

KITTITAS COUNTY
CLE ELUM, WASHINGTON
TECHNICAL SPECIFICATIONS

for the construction of the

KITTITAS COUNTY SOLID WASTE ON-CALL
CLE ELUM TRANSFER STATION SCALE UPGRADE DESIGN

JACOBS
Spokane, WA
April 2023

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Project No. KITTCO02

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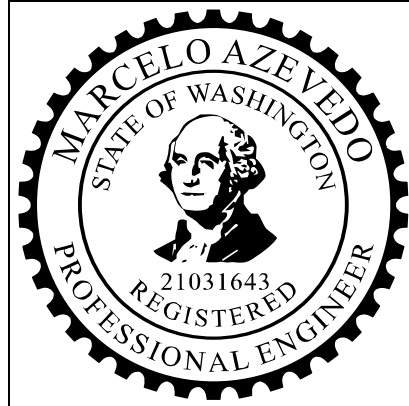
April 26, 2023

Elizabeth Ann Butterfield

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SPECIFICATIONS

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April 26, 2023

Marcelo Azevedo

END OF SECTION

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SPECIFICATIONS

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**SECTION 01 11 00
SUMMARY OF WORK**

PART 1 GENERAL

1.01 WORK COVERED BY CONTRACT DOCUMENTS

- A. The completed Work will provide Owner with the Kittitas County Cle Elem Transfer Station Scale Replacement. This new Work consists of the following general construction elements:

ITEM NO.	DESCRIPTION	SUMMARY OF WORK
1.	Excavation and filling to grades shown on Drawings.	General excavation and embankment fill include site clearing, erosion control, topsoil removal, stockpiling, layout staking, survey control and QA/QC testing. All Work and materials needed to develop onsite grades are included in this Bid. Any damage to existing utilities, or other systems to remain shall be repaired as an incidental to this Bid.
2.	Demolition of existing features.	Complete demolition of existing scales (shown on Drawings to be demolished).
3.	Installation of two new scales (entrance and exit).	The Bid covers all Work, materials, and equipment related to the installation of the commercial truck scales, including, but not limited to, structural systems, coordination with scale manufacturer/supplier, electrical systems and scale
4.	Finish grade and hydroseeding.	Finish grade and hydroseeding includes all Work, materials and equipment related to the soil stabilization and hydroseeding of all disturbed areas.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

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**SECTION 01 31 13
PROJECT COORDINATION**

PART 1 GENERAL

1.01 SUBMITTALS

A. Informational:

1. Statement of Qualification (SOQ) for land surveyor or civil engineer.
2. Photographs:
 - a. Digital Images: Submit digitally or on USB memory stick within 5 days of being taken.

1.02 RELATED WORK AT SITE

- A. General: Include sequencing constraints specified herein as a part of Progress Schedule.

1.03 OWNER-FURNISHED PRODUCTS

- A. Existing entry gate to be removed and installed at new entry gate location.

1.04 UTILITY NOTIFICATION AND COORDINATION

- A. Coordinate the Work with various utilities within Project limits. Notify applicable utilities prior to commencing Work, if damage occurs, or if conflicts or emergencies arise during the Work.

1. Electricity Company: Puget Sound Energy.
 - a. Telephone: (888) 321-7779.
2. Telephone Company: Inland Networks.
 - a. Telephone: (509) 649-2211.
3. Water Department: City of Cle Elum.
 - a. Telephone: (509) 674-2262.
4. Gas Department: Puget Sound Energy.
 - a. Telephone: (888) 321-7779.
5. Public Works Department: Kittitas County.
 - a. Contact Person: Mark Cook.
 - b. Telephone: (509) 962-7523.

1.05 PROJECT MILESTONES

- A. General: Include the Milestones specified herein as a part of the Progress Schedule.

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B. Project Milestones: Described in the Agreement Form.

1.06 WORK SEQUENCING/CONSTRAINTS

A. Include the following work sequences in the Progress Schedule:

1. The transfer station will remain in operation during construction. At least one scale must remain operational and open at all times.

1.07 FACILITY OPERATIONS

- A. Continuous operation of Owner's facilities is of critical importance. Schedule and conduct activities to enable existing facilities to operate continuously, unless otherwise specified.
- B. Perform Work continuously during critical connections and changeovers, and as required to prevent interruption of Owner's operations.
- C. When necessary, plan, design, and provide various temporary services, utilities, connections, temporary piping and heating, access, and similar items to maintain continuous operations of Owner's facility.
- D. Do not disturb any existing trees or shrubs without prior approval by the Owner, regardless of if shown on Drawings, to require removal.
- E. Do not close lines, open or close valves, or take other action which would affect the operation of existing systems, except as specifically required by the Contract Documents and after authorization by Owner and Contractor. Such authorization will be considered within 48 hours after receipt of Contractor's written request.
- F. Refer to Article Work Sequencing/Constraints. Construct Work in stages to facilitate for the specified sequence and constraints.
- G. Process or Facility Shutdown:
1. General: Provide 5 days advance written request for approval of need to shut down a process or facility to Owner and Contractor.
 2. Power outages will be considered upon 48 hours written request to Owner and Contractor. Describe the reason, anticipated length of time, and areas affected by the outage. Provide temporary provisions for continuous power supply to critical facility components.

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- H. Do not proceed with Work affecting a facility's operation without obtaining Owner's and Contractor's advance approval of the need for and duration of such Work.

- I. Relocation of Existing Facilities:
 - 1. During construction, it is expected that minor relocations of Work will be necessary.
 - 2. Provide complete relocation of existing structures and Underground Facilities, including piping, utilities, equipment, structures, electrical conduit wiring, electrical duct bank, and other necessary items.
 - 3. Use only new materials for relocated facility. Match materials of existing facility, unless otherwise shown or specified.
 - 4. Perform relocations to minimize downtime of existing facilities.
 - 5. Install new portions of existing facilities in their relocated position prior to removal of existing facilities, unless otherwise accepted by Contractor.

1.08 ADJACENT FACILITIES AND PROPERTIES

- A. Examination:
 - 1. After Effective Date of the Agreement and before Work at Site is started, Contractor, and affected property owners and utility owners shall make a thorough examination of pre-existing conditions including existing buildings, structures, and other improvements in vicinity of Work, as applicable, which could be damaged by construction operations.
 - 2. Periodic reexamination shall be jointly performed to include, but not limited to, cracks in structures, settlement, leakage, and similar conditions.

- B. Documentation:
 - 1. Record and submit documentation of observations made on examination inspections in accordance with Article Construction Photographs.
 - 2. Upon receipt, Owner will review, sign, and copy of documentation is to be kept on file in field office.
 - 3. Such documentation shall be used as indisputable evidence in ascertaining whether and to what extent damage occurred because of Contractor's operations, and is for the protection of adjacent property owners, Contractor, and Owner.

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1.09 CONSTRUCTION PHOTOGRAPHS

A. General:

1. Photographically document all phases of the Project including preconstruction, construction progress, and post-construction.
2. Engineer shall have right to select subject matter and vantage point from which photographs are to be taken.

B. Preconstruction and Post-Construction:

1. After Effective Date of the Agreement and before Work at Site is started, and again upon issuance of Substantial Completion, take a minimum of 30 photographs of Site and property adjacent to perimeter of Site.
2. Format: Digital, minimum resolution of 1680 pixels by 2240 pixels and 24-bit, millions of color.

C. Construction Progress Photos:

1. Photographically demonstrate progress of construction, showing every aspect of Site and adjacent properties as well as interior and exterior of new or impacted structures.
2. Weekly: Take 40 photographs using digital, minimum resolution of 1680 pixels by 2240 pixels and 24-bit, millions of color.

D. Digital Images:

1. Electronic image shall have date taken embedded into image.
2. Archive using a commercially available photo management system that provides listing of photographs including date, keyword description, and direction of photograph.
3. Label file folders or database records with Project and Owner's name, and month and year images were produced.

1.10 REFERENCE POINTS AND SURVEYS

- A. Owner's Responsibilities: Provide horizontal reference points or coordinate system with benchmarks and reference points for Contractor's use as necessary to lay out Work.
- B. Location and elevation of benchmarks are shown on Drawings.

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- C. Contractor's Responsibilities:
1. Provide additional survey and layout required to layout the Work.
 2. Check and establish exact location of existing facilities prior to construction of new facilities and any connections thereto.
 3. In event of discrepancy in data or staking provided by Owner, request clarification before proceeding with Work.
 4. Retain professional land surveyor or civil engineer registered in the State of Washington who shall perform or supervise engineering surveying necessary for additional construction staking and layout.
 5. Maintain complete accurate log of survey work as it progresses as a Record Document.
 6. On request of Engineer, submit documentation.
 7. Provide competent employee(s), tools, stakes, and other equipment and materials as Engineer may require to:
 - a. Establish control points, lines, and easement boundaries.
 - b. Check layout, survey, and measurement work performed by others.
 - c. Measure quantities for payment purposes.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 CUTTING, FITTING, AND PATCHING

- A. Cut, fit, adjust, or patch Work and work of others, including excavation and backfill as required, to make Work complete.
- B. Obtain prior written authorization of Owner before commencing Work to cut or otherwise alter:
1. Structural or reinforcing steel, structural column or beam, elevated slab, trusses, or other structural member.
 2. Weather-resistant or moisture-resistant elements.
 3. Efficiency, maintenance, or safety of element.
 4. Work of others.
- C. Refinish surfaces to provide an even finish.
1. Refinish continuous surfaces to nearest intersection.
 2. Refinish entire assemblies.
 3. Finish restored surfaces to such planes, shapes, and textures that no transition between existing work and the Work is evident in finished surfaces.

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- D. Restore existing work, Underground Facilities, and surfaces that are to remain in completed Work including concrete-embedded piping, conduit, and other utilities as specified and as shown on Drawings.
- E. Make restorations with new materials and appropriate methods as specified for new Work of similar nature; if not specified, use recommended practice of manufacturer or appropriate trade association.
- F. Fit Work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces and fill voids.
- G. Remove specimens of installed Work for testing when requested by Engineer.

END OF SECTION

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**SECTION 01 31 19
PROJECT MEETINGS**

PART 1 GENERAL

1.01 GENERAL

- A. Contractor shall schedule physical arrangements for meetings throughout progress of the Work, prepare meeting agenda with regular participant input and distribute with written notice of each meeting, preside at meetings, record minutes to include significant proceedings and decisions, and reproduce and distribute copies of minutes within 5 days after each meeting to participants and parties affected by meeting decisions.

1.02 PRECONSTRUCTION CONFERENCE

- A. Contractor shall be prepared to discuss the following subjects, as a minimum:

1. Required schedules.
2. Status of Bonds and insurance.
3. Sequencing of critical path work items.
4. Progress payment procedures.
5. Project changes and clarification procedures.
6. Use of Site, access, office and storage areas, security and temporary facilities.
7. Major product delivery and priorities.
8. Contractor's safety plan and representative.

- B. Attendees will include:

1. Owner's representatives.
2. Contractor's office representative.
3. Contractor's resident superintendent.
4. Contractor's quality control representative.
5. Subcontractors' representatives whom Contractor may desire or Engineer may request to attend.
6. Engineer's representatives.
7. Others as appropriate.

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1.03 PROGRESS MEETINGS

- A. Contractor will schedule regular progress meetings at Site, conducted weekly to review the Work progress, Progress Schedule, Schedule of Submittals, Application for Payment, contract modifications, and other matters needing discussion and resolution.
- B. Attendees will include:
 - 1. Owner's representative.
 - 2. Contractor, Subcontractors, and Suppliers, as appropriate.
 - 3. Engineer's representative may request to attend.
 - 4. Others as appropriate.

1.04 QUALITY CONTROL MEETINGS

- A. Scheduled by Contractor on regular basis and as necessary to review test and inspection reports, and other matters relating to quality control of the Work and work of other Contractors.
- B. Attendees will include:
 - 1. Contractor.
 - 2. Contractor's designated quality control representative.
 - 3. Subcontractors and Suppliers, as necessary.
 - 4. Engineer's representatives may be requested or may request to join.

1.05 PREINSTALLATION MEETINGS

- A. When required in individual Specification sections, convene at Site prior to commencing the Work of that section.
- B. Require attendance of entities directly affecting, or affected by, the Work of that section.
- C. Notify Engineer 5 days in advance of meeting date.
- D. Provide suggested agenda to Engineer to include reviewing conditions of installation, preparation and installation or application procedures, and coordination with related Work and work of others.

1.06 OTHER MEETINGS

- A. In accordance with Contract Documents and as may be required by Owner and Engineer.

