surfaces that were shop or quarry fabricated.
 - Sort stone before it is placed in wall to remove stone that does not comply with requirements relating to aesthetic effects, physical properties, fabrication, or that is otherwise unsuitable for intended use.
 - Arrange and trim stones in random ashlar pattern with course heights as indicated in random lengths with offset between vertical joints as shown.
 - Set stone to comply with requirements as shown. Install veneer anchors, supports, fasteners, and other attachments indicated or necessary to secure stone veneer assemblies in place. Set stone accurately in locations indicated with edges and faces aligned according to established relationships and industry standards.
 - Maintain uniform joint widths except for variations due to different stone sizes and where minor variations are required to maintain bond alignment, if any. Lay walls with joints not less than 1/4 inch at narrowest points no more than 1/2 inch at widest points.
 - Apply anti-graffiti coating per Manufacturer’s recommendations.
- Installation of Anchored Stone Masonry:
 - Anchor stone masonry to concrete with corrugated-metal veneer anchors unless otherwise indicated. Fasten anchors to concrete as shown.
- Pointing:

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- Prepare stone-joint surfaces for pointing with mortar by removing dust and mortar particles. Where setting mortar was removed to depths greater than surrounding areas, apply pointing mortar in layers not more than 3/8 inch deep until a uniform depth is formed.
- Point stone joints by placing and compacting pointing mortar in layers not more than 3/8 inch deep. Compact each layer thoroughly and allow to become thumbprint hard before applying next layer.
- Tool joints, when pointing mortar is thumbprint hard, with a smooth jointing tool to produce the following joint profile:
 - Joint Profile: match the joint profile of the stone veneer used in the recent construction of wayfinding signage in St. Helens, and the historic stone veneer used on the St. Helens courthouse and City Hall.
- Adjusting and Cleaning: Remove and replace stone veneer assemblies of the following description:
 - Broken, chipped, stained, or otherwise damaged stone. Stone may be repaired if Engineer approves methods and results.
 - Defective joints.
 - Stone veneer assemblies not matching approved samples and mockups.
 - Stone veneer assemblies not complying with other requirements indicated.
- Replace in a manner that result in stone veneer assemblies' matching approved samples and mockups, complying with other requirements, and showing no evidence of replacement.
- In-Progress Cleaning – Clean stone veneer assemblies as work progresses. Remove mortar fins and smears before tooling joints.
- Final Cleaning – After mortar is thoroughly set and cured, clean stone veneer assemblies as follows:
 - Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
 - Test cleaning methods on mockup; leave one-half of panel uncleaned for comparison purposes. Obtain Engineer's approval of sample cleaning before cleaning stone veneer assemblies.
- Clean stone veneer assemblies by bucket and brush hand-cleaning method described in BIA Technical Note No. 20 Revised II, using job-mixed detergent solution. Fully grouted joints in all stone veneer installations not to exceed 3/8" width.

(b) Precast Concrete Caps

- Submit the following for approval by Engineer prior to fabrication or installation:
 - Shop drawings of concrete caps for approval by Engineer prior to installation. Indicate—indicating layout, location, configuration, connection details, dimensions, openings, and relationship to adjacent materials. Include details of mix designs and finishes.
 - Submit this information at least 30 calendar days before beginning construction of the Precast Concrete Caps.
 - Shop drawings shall include, but not be limited to, the following:
 - Detail fabrication and installation of precast concrete cap units.
 - Indicate member locations, plans, elevations, dimensions, shapes, cross sections, limits of each finish, and types of reinforcement, including special reinforcement.

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- Indicate locations and details of anchorage devices to be embedded in other construction.
- Provide ~~Submit~~ one sample for each type of finish indicated on exposed surfaces of precast concrete seatwall and end column cap units, in sets of 3, illustrating full range of finish, color, and texture variations expected, min. 12 inch by 12 inch, of appropriate thickness, mixture, finish, color and edge conditions for approval by Engineer.
 - Design Mixes – For each concrete mix.
 - Material Certificates – Signed by manufacturers certifying that each of the following items complies with requirements:
 - Concrete materials.
 - Reinforcing materials.
 - Coloring Admixtures.
 - Bearing pads.
 - Water-absorption test reports.
- Fabricate in conformance with PCI MNL-117 and PCI MNL-135.
- Install precast concrete caps level and plumb within allowable tolerances. Grout connections where indicated on drawings.

(c) Skate Deterrent – Submit product for approval by Engineer prior to installation. Install as shown in drawings and per manufacturer’s instructions.

Measurement

01095.80 Measurement - The quantities of site furnishings will be measured on the unit basis.

The quantities of custom traffic barrier arm will be measured as lump sum.

The quantities of Stone Veneer Seatwall with Precast Concrete Cap will be measured on the linear foot basis.

