

CITY OF ROCHESTER, NH
31 Wakefield St.
Rochester, NH 03867
INVITATION TO BID

City of Rochester, NH is soliciting a competitive bid;

BID: Bid 24-27 Eastern Avenue Sanitary Sewer and Surface Drain Rehabilitation Project

1. BID Submission Options-Hardcopy, or Electronically:
 - a) Submit Hardcopy via USPS, FEDEX, or UPS: City of Rochester, NH, Purchasing Agent 31 Wakefield St. Rochester, NH 03867. Reference **Bid 24-27** on package. In person drop-offs are to go to the Finance Office at City Hall, 31 Wakefield Street, Rochester, NH 03867.
 - b) Submit Electronically via Email: RFP24-27@rochesternhnet.onmicrosoft.com Include in Email subject line: **Bid 24-27**. An automated email confirmation will be generated to bidder once bid has been received. It is bidder's responsibility to ensure proper email submission of bid, and to monitor for the confirmation email.
2. Bid Receipt Date & Time: No later than **March 20, 2024, at 5:00pm**.
3. Bid Opening Date & Time: **March 21, 2024 at 2:30pm**. Opening will be conducted in person in Council Chambers, 31 Wakefield Street, Rochester, NH 03867.
4. Bid Specifications, Questions & Addendums (Q&A): Can be obtained by visiting <https://rochesternh.gov/bids> see **OPEN BIDS** section. Or contact City of Rochester, NH Purchasing Agent 31 Wakefield St. Rochester, NH 03867, purchasing@rochesternh.gov, 603-335-7602. Note Q&A updates will end one week prior to bid opening.
5. Bid Results: Results of bids can be obtained at <https://rochesternh.gov/bids>, in **CLOSED BIDS** section. Select the specific bid to see all results, or contact Purchasing Agent.



westonandsampson.com

WESTON & SAMPSON ENGINEERS, INC.
100 International Drive, Suite 152
Portsmouth, NH 03801
tel: 603.431.3937

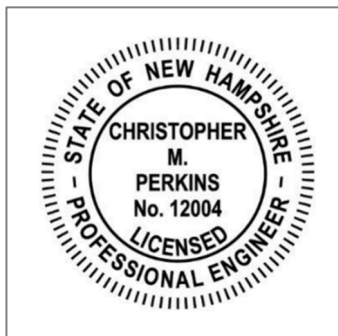
CONTRACT
DOCUMENTS

FEBRUARY 2024

CITY OF
Rochester
New Hampshire

EASTERN AVENUE SANITARY SEWER
AND SURFACE DRAIN REHABILITATION
PROJECT

City of Rochester: Bid 24-27



February 29, 2024

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* Denotes items to be submitted with Bid.

END OF SECTION

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SECTION 01014

SCOPE AND SEQUENCE OF WORK

PART 1- GENERAL

1.01 WORK INCLUDED:

- A. This Section of the specifications covers the scope and sequence of work for the “Eastern Avenue Sanitary Sewer and Surface Drain Rehabilitation Project” in Rochester, New Hampshire including:

The base bid includes open cut relocation of an existing section of water main and replacement of an existing section of sewer at one location, installation of 8,529 lf of structural cured-in-place pipe and reinstatement of active service connections, cutting of 8 protruding service connections, cementitious lining of 145 vf of manholes, epoxy lining of 160 vf of manholes, building of 1 sewer manhole bench and invert, chemical root treatment of 8 sewer manholes, and other related tasks.

Alternate bid 1 includes installation of 565 lf of structural ultraviolet cured-in-place pipe and reinstatement of active service connections, installation of 45 lf of pull in place glass reinforced plastic ultraviolet light cured-in-place pipe, cutting of 5 protruding service connections, and other related tasks.

Alternate bid 2 includes installation of 370 lf of structural ultraviolet cured-in-place pipe and reinstatement of active service connections, and other related tasks.

- B. The Contractor shall furnish all labor, materials, equipment, and incidentals required to complete the work as shown on the drawings and as specified herein.
- C. Sewer and surface drain system rehabilitations include:
1. Chemical root treatment (refer to Section 02437, SEWER LINE AND MANHOLE CHEMICAL ROOT TREATMENT);
 2. Relocation of an existing section of water main and replacement of an existing section of sewer (Section 02516, CONNECTIONS TO EXISTING WATER MAINS; Section 02442, POINT REPAIR OF GRAVITY SANITARY, SURFACE, AND COMBINED SEWERS);
 3. Lining of sewer mains (manhole to manhole) to repair and seal multiple cracks and holes which are leaking or have the potential to leak (refer to Section 02428, CURED-IN-PLACE PIPE);
 4. Lining of surface drain mains (manhole to manhole) using ultraviolet cured-in-place method to repair and seal multiple cracks and holes (refer to Section 02431, GLASS REINFORCED PLASTIC CURED-IN-PLACE PIPE);

5. Lining of a culvert using pull in place ultraviolet cured-in-place method to repair and seal multiple cracks and holes (refer to Section 02431, GLASS REINFORCED PLASTIC CURED-IN-PLACE PIPE);
6. Rehabilitating service connections including cutting protruding services; television inspecting, pressure testing and grouting to repair and seal cracks and holes which are leaking or have the potential to leak or to seal a reinstated service connection at a liner (refer to Section 02443, SERVICE CONNECTION REHABILITATION);
7. Rehabilitating manholes including invert sealing, exterior sealing and interior coating (refer to Section 02435, MANHOLE REHABILITATION); and
8. Building of a bench and invert in a sewer manhole (refer to Section 02630, BUILDING MANHOLE INVERTS).