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PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 57 13
TEMPORARY EROSION AND SEDIMENT CONTROL

PART 1 GENERAL

1.01 SUMMARY

- A. This section covers Work necessary for minimizing erosion and preventing the discharge of sediment during and after construction and land disturbing activities. The Work shall include the furnishing of all labor, materials, tools, and equipment to perform the Work and services necessary as herein specified and as indicated on Drawings. This shall include installation, maintenance, and final removal of all temporary soil erosion and sediment control measures.
- B. The minimum areas requiring soil erosion and sediment control best management practices (BMPs) are areas of land disturbance (from grading, excavation, filling, and other land disturbing activities) and those shown in the Stormwater Pollution Prevention Plan (SWPPP). The right is reserved to modify use, location and quantities of soil erosion and sediment control BMPs based on activities of the contractor.
- C. Contractor shall provide an erosion and sedimentation control specialist (ESCS) responsible for the implementation, maintenance and oversight of all erosion and sedimentation control activities, including submittals, SWPPP (and subsequent TESC Plan) development and implementation, dust control measures, emergency activities, repairs and removal of temporary controls in accordance with Washington's Construction Stormwater Program, including the 2019 Stormwater Manual for Eastern Washington.
- D. Contractor shall be responsible for phasing Work in areas allocated for their exclusive use during Project, including proposed stockpile areas, to restrict sediment transport. This will include installation of temporary erosion control devices, ditches, or other BMPs.
- E. Sediment transport and erosion from working/temporary stockpiles shall be controlled and restricted from moving beyond immediate stockpile area by implementing the BMPs identified in the approved SWPPP. Additionally, contractor shall implement the dust control BMP measures. Contractor shall keep these erosion and sediment control BMPs in operational condition by regular cleaning, regrading, and maintenance. Stockpiles remaining in place longer than 14 calendar days shall be considered permanent stockpiles for purposes of erosion and sediment control.

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- F. National Pollutant Discharge Elimination System: Comply with Federal, state, and local laws, rules and regulations, and the National Pollutant Discharge Elimination System (NPDES) Construction Stormwater Discharge Permit or Permits applicable to the Project.
- G. Other Regulations: A local government erosion and sediment control permit may apply, and some local agency requirements may be more stringent than this specification. Adequate erosion and sediment control is essential for complying with the federal Endangered Species Act where construction runoff enters waters inhabited by protected species.

1.02 REFERENCES

- A. Activities shall conform to the Washington Department of Ecology Stormwater Management Manual for Eastern Washington, Chapter 7 Construction Stormwater Pollution and Drawings. In the event of a conflict, the more stringent requirement shall apply.
- B. The following is a list of standards that may be referenced in this section:
 - 1. ASTM International (ASTM):
 - a. D2974, Standard Test Methods for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils.
 - b. D3776/D3776M, Standard Test Methods for Mass Per Unit Area (Weight) of Fabric.
 - c. D4355, Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc Type Apparatus.
 - d. D4397, Standard Specification for Polyethylene Sheeting for Construction, Industrial, and Agricultural Applications.
 - e. D4491, Standard Test Methods for Water Permeability of Geotextiles by Permittivity.
 - f. D4533, Standard Test Method for Trapezoid Tearing Strength of Geotextiles.
 - g. D4632/D4632M, Standard Test Method for Grab Breaking Load and Elongation of Geotextiles.
 - h. D4751, Standard Test Method for Determining Apparent Opening Size of a Geotextile.
 - i. D6241, Standard Test Method for Static Puncture Strength of Geotextiles and Geotextile-Related Products Using a 50-mm Probe.
 - j. D6459, Standard Test Method for Determination of Rolled Erosion Control Product (RECP) Performance in Protecting Hillslopes from Rainfall-Induced Erosion.

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- k. D6460, Standard Test Method for Determination of Rolled Erosion Control Product (RECP) Performance in Protecting Earthen Channels from Stormwater-Induced Erosion.
 - l. D6475, Standard Test Method for Measuring Mass Per Unit Area of Erosion Control Blankets.
 - m. D7322, Standard Test Method for Determination of Rolled Erosion Control Product (RECP) Ability to Encourage Seed Germination and Plant Growth Under Bench-Scale Conditions.
 - n. D7367, Standard Test Method for Determining Water Holding Capacity of Fiber Mulches for Hydraulic Planting.
2. National Weather Service:
- a. Precipitation-Frequency of the United States by State/Territory, 2012.
 - b. Precipitation Frequency Data Server, 2012.
3. North American Weed Management Association (NAWMA).
4. U.S. Department of Agriculture, Natural Resources Conservation Service: *Urban Hydrology for Small Watersheds*; 1986. Technical Release 55.
5. U.S. Environmental Protection Agency:
- a. Developing Your Stormwater Pollution Prevention Plan: A Guide for Construction Sites, 2007. EPA-833-R-06-004.
 - b. National Menu of BMPs, 2012.

1.03 SYSTEM DESCRIPTION

A. Erosion and Sediment Control:

- 1. Provide, maintain, and operate temporary facilities to control erosion and sediment releases during construction period.
- 2. Design erosion and sediment controls to handle peak runoff resulting from 25-year, 24-hour storm event based on National Weather Service: Precipitation Frequency Data Server.
- 3. Size temporary stormwater conveyances based on procedures presented in U.S. Department of Agriculture, Natural Resources Conservation Service: *Urban Hydrology for Small Watersheds*, 1986. Technical Release 55.

B. Erosion and Sediment Control (ESC) Lead:

- 1. Identify the ESC Lead at the preconstruction discussions and in the SWPPP Plan. The ESC Lead shall have certification in construction site erosion and sediment control from a course approved by Owner.

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2. The ESC Lead shall implement the SWPPP Plan, including, but not limited to:
 - a. Installing and maintaining all temporary erosion and sediment control Best Management Practices (BMPs) included in the SWPPP Plan to assure continued performance of their intended function. Damaged or inadequate SWPPP BMPs shall be corrected immediately.
 - b. Updating SWPPP Plan to reflect current field conditions.
 - c. Terminating SWPPP Plan.
3. When a SWPPP Plan is included in the Contract Plans, ESC Lead shall also inspect all areas disturbed by construction activities, all onsite erosion and sediment control BMPs, all stormwater discharge points, and all temporarily stabilized inactive sites per schedule in the Construction Stormwater Discharge Permit(s) or as directed by Engineer. Complete erosion and sediment control inspection form provided by water resource agency or Owner for each inspection and submit a copy to Engineer no later than end of the next working day following inspection.

C. Personnel Training:

1. Prior to commencement of construction, applicable personnel must have an understanding of the Construction Stormwater Discharge Permit's requirements and their specific responsibilities under the permit. At a minimum, personnel must be trained to understand the following as it relates to the scope of their job duties:
 - a. The location of all stormwater controls and how to maintain them.
 - b. Procedures for complying with the pollution prevention requirements.
 - c. Procedures for conducting inspections, recording findings, and taking corrective action.

D. Temporary Erosion and Sediment Control Plan (Stormwater Pollution Prevention Plan):

1. Contractor is to provide a TESC Plan.
2. For each phase of the scheduled work, indicate on the TESC Plan all the BMPs proposed and installed for erosion and sediment control to minimize clearing, stabilize exposed soil, divert or temporarily store flows, limit runoff from exposed areas, and filter transported sediment. Include all temporary slopes, constructed for staging or other reasons, which may not have been identified in the original Contractors plans. Refer to the current local jurisdiction's erosion and sediment control manual.

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3. Some TESC Plan required elements typically required by NPDES permits:
- a. Narrative Site Description:
 - 1) Nature of construction activity planned for the Site.
 - 2) Estimates of total site area and the areas of the Site expected to be disturbed.
 - 3) Soil types found onsite and their erosion potential.
 - 4) The types of fill materials to be used.
 - 5) Timetable for sequence of major construction events.
 - b. Site Map:
 - 1) All areas of development.
 - 2) Drainage patterns.
 - 3) Areas of soil disturbance, including pre-development and post-development elevation contours.
 - 4) Areas used for storage of soils or wastes.
 - 5) Areas where vegetative practices are to be implemented.
 - 6) Location of all erosion and sediment control BMP or structures.
 - 7) Location of all impervious structures and surfaces after project is completed.
 - 8) Springs, wetlands, and other surface waters located onsite.
 - 9) Boundaries of the 100-year floodplain, if determined.
 - 10) Ordinary High Water line, if determined.
 - 11) Location of storm drainage outfalls to receiving waters, if applicable.
 - 12) Details of sediment and erosion controls.
 - 13) Details of detention ponds, storm drain piping, inflow and outflow details.
 - c. Required BMPs and Procedures for Erosion Prevention, Runoff Control, and Sediment Control:
 - 1) Construction entrances and parking areas.
 - 2) Unpaved site roads such as haul roads.
 - 3) Hauling saturated soils from the Site.
 - 4) Water washed from concrete trucks.
 - 5) Correct installation of erosion and sediment control BMPs.
 - 6) Prompt maintenance and repair of BMPs.
 - 7) Clearing and grading practices to minimize area of exposed soil throughout life of the Project.
 - 8) Schedule of phased clearing operations to limit soils to what can be stabilized.
 - 9) Vegetative practices, including preservation of existing vegetation, seeding, mulching, and buffer strips.
 - 10) Preventing erosion of exposed areas.
 - 11) Diverting flows from exposed slopes.

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- 12) Limiting runoff from exposed areas.
 - 13) Limiting sediment transport within work sites and keeping it from moving off of project areas.
 - 14) Perimeter controls for all clearing and grubbing, both planned and installed.
 - 15) Additional controls for wet season work and temporary work suspensions.
 - 16) Sensitive areas such as wetlands.
 - 17) Offsite material source and waste areas.
 - 18) Dust.
 - 19) Emergency materials stockpiled onsite.
 - 20) Storing flows and filtering sediment.
 - 21) Soil stockpiles.
4. Contractor's construction TESC Plan and implementation schedules must be prepared by a competent individual. Furnish a signed copy of the TESC Plan with individual's name, title, state certifications, and employing firm if different than Contractor's firm.
 5. Do not begin any Site activities that have potential to cause erosion or sediment movement until the TESC Plan and implementation schedules are approved.
 6. Keep a copy of the approved TESC Plan with updated changes onsite during all construction activities. During inactive periods longer than 7 calendar days, keep the TESC Plan onsite.
 7. Continually update the TESC Plan and schedules as needed for unexpected storm or other events to ensure that sediment-laden water does not leave the construction site. Add approved changes to the TESC Plan no later than 24 hours after implementation.
- E. Preventing erosion, and controlling runoff, sedimentation, and non-stormwater pollution, requires Contractor to perform temporary Work items including, but not limited to:
1. Providing ditches, berms, culverts, and other measures to control surface water.
 2. Building dams, settling basins, energy dissipaters, and other measures, to control downstream flows.
 3. Controlling underground water found during construction.
 4. Covering or otherwise protecting slopes until permanent erosion control measures are working.
- F. To the degree possible, coordinate this temporary Work with permanent drainage and erosion control work the Contract requires.

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- G. Site may require additional temporary control measures if it appears pollution or erosion may result from weather, nature of materials, or progress on the Work.
- H. When natural elements rut or erode the slope, restore and repair damage with eroded material where possible, and remove and dispose of any remaining material found in ditches and culverts. When Engineer orders replacement with additional or other materials, unit Contract prices will cover quantities needed.
- I. Install all sediment control devices or other sediment trapping BMPs prior to any ground disturbing activity. Do not expose more erodible earth than necessary during clearing, grubbing, excavation, borrow, or fill activities without written approval by Engineer. Engineer may increase or decrease the limits based on Project conditions. Erodible earth is defined as any surface where soils, grindings, or other materials may be capable of being displaced and transported by rain, wind, or surface water runoff. Cover inactive areas of erodible earth, whether at final grade or not, within specified time period (see [NPDES] Erosion and Sediment Control Permit), using an approved soil covering practice. Phase clearing and grading to maximum extent practical to prevent exposed inactive areas from becoming a source of erosion.
- J. Water Management:
 - 1. Manage site water in accordance with the conditions of the waste discharge permit from a local permitting authority. If site water management is not subject to permit, manage as follows:
 - a. When groundwater is encountered in an excavation, treat and discharge as follows:
 - 1) When groundwater conforms to applicable Water Quality Standards, it may bypass detention and treatment facilities and be routed directly to its normal discharge point at a rate and method that will not cause erosion.
 - 2) When turbidity of groundwater is similar to turbidity of site runoff, groundwater may be treated using same detention and treatment facilities being used to treat the site runoff and then discharged at a rate that will not cause erosion.
 - 3) When groundwater turbidity is greater than turbidity of site runoff, treat ground water separately until turbidity is similar to or better than site runoff, and then it may be combined with site runoff and treated as described above.
 - b. Process Water:
 - 1) Do not discharge high pH process water or wastewater (non-stormwater) that is generated onsite, including water

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- generated during concrete grinding, rubblizing, washout, and hydro demolition activities, to surface waters, including wetlands. Water may be infiltrated on approval of Engineer.
- 2) Treat all water generated onsite from construction or washing activities that is more turbid than site runoff separately until turbidity is the same or less than site runoff, and then it may be combined with site runoff and treated as described above. Water may be infiltrated upon approval of Engineer.
- c. Offsite Water: Prior to disruption of normal watercourse, intercept offsite stormwater and pipe it either through or around the Project Site. This water shall not be combined with onsite stormwater. Discharge offsite water at its preconstruction outfall point preventing an increase in erosion below the site. Submit proposed method for performing this Work for Engineer's approval.
- K. Dispersion/Infiltration: Convey water only to dispersion or infiltration areas designated in the SWPPP Plan or to sites approved by Engineer. Water shall be conveyed to designated dispersion areas at a rate such that, when runoff leaves the area and enters surrounding drainage, turbidity standards are achieved. Convey water to designated infiltration areas at a rate that does not produce surface runoff.
- L. Pollution Control:
1. Use BMPs to prevent or minimize stormwater exposure to pollutants from spills; vehicle and equipment fueling, maintenance, and storage; other cleaning and maintenance activities; and waste handling activities. These pollutants include fuel, hydraulic fluid, and other oils from vehicles and machinery, as well as debris, leftover paints, solvents, and glues from construction operations. Implement the following BMPs when applicable:
 - a. Written spill prevention and response procedures.
 - b. Employee training on spill prevention and proper disposal procedures.
 - c. Spill kits in all vehicles.
 - d. Regular maintenance schedule for vehicles and machinery.
 - e. Material delivery and storage controls.
 - f. Training and signage.
 - g. Covered storage areas for waste and supplies.

