GLENCLIFF IMPROVEMENT COMPANY WATER DISTRICT
WATER TREATMENT SYSTEM
CONTRACT 2 – WATERMAIN IMPROVEMENTS
GLENCLIFF, NEW HAMPSHIRE

ADDENDUM #1

DATE: OCTOBER 10, 2025

TO: PLAN HOLDERS

This ADDENDUM #1 shall become part of the Bidding Documents and Contract Documents for the above-referenced project. BIDDERS, please acknowledge receipt of this ADDENDUM #1 on the BID FORM (Page 1). This ADDENDUM #1 consists of 2 pages and two attachments.

1. NHDOT issued ROW permit conditions with the approval for the watermain crossing of NH-25. The permit conditions are attached to this addendum. Please take note of the conditions relative to trench work in the highway pavement and temporary patching. Additionally, please note that NHDOT requires a $5000 surety bond for this work from the contractor.

RFP Questions Received

Q: Is there an opinion of probable cost or engineer's estimate?
A: An engineer's estimate was not completed for this project.

Q: The ad for bids mentions two different dates. Will you please confirm the correct bid date?
A: Bids are due on Wednesday, October 22, 2025 by 2:00pm. Please submit either one hard copy or one complete electronic copy no later than 2:00 pm Eastern Time to:

Horizons Engineering Inc. Attn: Kristin Darby 34 School Street Littleton, NH 03561	OR	kdarby@horizonsengineering.com Phone: (802) 624-7058 Fax: (603) 444-1343

Q: What is the construction timeline including start and end dates? Is winter construction allowed?
A: The completion time for the project is calculated as calendar days from the date specified in the "Notice to Proceed". 120 calendar days for substantial completion and 150 days for final completion. We will look to award the contract within a month of bid opening and would like to start work as soon as possible – ideally this fall.

Q: Is the selected contractor responsible for obtaining construction easements?
A: No, GICWD is obtaining the required temporary construction easements from the landowners. GICWD and HEI are coordinating with the landowner to obtain the permanent easement for the cross-country watermain from the pump house to the crossing at Station Road, as well as the temporary construction easement.

Q: GICWD has referenced improvements to the watermain along NH-25, is that also included in this contract? There is no reference to it on the plans or in the specs.
A: Contract 2 focuses only on the cross-country WM from the pump house to the crossing at Station Road. It is anticipated that a Change Order will be awarded for additional replacement of water main and water services along NH-25 in Spring 2026 following NHDOT approvals.

Q: In reviewing the specifications for Glencliff the pipe is being called out as SDR 21, while in the same sentence, expected to meet AWWA standards of the material. AWWA standards state that the minimum pressure rating of 3-in and under pipe should be SDR 9 rated for 250 PSI. This is specific to water service pipe. Please clarify what the rating of the material should be.
A: The pipe material shall be High Density Polyethylene (HDPE) Pipe, 3-inch IPS DR17 for a 125 psi pressure rating. The *33 14 00 Water Utility Piping* specification has been revised accordingly and is attached to this addendum.

End of Addendum #1

SECTION 33 14 00

WATER UTILITY PIPING, VALVES, AND ACCESSORIES

PART 1 – GENERAL

1.1 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals required to install and test pipe, fittings, and accessories complete as shown on Drawings and as specified herein.

B. This Specification includes all exterior water main and service piping and appurtenances to 5 feet outside of a building or vault exterior wall.

1.2 SUBMITTALS

A. General: Provide submittals in accordance with Specification 01 33 23.

B. Product data for pipe, gaskets, fittings, valves, water meters, and associated components listed herein. Pipe data shall include pipe class, wall thickness, and pressure rating.

C. Shop drawings for pre-cast concrete valve pits and meter pit, including frames and covers.

D. Shop drawings for cast-in-place concrete valve pits and meter pit, including frames and covers.

E. Line layout and marking diagram for all restrained joint areas.

F. Operation and maintenance data for valves.

1.3 QUALITY ASSURANCE

A. Comply with the requirements of utility supplying water to the Project.

B. All pressure water pipe shall be furnished by a single manufacturer. The supplier shall be responsible for the provisions of all specified test requirements as applicable. In addition, all water pipe to be installed under this Contract may be inspected at the plant for compliance with these specifications by an independent testing laboratory provided by the Owner. The Contractor shall require the manufacturer's cooperation in these inspections. The cost of plant inspection of all pipe approved for this Contract will be borne by the Owner.

C. Inspections of pipe may also be made by the Owner after delivery. The pipe shall be subject to rejection at any time on account of failure to meet any of the Specification requirements, even though sample pipes may have been accepted as satisfactory at the

place of manufacture. Pipe rejected after delivery shall be marked for identification and shall be removed from the job at once.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle water mains, valves, and appurtenances in accordance with the manufacturers' recommendations and in a manner which protects the materials.