1.02 RELATED WORK:

- A. SUPPLEMENT TO SPECIFICATIONS – SPECIAL PROVISIONS
- B. SECTION 01110 – CONTROL OF WORK AND MATERIALS

PART 2 – PRODUCTS – NOT APPLICABLE

PART 3 - EXECUTION

3.01 SEQUENCE OF WORK:

- A. The Contractor shall be responsible for scheduling its activities and the activities of any subcontractors involved, to meet the completion date, or milestones, established for the contract. Scheduling of all work shall be coordinated with the Owner and Engineer.
- B. Root treatment of sewers manholes shall be conducted first. Any other work in the root treated segments of sewer (manhole to manhole) shall not be performed until a waiting period has passed in accordance with Section 02437, SEWER LINE CHEMICAL ROOT TREATMENT.
- C. Cleaning and inspecting shall be performed prior to all other pipeline rehabilitation work in each segment of sewer (manhole to manhole).
- D. Relocation of a water main and replacement of a section of the existing sewer pipe (open cut point repairs) shall be performed prior to any other trenchless pipeline rehabilitation work required in that line segment or adjacent manhole rehabilitation work.
- E. Cutting of protruding service connections required in a segment of sewer (manhole to manhole) shall be performed prior to the installation of any trenchless pipeline rehabilitation work required in that segment.

- F. Lining (manhole to manhole) required in a segment of sewer (manhole to manhole) shall be completed prior to any television inspecting, pressure testing, or grouting of service connections required in that segment.
- G. Manhole rehabilitation (including invert sealing, exterior sealing and interior coating) shall be performed after cured-in-place pipe has been installed.
- H. All work may be scheduled at the Contractor's discretion within the time of contract so long as it adheres to this scope and sequence of work and all plans and specifications. The schedule is also subject to approval by the Engineer.

END OF SECTION

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NHDES Front End Documents Section A: Bidding Requirements

Advertisement for Bids

Owner Name: City of Rochester, New Hampshire		Project Number: Bid 24-27		
Project Address:	31 Wakefield Street	Rochester	NH	03867
	Street # and name	City/Town	State	ZIP

Separate sealed BIDS for the construction of: Eastern Avenue Sanitary Sewer and Surface Drain Rehabilitation Project will be received by The City of Rochester at the office of "Finance Office" 31 Wakefield Street Rochester, NH 03867 (**Reference Bid 24-27 on package**) until **5:00 PM**, Local Time on **Wednesday March 20th, 2024** and then opened at Council Chambers at City Hall at said address at **2:30 PM** on **Thursday March 21st, 2024** and publicly opened and read aloud.

1. Completion time for the project will be calculated as calendar days from the date specified in the "Notice to Proceed" as follows:
 - 90 calendar days for substantial completion (excluding re-test inspection).
 - 120 calendar days for final completion (excluding re-test inspection).
 - 21 calendar days for re-rest inspection

Liquidated damages will be in the amount of \$1,260 for each calendar day of delay from the date established for substantial completion, and \$1,260 for each calendar day of delay from the date established for final completion.
2. Each General Bid shall be accompanied by a Bid Security in the amount of 5% of the Total Bid Price.
3. The successful Bidder must furnish 100% Performance and Payment Bonds and will be required to execute the Contract Agreement within 10 days following notification of the acceptance of their Bid.
4. Any contract or contracts awarded under this Advertisement for Bids are expected to be funded in whole or in part by: **(Select all appropriate.)**
 - A loan from the NH Clean Water State Revolving Fund.
 - A loan from the NH Drinking Water State Revolving Fund.
 - A loan from the NH Drinking Water and Groundwater Trust Fund.
 - A grant from the NH Drinking Water and Groundwater Trust Fund.
 - A State Aid Grant from the NH Department of Environmental Services (SAG).
 - A grant from the American Rescue Plan Act from the NH Department of Environmental Services (ARPA).
 - A loan or grant from USDA Rural Development.
 - A Community Development Block Grant (CDBG) from the NH Community Development Finance Authority.
5. No Bidder may withdraw a Bid within 75 days after the actual date of opening thereof.
6. Questions shall be submitted via email to LabrieT@wseinc.com. Questions must be submitted no later than 14 Days prior to Bid Opening.

The Contract Documents may be examined at the following locations:

Weston & Sampson Engineers, Inc. 100 International Drive, Suite 152, Portsmouth, NH 03801

Accent Printing, Inc., 99 Chelmsford Road, North Billerica, Massachusetts

Contract Documents may be viewed and downloaded as a Portable Document Format (PDF) file free of charge at www.accentblueprints.com. Copies may be obtained for a fee by completing an order online or by calling 978-362-8038 for each set. Completed orders may be picked up at the office of Accent Printing located at 99 Chelmsford Road, North Billerica, MA 01862 (978-362-8038), from 9 a.m. to 4 p.m. Copies may also be shipped to prospective bidders for an additional charge to cover handling and mailing fees. All payments for printing and shipping are nonrefundable. For addition to the project plan holder's list to guarantee receipt of addenda, it is recommended interested bidders obtain the Contract Documents directly from Accent. Interested bidders will be prompted to register an email address with Accent to access the documents.