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- M. If Contractor orders the Work suspended, continue to control erosion, pollution, and runoff during the shutdown.
- N. Nothing in this section shall relieve Contractor from complying with other Contract requirements.

1.04 SUBMITTALS

A. Informational Submittals:

1. When a SWPPP Plan is included in the Drawings, either adopt or modify the SWPPP Plan. Provide a schedule for SWPPP Plan implementation and incorporate it into Contractor's progress schedule. Obtain Engineer's approval of the SWPPP Plan and schedule before any Work begins.
2. Modified SWPPP Plans shall meet all requirements of the applicable jurisdictions.
3. The SWPPP Plan shall cover all areas that may be affected inside and outside the limits of the Project (including all Owner-provided sources, disposal sites, and haul roads, and all nearby land, streams, and other bodies of water).
4. Allow at least 5 working days for Engineer to review any original or revised SWPPP Plan. Failure to approve all or part of any such Plan shall not make Owner liable to Contractor for any Work delays.

PART 2 PRODUCTS

2.01 GEOTEXTILE

- A. Geotextiles shall consist only of long chain polymeric fibers or yarns formed into a stable network such that the fibers or yarns retain their position relative to each other during handling, placement, and design service life. At least 95 percent by weight of the material shall be polyolefins or polyesters. The material shall be free from defects or tears. Geotextile shall also be free of any treatment or coating which might adversely alter its hydraulic or physical properties after installation.

2.02 INLET PROTECTION

- A. As specified under Article Geotextile.

2.03 PLASTIC COVERING

- A. Clear plastic meeting requirements of ASTM D4397 for polyethylene sheeting having a minimum thickness of 6 mils.

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2.04 SEEDING

- A. See Section 31 32 00, Soil Stabilization.

2.05 WATTLES

- A. Cylinders of biodegradable plant material such as weed-free straw, coir, compost, wood chips, excelsior, or wood fiber or shavings encased within biodegradable netting.
- B. Diameter: 5 inches minimum.
- C. Netting Material: Clean, evenly woven, and free of encrusted concrete or other contaminating materials such as preservatives. Also free from cuts, tears, or weak places with a minimum lifespan of 6 months.
- D. Compost Filler: Coarse compost, wood chips, or wood shavings.
- E. Wood Stakes: Untreated softwood species, 2-inch by 2-inch nominal dimension and 36 inches in length.

PART 3 EXECUTION

3.01 PREPARATION

- A. Engineer's acceptance of the SWPPP Plan is required prior to starting earth disturbing activities.
- B. Include proposed stockpile areas and installation of temporary erosion control devices, ditches, or other facilities in Work phasing plans.
- C. Areas designated for Contractor's use during Project may be temporarily developed as specified to provide working, staging, and administrative areas. Include control of sediment from these areas in the SWPPP Plan.
- D. Plastic Covering: Use clear plastic covering to promote seed germination when seeding is performed outside of specified dates. Use black plastic covering for stockpiles or other areas where vegetative growth is unwanted. Place plastic with at least a 12-inch overlap of all seams. Install and maintain plastic cover to prevent water from cutting under the plastic and to prevent cover from blowing open in the wind.

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3.02 ADDITIONAL REQUIREMENTS

- A. Natural Buffer or Equivalent:
 - 1. Unless natural buffer between the Project Site and receiving waters has previously been eliminated by pre-existing development disturbances, comply with one of the following alternatives if stormwater from construction will discharge to surface water:
 - a. Provide a 50-foot, undisturbed natural buffer between construction disturbances and surface water.
 - b. Provide an undisturbed natural buffer that is less than 50 feet supplemented by additional erosion and sediment controls, which in combination, achieve a sediment load reduction that is equivalent to a 50-foot buffer.
 - c. If it is infeasible to provide an undisturbed natural buffer of any size, implement erosion and sediment controls that achieve a sediment load reduction that is equivalent to a 50-foot buffer.

3.03 MAINTENANCE

- A. The ESCP measures described in this specification are minimum requirements for anticipated Site conditions. During the construction period, upgrade these measures as needed to comply with all applicable local, state, and federal erosion and sediment control regulations.
- B. Maintain erosion and sediment control BMPs so they properly perform their function until Engineer determines they are no longer needed.
- C. Construction activities must avoid or minimize excavation and creation of bare ground during wet weather.
- D. The intentional washing of sediment into storm sewers or drainage ways must not occur. Vacuuming or dry sweeping and material pickup must be used to cleanup released sediments.
- E. Inspect BMPs in accordance with the schedule in the Construction Stormwater Discharge Permit(s) or as directed by Engineer.
- F. Complete an inspection report within 24 hours of an inspection. Each inspection report shall be signed and identify corrective actions. Document that corrective actions are performed within 7 days of identification. Keep a copy of all inspection reports at the Site or at an easily accessible location.
- G. Unless otherwise specified, remove deposits before the depth of accumulated sediment and debris reaches approximately one half height of BMP. Dispose

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- of debris or contaminated sediment at approved locations. Clean sediments may be stabilized onsite using BMPs as approved by Engineer.
- H. Other Sediment Barriers (such as biobags): Remove sediment before it reaches 2 inches depth above ground height and before BMP removal.
 - I. Catch Basins: Clean before retention capacity has been reduced by 50 percent.
 - J. Initiate repair or replacement of damaged erosion and sediment control BMPs immediately, and work completed by end of next work day. Significant replacement or repair must be completed within 7 days, unless infeasible.
 - K. Within 24 hours, remediate any significant sediment that has left construction site. Investigate cause of the sediment release and implement steps to prevent a recurrence of discharge within same 24 hours. Perform in-stream cleanup of sediment according to applicable regulations.
 - L. At end of each work day, stabilize or cover soil stockpiles or implement other BMPs to prevent discharges to surface waters or conveyance systems leading to surface waters.
 - M. Temporarily stabilize soils at end of shift before holidays and weekends, if needed. Ensure soils are stable during rain events at all times of year.
 - N. Initiate stabilization by no later than end of next work day after construction work in an area has stopped permanently or temporarily.
 - O. Within 14 days of initiating stabilization or as specified in permit, either seed or plant stabilized area (see Section 31 32 00, Soil Stabilization); or apply non-vegetative measures and cover all areas of exposed soil. Seed dry areas as soon as Site conditions allow. Ensure that vegetation covers at least 70 percent of stabilized area. In areas where Contractor's activities have compromised erosion control functions of existing grasses, overseed existing grass. Non-vegetative measures may include blown straw and a tackifier, loose straw, or an adequate covering of compost mulch. Complete initial stabilization within 7 days if storm water discharges to surface waters impaired for sediment or nutrients, or high quality waters.
 - P. Provide permanent erosion control measures on all exposed areas. Do not remove temporary sediment control practices until permanent vegetation or other cover of exposed areas is established. However, do remove all temporary erosion control measures as exposed areas become stabilized, unless doing so conflicts with local requirements. Properly dispose of construction materials and waste, including sediment retained by temporary BMPs.

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3.04 EMERGENCY MATERIALS

- A. Provide, stockpile, and protect emergency erosion and sediment control materials on the Project Site for unknown weather or erosion conditions. Emergency materials are in addition to other erosion control materials required to implement and maintain the SWPPP Plan. Replenish emergency materials as they are used. Remove all unused emergency materials from the Project Site at completion of the Project.

3.05 REMOVAL

- A. When Engineer determines that an erosion control BMP is no longer required, remove BMP and all associated hardware from the Project limits. When materials are biodegradable, Engineer may approve leaving temporary BMP in place.
- B. Permanently stabilize all bare and disturbed soil after removal of erosion and sediment control BMPs. Dress sediment deposits remaining after BMPs have been removed to conform to existing grade. Prepare and seed graded area. If installation and use of erosion control BMPs have compacted or otherwise rendered soil inhospitable to plant growth, such as construction entrances, take measures to rehabilitate soil to facilitate plant growth. This may include, but is not limited to, ripping the soil, incorporating soil amendments, or seeding with specified seed.

END OF SECTION

**SECTION 02 41 00
DEMOLITION**

PART 1 GENERAL

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
 - 1. American National Standards Institute (ANSI): A10.6, Safety Requirements for Demolition Operations.
 - 2. Occupational Safety and Health Administration (OSHA), U.S. Code of Federal Regulations (CFR) Title 29 Part 1926—Occupational Safety and Health Regulations for Construction.

1.02 DEFINITIONS

- A. Demolition: Dismantling, razing, destroying, or wrecking of any fixed building or structure or any part thereof. Demolition also includes removal of pipes, manholes tanks, conduit, and other underground facilities, whether as a separate activity or in conjunction with construction of new facilities.
- B. Modify: Provide all necessary material and labor to modify an existing item to the condition indicated or specified.
- C. Relocate: Remove, protect, clean and reinstall equipment, including electrical, instrumentation, and all ancillary components required to make the equipment fully functional, to the new location identified on the Drawings.
- D. Renovation: Altering a facility or one or more facility components in any way.
- E. Salvage/Salvageable: Remove and deliver, to the specified location(s), the equipment, building materials, or other items so identified to be saved from destruction, damage, or waste; such property to remain that of Owner. Unless otherwise specified, title to items identified for demolition shall revert to Contractor.

1.03 SUBMITTALS

- A. Informational Submittals: Submit proposed Demolition/Renovation Plan, in accordance with requirements specified herein, for approval before such Work is started.

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1.04 REGULATORY AND SAFETY REQUIREMENTS

- A. Comply with Contractor's Construction Health and Safety Plan at all times. Demolition activities may encounter residential leachate, landfill gas and landfill gas condensate, and solids, within pipes, valves, and backfill materials.

1.05 DEMOLITION/RENOVATION PLAN

- A. Demolition/Renovation Plan shall provide for safe conduct of the Work and shall include:
 - 1. Detailed description of methods and equipment to be used for each operation.
 - 2. The Contractor's planned sequence of operations, including coordination with other work in progress.
 - 3. Procedures for removal and preparation of materials for disposal within Owner's designated disposal area.
 - 4. Testing of capped or flanged system components to remain after demolition is complete to ensure a proper seal is maintained.

1.06 SEQUENCING AND SCHEDULING

- A. The Work of this Specification shall not commence until Contractor's Demolition/Renovation Plan has been approved by Engineer.
- B. Include the Work of this Specification in the progress schedule.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 EXISTING FACILITIES TO BE DEMOLISHED OR RENOVATED

- A. Owner Systems and Related Equipment:
 - 1. Notify Engineer and Owner to turn off affected services at least 48 hours before starting demolition activities.
 - 2. Remove existing system components as indicated and terminate in a manner that seals and protects existing systems to remain as approved by Owner.
 - 3. When utility lines are encountered that are not indicated on Drawings, notify Engineer and Owner prior to further work in that area.
 - 4. Remove valve vaults and related equipment and deliver to a location as determined by the Owner.

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3.02 PROTECTION

A. Existing Work:

1. Survey the Site and examine Drawings and Specifications to determine the extent of the Work before beginning any demolition activities.
2. Take necessary precautions to avoid damage to existing items scheduled to remain in place, to be reused, or to remain the property of Owner; any Contractor-damaged items shall be repaired or replaced as directed by Engineer.