B. All items shall be bundled or packaged in such a manner as to provide adequate protection of the ends during transportation to the site. Any pipe damaged in shipment shall be replaced as directed by the Owner.

C. The use of chains, hooks or other equipment that might damage the pipe or pipe coating is not permitted. Stockpiled pipe shall be supported on sand or earth berms free of rock exceeding three inches in diameter.

D. Any pipe or fitting showing a crack or which has received a blow that may have caused an incident fracture, even though no such fracture can be seen, shall be marked as rejected and removed at once from the work.

E. Gaskets shall be stored in a secure dry place and protected from ultraviolet light.

F. If any defective item is discovered after it has been installed, it shall be removed and replaced with an exact replacement item in a satisfactory manner by the Contractor, at the Contractor's own expense. All pipe and fittings shall be thoroughly cleaned before installation and the interior shall be kept clean until completion of the project.

G. In handling the items, use special devices and methods as required to achieve the results specified herein. No uncushioned devices shall be used in handling the item.

1.5 PROJECT CONDITIONS

A. Site Information: Perform site survey, research public utility records, and verify existing utility locations. Verify that water service piping may be installed in compliance with the original design and referenced standards.

B. Contractor is responsible for compatibility between pipe materials, fittings, and appurtenances.

1.6 SEQUENCING AND SCHEDULING

A. Coordinate connection to public water mains with utility company.

B. Coordinate with interior water distribution piping.

C. Coordinate with other utility work.

PART 2 – PRODUCTS

2.1 WATER MAIN PIPE AND FITTINGS

A. High Density Polyethylene (HDPE) Pipe, 3-inch IPS **DR17**. High density polyethylene pipe shall be manufactured from PE4710 resin, conform to ASTM D3350, and be certified per NSF/ANSI 61. Provide standard pipe having plain ends for heat welded joints and cast iron equivalent outside diameter. Provide **DR 17 for a 125 psi** pressure rating.

B. Ductile Iron Pipe, 3- through 12-inch (DI). Push on joint ductile iron pipe shall conform to ANSI/AWWA C151/A21.51, ANSI/AWWA C111/A21.11, and ANSI/AWWA C104/A21.4 (cement lined). Pipe 12 inches and less shall meet Pressure Class 350, A21.51 standards.

C. PVC Pipe, 2- through 3-inch. Push-on joint PVC pipe shall be polyvinyl chloride (PVC) conforming to ASTM D2241 with material cell classification 12454 per ASTM D1784. Provide standard pipe having integral bell and spigot with elastomeric gasket and cast iron equivalent outside diameter. Provide pipe in standard 20-foot laying lengths. Random lengths will not be permitted. Provide DR 26 rated for 160 psi or as shown on the Drawings. Fittings shall be as follows unless specified otherwise: one-piece injection molded PVC gasketed, material cell classification 12454 per ASTM D1784, SBR gaskets, meeting ASTM D3139, and DR 21 with a 200 psi pressure rating. Provide fittings with bells and gaskets specifically designed for cast iron equivalent outside diameter PVC or HDPE pipe, as required.

D. PVC Pipe, 4- through 12-inch. Push-on joint PVC pipe shall be polyvinyl chloride (PVC) conforming to AWWA C900 with material cell classification 12454-B per ASTM D1784. Provide standard pipe having integral bell and spigot with elastomeric gasket and iron pipe size outside diameter. Provide pipe in standard 20-foot laying lengths. Random lengths will not be permitted. Provide DR 18 rated for 235 psi or as shown on the Drawings.

E. Polyethylene (PE) Pipe and Tubing for Gas Service, 1/2- through 2-inch. Pipe and tubing shall be polyethylene grade PE2406 or PE2708, minimum cell classification 234373E per ASTM D2513 and D3350. Fittings shall be socket type per ASTM D2683, butt fusion per ASTM D3261, or electrofusion per ASTM F1055. Connections to metallic piping shall meet ASTM D2513, F1973, or F2509. Install and test piping system in accordance with fuel and plumbing codes and manufacturer's written instructions.

F. Ductile Iron Pipe Fittings, 3- through 48-inch. Mechanical joint fittings shall be ductile iron Class 350, conforming to ANSI/AWWA C153/A21.53 or ANSI/AWWA C111/A21.11. Joints shall comply with ANSI/AWWA C111/A21.1. Fittings shall be cement lined in accordance with ANSI/AWWA C104/A21.04. Fittings shall have fully restrained joints. Provide ductile iron fittings conforming to AWWA C110 with a

minimum rated working pressure of 350 psi. Provide fittings with bells and gaskets specifically designed for cast iron equivalent outside diameter PVC or HDPE pipe, as required.

G. The manufacturer shall furnish all joint materials including rubber gasket and joint lubricant. Gasket shall meet ASTM F477 unless otherwise specified.

H. Where flanges are required as indicated in the Drawings or as specified herein, flanges shall be in accordance with ANSI B16.1 and shall be rated for the piping system's working pressure. Gaskets shall be 1/8 inch ring type full face Garlock 3200 compressed non-asbestos sheet packing or approved equal.