INSTRUCTION TO BIDDERS

- I. PREPARATION OF BID PROPOSAL**
- II. IRREGULAR PROPOSALS**
- III. DELIVERY OF PROPOSALS**
- IV. ELECTRONIC BID FORMAT**
- V. WITHDRAWAL OF BID PROPOSAL**
- VI. PUBLIC OPENING OF BID PROPOSAL**
- VII. DISQUALIFICATION OF BIDDERS**
- VIII. CONSIDERATION OF PROPOSALS**
- IX. AWARD OF CONTRACT**
- X. CANCELLATION OF AWARD**
- XI. BID EVALUTAION**
- XII. CONDITIONS AT SITE**
- XIII. LAWS, PERMITS & REGULATIONS**
- XIV. CONTRACTOR'S AND SUBCONTRACTOR'S INSURANCE**
- XV. ACCIDENT PROPTCTIONS**
- XVI. SUBCONTRACTS**
- XVII. PROTECTION OF WORK & PROPERTY**
- XVIII. USE OF PREMISES & REMOVAL OF DEBRIS**
- XIX. MATERIALS AND WORKMANSHIP**
- XX. STANDARDS**
- XXI. EXTRAS**
- XXII. GUARANTEE OF WORK**
- XXIII. DEFAULT & TERMINATION OF CONTRACT**
- XXIV. OPENING BID RESULTS**
- XXV. BID FORM**

I. PREPARATION OF BID PROPOSAL

1. The Bidder shall submit her/his proposal upon the form(s) furnished by the City (attached). The bidder shall specify a unit price for each pay item. All figures shall be in ink or typed.
2. If a unit price or lump sum bid already entered by the bidder on the proposal form is to be altered it should be crossed out with ink, the new unit price or lump sum bid entered above or below it, and initialed by the bidder, also with ink. In case of discrepancy between the prices written in words and those written in figures, the prices written in words shall govern.
3. The bidder's proposal must be signed with ink by an individual authorized by company to execute the proposal. Required information shall be name of authorized individual, title of individual, legal business name, address, email, and telephone number.
4. All questions shall be submitted in writing to and received by the Purchasing Agent at the above address, a minimum of 7 days prior to the scheduled bid opening. The Purchasing Agent, will then forward both the question and the city's response to the question to all known prospective bidders.

II. IRREGULAR PROPOSALS

Bid proposals will be considered irregular and may be rejected for any of the following reasons:

1. If the proposal is on a form other than that furnished by the Owner or if the form is altered or any part thereof is detached.
2. If there are unauthorized additions, conditional or alternate bids, or irregularities of any kind which may tend to make the proposal incomplete, indefinite or ambiguous as to its meaning.
3. If the bidder adds any provisions reserving the right to accept or reject an award, or to enter into a contract pursuant to an award.
4. If the proposal does not contain a unit price for each pay item listed, except in the case of authorized alternate pay items.

III. DELIVERY OF BID PROPOSALS

When sent by mail, the sealed proposal shall be addressed to the City of Rochester, Purchasing Agent, 31 Wakefield Street, Rochester, NH 03867. All proposals shall be filed prior to the time and at the place specified in the invitation for bids. Proposals received after the time for opening of the bids will be returned to the bidder, unopened. Faxed bid proposals are not acceptable.

IV. ELECTRONIC BIDS: Due to Covid-19 the City of Rochester has incorporated an electronic bid process. If an electronic format is to be utilized specific submission instructions will be identified in the bid cover page.

V. WITHDRAWAL OF BID PROPOSALS

A bidder will be permitted to withdraw his proposal unopened after it has been deposited if such request is received in writing prior to the time specified for opening the proposals.

VI. PUBLIC OPENING OF BID PROPOSALS

Proposals will be opened and read publicly at the time and place indicated in the invitation for bids. Bidders, their authorized agents, and other interested parties are invited to be present.

VII. DISQUALIFICATION OF BIDDERS

Either of the following reasons may be considered as being sufficient for the disqualification of a bidder and the rejection of her/his bid proposal(s):

1. Evidence of collusion among bidders.
2. Failure to supply complete information as requested by the bid specifications.

VIII. CONSIDERATION OF PROPOSALS

1. Bids will be made public at the time of opening and may be reviewed only after they have been properly recorded. In case of discrepancy between the prices written in words and those written figures, the prices written in words shall govern. In case of a discrepancy between the total shown in the proposal and that obtained by adding the products of the quantities of items and unit bid prices, the latter shall govern.
2. The right is reserved to reject any or all proposals, to waive technicalities or to advertise for new proposals, if in the judgment of the City, the best interest of the City of Rochester will be promoted thereby.
3. Bid results will be available on the website at www.rochesternh.gov within 48 hours of the bid opening.

IX. AWARD OF CONTRACT

The City holds the right, in its judgment, to award the contract to the bidder, which it feels is in the best interest of the City. If a contract is to be awarded, the Contractor/Vendor selection shall be based in part on possession of the necessary experience, organization, technical and professional qualifications, skills and facilities, reference checks, project understanding, approach, ability to comply with proposed or required time to completion or performance, licensing or certification, in good standing with Federal, State and Local agencies, possession of satisfactory record of performance, cost and to a responsible and qualified bidder whose proposal complies with all the requirements prescribed as soon as practical after the bid opening. No bid shall be withdrawn for a period of (75) seventy-five days subsequent to the opening of bids without the consent of the City of Rochester. The successful bidder will be notified, by the form mailed to the address on his proposal, that his bid has been accepted and that he has been awarded the contract.

X. CANCELLATION OF AWARD

The City reserves the right to cancel the award of any contract at any time before the execution of such contract by all parties without any liability or other claim against the City.

XI. BID EVALUATION

In addition to the bid amount, additional factors will be considered as an integral part of the bid evaluation process, including, but not limited to:

1. The bidder's ability, capacity, and skill to perform within the specified time limits.
2. The bidder's experience, reputation, efficiency, judgment, and integrity.
3. The quality, availability and adaptability of the supplies and materials sold.
4. The bidder's past performance.
5. The sufficiency of bidder's financial resources to fulfill the contract.
6. The bidder's ability to provide future maintenance and/or services.
7. Any other applicable factors as the City determines necessary and appropriate (such as compatibility with existing equipment).

