SP-151130
(Replaces SP-151100)

SPECIAL PROVISIONS
FOR
START-UP AND TUNING

Polk County
EDP-PA26(001)--7Y-77

Effective Date
March 29, 2022

THE STANDARD SPECIFICATIONS, SERIES 2015, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

151130.01 DESCRIPTION.

The work of this Special Provision consists of the start-up and tuning, including interim and final modifications of in-river recreational features and grading. Iterative trials and testing, modifications, and adjustments to WaveShapers™, blocks, sculpted concrete, and modifications and additions to boulders, surfacing, vanes, and other features in and around the drops and pools are anticipated after initial start-up and observation. The intent of the start-up and tuning effort is to optimize performance and improve operational ease and safety.

151130.02 MATERIALS.

A. Contractor should provide materials required to support iterative testing and trials, including temporary wood structures (plywood, framing wood, concrete anchors, etc.) anchored to concrete and rock and sandbags to temporarily direct flows.

B. Tuning blocks shall be fabricated according to the details provided in the plans.

C. A reserve of Chevron Boulders shall be available for placement by Iowa DNR staff during the fish passage tuning phase.

D. Boulder Grout: Placed in bulk or to grout added Surface Boulders.

E. Surface Boulders: Placed and grouted to modify flow patterns observed during the iterative testing.

F. Sculpted Concrete: Placed to modify flow patterns observed during the iterative testing.

151130.03 CONSTRUCTION.

A. General:
The start-up and tuning phase consist of iterative trials, installation of temporary and permanent

structures, modifications to previous work, adjustments to the WaveShaper™ and appurtenances, installation/adjustments of invert blocks, and placement of Chevron Boulders per Iowa DNR direction.

1. **Iteration Trials and Testing:** Contractor shall install temporary structures (plywood, sandbags, etc.) and piles of rock or granular material to provide for temporary blockage or partial blockage of flows, to guide flow during iterative trials, and redirect flow during relocation and/or addition of Invert Blocks, relocation and adjustment of Chevron Boulders in fish passage pools, placement of submerged Grouted Boulders, and placement of sculpted concrete. These efforts will likely focus on modifications to Drops 2 and 3, fish passages, and vanes.

2. **Iterations**: Testing and Modification Iterations will typically include:
   - **a.** Engineer with Contractor support shall complete observation of performance of the improvements at typical river flows.
   - **b.** Engineer will prepare a tuning iteration field directive with drawings, exhibits, and descriptions as required. This will identify movement of invert blocks, temporary placement of materials if needed, locations of grout or grouted boulders and/or sculpted concrete to be placed, movement of Chevron Boulders, etc.
   - **c.** Contractor to review the field directive and provide a submittal that includes approach and specifics to complete the Tuning iteration for review by Engineer.
   - **d.** Once an iteration has been reviewed and agreed to by Contractor and Engineer, the Contractor shall implement the modifications including temporary localized dewatering as required, then remove any temporary dewatering structures and rewater the area for further observations.
   - **e.** Engineer shall observe the last Iteration and the above process shall be repeated.

3. **Final Modifications and Cleanup:** After all iterative trials are completed, work including the addition of localized Boulder Grout (likely placed in a submerged condition) to replace any remaining temporary features if required, mechanically grinding any remaining sharp edges to a radius of 3 inches or greater on exposed surfaces of Rounded Surface Boulders and Rounded Feature Boulders as directed by the Engineer, and cleanup of the site will be completed.

B. Job Conditions:

1. **Protection of Structures, Banks, Riverbed and Vegetation:** All structures, final grading, existing banks, riverbed, and existing natural vegetation both inside and outside of the project boundaries shall be protected from injury during modifications and operational tuning of the project. Any damage to such facilities or resources shall be repaired by the Contractor to a condition equal to or better than original at no additional expense to the Contracting Authority. Any required repairs shall be made to the satisfaction of the Engineer. Restoration and cleanup of areas disturbed by the testing iterations, Work, and access, conducted during start-up and tuning.