I. Dielectric Insulation. Provide dielectric insulating-flanged joints as required for cathodic protection for dissimilar metals. Provide flange insulation kits to include flange insulating gasket, flange bolt insulating sleeves and flange bolt insulating washers.

1. Pipeline Seal and Insulator, Inc., Advance Products and Systems, Inc, Type E for full protection of both flange faces, or approved equal.
2. Neoprene faced phenolic gaskets.
3. Insulating bolt sleeves shall be the single one-piece type. Separate insulating sleeve and insulating washers are unacceptable.

2.2 WATER SERVICE LINE AND FITTINGS

A. Copper Tubing (COP)

1. Underground installations – Soft annealed, Type K, conforming to ANSI H23.1.
2. Interior and above ground installations – Hard drawn domestic Type L, conforming to ANSI H23.1.

B. High Density Polyethylene (HDPE) Tubing. Class 200, copper tube size (CTS), for potable water supply.

C. Fittings

1. Heavy duty three-part couplings shall be used to join lengths of service line. Compression pack joints shall be used. Provide tubing inserts as needed.

D. All brass that comes in contact with potable water shall conform to AWWA C800 (UNS C89833). These products shall have the letters "NL" cast into the body for proper identification. Brass components that do not come in contact with potable water shall conform to AWWA C800 (ASTM B-62 and ASTM B584, UNS C83600-85-5-5-5).

E. Corporation stops shall be ball type, heavy duty brass as manufactured by Ford Meter Box Company, Mueller or equal. Only compression pack joints may be used.

F. Service saddles on 4-inch and larger mains shall be double strap, epoxy coated with stainless steel hardware, and used for all taps. Services on 3-inch and smaller mains shall use deep bell ductile iron fittings meeting ASTM A536 with joints meeting AWWA C111 and coating meeting AWWA C153.

G. Curb stops shall be ball type, heavy duty brass as manufactured by Ford Meter Box Company, Mueller, McDonald or equal. Only compression pack joints may be used. The curb stops shall not have a drain. Provide each curb stop with a valve box as specified herein.

2.3 VALVES

A. Gate Valves 2- to 12-inch: Conform to AWWA C509 latest revision. Gate valves shall be resilient seated with an encapsulated disc with elastomer seat which, in the closed position, creates a seal on the cast iron body resulting in a bubble tight seal across this disc at 200 psi. Buried valves shall operate with a 2" square wrench nut and shall open counter-clockwise. Valves shall have non-rising stem, mechanical joints on both sides (except that tapping valves shall be mechanical joint on one side and flanged on the other side), and shall have fusion bonded epoxy coating on all exterior and interior surfaces. Valve stem shall seal with two "O" rings, each of which shall be designed to allow replacement under full line pressure when the valve is in the open position. Valve bolts shall be Type 18-8 stainless steel.

B. Buried Operators

1. Buried service operators on valves larger than 2-1/2 inches shall have a 2-inch AWWA operating nut. Buried operators on valves 2 inches and smaller shall have cross handle for operation by forked key unless specified otherwise. Enclose moving parts of valve and operator in housing to prevent contact with the soil.
2. Design buried service operators for quarter-turn valves to withstand 450 foot-pounds of input torque at the FULLY OPEN or FULLY CLOSED positions, grease packed and gasketed to withstand a submersion in water to 10 psi.
3. Buried valves shall have extension stems, bonnets, and valve boxes. Where the depth of the valve is such that its centerline is more than 3 feet below grade, furnish an operating extension stem with 2-inch operating nut to bring the operating nut to a point 6 inches below the surface of the ground and/or box cover.

2.4 VALVE BOXES

A. Cast iron valve boxes and covers shall be provided on all buried gate valves. The boxes shall be adjustable and extend from the valve to the ground surface, with an 18-inch minimum overlap. Minimum diameter of valve boxes shall be six (6) inches. Provide a minimum of one (1) 4-foot long valve key, Mueller A-24610 T-handle operating wrench or approved equal.

B. Cast iron curb stop boxes shall be "Erie" type with 9/16" diameter rod and plug cover, cotter pin at base of rod shall be stainless steel. For any valve larger than 1", a properly sized foot piece shall also be installed. Provide a minimum of two (2) 4-foot long curb stop wrenches, Trumbull 367-4294 or approved equal.

2.5 PRESSURE REDUCING VALVES – 1" AND SMALLER

A. None

2.6 PRESSURE REDUCING VALVES – 1-1/2" AND LARGER

A. None

2.7 RESIDENTIAL WATER METERS

A. None

2.8 METER PITS

A. None

2.9 FIRE HYDRANTS

A. Fire hydrants shall be furnished and installed by the Contractor, Waterous Pacer WB-67-250, Kennedy K-81-D, or approved equal.