XII. CONDITIONS AT SITE

Bidders shall be responsible for having ascertained pertinent local conditions, such as: location, accessibility and general character of the site. The character and extent of existing work within or adjacent to the site and any other work being performed thereon at the time of the submission of her/his bid.

XIII. LAWS, PERMITS AND REGULATIONS

1. The Contractor shall obtain and pay for all licenses and permits as may be required of him by law, and shall pay for all fees and charges for connection to outside services, and use of property other than the site of the work for storage of materials or other purposes.
2. The Contractor shall comply with all State and Local laws, ordinances, regulations and requirements applicable to work hereunder, including building code requirements. If the Contractor ascertains at any time that any requirement of this Contract is at variance with applicable laws, ordinances, regulations or building code requirements, she/he shall promptly notify the City of Rochester in writing.

XIV. CONTRACTOR'S AND SUBCONTRACTOR'S INSURANCE

1. The Contractor shall deliver with bid documents; certificates of all insurance required hereunder. The certificate shall state that the companies issuing insurance will endeavor to mail to the City of Rochester ten (10) days notice of cancellation, alteration or material change of any listed policies. The Contractor shall keep in force the insurance required herein for the period of the Contract. At the request of the City of Rochester, the Contractor shall promptly make available a copy of any and all listed insurance policies. The requested insurance must be written by a Company licensed to do business in New Hampshire at the time the policy is issued.

2. The City of Rochester, NH shall be listed as additional insured on all the Certificates of Insurance.
3. The Contractor shall require each Subcontractor employed on the Project to maintain the coverage listed below unless the Contractor's insurance covers activities of the Subcontractor on the Project.
4. No operations under this Contract shall commence until certificates of insurance attesting to the below listed requirements have been filed with and approved by the Department of Public Works, and the Contract approved by the City Manager.
 - a. Workmen's Compensation Insurance
Limit of Liability - \$100,000.00 per accident
 - b. Commercial General Liability
Limits of Liability
Bodily Injury: \$1,000,000.00 per occurrence, \$1,000,000.00 aggregate
Property Damage: \$500,000.00 per occurrence, \$200,000.00 aggregate
Combined Single Limit, Bodily Injury and Property Damage:
\$2,000,000.00 aggregate
 - c. Automobile Liability
Limits of Liability - \$500,000.00 per accident.
 - d. The Contractor shall indemnify, defend, and save harmless the City of Rochester and its agents and employees from and against any suit, action or claim of loss or expenses because of bodily injury. Including death at any time resulting there from, sustained by any person or persons or on account of damage to property, including loss of use thereof, whether caused by or contributed to by said City of Rochester, its agents, employees or others.

XV. ACCIDENT PROTECTIONS

It is a condition of this Contract, and shall be made a condition of each subcontract entered into pursuant to the Contract. That a Contractor and any Subcontractors shall not require any laborer or mechanic employed in the performance of the Contract to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to health or safety, as determined by construction safety and health standards of the Occupational Safety and Health Administration, United States Department of Labor, which standards include, by reference, the established Federal Safety and Health regulations for Construction. These standards and regulations comprise Part 1910 and Part 1926 respectively of Title 29 of the Code of Federal Regulations and are set forth in the Federal Register. In the event any revisions in the Code of Federal Regulations are published, such revisions will be deemed to supersede the appropriate Part 1910 and Part 1926, and be effective as of the date set forth in the revised regulation.

XVI. SUBCONTRACTS

1. Nothing contained in the Specifications or Drawings shall be construed as creating any contractual relationship between any Subcontractor and the City of Rochester. The Division or Sections of the Specifications are not intended to control the Contractor in dividing the work among Subcontractors or to limit the work performed by any trade.
2. The Contractor shall be as fully responsible to the City of Rochester for the acts and omissions of Subcontractors and of persons employed by her/him, as she/he is responsible for the acts and omissions of persons directly employed by her/him.

XVII. PROTECTION OF WORK AND PROPERTY

The Contractor shall, at all times, safely guard the City's property from injury or loss in connection with this Contract. She/he shall, at all times, safely guard and protect her/his own work and that of adjacent property from damage. All passageways, guard fences, lights and other facilities required for protection by State or Municipal laws, regulations and local conditions must be provided and maintained.

XVIII. USE OF PREMISES AND REMOVAL OF DEBRIS

The Contractor expressly undertakes at his own expense:

1. To take every precaution against injuries to persons or damage to property;
2. To comply with the regulations governing the operations of premises which are occupied and to perform his Contract in such a manner as not to interrupt or interfere with the operation of the Institution;
3. To perform any work necessary to be performed after working hours or on Sunday or legal holidays without additional expense to the City, but only when requested to do so by the City;
4. To store his apparatus, materials, supplies and equipment in such orderly fashion at the site of the work as will not unduly interfere with the progress of his work or the work of any other Contractors;
5. Daily to clean up and legally dispose of (away from the site), all refuse, rubbish, scrap materials and debris caused by his operation. Including milk cartons, paper cups and food wrappings left by his employees, to the end that at all times the site of the work shall present a neat, orderly and workmanlike appearance;
6. All work shall be executed in a workmanlike manner by experienced mechanics in accordance with the most modern mechanical practice and shall represent a neat appearance when completed.

XIX. MATERIALS AND WORKMANSHIP

1. Unless otherwise specified, all materials and equipment incorporated into the work under the Contract shall be new. All workmanship shall be first class and by persons qualified in their respective trades.
2. Where the use of optional materials or construction method is approved, the requirements for workmanship, fabrication and installation indicated for the prime material or

construction method shall apply wherever applicable. Required and necessary modifications and adjustments resulting from the substitution or use of an optional material or construction method shall be made at no additional cost to the City.