B. Protection of Personnel: During demolition, continuously evaluate the condition of the pipes and excavation areas being demolished and take immediate action to protect operating systems and existing components in and around the demolition site.

3.03 BACKFILL

A. Do not use demolition debris as backfill material.

3.04 DISPOSITION OF MATERIAL

A. Do not remove equipment and materials without approval of Contractor's Demolition/Renovation Plan by Engineer.

END OF SECTION

**SECTION 31 10 00
SITE CLEARING**

PART 1 GENERAL

1.01 DEFINITIONS

- A. Interfering or Objectionable Material: Trash, rubbish, and junk; vegetation and other organic matter, whether alive, dead, or decaying; topsoil.
- B. Clearing: Removal of interfering or objectionable material lying on or protruding above ground surface.
- C. Grubbing: Removal of vegetation and other organic matter including stumps, buried logs, and roots greater than 2 inch caliper to a depth of 6 inches below subgrade.
- D. Project Limits: Areas, as shown or specified, within which Work is to be performed.

1.02 SUBMITTALS

- A. Action Submittals: Drawings clearly showing clearing, grubbing, and stripping limits.

1.03 QUALITY ASSURANCE

- A. Obtain Engineer's approval of staked clearing and grubbing limits, prior to commencing clearing and grubbing.

1.04 SCHEDULING AND SEQUENCING

- A. Prepare Site only after adequate erosion and sediment controls are in place.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL

- A. Clear and grub areas actually needed for waste disposal, borrow, or Site improvements within limits shown or specified.
- B. Do not injure or deface vegetation that is not designated for removal.

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3.02 LIMITS

- A. As follows, but not to extend beyond Project limits.
 - 1. Excavation 5 feet beyond top of cut slopes.
 - 2. Fill:
 - a. Clearing and Grubbing: 5 feet beyond toe of permanent fill.
 - b. Stripping and Scalping: 2 feet beyond toe of permanent fill.
 - 3. Waste Disposal:
 - a. Clearing: 5 feet beyond perimeter.
 - b. Grubbing: Around perimeter as necessary for neat finished appearance.
 - 4. Other Areas: As shown.
- B. Remove rubbish, trash, and junk from entire area within Project limits.

3.03 CLEARING

- A. Clear areas within limits shown or specified.
- B. Trees are not to be removed without County approval. Trees approved for removal, fell trees so that they fall away from facilities and vegetation not designated for removal.
- C. Cut stumps not designated for grubbing flush with ground surface.
- D. Cut off brush, weeds, and grasses to within 2 inches of ground surface.

3.04 GRUBBING

- A. Grub areas within limits shown or specified.

3.05 DISPOSAL

- A. Clearing Grubbing Debris: Dispose of debris at designated location specified by Owner.
- B. Scalpings: As specified for clearing and grubbing debris.

END OF SECTION

SECTION 31 23 13
SUBGRADE PREPARATION

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. ASTM International (ASTM):
 - a. D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lb/ft³ (600 kN-m/m³)).

1.02 DEFINITIONS

- A. Optimum Moisture Content: As defined in Section 31 23 23, Fill and Backfill.
- B. Prepared Ground Surface: Ground surface after completion of clearing and grubbing, scalping of sod, stripping of topsoil, excavation to grade, and scarification and compaction of subgrade.
- C. Relative Compaction: As defined in Section 31 23 23, Fill and Backfill.
- D. Subgrade: Layer of existing soil after completion of clearing, grubbing, scalping of topsoil prior to placement of fill, roadway structure or base for floor slab.
- E. Proof-Rolling: Testing of subgrade by compactive effort to identify areas that will not support the future loading without excessive settlement.

1.03 SEQUENCING AND SCHEDULING

- A. Complete applicable Work specified in Section 02 41 00, Demolition; Section 31 10 00, Site Clearing; and Section 31 23 16, Excavation, prior to subgrade preparation.

1.04 QUALITY ASSURANCE

- A. Notify Owner when subgrade is ready for compaction or proof-rolling or whenever compaction or proof-rolling is resumed after a period of extended inactivity.

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1.05 ENVIRONMENTAL REQUIREMENTS

- A. Prepare subgrade when unfrozen and free of ice and snow.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL

- A. Keep subgrade free of water, debris, and foreign matter during compaction or proof-rolling.
- B. Bring subgrade to proper grade and cross-section and uniformly compact surface.
- C. Do not use sections of prepared ground surface as haul roads. Protect prepared subgrade from traffic.
- D. Maintain prepared ground surface in finished condition until next course is placed.

3.02 COMPACTION

- A. Under Earthfill: Three passes with three-wheeled power roller weighing approximately 10 tons.
- B. Under Pavement Structure, Slabs on Grade, Footings, or Leveling Course under Scales: Compact the upper 6 inches to minimum of 98 percent relative compaction as determined in accordance with ASTM D698.

3.03 SUBGRADE FOR EMBANKMENT FILL

- A. Under Earthfill: Compact upper 6 inches to minimum of 95 percent relative compaction in accordance with ASTM D698.

3.04 MOISTURE CONDITIONING

- A. Dry Subgrade: Add water, then mix to make moisture content uniform throughout.
- B. Wet Subgrade: Aerate material by blading, discing, harrowing, or other methods, to hasten drying process.

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3.05 TESTING

- A. Proof-roll subgrade with loaded dump truck or similar heavy-wheeled vehicle weighing approximately 10 tons to detect soft or loose subgrade or unsuitable material, as determined by Engineer.
- B. In areas where subgrade is not accessible to equipment for proof-rolling, perform moisture-density testing and allow Engineer to conduct subgrade probing to detect soft or loose subgrade or unsuitable material, as determined by Engineer.

3.06 CORRECTION

- A. Soft or Loose Subgrade:
 - 1. Adjust moisture content and recompact.
 - 2. Over excavate as specified in Section 31 23 16, Excavation, and replace with suitable material, as specified in Section 31 23 23, Fill and Backfill.
- B. Unsuitable Material: Over excavate as specified in Section 31 23 16, Excavation, and replace with suitable material, as specified in Section 31 23 23, Fill and Backfill.

END OF SECTION

**SECTION 31 23 16
EXCAVATION**

PART 1 GENERAL

1.01 DEFINITIONS

- A. Common (Unclassified) Excavation: Removal of material not classified as rock excavation.

1.02 SUBMITTALS

- A. Informational Submittals:
 - 1. Excavation Plan, Detailing:
 - a. Methods and sequencing of excavation.
 - b. Proposed locations of stockpiled material.
 - c. Numbers, types, and sizes of equipment proposed to perform excavations.
 - d. Anticipated difficulties and proposed resolutions.
 - e. Reclamation (permanent stabilization) of onsite spoil disposal areas.

1.03 QUALITY ASSURANCE

- A. Provide adequate survey control to avoid unauthorized over excavation.

1.04 WEATHER LIMITATIONS

- A. Material excavated when frozen or when air temperature is less than 32 degrees F shall not be used as fill or backfill until material completely thaws.
- B. Material excavated during inclement weather shall not be used as fill or backfill until after material drains and dries sufficiently for proper compaction.

1.05 SEQUENCING AND SCHEDULING

- A. Site Preparation: Complete applicable Work specified in Section 31 10 00, Site Clearing, prior to excavating.
- B. Clearing, Grubbing, and Stripping: Complete applicable Work specified in Section 31 10 00, Site Clearing, prior to excavating.

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- C. Dewatering: Conform to applicable requirements of this section.
- D. Excavation Support: Install and maintain, as necessary to support sides of excavations (and trenches) and prevent detrimental settlement and lateral movement of existing facilities, adjacent property, and completed Work, as well as to protect worker safety.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.01 GENERAL

- A. Excavate to lines, grades, and dimensions shown and as necessary to accomplish Work. Excavate to within tolerance of plus or minus 0.1 foot, except where dimensions or grades are shown or specified as maximum or minimum. Allow for forms, working space, granular base, topsoil, and similar items, wherever applicable. Trim to neat lines where concrete is to be deposited against earth.
- B. Do not over excavate without written authorization of Engineer.
- C. Review Excavation Plan with Engineer prior to beginning excavating activities. Obtain Engineer's approval of deviations from Excavation Plan prior to their implementation.
- D. Work excavation in a systematic manner. Continuously keep excavation graded to drain, and take necessary precautions to control erosion and prevent sediment releases, in conformance with Contractor's Construction Period Sedimentation and Erosion Control Plan.
- E. Excavate to the lines and grades shown on Drawings, leaving room for prepared subgrade as shown or required. Protect subgrade in accordance with Section 31 23 13, Subgrade Preparation.

3.02 GENERAL (UNCLASSIFIED) EXCAVATION

- A. Excavation is unclassified. Complete all excavation regardless of the type, nature, or condition of the materials encountered.

3.03 GENERAL TRENCHES

- A. Minimum Width of Trenches:
 - 1. Single Pipes, Conduits, Direct-Buried Cables, and Duct Banks:
 - a. Less Than 4-Inch Outside Diameter or Width: 18 inches.

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- B. Maximum Trench Width:
 - 1. Single Pipes, Conduits, Direct-Buried Cables, and Duct Banks:
 - a. Less Than 4-Inch Outside Diameter or Width: 24 inches.

3.04 EMBANKMENT AND CUT SLOPES

- A. Shape, trim, and finish cut slopes to conform with lines, grades, and cross-sections shown, with proper allowance for topsoil or slope protection, where shown.
- B. Remove stones and rock that exceed 3-inch diameter and that are loose and may roll down slope. Remove exposed roots from cut slopes.
- C. Round tops of cut slopes in soil to not less than a 6-foot radius, provided such rounding does not extend offsite or outside easements and rights-of-way, or adversely impacts existing facilities, adjacent property, or completed Work.

3.05 STOCKPILING EXCAVATED MATERIAL

- A. Stockpile excavated material that is suitable for use as fill or backfill until material is needed.
- B. Confine stockpiles to within easements, rights-of-way, and approved work area. Do not obstruct roadways or access to stockpiles.
- C. Do not stockpile excavated material adjacent to trenches and other excavations unless excavation sideslopes and excavation support systems are designed, constructed, and maintained for stockpile loads.
- D. Do not stockpile excavated materials near or over existing facilities, adjacent property, or completed Work, if weight of stockpiled material could induce excessive settlement.

3.06 LOOSE, SOFT, OR UNSUITABLE AREAS

- A. Subexcavate to suitable material and backfill in accordance with Section 31 23 23, Fill and Backfill; refer to Article Replacing Overexcavated and Subexcavated Material.

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3.07 DISPOSAL OF SPOIL

- A. Dispose of excavated materials, which are unsuitable or exceed quantity needed for fill or backfill, offsite.
- B. Dispose of debris resulting from removal of organic matter, trash, refuse, and junk as specified in Section 31 10 00, Site Clearing, for clearing and grubbing debris.

END OF SECTION

**SECTION 31 23 23
FILL AND BACKFILL**

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. ASTM International (ASTM):
 - a. C117, Standard Test Method for Materials Finer Than 75-Micrometers (No. 200) Sieve in Mineral Aggregates by Washing.
 - b. C136, Standard Method for Sieve Analysis of Fine and Coarse Aggregates.
 - c. D75, Standard Practice for Sampling Aggregates.
 - d. D698, Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
 - e. D1140, Standard Test Methods for Amount of Material in Soils Finer than No. 200 (75 micrometer) Sieve.
 - f. D4253, Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table.
 - g. D4254, Standard Test Method for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.
 - h. D6938, Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).

1.02 DEFINITIONS

A. Relative Compaction:

1. Ratio, in percent, of as-compacted field dry density to laboratory maximum dry density as determined in accordance with ASTM D698.
2. Apply corrections for oversize material to either as-compacted field dry density or maximum dry density, as determined by Engineer.

B. Optimum Moisture Content:

1. Determined in accordance with ASTM Standard specified to determine maximum dry density for relative compaction.
2. Determine field moisture content on basis of fraction passing 3/4-inch sieve.

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- C. Prepared Ground Surface: Ground surface after completion of required demolition, clearing and grubbing, scalping of sod, stripping of topsoil, excavation to grade, and subgrade preparation.
- D. Completed Course: A course or layer that is ready for next layer or next phase of Work.
- E. Lift: Loose (uncompacted) layer of material.
- F. Well-Graded:
 - 1. A mixture of particle sizes with no specific concentration or lack thereof of one or more sizes.
 - 2. Does not define numerical value that must be placed on coefficient of uniformity, coefficient of curvature, or other specific grain size distribution parameters.
 - 3. Used to define material type that, when compacted, produces a strong and relatively incompressible soil mass free from detrimental voids.
- G. Influence Area:
 - 1. Area within planes sloped downward and outward at 60-degree angle from horizontal measured from:
 - a. 1 foot outside outermost edge at base of foundations or slabs.
 - b. 1 foot outside outermost edge at surface of roadways or shoulder.
 - c. 0.5 foot outside exterior at spring line of pipes or culverts.
- H. Borrow Material: Material from required excavations or from designated borrow areas on or near Site.
- I. Selected Backfill Material: Materials available onsite that Engineer determines to be suitable for specific use.
- J. Imported Material: Materials obtained from sources offsite, suitable for specified use.
- K. Structural Fill: Fill materials as required under structures, pavements, and other facilities.
- L. Embankment Material: Fill materials required to raise existing grade in areas other than under structures.