B. Nozzles, Operating Nuts, and Direction to Open: One (1) 4-1/2 inch steamer and two (2) 2-1/2 inch outlets. Threads on nozzles and caps and operating nuts shall be National Fire Hose Coupling Screw Threads, 1-1/2 inch point to flat pentagon operating nuts, and the direction to open shall be to the left (counter-clockwise). A direction to open arrow shall be cast in hydrant adjacent to operating nut. Furnish chains for outlet caps.

C. Pipe Connection: 6 inch mechanical joint.

D. Pressure Rating: 250 psi rated working pressure.

E. Type: 5-1/4 inch dry-barrel, compression type safety breakable section, AWWA C502.

F. Hydrant drains shall be plugged.

2.10 FLEXIBLE COUPLINGS

A. Not allowed unless the product and application are approved by Engineer.

2.11 TAPPING SLEEVES

A. Tapping sleeves shall be cast iron or ductile iron, mechanical joint, with outlet flange conforming to AWWA C-110.

2.12 ANCHORAGES

A. Clamps, Straps, and Washers: ASTM A 506, steel.

B. Rods: ASTM A 575, steel.

C. Rod Couplings: ASTM A 197, malleable iron.

D. Bolts: ASTM A 307, steel.

E. Cast-Iron Washers: ASTM A 126, gray iron.

F. Concrete Reaction Backing: Portland cement concrete mix, 3000 psi.

1. Cement: ASTM C 150, Type I.
2. Fine Aggregate: ASTM C 33, sand.
3. Coarse Aggregate: ASTM C 33, crushed gravel.
4. Water: Potable

G. Mechanical joint restraints shall be manufactured of ductile iron in accordance with ASTM A536 with the following additional requirements or exceptions:

1. Mechanical joint restraints shall be incorporated into the design of a follower gland. Dimensions of the gland shall be such that it can be used with the standardized mechanical joint bell and tee-head bolts in accordance with AWWA C111 and C153.
2. The restraint mechanism shall consist of numerous individually activated gripping surfaces to maximize restraint capability. The gripping surfaces shall be wedges that are designed to spread the bearing surfaces on the pipe. Twist-off nuts, sized the same as tee-head bolts, shall be used to ensure the proper actuating of restraining devices. When the nut is sheared off, a standard hex nut shall remain.
3. The mechanical joint restraint device shall be rated for a maximum working pressure of 350 psi, with a factor of safety of 2.
4. Mechanical joint restraint for 2- to 3-inch PVC pipe shall be Ford Meter Box Uni-Flange Series 1350 or approved equal.
5. Mechanical joint restraint for 4-inch and larger PVC and HDPE pipe shall be EBAA Iron, Inc. Megalug 2000 PV, Sigma Corporation One-Lok SLCE, Star Pipe Products StarGrip 4000, or approved equal.
6. Mechanical joint restraint for ductile iron pipe shall be EBAA Iron, Inc. Megalug 1100, Romac Industries RomaGrip, Sigma Corporation One-Lok SLDE, Star Pipe Products StarGrip 3000 Series, or Uni-Flange (Ford) UFR, or approved equal.

2.13 IDENTIFICATION

A. Plastic Underground Warning Tapes: Polyethylene plastic tape, 6 inches wide by 4 mils thick, solid blue in color with continuously printed caption in black letters "CAUTION - WATER LINE BURIED BELOW."

B. Metallic-Lined Plastic Underground Warning Tapes: Polyethylene plastic tape with metallic core, 6 inches wide by 4 mils thick, solid blue in color with continuously printed caption in black letters "CAUTION - WATER LINE BURIED BELOW."

C. Nonmetallic Piping Label: Engraved plastic laminate label, for installation on the main electrical meter panel; not less than 1 inch by 3 inches, with caption "CAUTION - THIS STRUCTURE HAS A NONMETALLIC WATER SERVICE."

2.14 TRACER WIRE

A. 10 gauge solid strand copper tracer wire shall be installed with all PVC and/or HDPE pipe. Splicing of tracer wire shall be per manufacturer's recommendation.

B. Wire shall be run along main and service alignments and terminated at the top of valve boxes and curb stop boxes in accordance with manufacturer's recommendations.

PART 3 – EXECUTION

3.1 PREPARATION OF BURIED PIPE FOUNDATION

A. Excavate to a depth that provides a minimum finished grade pipe cover of 6-feet.

B. Grade trench bottom to provide a smooth, firm, stable, and rock-free foundation throughout the length of the piping.

C. Remove unstable, soft, and unsuitable materials at the surface upon which pipes are to be laid and backfill with clean sand or pea gravel to indicated level.

D. Shape bottom of trench to fit bottom of piping. Fill unevenness with tamped sand backfill. Dig bell holes at each pipe joint to relieve the bells of all loads and to ensure continuous bearing of the pipe barrel on the foundation.