XX. STANDARDS

1. Materials specified by reference to the number, symbol or title of a specific standard, such as a Commercial Standard, a Federal Specification, Department's Standard Specifications, a trade association standard or other similar standard. Shall comply with requirements in the latest revision thereof and any amendment or supplement thereto in effect on the date of advertisement, except as limited to type, class or grade or modified in such reference.
2. Reference in the Specifications to any article, device, product, material, fixture, form or type of construction by name, make or catalog number shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition. In such cases the Contractor may, at his option, use any articles, device, product, material fixture, form or type of construction that, in the judgment of the City expressed in writing to all Bidders before opening of bids as an addendum, is an acceptable substitute to the specified.
3. Substitution During Bid Time: Whenever any particular brand or make of material or apparatus is called for in the Specifications, a Bidder's Proposal must be based upon such material or apparatus, or upon a brand or make which has been specifically approved as a substitution in an Addendum issued to all Bidders during the bidding time.
4. The intent is that the brand or make of material or apparatus that is called for herein establishes a standard of excellence that, in the opinion of the Consultant and Engineer, is necessary for this particular Project.
5. Substitution After Bid Opening: No substitutions will be considered after bids have been opened unless necessary due to strikes, lockouts, bankruptcy or discontinuance of manufacture, etc. In such cases, the Contractor shall apply to the City, in writing within ten (10) days of his realizing his inability to furnish the article specified, describing completely the substitution he desires to make.

XXI. EXTRAS

Except as otherwise herein provided, no charge for any extra work or material will be allowed unless the Director of Public Works has ordered the same, in writing.

XXII. GUARANTEE OF WORK

1. Except as otherwise specified, all work shall be guaranteed by the Contractor against defects resulting from the use of inferior materials, equipment or workmanship for one (1) year from the Date of Final Acceptance.
2. Make good any work or material, or the equipment and contents of said building or site disturbed in fulfilling any such guarantee.
3. In any case, wherein fulfilling the requirements of the Contract or of any guarantee, should the Contractor disturb any work guaranteed under another contract, the Contractor shall restore such disturbed work to a condition satisfactory to the Director of Public

Works. And guarantee such restored work to the same extent as it was guaranteed under such other contracts.

4. If the Contractor, after notice, fails to proceed promptly to comply with the terms of the guarantee, the City of Rochester may have the defects corrected and the Contractor shall be liable for all expense incurred.
5. All special guarantees applicable to definite parts of the work that may be stipulated in the Specifications or other papers forming a part of the Contract shall be subject to the terms of this paragraph during the first year of the life of such special guarantee.

XXIII. DEFAULT AND TERMINATION OF CONTRACT

If the Contractor:

1. Fails to begin work under Contract within the time specified in the notice to proceed; or
2. Fails to perform the work with sufficient workers and equipment, or with sufficient materials to assume prompt completion of said work; or
3. Performs the work unsuitably or neglects or refuses to remove materials or to perform anew such work as may be rejected as unacceptable and unsuitable; or
4. Discontinues the prosecution of the work; or
5. Fails to resume work, which has been discontinued, within the time frames included in specifications; or
6. Becomes insolvent or has declared bankruptcy, or commits any act of bankruptcy or insolvency; or
7. Makes an assignment for the benefit of creditors; or
8. For any other causes whatsoever, fails to carry on the work in an acceptable manner the City of Rochester will give notice, in writing, to the Contractor for such delay, neglect, and default.

If the Contractor does not proceed in accordance with the Notice, then the City of Rochester will have full power and authority without violating the Contract to take the prosecution of the work out of the hands of the Contractor. The City of Rochester may enter into an agreement for the completion of said Contract according to the terms and conditions thereof, or use such other methods as in the City's opinion will be required for the completion of said Contract in an acceptable manner.

All extra costs and charges incurred by the City of Rochester as a result of such delay, neglect or default, together with the cost of completing the work under the Contract will be deducted from any monies due or which may become due to said Contractor. If such expenses exceed the sum which would have been payable under the contract, then the Contractor shall be liable and shall pay to the City of Rochester the amount of such excess.

XXIV. OBTAINING BID RESULTS

Bid results will be available on the website at www.rochesternh.net within 48 hours of the bid opening.

NHDES Front End Documents

Section B: Contract

Section B: Contract

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NOTICE OF AWARD

Dated _____

TO: _____

ADDRESS: _____

Street Address

City/Town

State

ZIP

Project Number

Owner Contract Number

Project : Eastern Avenue Sanitary Sewer and Surface Drain Rehabilitaion Project

Contract For: Eastern Avenue Sanitary Sewer and Surface Drain Rehabilitaion Project

Insert the name of the contract as it appears on the bid documents

You are notified that your bid dated _____ for the above contract has been considered. You are the apparent successful bidder and have been awarded a contract for:

Eastern Avenue Sanitary Sewer and Surface Drain Rehabilitation Project

(Indicate total Work, alternates or sections of Work awarded)

The Contract Price of your contract is _____ dollars (\$_____).

_____ copies of each of the proposed Contract Documents (except Drawings) accompany this Notice of Award. The same number of sets of the drawings will be delivered separately or otherwise made available to you immediately.

You must comply with the following conditions precedent within 10 days of receiving this Notice of Award.

1. You must deliver to the OWNER all of the fully executed counterparts of the Agreement including all the Contract Documents. This includes the sets of drawings. Each of the Contract Documents must bear your signature on (the cover) (every) page.
2. You must deliver with the executed Agreement the Contract Security (Bonds) as specified in the Information for Bidders and General Conditions.
3. (List all other conditions of precedent.)