2. **Permits:** The Contractor shall be responsible for adhering to all permits associated with or obtained for the project during any work carried out under the modifications phase of the project.

3. **Water Control:** The Contractor shall be responsible for all elements of water control required to carry out the work covered by this Special Provision. It is anticipated that local water control and dewatering needed to install invert blocks, boulders, and sculpted concrete will be required during this phase. The Contractor shall be responsible for safely passing all Des Moines River flows during the start-up and tuning phase, regardless of the flow magnitudes that occur, while maintaining the existing levels of flood protection.

4. **Coordination:** The Contractor shall coordinate with the Engineer during the execution of the tuning. Following substantial completion of the project the Contractor shall provide notice to the Engineer.

C. Start-Up Observation:

The project or adequate portions of the project shall be re-watered and initial operation of improvements completed. Specific requirements include that the river will be observed at normal flow rates during Start-up. Therefore, recreational observation will have to be scheduled once flows in the river are within the range of 1500 cubic feet per second to a maximum of 10,000 cubic feet per second. Fish passage observation will have to be scheduled once flows in the river are within the range of 700 cubic feet per section to a maximum of 6,000 cubic feet per second. ~~During these observational periods, the Contractor shall supply a survey crew to determine water surface elevations and locate where velocity measurements are made by the Engineer and make knowledgeable personnel available to access proposed efforts and modifications by the Engineer as described in this Special Provision.~~

D. Tuning And Modifications Of Fish Passages:

Iowa DNR staff shall be notified 1 week prior to removal of temporary cofferdams for observation of the fish passages. The Contractor shall accommodate Iowa DNR staff over a 1 month period to measure velocities of the fish passages in low-flow conditions after fish passage construction is complete. At a minimum, it is anticipated that a 1 week initial period will be required for observation of fish passage performance of the initial construction and periods between boulder placement effort will require a week of additional observation by the Engineer (Iowa DNR staff). Contractor shall supply crews adequate for initial placement of all (loose) chevron boulders and adjustment of the Fish Passage Loose Stone Material after the initial observation by Iowa DNR staff. Chevron boulders placed in the pools and between the chevrons shall be per the direction of Iowa DNR staff. The Contractor shall make provisions to stockpile these boulders from at least one bank of the fish passages immediately prior to placement or otherwise make provisions to quickly set the material in the fish passages at the direction of the Iowa DNR staff. Temporary stockpiling of these boulders along the banks may be allowed, however the Contractor shall remain responsible for any that may be washed away during higher flows.

Two subsequent iterations are anticipated. Contractor shall supply crews and equipment adequate for relocation and adjustment of up to a total of 75 loose chevron boulders and adjustment of the Fish Passage Loose Stone Material at the direction of Iowa DNR staff. The minimum crew size for tuning and modification of the fish passages shall be three laborers, one crew chief, equipment and operators to prepare subgrade and place individual boulders as required in Article 151136.05, E, 2, and equipment, operators, and dewatering and water control efforts as required to transport boulders to the adjacent bank, stockpile, and place.

Flows into the fish passages may require temporary blocking or partial blocking of flows to allow for placement of boulders, however the Contractor should plan on placement of the Chevron Boulders during active flows.

E. Tuning And Modifications of Waveshaper™ And All Drops

Tuning of all Drops is anticipated after initial flows are observed through all of the Drops. Adequate observation time shall be allowed for the Engineer to observe, survey and complete documentation for before and after installed modifications and tuning efforts. Tuning and modifications will include but not be limited to the following:

1. **WaveShaper™ and Appurtenances**: Including operating the WaveShaper™ over a range of flows, installing and adjusting apparatus that is designed to be adjusted or modified, calibrating and verification of inclinometers.