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1.03 SUBMITTALS

- A. Action Submittals: Certified test results of all imported and processed material from independent testing agency.
- B. Informational Submittals:
 - 1. Manufacturer's data sheets for compaction equipment.
 - 2. Certified results of in-place density tests from independent testing agency.

1.04 QUALITY ASSURANCE

- A. Notify Engineer when:
 - 1. Structure is ready for backfilling, and whenever backfilling operations are resumed after a period of inactivity.
 - 2. Soft or loose subgrade materials are encountered wherever embankment or site fill is to be placed.
 - 3. Fill material appears to be deviating from Specifications.

1.05 SEQUENCING AND SCHEDULING

- A. Complete applicable Work specified in Section 02 41 00, Demolition; Section 31 10 00, Site Clearing; Section 31 23 16, Excavation; and Section 31 23 13, Subgrade Preparation, prior to placing fill or backfill.
- B. Backfill against concrete structures only after concrete has attained 70 percent of design strength. Obtain Engineer's acceptance of concrete work and attained strength prior to placing backfill.
- C. Backfill around buried structures only after structure is set in position, securely anchored and ready to be backfilled. Engineer provides authorization to backfill, and completion of satisfactory repairs to concretes, cracks, seams, have been satisfactory completed.
- D. Do not place fill materials until after subgrade has been prepared as specified in Section 31 23 13, Subgrade Preparation.

PART 2 PRODUCTS

2.01 SOURCE QUALITY CONTROL

- A. Gradation Tests: As necessary to locate acceptable sources of onsite or imported material.

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- B. Final approval of aggregate material will be based on test results of installed materials.

2.02 EARTHFILL

- A. Excavated material from required excavations, free from rocks larger than 3 inches, from roots and other organic matter, ashes, cinders, trash, debris, and other deleterious materials.
- B. If shown beneath structures or pavements, shall have maximum 15 percent by weight passing No. 200 sieve.
- C. Provide imported material of equivalent quality, if required to accomplish Work.

2.03 BASE COURSE

- A. As specified in Section 32 11 23, Aggregate Base Courses.

2.04 BEDDING MATERIAL AND PIPE ZONE MATERIAL

- A. Unfrozen, friable, and no clay balls, roots, or other organic material.
 - 1. Conduit and Direct-Buried Cable:
 - a. Sand, clean or clean to silty, less than 12 percent passing No. 200 sieve, as determined in accordance with ASTM D1140.
 - b. Individual Particles: Free of sharp edges.
 - c. Maximum Size Particle: Pass a No. 4 sieve.
 - d. If more than 5 percent passes No. 200 sieve, the fraction that passes No. 40 sieve shall be nonplastic as determined in accordance with ASTM D4318.

2.05 COMPACTION EQUIPMENT

- A. Compaction equipment shall be of suitable type and adequate to obtain the specified relative compaction, and shall provide satisfactory breakdown of materials to form a dense and unyielding fill.
- B. Compaction equipment shall be operated in strict accordance with the manufacturer's instructions and recommendations. Equipment shall be maintained in such condition that it will deliver the manufacturer's rated compactive effort. If inadequate relative densities are obtained, larger and/or different types of additional equipment shall be provided by the Contractor at the Contractor's sole expense. Hand-operated equipment shall also be capable of achieving the specified relative densities.

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2.06 WATER FOR MOISTURE CONDITIONING

- A. Free of hazardous or toxic contaminates, or contaminants deleterious to proper compaction.

PART 3 EXECUTION

3.01 GENERAL

- A. Keep placement surfaces free of water, debris, and foreign material during placement and compaction of fill and backfill materials.
- B. Place and spread fill and backfill materials in horizontal lifts of uniform thickness, in a manner that avoids segregation, and compact each lift to specified densities prior to placing succeeding lifts. Slope lifts only where necessary to conform to final grades or as necessary to keep placement surfaces drained of water.
- C. During filling and backfilling, keep level of fill and backfill around each structure even.
- D. Do not place fill or backfill, if fill or backfill material is frozen, or if surface upon which fill or backfill is to be placed is frozen.
- E. If pipe, conduit, duct bank, or cable is to be laid within fill or backfill:
 - 1. Fill or backfill to an elevation 1 foot above top of item to be laid.
 - 2. Excavate trench for installation of item.
 - 3. Install Bedding:
 - a. Conduit: 3 inches.
 - b. Direct-Buried Cable: 3 inches.
 - 4. Install item.
 - 5. Backfill pipe zone 3 inches above direct buried cable or conduit before resuming filling or backfilling specified in this section.
- F. Tolerances:
 - 1. Final Lines and Grades: Within a tolerance of 0.1 foot unless dimensions or grades are shown or specified otherwise.
 - 2. Grade to establish and maintain slopes and drainage as shown. Reverse slopes are not permitted.
- G. Settlement: Correct and repair any subsequent damage to structures, pavements, curbs, slabs, piping, and other facilities, caused by settlement of fill or backfill material.

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3.02 BACKFILL UNDER AND AROUND STRUCTURES

- A. Under Facilities: Within influence area beneath structures, slabs, pavements, curbs, conduits, and other facilities, backfill with base course, unless otherwise shown. Place base course in lifts of 6-inch maximum thickness and compact each lift to minimum of 95 percent relative compaction as determined in accordance with ASTM D698.

3.03 FILL

- A. Outside Influence Areas beneath Structures, Pavements, Slabs, Piping, and Other Facilities:
 - 1. Unless otherwise shown, place earthfill as follows:
 - a. Allow for 6-inch thickness of topsoil where required.
 - b. Maximum 8-inch thick lifts.
 - c. Place and compact fill across full width of embankment.
 - d. Compact to minimum 90 percent relative compaction in accordance with ASTM D698.
 - e. Dress completed embankment with allowance for topsoil, crest surfacing, and slope protection, where applicable.

3.04 REPLACING OVEREXCAVATED AND SUBEXCAVATED MATERIAL

- A. Replace excavation carried below grade lines shown or established by Engineer as follows:
 - 1. Beneath Fill or Backfill: Same material as specified for overlying fill or backfill.

3.05 PREPARED NATIVE SUBGRADE

- A. Conform to requirements of Section 31 23 13, Subgrade Preparation.

3.06 FIELD QUALITY CONTROL TESTING

- A. During fill and backfill activities, soil materials shall be verified for gradation and placement thicknesses in conformance with these specifications.
- B. Testing requirements and locations shall be coordinated with (and approved by) the Engineer.

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- C. For tests conducted in the field, Contractor shall make available test results to the Engineer within 24 hours. If a sample is taken from the field and sent to a laboratory for testing, Contractor shall make available test results to the Engineer within 48 hours after the sample is taken in the field.
- D. For bidding purposes, the following minimum test schedule shall be assumed:
 - 1. In-place density tests shall be made on the following minimum schedule:
 - a. Subgrade Preparation: Ten per acre.
 - b. Gravel Bases for Slabs/Footings: Two per slab and one per footing.
 - c. Roadways and Embankment Fill Areas: One per 250 linear feet per lift.
 - 2. Standard Proctor laboratory density curves (five-point minimum) shall be submitted by Contractor for each imported material in accordance with ASTM D698. Samples of native materials used for embankment and backfill and additional samples of imported materials shall be taken at locations requested by Engineer.

END OF SECTION

**SECTION 31 32 00
SOIL STABILIZATION**

PART 1 GENERAL

1.01 WORK OF THIS SECTION

- A. This section covers the Work to permanently manage and stabilize the Site. Refer to Section 01 57 13, Erosion and Sediment Control During Construction, for requirements associated with managing stormwater and erosion during construction activities. Permanent soil stabilization measures shall be coordinated with temporary measures which are employed. Contractor shall stage Work in such manner to limit disturbance and finish and stabilize areas as Work is completed. Leaving areas open and vulnerable to erosion and sediment transport is not acceptable. The Work shall include the furnishing of all labor, materials, tools, and equipment to perform such work and services necessary as herein specified and as indicated on Drawings.

1.02 DEFINITIONS

- A. Maintenance Period: Begin maintenance immediately after each area is planted and continue for a period of 8 weeks after planting under this section is completed.
- B. Permanent Soil Stabilization: Finished surfacing to be placed on permanent cut and fill slopes adjacent to new scales as shown on Drawings and on Contractor disturbed areas requiring soil erosion stabilization. Permanent soil stabilization consists of surface preparation, placement hydroseed with seed.
- C. Satisfactory Stand:
1. Grass or section of grass of 10,000 square feet or larger that has:
 - a. No bare spots larger than 3 square feet.
 - b. Not more than 10 percent of total area with bare spots larger than 1 square foot.
 - c. Not more than 15 percent of total area with bare spots larger than 6 square inches.

1.03 SUBMITTALS

- A. Action Submittals: Product data for commercial products.

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B. Informational Submittals:

1. Subschedule of drainage, erosion, and sedimentation control.
2. Construction Period Drainage and Erosion/Sedimentation Control Plan and Procedures in coordination with Stormwater Pollution Prevention Plan.
3. Manufacturer's Installation Instructions: Commercial products.
4. Seed certifications.
5. Copies of delivery invoices or other proof of quantities of mulch and fertilizer.

1.04 DELIVERY, STORAGE, AND PROTECTION

A. Per Manufacturer's Recommendations:

1. Furnish in standard containers with seed name, lot number, net weight, percentages of purity, germination, and hard seed and maximum weed seed content, clearly marked for each container of seed.
2. Keep dry during storage.

B. Hydroseeding Mulch: Mark package of wood fiber mulch to show air dry weight.

1.05 SEQUENCING AND SCHEDULING

A. Prepare topsoil before starting Work of this section.

B. Complete soil preparation, seeding, liming, fertilizing, mulching, and matting within 5 days after final grades have been reached.

C. Notify Engineer at least 3 days in advance of:

1. Materials delivery.
2. Start of planting/seeding activity.

D. Seeding: Perform under favorable weather conditions during seasons that are normal for such Work as determined by accepted local practice.

1.06 MAINTENANCE

A. Operations:

1. Perform during maintenance period to include:
 - a. Watering: Keep seeded surface moist.
 - b. Washouts: Repair by filling with topsoil, fertilizing, seeding, and mulching.

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- c. Mulch: Replace wherever and whenever washed or blown away.
 - d. Reseed unsatisfactory areas or portions thereof immediately at end of maintenance period if a satisfactory stand has not been produced.
 - e. Reseed during next planting season if scheduled end of maintenance period falls after September 15.
 - f. Reseed entire area if satisfactory stand does not develop by July 1 of the following year.
2. Inspect, repair, and replace as necessary all erosion control measures during the time period from start of construction to completion of construction.
- B. Maintenance Service Agreement: Provide for period of 1 year from Substantial Completion.

1.07 PERMANENT SOIL STABILIZATION AREAS

- A. General: Permanent soil stabilization to be placed on all final cut and fill slopes associated with new scale construction and all areas disturbed by construction activities.

PART 2 PRODUCTS

2.01 FERTILIZER

- A. Commercial, uniform in composition, free-flowing, suitable for application with equipment designed for that purpose.
- B. Fertilizer shall have the following minimum percentage of plant food by weight:
 - 1. Mix:
 - a. Nitrogen: 18 percent.
 - b. Ammoniacal Nitrogen: 16 percent.
 - c. Urea Nitrogen: 2 percent.
 - d. Soluble Potash: 10 percent.
 - e. Sulfur: 19 percent.
- C. Fertilizer shall be suitable for hydraulic application.

2.02 SEED

- A. Hydroseeding.
- B. Mix: Based on local availability.

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2.03 MULCH

A. Wood Cellulose Fiber Mulch:

1. Specially processed wood fiber containing no growth or germination inhibiting factors.
2. Dyed suitable color to facilitate inspection of material placement.
3. Manufactured such that after addition and agitation in slurry tanks with water, material fibers become uniformly suspended to form homogenous slurry.
4. When hydraulically sprayed on ground, material will allow absorption and percolation of moisture.

2.04 EROSION CONTROL MATTING

A. Excelsior mat or straw blanket; staples as recommended by matting manufacturer.

B. Manufacturers and Products:

1. Akzo Industries, Asheville, NC; Curlex Mat.
2. North American Green, Evansville, IN; S150 blanket.

PART 3 EXECUTION

3.01 SOIL PREPARATION

- A. Before start of hydroseeding and after surface has been shaped and graded, and lightly compacted to uniform grade, scarify soil surface to minimum depth of 1 inch.