3.2 INSTALLATION OF PIPE AND PIPE FITTINGS

A. As soon as the excavation is complete to normal grade of the bottom to the trench, bedding shall be placed, compacted, and graded to provide firm, uniform, and continuous support for the pipe. Bell holes shall be excavated so that only the barrel of the pipe bears upon the bedding. The pipe shall be laid accurately to the lines and grades indicated on the Drawings. Blocking under the pipe will not be permitted. Bedding and backfill shall be placed in accordance with Specification 31 23 16. Generally the

compaction shall be done evenly on each side of the pipe and compaction equipment shall not be operated directly over pipe until sufficient backfill has been placed to ensure that such compaction equipment will not have a damaging effect on the pipe.

B. Ductile-Iron Pipe: Install with cement-mortar-lined, ductile-iron or cast-iron, mechanical joint or push-on joint fittings and rubber gaskets in accordance with AWWA C600.

1. Polyethylene Encasement: Install in accordance with AWWA C105.

C. PVC (Polyvinyl Chloride) Pipe: Install with cement-mortar-lined, ductile-iron or cast-iron, mechanical joint or push-on joint fittings and rubber gaskets in accordance with AWWA M23.

D. HDPE Pipe: Sections of polyethylene pipe should be joined into continuous lengths on the jobsite above ground. The joining method shall be the butt fusion method and shall be performed in strict accordance with the pipe manufacturer's recommendations. The butt fusion equipment used in the joining procedures should be capable of meeting all conditions recommended by the pipe manufacturer, including, but not limited to, temperature requirements of 400-450 degrees Fahrenheit, alignment, and an interfacial fusion pressure of 75 psi. The butt fusion joining will produce a joint with weld strength equal to or greater than the tensile strength of the pipe itself. All welds will be made using a data logger to record temperature, fusion pressure, with a graphic representation of the fusion cycle shall be part of the quality control records. Mechanical joining will be used where the butt fusion method cannot be used. Mechanical joining will be accomplished by either using a HDPE flange adapter with a ductile iron back-up ring or HDPE mechanical joint adapter with a ductile iron back-up ring. Socket fusion, hot gas fusion, threading, solvents, and epoxies will not be used to join HDPE pipe. Inspect the pipe for defects before installation and fusion. Defective, damaged, or unsound pipe will be rejected.

E. Copper Tube: Install with compression pack joint fittings.

F. PB (Polybutylene) Pipe: Install with brass or bronze, barbed insert fittings, and 2 strap-type stainless steel clamps over pipe at each insert in accordance with manufacturer's installation instructions.

G. PB (Polybutylene) Tubing: Install with brass or bronze, flared joint or compression joint fittings in accordance with manufacturer's installation instructions.

H. PE (Polyethylene) Pipe and Tubing: Install with copper alloy or nylon, barbed insert fittings, and 2 strap-type stainless steel clamps over pipe at each insert in accordance with manufacturer's installation instructions.

I. Depth of Cover: Provide six (6.0) feet of minimum cover over piping.

J. The Owner may examine each bell and spigot end to determine whether any preformed joint has been damaged prior to installation. Any pipe having defective joint surfaces shall be rejected, marked as such and immediately removed from the job site.

K. Before any joint is made, the pipe shall be checked to assure that a close joint with the next adjoining pipe has been maintained and that the inverts are matched to conform to the required grade. The pipe shall not be driven down to the grade by striking it.

L. Whenever the pipe is left unattended, temporary plugs shall be installed at all openings. Temporary plugs shall be watertight and of such design as to prevent debris, children, and animals from entering the pipe. If water accumulates in the trench, the plugs shall remain in place until the trench has been pumped out and is sufficiently dry to permit the continuance of work.

3.3 INSTALLATION OF VALVES

A. General Application: Use mechanical joint end valves for 3-inch and larger buried installation. Use flanged end valves for installation in pits and inside building. Use bronze corporation stops and valves with ends compatible to piping for 2-inch and smaller installations.

B. Count and record number of turns to open and close each valve; account for any discrepancies with manufacturer's data.

C. AWWA-Type Gate Valves: Comply with AWWA C600. Install buried valves with stem pointing up and with cast-iron valve box.

D. Bronze Corporation Stops and Curb Stops: Comply with manufacturer's installation instructions. Install buried curb stops with head pointed up and with cast-iron curb box.

3.4 INSTALLATION OF ANCHORAGES

A. Anchorages: Provide anchorages for tees, plugs and caps, bends, crosses, valves, and hydrant branches.

3.5 APPLICATION OF PROTECTIVE COATINGS

A. Apply full coat of asphalt or other acceptable corrosion-retarding material to surfaces of installed ferrous anchorage devices.

3.6 INSTALLATION OF HYDRANTS

A. Install hydrants in locations shown on the plans or as directed by the Engineer. Hydrants shall be installed in accordance with the manufacturer's recommendations. Hydrant drains shall be plugged.