2. **Invert Blocks:** precast concrete blocks used for altering hydraulic characteristics of in-river structures according to Special Provisions for In-River Structural Concrete. Invert blocks

shall be attached to the sides of Drops 2 and 3 as shown on the plans as directed by the Engineer. During Start-up, the Engineer will evaluate needed modifications to the invert block configurations to achieve the desired hydraulic conditions. The Contractor shall provide localized water control and dewatering for installation of the blocks, attach new invert blocks, rearrange original blocks, or a combination of the two as directed by the Engineer.

3. **Adjustments to Grouted Boulders, Sculpted Concrete, and Loose Boulders:** Shape and sizes of individual surface boulders and sculpted concrete areas vary significantly, and local flow patterns often need to be modified. Because of these and other factors, adjustment to, or replacement of, individual grouted boulders and/or addition of grout masses and/or sculpted concrete may be required to achieve performance goals for the overall project. The Contractor shall exercise proper care in the this work so that all other portions of the Project remain undamaged.

4. **Time Period for Modifications:** The Contractor shall be responsible for providing all materials, localized water control and dewatering, equipment, and personnel required to facilitate observation of performance and carry out modification iterations as directed by the Engineer. At a minimum, it is anticipated that a 2 week initial period will be required for observation of performance of the initial construction and periods between tuning iterations will require a week of additional observation by the Engineer. The scheduling of these tuning efforts can be adjusted by the Contractor to target lower river flows and will be coordinated and agreed upon with the Engineer. It should be anticipated that 10 crew days over a period of at least 2 months (dependent on river flows) for completion of tuning and modifications following completion of project construction will be required. One crew day shall have the capacity (labor and equipment) to perform at least 25% of the total estimated tuning effort specified in Article 151130.04 below. During the tuning phase, the crew shall be prepared to perform modifications within 2 days after receiving direction of the Engineer. The anticipated crew size for tuning and modification of the WaveShaper and other drops is five people plus all equipment and personnel needed for local water control, and to support and perform the requested modifications.

F. Schedule

The Contractor shall coordinate, schedule, and supply all labor and materials, miscellaneous materials, and equipment, to support the start-up and tuning effort and construct all temporary/interim modifications and structures, and construct all final modifications.

151130.04 METHOD OF MEASUREMENT.

A. Start-Up and Tuning, River Recreation and Fish Passage: ~~Measurement will not be made. Payment is by Lump Sum and excludes installed items listed below.~~ The Engineer will count the number of days the crew works to complete the Start-Up and Tuning of the Fish Passage, WaveShaper and all drops, as described above. Only days when a full crew, as defined in Article 151130.03, is used will be counted. If crew is required for less than 4 hours, only one-half day will be counted.

B. Invert Blocks: Invert Blocks are measured by count of tuning block installed.

C. Boulder Grout: Measurement will be 3 times the cubic yards of Boulder Grout furnished and placed per Special Provisions for Rock during the tuning phase. An estimate of 5 cubic yards of Boulder Grout is anticipated during the tuning phase and has been quantified as 15 cubic yards in the tabulation of quantities.

D. Surface Boulders, Single Layer: measurement will be 3 times the square yards of Surface Boulders furnished and placed per Special Provisions for Rock during the tuning phase. An estimate of 5 square yards of Surface Boulders, Single Layer is anticipated during the tuning

phase and has been quantified as 15 square yards in the tabulation of quantities.

E. Sculpted Concrete, Type II: measurement will be 3 times the square yards of sculpted concrete furnished and placed per Special Provisions for Sculpted Concrete during the tuning phase. An estimate of 5 square yards of Sculpted Concrete, Type II is anticipated during the tuning phase and has been quantified as 15 square yards in the tabulation of quantities.