3.02 HYDROSEEDING

- A. Prepare 1-inch-deep seed bed; obtain Engineer's acceptance prior to proceeding.
- B. Seeding shall not be done during windy weather or when the ground is frozen, excessively wet, or otherwise unsuitable. Seed shall be placed at the rate and mix specified herein. Seed shall be sown by an approved hydroseeder that uses water as the carrying agent and maintains continuous agitation through paddle blades. It shall have an operating capacity sufficient to agitate, suspend, and mix into a homogeneous slurry the specified amount of seed and water or other material. Distribution and discharge lines shall be large enough to prevent stoppage and shall be equipped with a set of hydraulic discharge spray nozzles that will provide a uniform distribution of the slurry.

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- C. Seed and fertilizer may be applied in one application.
- D. Hydroseed all areas disturbed by Contractor, except for areas covered with structures, rock, or pavements.
- E. Apply by hydroseeding method on moist soil, but only after free surface water has drained away. Prevent drift and displacement of mixture into other areas.
- F. Application:
 - 1. Prepare and apply slurry as follows:

Item	Rate
Seed Mix	30 pounds per acre
Fertilizer	200 pounds per acre
Wood Cellulose Fiber Mulch	1,500 pounds per acre
Water	As necessary
Tackifier	40 – 60 pounds per acre

3.03 MULCHING

- A. Apply uniformly on seeded areas. Do not apply mulch on seeded areas that will be immediately covered with erosion control matting.
- B. Application: Sufficiently loose to permit penetration of sunlight and air circulation, and sufficiently dense to shade ground, reduce evaporation rate, and prevent or materially reduce erosion of underlying soil.
 - 1. Wood Cellulose Fiber: 1,500 pounds per acre.

3.04 EROSION CONTROL MATTING

- A. Place on seeded slopes 3H:1V and steeper, staple/stake in place and with the appropriate overlap in accordance with manufacturer’s instruction.

3.05 TACKIFIER

- A. Can be applied on with mulch or after mulch is in place.

3.06 HYDROSEED MAINTENANCE

- A. Contractor shall apply a second application of the specified fertilizer to each hydroseeded area during the growing season that follows the growing season in which each area was seeded.

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- B. Work under this section shall include complete responsibility for maintaining adequate protection from disturbance for all hydroseeded areas. Damaged or washed out areas shall be filled and repaired at no additional expense to the Owner.
- C. Hydroseeded areas that do not properly germinate or grow shall be reseeded in accordance with the specifications for the original seeding. Hand broadcasting will not be allowed.
- D. Upon completion of maintenance period and on written notice from Contractor, Engineer, will, within 15 days of receipt, determine if a satisfactory stand has been established.
- E. If a satisfactory stand has not been established, Engineer will make another determination upon written notice from Contractor following the next growing season.

END OF SECTION

SECTION 32 11 23
AGGREGATE BASE COURSES

PART 1 GENERAL

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. American Association of State Highway and Transportation Officials (AASHTO):
 - a. T11, Standard Method of Test for Materials Finer Than 75 μ m (No. 200) Sieve in Mineral Aggregates by Washing.
 - b. T27, Standard Method of Test for Sieve Analysis of Fine and Coarse Aggregates.
 - c. T89, Standard Specification for Determining the Liquid Limit of Soils.
 - d. T90, Standard Specification for Determining the Plastic Limit and Plasticity Index of Soils.
 - e. T96, Standard Specification for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.
 - f. T99, Standard Specification for the Moisture-Density Relations of Soils Using a 2.5 kg (5.5 pound) Rammer and a 305 mm (12 in) Drop.
 - g. T180, Standard Specification for Moisture-Density Relations of Soils Using a 4.54 kg (10-lb) Rammer and a 457 mm (18-in) Drop.
 - h. T190, Standard Specification for Resistance R-Value and Expansion Pressure of Compacted Soils.
 - i. T265, Standard Method of Test for Laboratory Determination of Moisture Content of Soils.
 - j. T310, Standard Specification for In-Place Density and Moisture Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).
 2. ASTM International (ASTM):
 - a. C88, Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate.
 - b. D1883, Test Method for CBR (California Bearing Ratio) of Laboratory Compacted Soils.

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- c. D2419, Test Method for Sand Equivalent Value of Soils and Fine Aggregate.
- d. D4791, Test Method for Flat Particles, Elongated Particles, or Flat and Elongated Particles in Coarse Aggregate.

1.02 DEFINITIONS

- A. Completed Course: Compacted, unyielding, free from irregularities, with smooth, tight, even surface, true to grade, line, and cross-section.
- B. Completed Lift: Compacted with uniform cross-section thickness.
- C. Standard Specifications: When referenced in this section, shall mean the 2023 Washington State Department of Transportation, Standard Specifications for Road, Bridge, and Municipal Construction.

1.03 SUBMITTALS

- A. Informational Submittals:
 - 1. Certified Test Results on Source Materials: Submit copies from commercial testing laboratory 20 days prior to delivery of materials to Project showing materials meeting the physical qualities specified.
 - 2. Certified results of in-place density tests from independent testing agency.

PART 2 PRODUCTS

2.01 BASE COURSE

- A. As specified for Base Course in Division 9-03.9(3) of the Standard Specifications.
- B. Clean, hard durable, crushed stone graded from coarse to fine containing enough fines to bind material when compacted.

2.02 TOP COURSE

- A. As specified for Top Course and Keystone in Division 9-03.9(3) of the Standard Specifications.
- B. Physical Qualities: Same as for base course.

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2.03 SOURCE QUALITY CONTROL

- A. Perform tests necessary to locate acceptable source of materials meeting specified requirements.
- B. Final approval of aggregate material will be based on test results of installed materials.
- C. Should separation of coarse from fine materials occur during processing or stockpiling, immediately change methods of handling materials to correct uniformity in grading.

PART 3 EXECUTION

3.01 SUBGRADE PREPARATION

- A. As specified in Section 31 23 13, Subgrade Preparation.
- B. Obtain Engineer's acceptance of subgrade before placing base course or surfacing material.
- C. Do not place base course or surfacing materials in snow or on soft, muddy, or frozen subgrade.

3.02 EQUIPMENT

- A. Compaction Equipment: Adequate in design and number to provide compaction and to obtain specified density for each layer.

3.03 HAULING AND SPREADING

- A. In accordance with Division 4-04.3 of the Standard Specifications.
- B. Hauling Materials:
 - 1. Do not haul over surfacing in process of construction.
 - 2. Loads: Of uniform capacity.
 - 3. Maintain consistent gradation of material delivered; loads of widely varying gradations will be cause for rejection.
- C. Spreading Materials:
 - 1. Distribute material to provide required density, depth, grade, and dimensions with allowance for subsequent lifts.
 - 2. Produce even distribution of material upon roadway or prepared surface without segregation.

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3. Should segregation of coarse from fine materials occur during placing, immediately change methods of handling materials to correct uniformity in grading.

3.04 CONSTRUCTION OF COURSES

- A. Construction of Courses: In accordance with Division 4-04.3 of the Standard Specifications, except as modified hereinafter.
- B. Untreated Aggregate Base Course:
 1. Maximum Completed Lift Thickness: 6 inches.
 2. Completed Course Total Thickness: As shown.
 3. Spread lift on preceding course to required cross-section.
 4. Lightly blade and roll surface until thoroughly compacted.
 5. Add keystone to achieve compaction and as required when aggregate does not compact readily due to lack of fines or natural cementing properties, as follows:
 - a. Use top course material as keystone.
 - b. Spread evenly on top of base course, using spreader boxes or chip spreaders.
 - c. Roll surface until keystone is worked into interstices of base course without excessive displacement.
 - d. Continue operation until course has become thoroughly keyed, compacted, and will not creep or move under roller.
 6. Blade or broom surface to maintain true line, grade, and cross-section.
- C. Top Course:
 1. Maximum Completed Lift Thickness: 3 inches.
 2. Completed Course Total Thickness: As shown.
 3. Spread on preceding course in accordance with cross-section shown.
 4. Blade lightly and roll surface until material is thoroughly compacted.

3.05 ROLLING AND COMPACTION

- A. Compact to 95 percent of the standard density in accordance with Division 4-04.3(5) of the Standard Specifications except as modified hereinafter.
- B. Commence rolling at outer edges and continue toward center; do not roll center of road first.
- C. Apply water as needed to obtain specified densities.

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- D. Place and compact each lift to required density before succeeding lift is placed.
- E. Remove floating or loose stone from surface of preceding course before placing leveling course.
- F. Surface Defects: Remedy by loosening and rerolling. Reroll entire area, including surrounding surface, until thoroughly compacted.
- G. Finished surface shall be true to grade and crown before proceeding with surfacing.

3.06 SURFACE TOLERANCES

- A. Blade or otherwise work surfacing as necessary to maintain grade and cross-section at all times, and to keep surface smooth and thoroughly compacted.
- B. Finished Surface of Untreated Aggregate Base Course: Within plus or minus 0.04 foot of grade shown at any individual point.
- C. Top Course: Within 0.04 foot from lower edge of 10-foot straightedge placed on finished surface, parallel to centerline.
- D. Overall Average: Within plus or minus 0.01 foot from crown and grade specified.

3.07 FIELD QUALITY CONTROL

- A. In-Place Density Tests:
 - 1. Provide testing laboratory at least 4 hours advance notification prior to testing.
 - 2. Show proof that areas meet specified requirements before requesting that Engineer identify density test locations.

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3. Refer to Table 1 for minimum sampling and testing requirements for aggregate base course and surfacing.

Table 1 Minimum Sampling and Testing Requirements			
Property	Test Method	Frequency	Sampling Point
Gradation	AASHTO T11 and AASHTO T27	One sample every 500 tons but at least every 4 hours of production	Roadbed after processing
Moisture Density (Maximum Density)	Division 2-03.3(14)D of the Standard Specifications	One test for every aggregate grading produced	Production output or stockpile
In-Place Density and Moisture Content	Division 2-03.3(14)D of the Standard Specifications for in-place density and AASHTO T265 for moisture content	One for each 500 ton but at least every 2,500 sq ft of area per lift	In-place completed, compacted area

3.08 CLEANING

- A. Remove excess material from the Work area. Clean stockpile and staging areas of all excess aggregate.

END OF SECTION

SECTION 32 31 13
CHAIN LINK FENCES

PART 1 GENERAL

1.01 REFERENCES

- A. The following is a list of standards which may be referenced in this section:
1. ASTM International (ASTM):
 - a. A121, Standard Specification for Metallic-Coated Carbon Steel Barbed Wire.
 - b. A313/A313M, Standard Specification for Stainless Steel Spring Wire.
 - c. A392, Standard Specification for Zinc-Coated Steel Chain-Link Fence Fabric.
 - d. A491, Standard Specification for Aluminum-Coated Steel Chain-Link Fence Fabric.
 - e. A497/A497M, Standard Specification for Steel Welded Wire Reinforcement, Deformed, for Concrete.
 - f. A615/A615M, Standard Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement.
 - g. A780, Standard Specification for Repair of Damaged and Uncoated Areas of Hot-Dipped Galvanized Coatings.
 - h. A824, Standard Specification for Metallic-Coated Steel Marcellled Tension Wire for Use with Chain Link Fence.
 - i. A1011/A1011M, Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
 - j. C94/C94M, Standard Specification for Ready-Mixed Concrete.
 - k. C150, Standard Specification for Portland Cement.
 - l. C387, Standard Specifications for Packaged, Dry, Combined Materials for Mortar and Concrete.
 - m. F552, Standard Terminology Relating to Chain Link Fencing.
 - n. F567, Standard Practice for Installation of Chain-Link Fence.
 - o. F626, Standard Specification for Fence Fittings.
 - p. F668, Standard Specification for Polyvinyl Chloride (PVC) and Other Organic Polymer-Coated Steel Chain-Link Fence Fabric.
 - q. F934, Standard Specification for Standard Colors for Polymer-Coated Chain Link Fence Materials.

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- r. F1043, Standard Specification for Strength and Protective Coatings on Metal Industrial Chain Link Fence Framework.
 - s. F1083, Standard Specification for Pipe, Steel, Hot-Dipped Zinc-Coated (Galvanized) Welded, for Fence Structures.
 - t. F1183, Standard Specifications for Aluminum Alloy Chain Link Fence Fabric.
 - u. F1379, Standard Terminology Relating to Barbed Tape.
 - v. F1911, Standard Practice for Installation of Barbed Tape.
 - w. F1916, Standard Specification for Selecting Chain Link Barrier Systems with Coated Chain Link Fence Fabric and Round Posts for Detention Applications.
2. Institute of Electrical and Electronic Engineers (IEEE), Inc.: C2, National Electrical Safety Code.
 3. National Electrical Manufacturers Association (NEMA): 250, Enclosures for Electrical Equipment (1,000 volts max.).