Failure to comply with these conditions within the time specified will entitle **OWNER** to consider your bid abandoned, to annul this Notice of Award and to declare your Bid Security forfeited.

Within 10 days after receipt of acceptable performance **BOND**, payment **BOND** and agreement signed by the party to whom the Agreement was awarded, the **OWNER** will return to you one fully signed counterpart of the Agreement with the Contract Documents attached.

(OWNER)

(Authorized Signature)

(Title)

ACKNOWLEDGEMENT OF NOTICE

Receipt of the above NOTICE OF AWARD is hereby acknowledged:

By: _____, The _____ day of _____, 20__ by
_____ title _____.

Copy to ENGINEER (Use Certified Mail, Return Receipt Requested)

AGREEMENT

THIS AGREEMENT, made this _____ day of _____, 20__ by and between the City of Rochester, NH, hereinafter called "**OWNER**" and _____ doing business as _____ (an individual, a partnership or a corporation) hereinafter called "**CONTRACTOR**".

WITNESSETH: That for and in consideration of the payments and agreements hereinafter mentioned:

1. The **CONTRACTOR** will commence and complete the construction of _____.
2. The **CONTRACTOR** will furnish all of the material, supplies, tools, equipment, labor and other services necessary for the construction and completion of the **PROJECT** described herein.
3. The **CONTRACTOR** will commence the work required by the **CONTRACT DOCUMENTS** within _____ calendar days after the date of the **NOTICE TO PROCEED** unless the period for completion is extended otherwise by the **CONTRACT DOCUMENTS**. Completion time for the project will be calculated as calendar days from the date specified in the **NOTICE TO PROCEED** as follows:
 4. 90calendar days for substantial completion (excluding re-test inspection).
 - 120 calendar days for final completion (excluding re-test inspection).
 - 21 calendar days for re-test inspectionLiquidated damages will be in the amount of \$1,260 for each calendar day of delay from the date established for the substantial completion and \$1,260 for each calendar day of delay from the date established for final completion.
5. The **CONTRACTOR** agrees to perform all of the **WORK** described in the **CONTRACT DOCUMENTS** and comply with the terms therein for the sum of \$_____ or as shown in the **BID** schedule.
6. The term "**CONTRACT DOCUMENTS**" means and includes the following:
 - a. ADVERTISEMENT FOR BIDS
 - b. INFORMATION FOR BIDDERS
 - c. BID
 - d. BID BOND
 - e. NOTICE OF AWARD
 - f. AGREEMENT
 - g. PAYMENT BOND
 - h. PERFORMANCE BOND
 - i. CERTIFICATE OF INSURANCE
 - j. NOTICE TO PROCEED
 - k. CHANGE ORDER(S)
 - l. CERTIFICATON OF SUBSTANTIAL COMPLETION
 - m. CERTIFICATION OF FINAL COMPLETION
 - n. CONTRACTOR'S AFFIDAVIT
 - o. CONTRACTOR'S RELEASE
 - p. GENERAL CONDITIONS
 - q. SUPPLEMENTAL GENERAL CONDITIONS
 - r. SPECIAL CONDITIONS
 - s. FEDERAL PROVISIONS, RULES, REGULATIONS AND FORMS
 - t. DRAWINGS prepared by: _____ numbered _____ through _____ and dated _____, 20__

u. SPECIFICATIONS prepared or issued by:

_____ and dated
_____, 20__

v. ADDENDA

No. _____ dated _____, 20__

No. _____ dated _____, 20__

No. _____ dated _____, 20__

No. _____ dated _____, 20__

- 7. The **OWNER** will pay to the **CONTRACTOR** in the manner and at such times as set forth in the General Conditions such amounts as required by the **CONTRACT DOCUMENTS**.
- 8. This agreement shall be binding upon all parties hereto and their respective heirs, executors, administrators, successors and assigns.

IN WITNESS WHEREOF, the parties hereto have executed, or caused to be executed by their duly authorized officials this Agreement in ___ copies, each of which shall be deemed an original on the date first above written.

OWNER: _____

By: _____

NAME: _____

(SEAL)

ATTEST: _____

NAME: _____

TITLE: _____

CONTRACTOR: _____

BY: _____

NAME: _____

ADDRESS: _____

(SEAL)

ATTEST: _____

NAME: _____

TITLE: _____

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS: that

_____, (contractor name),
 _____, (contractor address), a
 _____(corporation partnership, individual), hereinafter called
 Principal, and _____, (surety name),
 _____, (surety address) herein after called
 surety, are held and firmly bound unto _____,
 (owner name), _____, (owner address)
 hereinafter called OWNER and unto all persons, firms, and corporations who or which may furnish labor, or who furnish
 materials to perform as described under the contract and to their successors and assigns, in the total aggregate penal
 sum of _____dollars, (\$_____) in lawful money of the United States, for the payment
 of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors, and assigns,
 jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain contract with the
OWNER, dated the _____ day of _____, 20____, a copy of which is hereto attached and made a part
 hereof for the construction of _____.

NOW, THEREFORE, if the Principal shall promptly make payment to all persons, firms, and corporations furnishing
 materials for or performing labor in the prosecution of the **WORK** provided for in such contract, and any authorized
 extension or modification thereof, including all amounts due for materials, lubricants, oil, gasoline, coal and coke,
 repairs on machinery, equipment and tools, consumed or used in connection with the construction of such **WORK**, and
 for all labor cost incurred in such WORK including that be a subcontractor, and to any mechanic or materialman
 lienholder whether it acquires its lien by operation of State or Federal Law; then this obligation shall be void; otherwise
 to remain in full force and effect.

PROVIDED, that beneficiaries or claimants hereunder shall be limited to the subcontractors, and persons, firms, and
 corporations having a direct contract with the PRINCIPAL or its SUBCONTRACTORS.