3.7 INSTALLATION OF VALVE PITS AND WATER METER PITS

A. Construct poured-in-place or pre-cast concrete of dimensions indicated, with manhole frame and cover, ladder, and drain. Provide sleeves with waterproof sleeve seals for pipe entry and exit.

B. Water Meter: Install water meter in accordance with AWWA M6, in meter pit, in location and with support as indicated. Provide 3-valve bypass around meter, full size of water service piping.

3.8 INSTALLATION OF IDENTIFICATION

A. Install continuous plastic underground detectable warning tape during back-filling of trench for underground water service piping. Locate approximately 18 inches above pipe, directly over centerline of piping.

3.9 RECORD DRAWINGS

A. The following record drawings must be prepared by the Contractor:

1. Precisely measured dimensions to all on-line gate valves.
2. Precisely measured dimensions to all blow-offs.
3. Precisely measured dimensions to all house service shut-offs.
4. Precisely measured dimensions to all house service taps to primary mains.
5. Precisely measured dimensions to all distribution piping at approximately 200-foot intervals.
6. Precisely measured dimensions to any principal changes in pipe direction or size.
7. Precisely measured dimensions of vertical depths of pipes and appurtenances, shown on the profiles.

3.10 CLEANING AND DISINFECTION

A. Mains and appurtenances shall not be put in service until satisfactory disinfection and leakage testing has been performed. Testing shall be completed between main line gate valves, with a maximum length of 2,000 linear feet. Clean and disinfect water distribution piping as follows:

1. Purge all new water distribution piping systems and parts of existing systems that have been altered, extended, or repaired, prior to use.
2. Use the purging and disinfecting procedure prescribed by the authority having jurisdiction or, in case a method is not prescribed by that authority, use the procedure described in AWWA C651-14, or as described below:

    a. Fill the system or part thereof with a water/chlorine solution containing at least 50 parts per million of chlorine.

b. Isolate (valve off) the system or part thereof and allow to stand for 24 hours. At the end of the 24 hour period, the treated water in all portions shall contain a residual of not less than 10 mg/l free chlorine.
c. Operate all gate valves within the test section to disinfect.
d. Following the allowed standing time, flush the system with clean, potable water from the system in accordance with AWWA C651-14.
e. Submit water samples to a laboratory approved by the Engineer for bacteriological analysis in accordance with AWWA C651-14.

B. Furnish copies of laboratory test results to the Engineer for review prior to placing the mains in service.

C. Heterotrophic plate count (HPC) testing may be required at the discretion of the Owner.

D. The Contractor is responsible for all costs associated with disinfection and testing, including any and all costs for re-chlorination and re-testing necessary due to failed tests.

E. After a failed disinfection test, the Contractor shall flush, re-chlorinate, and re-test the main until such time as a satisfactory test result is obtained.

3.11 HYDROSTATIC TESTING

A. The Contractor shall notify the Engineer and the Owner at least 48 hours in advance of beginning testing or disinfection. The Contractor shall utilize the services of a certified subcontractor to perform hydrostatic, conductivity, and other tests on the completed water main in accordance with AWWA C600-17 Specifications. This third-party will provide a certified report to the Owner and Engineer. The Contractor may assist the subcontractor and furnish all necessary equipment.

B. The pipe shall be subjected to hydrostatic pressure of one (1) and one-half (1-1/2) times the design pressure (at least 100 psi) at the lowest elevation of the test section, and this pressure maintained for at least two hours. The test pressure shall not exceed the thrust restraint design pressures or 1.5 times the pressure rating of the pipe or joint, whichever is less (as specified by the manufacturer).

C. The leakage test shall be conducted at a pressure as determined by the Engineer and this pressure shall be maintained for at least 120 minutes during the test. The amount of leakage which will be permitted shall be in accordance with the Specifications for Installation of Water Mains by AWWA C600. For flanged joints, no leakage shall be allowed. The allowable rate of leakage shall be less than the number of gallons per hour determined by the following formula:

$$L = \frac{SD\,(P)^{1/2}}{133{,}200}$$

L= Allowable leakage in gallons per hour
S= Length of pipe tested, feet
D= Nominal diameter of the pipe in inches
P= Average test pressure maintained during the leakage test in pounds per square inch gauge

The testing procedure shall include the continued application of the specified pressure to the test system for the two-hour period by way of a pump taking supply from a container suitable for measuring water loss. The amount of loss shall be determined by measuring the volume displaced from said container. When hydrants are in the test section, the test shall be made against the main valve in the hydrant.

C. Any exposed pipe, fittings, valves, hydrants, and joints shall be examined during the test. Any damaged or defective pipe fittings, valves, or hydrants that are discovered following the pressure test shall be repaired or replaced with sound material, and all tests shall be repeated.

D. The pressure shall not vary by more than ±5 psi from the required pressure for the duration of the test. If at any point during the test the pressure loss exceeds 5 psi, the test is considered failed. Should the test fail, the Contractor shall accomplish necessary repairs and the test repeated until within the established limits.