1.02 DEFINITIONS

- A. Terms as defined in ASTM F552.

1.03 SUBMITTALS

A. Action Submittals:

1. Shop Drawings:
 - a. Product Data: Include construction details, material descriptions, dimensions of individual components, and finishes for chain link fences.
 - 1) Chain link fence (Not to exceed 6 feet and 11 inches), posts, rails, and fittings.
 - 2) New chain link fence is to match, or be similar, to specifications of existing onsite fencing.
2. Test Reports: Field test result for compliance of installation of chain link fence.

B. Informational Submittals:

1. Manufacturer's recommended installation instructions.
2. Evidence of Supplier and installer qualifications.

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1.04 QUALITY ASSURANCE

A. Qualifications:

1. Chain Link Fence Supplier: 5 years' experience in fence manufacturing.
2. Chain Link Fence Supplier: Experienced installer who has completed chain link fences similar in material, design, and extent to those indicated for Project and whose work has resulted with a record of successful in-service performance with a minimum 3 years' experience.

B. Design, supply of equipment and components, installation, and on-call service shall be product of individual company with record of installations meeting requirements specified.

C. Preinstallation Conference: Conduct conference at project Site to confirm location of fence.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Site in undamaged condition. Store materials off the ground to provide protection against oxidation caused by ground contact.

1.06 SCHEDULING AND SEQUENCING

A. Complete necessary Site preparation and grading before installing chain link fence.

B. Interruption of Existing Utility Service: Notify owner of utility 72 hours prior to interruption of utility services. Do not proceed with interruption of utility service without written permission from utility owner.

1.07 SPECIAL GUARANTEE

A. Provide manufacturer's extended guarantee or warranty, with Owner named as beneficiary, in writing, as special guarantee. Special guarantee shall provide for correction, or at the option of the Owner, removal and replacement of the following items found defective during a period of 5 years after the date of Substantial Completion. Duties and obligations for correction or removal and replacement of defective Work shall be as specified in the General Conditions.

1. Deterioration of metals, metal finishes, and other materials beyond normal weathering.

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PART 2 PRODUCTS

2.01 GENERAL

- A. Match style, finish, and color of each fence component with that of other fence components existing onsite.

2.02 POSTS

A. General:

- 1. Strength and Stiffness Requirements: ASTM F1043, except as modified in this section.
- 2. Round Steel Pipe, Schedule 40: ASTM F1083.
- 3. Roll-Formed Steel Shapes: Roll-formed from ASTM A1011/A1011M, Grade 45, High-Strength Low-Alloy steel.
- 4. Lengths: Manufacturer's standard with allowance for minimum embedment below finished grade of 34 inches.
- 5. Protective Coatings:
 - a. Zinc Coating: ASTM F1043, Type A external and internal coating.
 - b. Zinc with Polymer Film Coating: ASTM F1043, Type B external and internal coating.
 - c. Zinc-5 Percent Aluminum-Mischmetal Alloy Coating: ASTM F1043, Type C external and internal coating.
 - d. Zinc with Polymer Film Exterior Coating and Zinc Pigmented Interior Coating: ASTM F1043, Type B external coating, Type D interior coating.

- B. Line Posts: Match specifications of existing onsite fencing.

- C. End, Corner, Angle, and Pull Posts: Match specifications of existing onsite fencing.

2.03 TOP AND BRACE RAILS

A. Galvanized Round Steel Pipe:

- 1. ASTM F1083.
- 2. Match, or similar, to existing onsite fence dimension specifications.

B. Galvanized Roll-Formed Steel C Shapes:

- 1. Roll formed from ASTM A1011/A1011M, Grade 45.
- 2. Match, or similar, to existing onsite fence dimension specifications.

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- C. Protective Coatings: As specified for posts.
- D. Strength and Stiffness Requirements: ASTM F1043, top rail.

2.04 FENCE FITTINGS

- A. General: In conformance with ASTM F626, except as modified by this article.
 - 1. Match, or similar, to existing onsite fence specifications.

2.05 CONCRETE

- A. Materials: ASTM C387, packaged, dry, combined ingredients with Type I cement.
- B. Mixing: In a clean metal container, mix package of dry materials by hand or machine. Following manufacturer's instructions, add clean water in sufficient quantity to produce a slump of 2 inches to 3 inches.

2.06 FENCE GROUNDING

- A. Conductors: Bare, solid wire for 6 AWG and smaller; stranded wire for 4 AWG and larger.
 - 1. Material above Finished Grade: Copper.
 - 2. Material on or below Finished Grade: Copper.
 - 3. Bonding Jumpers: Braided copper tape, 1-inch wide, woven of 30 AWG bare copper wire, terminated with copper ferrules.
- B. Connectors and Grounding Rods: Comply with UL 467.
 - 1. Connectors for Below-Grade Use: Exothermic welded type.
 - 2. Grounding Rods: Copper-clad steel.

PART 3 EXECUTION

3.01 GENERAL

- A. Install chain link fences in accordance with ASTM F567, except as modified in this section, and in accordance with fence manufacturer's recommendations, as approved by Engineer. Erect fencing in straight lines between angle points.
- B. Provide necessary hardware for a complete fence installation.

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- C. Any damage to galvanized surfaces, including welding, shall be repaired with paint containing zinc dust in accordance with ASTM A780.
- D. Drainage Crossings: Where the chain-link fence must cross drainage ditches or swales, the main fence shall be carried across a ditch or swale with additional fence added below.

3.02 REPARATION

- A. Clear area on either side of fence to the extent specified in Section 31 10 00, Site Clearing. Eliminate ground surface irregularities along fence line to the extent necessary to maintain a 2-inch clearance between bottom of fabric and finish grade.
- B. Stake locations of fence lines, and terminal posts. Do not exceed intervals of 500 feet or line of sight between stakes. Indicate locations of utilities, underground structures, benchmarks, and property monuments.

3.03 POST SETTING

- A. Drill or hand-excavate holes for posts to diameters and spacing indicated, in firm, undisturbed soil. Driven posts are not acceptable. Postholes shall be clear of loose materials. Waste materials from postholes shall be removed from Site or regraded into slopes on Site.
- B. Posthole Depth:
 - 1. Minimum 3 feet below finished grade.
 - 2. 2 inches deeper than post embedment depth below finish grade.
- C. Set posts with minimum embedment below finished grade of 34 inches and with top rail at proper height above finished grade. Verify posts are set plumb, aligned, and at correct height and spacing. Brace posts, as necessary, to maintain correct position and plumbness until concrete sets.
- D. Backfill postholes with concrete to 2 inches above finished grade. Vibrate or tamp concrete for consolidation. Protect above ground portion of posts from concrete splatter.
- E. Before concrete sets, crown and finish top of concrete to readily shed water.

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- F. Terminal Posts: Locate terminal end, and corner posts per ASTM F567 and terminal pull posts at changes in horizontal or vertical alignment of 15 degrees or more.
- G. Line Posts: Space line posts uniformly at 10 feet on centers between terminal end, and corner posts.

3.04 POST BRACING

- A. Install according to ASTM F567, maintaining plumb position, and alignment of fencing. Install braces at end, pull, and corner posts diagonally to adjacent line posts to ensure stability. Install braces on both sides of corner and pull posts.
 - 1. Install so posts are plumb when diagonal truss rod assembly is under proper tension.

3.05 TOP RAILS

- A. Install according to ASTM F567, maintaining plumb position and alignment of fencing. Run rail continuously through line post caps and terminating into rail end attached to posts or posts caps fabricated to receive rail at terminal posts. Install top rail sleeves with springs at 105 feet maximum spacing to permit expansion in rail.

3.06 CLEANUP

- A. Remove excess fencing materials and other debris from Site.

END OF SECTION

SECTION 41 14 36.01
COMMERCIAL TRUCK SCALE

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. This section and attached supplements covers the Work necessary to furnish and install, complete and ready for operation, a low-profile commercial truck scale.
- B. Refer to other specification sections or Electrical Drawings for the telecommunication system, power system, and other elements and features of the commercial truck scale system as shown on Drawings.
- C. Performance Requirements:
 - 1. Truck scale will be used to weigh public and commercial vehicles. The truck scale will be a staffed-controlled system.
 - 2. Truck scale will be installed on concrete foundation supports above-grade and will include entry and egress control lights, safety rails, and weighing terminal, as show on Drawings and specified herein.

1.02 QUALITY ASSURANCE

- A. Referenced Standards: This section incorporates by reference the latest revisions of the following documents. They are part of this section insofar as specified and modified herein. In case of conflict between the requirements of this section and the listed documents, the Contractor shall point out the conflict to the project representative; lacking a definitive answer otherwise, the requirements of the contract specifications shall prevail.
 - 1. NIST H-44: National Institute of Standards and Technology Handbook H-44 Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices
- B. Factory Tests:
 - 1. Custom-programming in digital scale controller. Provide documentation of custom-designed input screens.
 - 2. Test assembled control panel. Provide test documentation.
- C. Scale Manufacturer: The new scale system shall be consistent with the scale systems the County is using throughout their solid waste facilities.

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- D. Scale shall be built in accordance with standards of the American Society of State and Highway Officials and the Scale Manufacturers Association.
- E. Performance: The scale, new and adjusted, shall perform automatically as specified, with all components compatible to suit the intended use. The performance requirements and tolerance values shall be as set forth for vehicle scale in the Scale Code of National Bureau of Standards Handbook H-44 and shall be met in every respect. The scale manufacturer shall provide a Certificate of Conformance to the standards. The installation shall be completed and tested under the Contractor's direction to meet the approval of and to obtain the Seal of Certification from the State of Washington regarding automatic weight indicators.
- F. The scale in its entirety (except for Data Management System) shall be manufacturer's standard design, without modification for this Project, and shall have been proven in similar installations and shall have NTEP (National Type Evaluation Program) certificate for scale and load cells.
- G. Scale foundation and approach slabs shall comply with the requirements set forth for vehicle scales in the Scale Code of National Bureau of Standards Handbook H-44.

1.03 MANUFACTURER'S SERVICES

- A. A manufacturer's representative for the equipment specified shall be present at the Job Site for 2 days for certification of the installation, startup assistance, and training of Owner's personnel. Travel time shall not be included in the 2 days at the Job Site.

1.04 SUBMITTALS

- A. Action Submittals:
 - 1. Manufacturer provided documentation pertaining to installation and standard setting, and foundation plans.
 - 2. Complete detailed construction drawings for one new concrete platform commercial truck scale, scale foundations, conduit requirements between the scale and the data and electrical interface locations, cabling to be provided between the scale and the data communications, and manufacturer's brochures for the new scale and associated equipment to be furnished. Contractor must provide above Shop Drawings within 30 days of contract award and must be approved by the Engineer prior to starting scale foundation construction.

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3. Complete schematic diagrams and Operating and Maintenance Manuals and Maintenance Summary Sheets for the equipment specified herein shall be furnished.

B. Informational Submittals:

1. Certificate of conformance with the Scale Code of National Bureau of Standards Handbook H-44.
2. Washington State Seal of Certification.
3. O&M Manuals.

1.05 WARRANTY

- A. Guarantee in writing the operating performance of the adjusted scale and all related equipment and components for a period of 2 years upon certified completion of the entire Contract (but no sooner than Final Completion). In the event of any defect during this period attributable to workmanship under this Contract, make corrective repairs within 5 days of written notice by the Owner so specifying the nature of the defect.

PART 2 PRODUCTS

2.01 MANUFACTURER

- A. Materials, equipment, components, and accessories specified in this section shall be products of Unitec Corp, Tukwila, WA; telephone, (206) 575-1100, or their subcontractor (B-tek) or similar.

2.02 SCALE FOUNDATION

- A. Low-profile aboveground foundation with 10-foot long approach slab at each end, in compliance with requirements of NBS Handbook H-44.
- B. The approach slab shall include concrete 10-foot flared curbs with diamond plate steel curb trim shaped similar to a jersey barrier on the inside of each curb. The height of the curb shall match the height of the weighbridge rails.
- C. Concrete for scale foundation shall comply with requirements of Section 31 23 23, Fill and Backfill and as shown on Drawings. Concrete for the scale deck is as specified by the scale manufacturer and shall be the minimums as specified herein.