Payment

01095.90 Payment - The accepted quantities of site furnishings will be paid for at the Contract unit price, per unit of measurement, for the following items:

Pay Item	Unit of Measurement
(a) Benches	Each
(b) Bicycle Racks	Each
(c) Interpretive Panel	Each
(d) Pedestrian Directional Signs.....	Each
(e) Basalt Column	Each
(g) Drinking Fountain	Each
(f) Traffic Barrier Arm	Lump Sum
(f) Trash Can.....	Each
(g) Pet Waste Bag Dispenser.....	Each
(h) Stone Veneer Seatwall with Precast Concrete Cap	Linear Foot

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- (i) Stone Veneer End Column with Precast Concrete Cap.....Each
- (j) Skate Deterrent.....Each

Payment will be payment in full for furnishing and placing all Materials, and for furnishing all Equipment, labor, and Incidentals necessary to complete the Work as specified.

SECTION 01120 - IRRIGATION SYSTEMS

Comply with Section 01120 of the Standard Specifications modified as follows:

01120.12 Automatic Controllers - Add the following sentence to the end of this subsection:

See drawings for controller make and model.

01120.17 Valves - Add the following sentence to the beginning of this subsection:

See drawings for make and model of valves in this section. Where make and models are not provided, submit product meeting specification below for review prior to installation.

01120.18 Valve Boxes and Protective Sleeves – Replace this subsection with text below:

Provide automatic control valves, flow control valves, pressure reducing valves, backflow preventers, filters and other serviceable fixtures with valve boxes that are extendable to obtain the depth required. Furnish boxes constructed of thermoplastic with locking lids. Use brown or black lids in mulch (planting areas) and green lids in seeded areas. Include a protective sleeve and cap with all manual drain valves and manual control valves

01120.22 Tree Watering Bags - Add the following product to the end of this subsection:

Provide tree watering bags as shown on plans. Basis of design: Dew Right Tree Watering Bag by DeWitt (<https://www.dewittcompany.com/product/dew-right-tree-watering-bag/>).

01120.42 Excavation – Add the following to the end of the fourth paragraph:

Vibratory pipe pulling shall only be allowed on 3/4 inch and 1-inch diameter piping only. Solvent weld joints shall be thoroughly cured prior to pipe pulling.

The Contractor shall ensure, by means of an open pit or trench at the beginning, middle, and the end of pull, that pipe and wire is installed at the specified burial depths throughout the entire length of the pull. Burial depths shall be the same as specified for trenching. Allow a minimum of five chain links between plow blade and pulling grip/bullet.

Pulling grip/bullet shall be a minimum of two-inch in diameter greater than the combined diameters of pipe joints and wire to be pulled. Wire pulling shall only occur with proper wire blade feed attachment.

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01120.43 Piping – Add the following to the end of the first paragraph:

Trench bottoms shall have uniform slopes with one percent minimum slope towards drain valves. Trench bottom shall be free of rocks or sharp-edged objects. Stones larger than one-inch in diameter are not allowed in the backfill material. Trench backfill material shall be compacted to match adjacent soil density. Keep trenches free of debris, during construction.

01120.45(a) Sprinkler Heads – Add the following paragraph at the end of this subsection:

Install all underground sprinklers on flexible risers, using flexible polyethylene pipe or PVC swing joints. Sprinklers located on slopes which are less than three percent shall be installed plumb. Those that are located on slopes greater than three percent shall be installed at an angle midway between plumb and perpendicular to the slope. Temporary Irrigation heads shall be placed on upright fixed pipe staked with #4 rebar per drawings.

01120.45(d) Controllers – Add the following paragraph at the end of this subsection:

Provide grounding and lightning protection for all controllers per manufacturer's specifications.

01120.45(f) Valves – Add the following paragraph at the end of this subsection:

Install one manual drain valve at discharge side of each remote control valve and at all low points in main line pipe to allow for complete drainage of all main lines. Install Automatic valves as shown on drawings. Install specified quick coupling valve, in specified box, at point of connection, and as shown and noted on plans. Valves and valve box locations shall be located in a manner so as not to interrupt plant massing or groups, hedge lines, or otherwise alter the character of the proposed plantings. Place valves and valve boxes in low growing ground cover areas offset from adjacent paving by a minimum of 2 times the specified ground cover spacing. In public areas where valves or valve boxes may be readily visible to the public, verify their location with Owner's Representative prior to installation. Backflow prevention devices shall comply with state and local codes. Conceal in planting beds where possible.

01120.46 Low Voltage Electrical Installation – Add the following sentence at the end of the last paragraph:

All controllers and other devices requiring grounding shall be grounded in accordance with manufacturer's specification.

01120.60 System Operation - Add the following paragraph at the end of the first paragraph:

System programming: Calculate three irrigation programs: Spring / Early Summer, Summer, Late Summer/ Fall. System operation requirements shall be based on annual precipitation rates, plant material maturation requirements, solar exposure, and topography and soil conditions. Submit seasonal controller operation program with as-built record drawings and include laminated copy of program at controller location in controller cabinet.

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Include total application quantities in inches per week for all zones, for establishment period and normal system operation.