E. Tests to be made only after partial or complete backfilling of trenches. Position of valves (fully opened or closed) in section of line to be tested shall be checked in the presence of the Engineer to ensure that:

1. All hydrant branch connections are open to the hydrant (hydrant closed, branch connection valve open).
2. All main line valves are properly positioned for section of line being tested.

F. Tests not to be performed for at least seven (7) days after last concrete block or anchor has been cast.

G. Expel air from pipelines, fittings and appurtenances prior to performing tests. If permanent air vents are not located at all high points, the Contractor shall install corporation stops at his expense at such points so that the air can be expelled as the line is filled with water. These stops shall be protected with a masonry bridge to prevent breakage during backfilling.

H. Examination under pressure: All exposed valves, hydrants and joints shall be examined carefully during the hydrostatic and leakage tests.

I. Evaluation of Results/Corrective Actions:

1. Examination of leakage: If any leakage test of section of the system discloses a leakage greater than that specified herein, the Contractor shall, at his own expense, locate and repair or replace the defective or damaged materials. He shall then repeat the entire test and make additional repair and test and continue to repeat until the leakage is within specified allowance.

2. All visible leaks are to be repaired by the Contractor, at his own expense, regardless of the amount of leakage.

End of Section

NHDOT ROW PERMIT CONDITIONS

GLENCLIFF IMPROVEMENT COMPANY WATER DISTRICT
CONTRACT 2 - WATERMAIN IMPROVEMENTS
WARREN, NEW HAMPSHIRE
PWS 2421010 / DWGT-100

SEPTEMBER 2025

1. No work in the NHDOT ROW shall be permitted during inclement weather/periods of restricted visibility, the hours of darkness, weekends, holidays, or during the period from November 15th to April 15th. Exceptions may be permitted at the discretion of the NHDOT.
2. The NHDOT reserves the right to suspend any or all construction activities, which, in the NHDOT's opinion are unsafe to the traveling public, or for any other reason.
3. The NHDOT reserves the right to limit work to within certain days and times, which may be an additional requirement of this permit.
4. The NHDOT may inspect, test, and/or monitor any and all of the Contractor's activities within the ROW to ensure compliance with this permit.
5. This permit does not abrogate the rights of abutting Owners or relieve the Contractor from complying with all applicable laws, regulations, codes, or orders issued by the NHDOT, or other appropriate agencies.
6. Interruptions to traffic shall be kept to a minimum and be maintained in accordance with the Manual on Uniform Traffic Control Devices (MUTCD), as revised during the performance of the work. Traffic shall be protected by suitable barricades, standard warning and advance warning signs, uniformed officers (as appropriate), and/or flaggers during performance of the work. Approved work during the hours of darkness shall have proper lighting. All signs shall be kept clean and in good repair.
7. Two-way traffic shall be maintained at all times during nights, weekends, and holidays, unless otherwise approved by the NHDOT.
8. Detour of State highway traffic requires prior approval by the NHDOT and shall be in accordance with an approved Traffic Control Plan. If municipal roads are to be used, municipal approval is necessary by way of a letter waving the NHDOT of liability from the added traffic and road wear.
9. Damage to the roadway, resulting from work or detoured traffic, shall be repaired by the Contractor to the NHDOT's satisfaction.
10. The Contractor shall clear the roadway of all foreign material at the end of each working day or as directed by the NHDOT.
11. Equipment must be removed from the highway clear zone during nights, weekends, holidays, and periods of shutdown. If this cannot be achieved within the ROW, the Contractor shall seek an alternate location or provide MUTCD approved delineation of all non-active construction equipment left unattended. Suitable barricades and lighting shall be erected to properly protect the work areas. Periodic maintenance of signs during periods of shutdown is required to restore blown over or missing signs, cones, and other traffic control devices. Routine NHDOT maintenance operations shall not be hindered by the Contractor's activities.
12. If a highway sign or guardrail must be moved to allow for this work, said sign and guardrail shall be reinstalled or replaced at the location of removal at the end of each workday or replaced by approved temporary devices pending permanent installation. Reinstallation of posts, rail, or terminals must be performed by a competent company, to be approved by NHDOT.
13. Following completion of work activities, the NHDOT will field review the work area for general conformance to NHDOT standards for construction within the NHDOT ROW. Final acceptance may be reasonably withheld should the work not be completed in an acceptable manner and in accordance with the terms of this permit.
14. Any issue within the project area, due to settlement or other causes attributable to the project, shall be corrected by the Contractor as required during construction and for a period of two (2) years following the acceptance of the project by NHDOT.

15. The Contractor shall notify Dig Safe as required by RSA 374:48-56 (Call 1-888-DIG-SAFE)

16. Photographs and/or videos in sufficient detail to show the existing condition of the area to be disturbed within the ROW shall be furnished to the NHDOT prior to the start of work. Photographs of all State underground structures shall be taken just prior to backfill and furnished to the NHDOT.