F. Chevron Boulders: measurement will be by each Chevron Boulders furnished and placed per Special Provisions for Rock.

151130.05 BASIS OF PAYMENT.

A. Startup & Tuning, River Recreation.

1. This includes all modifications to the drops, pools, and banks outside of the fish passages.

2. This bid item includes, but is not limited to:
- **a.** Operations of the hydraulic system throughout the specified ranges and calibration of the inclinometers (conducted prior to rewatering).
- **b.** Survey/measurement support of water, structure, and gate elevations as requested by Engineer.
- **c.** Localized water control and dewatering needed to support tuning phase
- **d.** Remobilization of equipment and laborers
- **e.** Providing all other related and necessary material, equipment, and labor in addition to the material, equipment and labor involved in the installation of the individual material units for 10 crew days
- **f.** Site clean-up and restoration of disturbed areas

B. Startup & Tuning, Fish Passage.

1. This item includes accommodations to support Engineer oversight of fish passage performance over a 1 month period to measure velocities of the fish passages in low-flow conditions after fish passage construction is complete.

2. Initial placement of large chevron boulders and small chevron boulders is paid for under the bid items Chevron Boulders, Large and Chevron Boulders, Small, respectively. Only work related to relocating or adjusting previously placed boulders will be paid for under the bid item.

~~2~~ **3.** This bid item includes, but is not limited to:
- **a.** Mobilization and localized flow control.
- **b.** Handling, access, staging/stockpiling, moving, adding, removing, and placing loose Chevron boulders and Fish Passage Loose Stone material at the direction of IDNR staff for initial placement and two subsequent iterations during tuning.
- **c.** Survey/measurement support of water, structure, and elevations as requested by Engineer.
- **d.** Remobilization of equipment and laborers. (Tuning may occur over a 1 month period and is dependent on river flows)
- **e.** Providing all other related and necessary labor, equipment, and materials to complete the work.
- **f.** Site clean-up and restoration of disturbed areas

C. Invert Blocks.

1. Payment will be the contract unit price per each Invert Block. It should be anticipated that the total number of block placement and movements will be twice the number of supplied

blocks (on the average each block will be installed and moved once after installation) and that this will be accomplished in a total of at least five separate installation and movement efforts.

2. The contract unit price is full compensation for:
- **a.** Furnishing, forming, and placing concrete, including coloring and fibermesh as shown on the Plans.
- **b.** Furnishing and applying curing compounds
- **c.** Embedded items
- **d.** Invert block attachment hardware, grouting of attachment hardware.
- **e.** Finishing and edging concrete surfaces
- **f.** Furnishing and placing reinforcing steel as shown on Plans
- **g.** Providing hot and cold protection
- **h.** Initial installation of tuning blocks as directed by the Engineer
- **i.** Handling, access, staging/stockpiling, moving, adding, removing, and attaching invert blocks during tuning phase
- **j.** Providing all other related and necessary labor, equipment, and materials to complete the work.

D. Boulder Grout, Surface Boulders, Single Layer.
These will be installed at locations directed by the Engineer during the tuning phase. Installation shall include additional localized/partial dewatering, installation of boulders, submerged construction (if necessary), delivery of Boulder Grout, and cleanup. At least five separate areas and construction mobilizations should be planned upon. Installation shall be limited to no more than 15 feet (horizontal) from the existing water surface elevation along any bank including the north bank of Drops 2 and 3 and the intermedial pool.

E. Sculpted Concrete, Type II.
These will be installed at locations directed by the Engineer during the tuning phase. Installation shall include additional localized/partial dewatering, installation of sculpted concrete, submerged construction (if necessary), delivery of concrete, and cleanup. At least three separate areas and construction mobilizations should be planned upon. Installation shall be limited to no more than 15 feet (horizontal) from the existing water surface elevation along any bank including the north bank of Drops 2 and 3 and the intermedial pool.

F. Chevron Boulders: Payment will be as described in Special Provisions for Rock.

G. Other Modifications needed for Tuning.
Payment for additional or subsequent adjustments (if needed) beyond those covered in the bid items will be paid by negotiating change orders based upon existing contract unit prices or time and material pricing in accordance with Article 1109.03, B, 1 of the Standard Specifications. The Contractor is required to submit a Schedule of Values for approval. If required modifications or subsequent tuning is a result of quality that does not meet the tolerances for grades or the dimensions provided on the plans, the costs of adjustment will be borne by the Contractor.