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2.03 COMMERCIAL TRUCK SCALE

- A. General: Contractor shall coordinate with the scale manufacturer for products and materials that the scale manufacturer will provide preassembled, those that will be provided and require Contractor installation, and those that will be provided and installed by the Contractor. This includes, but is not limited to, the scale, all conduits, wires, cables, self-service weighing terminal, and all other ancillaries to provide a complete, fully operational, and automated scale system.
- B. Concrete platform truck scale, electronic full load cell type, 80 feet long overall, in maximum of three sections and eight load cells by 10 feet wide with a 120,000-pound capacity and designed to support a 60,000-pound dual axle, with axles on 4-foot centers and offset to one side of the module, or worst case loading conditions. Under the specified load, the maximum deflection shall not exceed 1/500th of span and the bending stress in any member shall not exceed 20,000 psi. The deck design shall be for 120 psi minimum tire pressure. Provide scales as shown on Drawings. Details of scale deck and load cell support locations and depth shall be as required by the scale manufacturer.
- C. Systems or components that require proprietary/sole source service or maintenance by the manufacturer, or their service division, are not acceptable.
- D. The scale shall have the following minimum features and capacities:
 - 1. Fully electronic in design and shall not incorporate any mechanical weighing elements, check rods, or check stays.
 - 2. Designed to perform as single weighing platforms, of low-profile aboveground design. With side rails that are integral with the weighbridge.
 - 3. Junction boxes shall be NEMA 4 rated.
 - 4. Weighbridge, load cells, scale instrument, and associated accessories, shall be furnished by the same supplier to maximize compatibility and availability of components and design.
 - 5. Platforms shall be constructed of steel framing with concrete slab surface and shall be designed and constructed to withstand sudden truck stops. Scale system shall be self-checking without check rods, and scale shall not use load cell as a checking device.
 - 6. Load cells shall be approved by NTEP and meet the specifications as set forth by the National Institute of Standards and Technology Handbook 44 for Class IIII, 10,000d Devices. A Certificate of Conformance to these standards shall be provided by the Contractor.

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7. The scale shall be fully electronic and be equipped with heavy-duty surge voltage protection for the electronic system, and be electrically grounded.
8. Provide T-Grip closure strips between edge of scale and scale pit walls.
9. Metal Parts: All metal parts shall be galvanized or epoxy coated for corrosion protection. The corrosion protection coating of all the steel members shall be prepared and painted in accordance with manufacturer's, requirements. The final color shall be selected by the Owner.
10. Electrical: All wiring and conduits shall be concealed and protected within the scale. All control wiring shall be installed in galvanized steel metal conduits and rated for wet underground conditions. The Contractor shall provide RFI (radio frequency interference) and EMI (electromagnetic interference) protection for weighing instrumentation. Junction boxes shall be mounted by each section, located in an accessible area for inspection and maintenance. The sectional junction boxes shall be rated NEMA 4 and the main junction boxes shall be rated for NEMA 12 suitable for push mounting.
11. Grounding System: Each structural panel shall have all metal parts bonded to one another. A ground rod shall be installed for each panel and bonded to structural steel of the panel. All ground rods shall be bonded together using compression lugs. Ground rods shall be copper, minimum 10 feet long, 3/4-inch in diameter. All grounding shall be in accordance with Article 250 of the National Electrical Code. Minimum ground conductor size shall be No. 1/0 copper. Ground rods shall be mounted near the access plates of each of the structural panels.
12. Environmental Condition: Scale system shall operate satisfactorily over the full range of weather conditions. The scale's structural members, load cells, and electrical wiring shall not be susceptible to the influence of the extraneous environmental conditions.
13. The deck surface shall be concrete to provide high-impact resistance, high-abrasion resistance, and low permeability from infiltration of water and road salts. Install the deck in accordance with the scale manufacturer's instructions.
14. The height of the load cell stand shall be such that there will be 8 inches of clearance between the concrete pier and the bottom of the weighbridge for ease of cleanout.
15. Side rails shall be included as the integral part of the weighbridge. Add on side rails will not be accepted. 4-inch rub rails shall be included.
16. Diamond plate steel approach guards installed 4 feet in on each end, of each module on the inside of side rails for tire protection, and to keep trucks centered on scale.

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- 17. Adjustable screw bearings will be located above each load support point to provide vertical adjustment of each module; shimming to elevation is not acceptable.
 - 18. The scale shall be completely self-checking. No check rods shall be used. Scale shall not use the load cell as a checking device.
- E. The load cell stands, and load cell suspension components shall be designed for the Anyload Model 102BH, double ended, center loaded, shear beam load cell. Load cell must be available from more than one supplier and must be interchangeable. Load cells shall be mounted no less than 12 inches above concrete pier and shall be mounted outside of the weighbridge for ease of maintenance.

2.04 SCALE INSTRUMENTATION

- A. General: The new scale hardware and software shall integrate seamlessly with the County's software system, including any hardware and/or software upgrades to the County's current system. Conduits, cables, conductors, etc. shall be furnished and installed to accommodate all necessary telecommunications and electrical systems between the existing connection points and the new commercial truck scale, including, but not limited to, the new self-service weighing terminal.
- B. Scale instrument and associated equipment shall be supplied by the scale manufacturer, as approved by Owner.

PART 3 EXECUTION

3.01 INSTALLATION

- A. General: The scale shall be installed by the Contractor in accordance with the scale manufacturer's instructions and approved Shop Drawings. Contractor shall cover painted surfaces with tape or other means during concrete placement to avoid damage to paint surface and to minimize touchup requirements.
- B. A straight approach of half the scale deck length must be provided with the first 10 feet on both ends of the scale being a concrete apron (pad) level with the deck.
- C. Site-Poured Deck: Refer to the scale manufacturer's instructions and coordinate with the scale manufacturer for products and materials that they will and will not be providing to the Contractor.
- D. The scale modules shall be center-supported while pouring the deck.

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- E. The scale must be installed level, plumb and in a straight line with itself and the foundation.
- F. The load cell stands, once leveled, must be grouted using a high quality, nonmetallic, non-shrinking-type grout as approved by the scale manufacturer.
- G. The Contractor shall accomplish installation, calibration, and testing under the direction of the scale manufacturer.
- H. Contractor shall have scale certified by the State of Washington.
- I. Install self-service weighing terminal for accessibility by driver in a seated position.

3.02 MANUFACTURER'S INSPECTION AND CERTIFICATION

- A. Following installation by the Contractor and certification by the State of Washington, a manufacturer's representative shall inspect and certify that the scale has been installed in full compliance with the manufacturer's instructions. Furthermore, the manufacturer shall instruct the Owner's operators in proper operation of the equipment. A minimum of one of the 2 days the manufacturer's representative is onsite shall be dedicated to training of Owner's personnel.

3.03 TESTING

- A. Preoperational Test Phase: Perform factory tests in accordance with manufacturer's requirements. Factory tests shall include factory testing of custom-programmed scale controller and testing of inputs for all County provided input fields.
- B. Component Test Phase: Test scale controller, self-service weighing terminal, and load cells for proper installation, and interface with the Owner's software system. Obtain State of Washington Certification of Scale following check-out of equipment and system. Arrange for registration of the scale in accordance with State of Washington requirements. Contractor shall pay all fees for registration.

3.04 SERVICE

- A. In addition to the required warranty, the scale manufacturer shall provide complete service of the new scale for a period of 2 years in a manner that keeps the equipment in continuous and legal operation. This shall be accomplished at no additional cost to the Owner.

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- B. At a minimum provide two inspections and calibrations per year.

3.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store materials in manufacturer's original, unopened, undamaged containers.
- B. Handle materials in such a manner as to prevent damage to products or finishes.

3.06 SUPPLEMENT

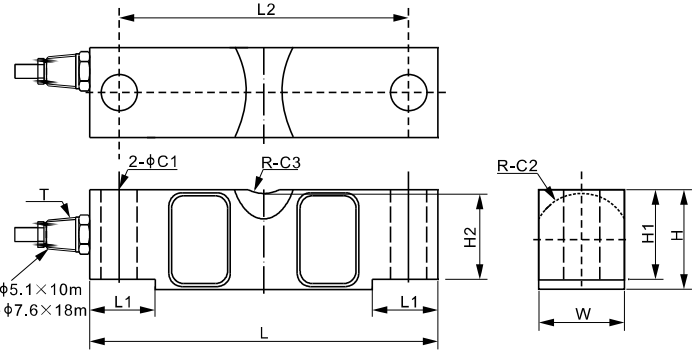
- A. The supplement listed below, following "End of Section," is part of this specification.
 - 1. Manufacturer's Literature: Anyload Model 102BH Double-Ended Shear Beam Load Cell.

END OF SECTION

102BH



Alloy Steel



Capacity < 40Klb Cable $\phi 5.1 \times 10\text{m}$
 Capacity $\geq 40\text{Klb}$ Cable $\phi 7.6 \times 18\text{m}$



DIMENSIONS

RATED CAPACITY	C1	C2	C3	H	H1	H2	L	L1	L2	W	T
Klb/inches											
10-25	0.68	0.90	0.75	1.94	1.70	1.63	7.75	1.38	6.50	1.69	1/4-18 NPT
40	0.81	1.12	0.98	2.44	2.10	2.03	10.25	1.93	8.50	1.94	1/2-14 NPT
50-75	1.06	1.38	0.98	2.94	2.65	2.53	10.25	1.93	8.50	2.44	1/2-14 NPT
SE100	1.06	1.38	0.98	3.44	2.65	2.53	10.25	1.93	8.50	2.44	1/2-14 NPT
100-125	1.62	1.80	1.50	3.86	3.43	3.30	15.25	3.13	12.75	2.90	1/2-14 NPT
200	1.62	2.37	2.00	5.80	5.12	4.44	19.25	4.00	15.25	3.80	1/2-14 NPT
300	2.12	4.00	2.50	5.80	5.12	4.44	22.00	5.00	17.00	5.80	1/2-14 NPT
400	2.12	5.00	3.00	5.80	5.12	4.44	22.00	5.00	17.00	5.80	1/2-14 NPT
t/mm											
5-15	17.3	22.9	19.1	49.3	43.2	41.5	196.9	35.1	165.1	42.9	1/4-18 NPT
20	20.5	28.4	25.0	62.0	53.4	51.6	260.4	49.0	216.0	49.3	1/4-18 NPT
25-35	27.0	35.0	25.0	74.6	67.2	64.3	260.4	49.0	216.0	62.0	1/2-14 NPT
50	41.2	45.7	38.1	98.0	87.1	83.8	387.4	79.5	323.9	73.7	1/2-14 NPT

SPECIFICATIONS

Full Scale Output	3.0 mV/V $\pm 0.25\%$	Recommended Excitation	10V (15V Maximum)
Zero Balance	± 0.02 mV/V	Insulation Resistance	$> 2 [50\text{V DC}] \text{ G}\Omega$
Non-linearity	$< \pm 0.023\%$	Compensated Temperature Range	-10°C to 50°C / 14°F to 122°F
Repeatability	$< \pm 0.017\%$	Safe Overload	150% of full scale
Hysteresis Error	$< \pm 0.023\%$	Breaking Overload	300% of full scale
Creep in 30 min.	$< \pm 0.023\%$	Seal Type / IP Rating	Environmentally Sealed / IP67
Input Resistance	$700\Omega \pm 10$	Cable Color Code	Exc+ Red Exc- Black
Output Resistance	$700\Omega \pm 5$		Sig+ Green Sig- White
Element Material	Alloy Steel, Nickel Plated		Shield Bare

PART NUMBER*

Rated Capacity	Part No.	Weight (kg) Approx.
10Klb	102BH-10Klb	2.9
20Klb	102BH-20Klb	3.0
25Klb	102BH-25Klb	3.0
40Klb	102BH-40Klb	7.0
50Klb	102BH-50Klb	9.0
60Klb	102BH-60Klb	9.0
75Klb	102BH-75Klb	9.0
SE100Klb	102BH-SE100Klb	10.0
100Klb	102BH-100Klb	20.5
125Klb	102BH-125Klb	20.5
200Klb	102BH-200Klb	47.0
300Klb	102BH-300Klb	75.0
400Klb	102BH-400Klb	80.5
5t	102BH-5t	3.0
10t	102BH-10t	3.0
15t	102BH-15t	3.0
20t	102BH-20t	7.0
25t	102BH-25t	9.0
30t	102BH-30t	9.0
35t	102BH-35t	9.0
50t	102BH-50t	20.5

Lightning Protection Version:

60Klb	102BH-60Klb-02	9.0
75Klb	102BH-75Klb-02	9.0

SE refers to small envelope

* ATEX, FM, IECEx approved versions carry the "-Ex" suffix.

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WEIGH MODULE

Model	Page
102BHM1	142

INTERCHANGEABLE REFERENCE

Manufacturer	Model
Coti Global	CG-58
Rice Lake	RL75058
Vishay Celtron	CLB
Vishay Revere Transducers	5303
Vishay Sensortronics	65058A*
Vishay Tedea-Huntleigh	4158

* Sensortronics 65058A has SE50Klb and 50Klb.

25Klb-125Klb: NTEP 1:10 000 Class III, Multiple Cell

11t-55t: OIML MAA C3, Y=7500

**DRAWINGS
(BOUND SEPARATELY)**