17. During the hours the job is inactive, a standby crew shall be on call. Contact information for this crew shall be furnished to the following people: local NHDOT District Dispatch, NHDOT Transportation Management Center, local police chief, local superintendent of public works or road agent (if the project is municipally owned), and the local NHDOT patrol foreman.

18. Pipe, equipment, and supplies shall not be stored within the NHDOT ROW without prior approval by the NHDOT. Pipe or materials shall not be laid out ahead of construction.

19. No trench shall be left open or unsafe at night or over weekends. Suitable unrestricted ingress and egress to properties abutting the highway shall be maintained at all times.

20. In areas where the pavement is to be excavated, trench size shall be minimized and it shall be neatly and uniformly sawcut, with square edges by machine, at each side of all trenches. Every precaution shall be used to prevent undermining of the remaining pavement, utilizing sheeting as required. Undermined areas developed inadvertently shall have the projecting pavement cut square and removed.

21. The pavement and base course materials are to be discarded and handled as surplus materials.

22. All excavated topsoil, or in the absence of topsoil the top 6 inches of soil, within the limits of State ROW shall be properly re-used within the limits of the State ROW. All temporary stockpiles of the re-use material shall be located within the State ROW, or as otherwise approved by the NHDOT.

23. All backfill material in trenches and below base courses shall consist of previously excavated material suitable for backfill as defined in current NHDOT Standard Specifications Section 603. All backfill shall be compacted at or near optimum moisture content, in layers not exceeding six (6) inches compacted thickness, using pneumatic tampers, vibratory compactors, or other approved means. The material shall be compacted to not less than ninety-five (95) percent of maximum density as determined by AASHTO T99 (Standard Proctor Test). Water shall be uniformly applied during compaction in the amount necessary for proper compaction.

24. Within paved areas, crushed gravel meeting current NHDOT Standard Specifications Section 304, or approved equal to the existing gravel course, shall be placed in layers not exceeding six (6) inches compacted thickness, and thoroughly compacted.

25. Excavation dewatering shall not be pumped onto the State highway pavement or into State drainage structures.

26. Damage to existing drainage structures and systems shall be repaired in a manner approved by the NHDOT. Methods and materials utilized for the repair shall be subject to prior approval. Drainage structures or systems shall be cleaned of all material that has accumulated as a result of the work.

27. Gravel shoulders disturbed during construction shall be restored by placing a similar depth of crushed gravel for shoulder leveling meeting current NHDOT Standard Specifications Section 304, which shall be graded and compacted on a slope to match the cross slope of the existing roadway shoulder, or as directed by the NHDOT.

28. Earth areas disturbed during the work shall be replaced in kind, with loam, fertilizer, suitable grass seed, and mulch as required.

29. In other areas, the existing surface type shall be restored by placing similar material to a minimum depth and quality equal to or exceeding the existing depth before excavation. Reestablish existing grassland to equal what

existed before excavation. Reestablish lawns to pre-construction condition, using a minimum of four (4) inches of loam, lime, fertilizer, similar seed, and mulch as required. The surface shall be reasonably smooth, free of stones larger than two (2) inches or debris, and be graded to drain. Existing topsoil removed from within the ROW shall only be reused within the NHDOT ROW and not as topsoil on properties beyond the ROW, or as otherwise approved by the NHDOT.

30. An approved hot bituminous pavement plant mix meeting current NHDOT Standard Specifications Section 401, shall be used for all patching material at a depth equal to the existing pavement, unless otherwise stated.

31. Temporary pavement patches shall be placed the same day as the excavation, unless otherwise approved by the NHDOT. In all cases, pavement patches are to be completed prior to the weekend. Whether paved or unpaved, trenches are to be carefully graded and rolled to the adjacent pavement grade at the end of each working day.

32. Just before completion of the project and after suitable exposure of temporary patches to traffic compaction, the pavement shall be saw cut as directed on all sides of the trench to provide a two (2) foot minimum overlap of the final patch on undisturbed material. Within the limits of saw cuts, the existing pavement and temporary patch material shall be removed. An emulsified asphalt tack coat shall be applied to the saw cut edges of the pavement, and the new asphalt pavement shall be placed to an equal depth, but not less than four (4) inches, placed as directed, and compacted to meet the existing pavement grades. Finished pavement must replicate the original pavement design including normal crown, superelevations, and breaks in superelevated shoulders. Saw cuts for final patching shall be as directed by the NHDOT.

33. After paving, temporary raised markers are to be installed if permanent MUTCD standard pavement markings are not painted soon after. Temporary yellow overlay markers shall be placed in pairs, separated by a lateral space of approximately three (3) inches, using a maximum spacing of eighty (80) feet. On sections of roadway with severe curvature, lesser spacing should be used so that at least three (3) pairs of markers are visible to approaching traffic at all times. Temporary overlay markers shall be removed following placement of standard pavement markings.