PROVIDED FURTHER, that the said Surety for value received hereby stipulates and agrees that no change, extension of
 time, alteration or addition to the terms of the contract or to the **WORK** to be performed thereunder or the
SPECIFICATIONS accompanying the same shall in any way affect its obligation on this **BOND**, and it does hereby waive
 notice of any such change, extension of time, alteration or addition to the terms of the contract or to the **WORK** or to
 the **SPECIFICATIONS**.

PROVIDED, FURTHER that no suit or action shall be commenced hereunder by any claimant: (a) Unless claimant, other
 than one having a direct contract with the PRINCIPAL shall have given written notice to any two of the following: The
 PRINCIPAL, the OWNER, or the SURETY above named within ninety (90) days after such claimant did or performed the
 last of the work or labor, or furnished the last of the materials for which said claim is made, stating with substantial
 accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work
 or labor was done or performed. Such notice shall be served by mailing the same by registered mail or certified mail,
 postage prepaid, in an envelope addressed to the PRINCIPAL, OWNER, or SURETY, at any place where an office is
 regularly maintained for the transaction business, or served in any manner in which legal process may be served in the
 state in which the aforesaid project is located, save that such service need not be made by a public officer; (b) After the
 expiration of one (1) year following the date on which PRINCIPAL ceased work on said CONTRACT, it being understood,
 however, that if any limitation embodied in the BOND is prohibited by any law controlling the construction hereof, such
 limitation shall be deemed to be amended so as to be equal to the minimum period of limitation permitted by such law.

PROVIDED, FURTHER, that it is expressly agreed that this BOND shall be deemed amended automatically and immediately, without formal and separate amendments hereto, upon amendment to the Contract not increasing the contract price more than 20 percent, so as to bind the PRINCIPAL and the SURETY to the full and faithful performance of the Contract as so amended. The term "Amendment", wherever used in this BOND and whether referring to this BOND, the contract or the loan Documents shall include any alteration, addition, extension or modification of any character whatsoever.

PROVIDED FURTHER, that no final settlement between the **OWNER** and the **CONTRACTOR** shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in _____
counterparts, each one of which shall be deemed an original this day of _____, 20__

ATTEST:

BY: _____
(Principal) Secretary

BY: _____
Witness as to Principal

(ADDRESS)

ATTEST:

BY: _____
Witness to Surety

(PRINCIPAL)

BY: _____

(ADDRESS)

(SURETY)

BY: _____
(ATTORNEY in FACT)

(ADDRESS)

NOTE: Date of **BOND** must not be prior to date of Contract.
If **CONTRACTOR** is partnership, all partners should execute BOND.

IMPORTANT: Surety companies executing **BONDS** must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State of New Hampshire.

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS: that

_____, (contractor name),
 _____, (contractor address), a
 _____ (corporation partnership, individual), hereinafter called
 Principal, and _____, (surety name),
 _____, (surety address) herein after called
 surety, are held and firmly bound unto _____, (owner name),
 _____, (owner address) hereinafter called
OWNER in the total aggregate penal sum of _____ dollars, (\$ _____) in lawful money
 of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors,
 administrators, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION is such that whereas, the Principal entered into a certain contract with the
OWNER, dated the _____ day of _____, 20____, a copy of which is hereto attached and made a part
 hereof for the construction of Eastern Avenue Sanitary Sewer and Surface Drain Rehabilitation Project.

NOW, THEREFORE, if the Principal shall well, truly and faithfully perform its duties, all the undertakings, covenants,
 terms, conditions, and agreements of said contract during the original term thereof, and any extension thereof which
 may be granted by the **OWNER**, with or without notice to the Surety and during the one year guaranty period, and if the
PRINCIPAL shall satisfy all claims and demands incurred under such contract, and shall fully indemnify and save harmless
 the **OWNER** from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay
 the **OWNER** all outlay and expense which the **OWNER** may incur in making good any default, then this obligation shall
 be void: otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said surety, for value received hereby stipulates and agrees that no change, extension of
 time, alteration or addition to the terms of the contract or to **WORK** to be performed thereunder or the specifications
 accompanying same shall in any way affect its obligation on this **BOND**, and it does hereby waive notice of any such
 change, extension of time alteration or addition to the terms of the contract or to the **WORK** or to the specifications.

PROVIDED, FURTHER, that it is expressly agreed that this **BOND** shall be deemed amended automatically and
 immediately, without formal and separate amendments hereto, upon amendment to the Contract not increasing the
 contract price more than 20 percent, so as to bind the **PRINCIPAL** and the **SURETY** to the full and faithful performance of
 the Contract as so amended. The term "Amendment", wherever used in this **BOND** and whether referring to this **BOND**,
 the contract or the loan Documents shall include any alteration, addition, extension or modification of any character
 whatsoever.

PROVIDED, FURTHER, that no final settlement between the **OWNER** and the **CONTRACTOR** shall abridge the right of any
 beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in _____ counterparts, each one of which shall be deemed an original this day of _____, 20__

ATTEST:

BY: _____
(Principal) Secretary

BY: _____
Witness as to Principal

(ADDRESS)

ATTEST:

BY: _____
Witness to Surety

(PRINCIPAL)

BY: _____

(ADDRESS)

(SURETY)

BY: _____
(ATTORNEY in FACT)

(ADDRESS)

NOTE: Date of **BOND** must not be prior to date of Contract.
If **CONTRACTOR** is partnership, all partners should execute BOND.

IMPORTANT: Surety companies executing **BONDS** must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State of New Hampshire.

NOTICE TO PROCEED

Dated _____, 20__

TO: _____
(Insert Name of Contractor as it appears in the Bid Documents)

ADDRESS: _____

OWNER'S PROJECT NO. _____

PROJECT: Eastern Avenue Sanitary Sewer and Surface Drain Rehabilitaion Project

OWNER'S CONTRACT NO. _____

CONTRACT FOR: Eastern Avenue Sanitary Sewer and Surface Drain Rehabilitaion Project

You are notified that the Contract Time under the above contract will commence to run on _____, 20___. By that date, you are to start performing your obligations under the Contract Documents. In accordance with paragraph 3 of the Agreement, the dates of Substantial Completion and Final Completion are _____, 20__ and _____, 20__, respectively.

Before you may start any Work at the site, paragraph 27 of the General Conditions provides that you and Owner must each deliver to the other (with copies to ENGINEER) certificates of insurance which each is required to purchase and maintain in accordance with the Contract Documents. Also before you may start any Work at the site, you must: Notify the Owner and Engineer a minimum of 1 week prior to the anticipated start date of work.

Copy to ENGINEER
(Use Certified Mail, return receipt Requested)
Weston & Sampson Engineers, Inc.

OWNER: City of Rochester

By: _____
(Authorized Representative)
NAME: Kathryn Ambrose - City Manager
(Title)

ACKNOWLEDGEMENT OF NOTICE

Receipt of the above NOTICE TO PROCEED is hereby acknowledged by:

(Contractor)

This the _____, day of 20__, by _____

Employee Identification Number: _____

CHANGE ORDER

No. _____

PROJECT NAME:	<u>Eastern Avenue Rehabilitaion Project</u>	DATE OF ISSUANCE:	_____		
OWNER:	<u>City of Rochester, New Hampshire</u>	OWNER PROJECT NO.	_____		
OWNER ADDRESS:	<u>209 Chestnut Hill Road</u>	<u>Rochester</u>	<u>NH</u>	<u>03867</u>	
	Street Name	City/Town	State	ZIP	
CONTRACTOR:	_____				
CONTRACT FOR:	_____				
ENGINEER:	<u>Weston & Sampson Engineers</u>	ENG. PROJECT NO.	<u>ENG23-0612</u>		
ENGINEER ADDRESS:	<u>100 International Drive, Suite 152</u>	<u>Portsmouth</u>	<u>NH</u>	<u>03801</u>	
	Street Name	City/Town	State	ZIP	

You are directed to make the following changes in the Contract Documents.

Description: _____

Purpose of Change Order: _____

Justification: _____

Attachments: (List documents supporting change)

CHANGE IN CONTRACT PRICE	CHANGE IN CONTRACT TIME		
Original Contract Price	Original Contract Time		
	days		date
Previous Change Orders	Net change from previous Change Orders		
	days		date
Contract Price prior to this Change Order	Contract Time prior to this Change Order		
	days		date
Net Increase (Decrease) of this Change Order	Net Increase (decrease) this Change Order		
	days		date
Contract Price with all approved Change Orders	Contract Time with all Change Orders		
	days		date

This document will become a supplement to the CONTRACT and all provisions will apply hereto. The attached Contractor's Revised Project Schedule reflects increases or decreases in Contract Time as authorized by this Change Order.

Stipulated price and time adjustment includes all costs and time associated with the above described change. Contractor waives all rights for additional time extension for said change. Contractor and Owner agree that the price(s) and time adjustment(s) stated above are equitable and acceptable to both parties.

RECOMMENDED BY:	APPROVED BY:	APPROVED BY:	APPROVED BY:
_____	_____	_____	_____
Engineer	Owner	Contractor	NHDES
_____	_____	_____	_____
Date	Date	Date	Date

CERTIFICATE OF SUBSTANTIAL COMPLETION

Owner Project No. _____ Engineer Project No. ENG23-0612
 Project: Eastern Avenue Sanitary Sewer and Surface Drain Rehabilitaion Project
 Contractor: _____
 Contract For: Eastern Avenue Sanitary Sewer and Surface Drain Rehabilitaion Project Contract Date: _____

This Certificate of Substantial Completion applies to all work under the Contract Documents or to the following specified parts thereof:

To City of Rochester, New Hampshire
 (Owner)

And to _____
 (Contractor)

The Work to which this Certificate applies has been inspected by authorized representatives of OWNER, CONTRACTOR and ENGINEER, and that Work is hereby declared to be substantially complete in accordance with the Contract Documents on Documents on _____.
 (Date of Substantial Completion)

A tentative list of items to be completed or corrected is attached hereto. This list may not be all-inclusive, and the failure to include an item in it does not alter the responsibility of CONTRACTOR to complete all the work in accordance with the Contract Documents. The items in the tentative list shall be completed or corrected by CONTRACTOR within _____ calendar days of the above Substantial Completion.

The responsibilities between OWNER and CONTRACTOR for security, operation, safety, maintenance, heat, utilities, insurance and warranties shall be as follows:

RESPONSIBILITIES:

OWNER: City of Rochester, New Hampshire

CONTRACTOR: _____

The following documents are attached to and made a part of this Certificate:

B-8.2

This certificate does not constitute an acceptance of work not in accordance with the Contract Documents nor is it a release of CONTRACTOR's obligation to complete the work in accordance with the Contract Documents.

Executed by the Engineer on

_____, 20__

Weston & Sampson Engineers
(Engineer)

By: _____

CONTRACTOR accepts this Certificate of Substantial Completion on _____, 20__

(Contractor)

By: _____

OWNER accepts this Certificate of Substantial Completion on _____, 20__

City of Rochester, New Hampshire
(Owner)

By: _____

CERTIFICATE OF FINAL COMPLETION

Owner Project No. _____ Engineer Project No. ENG23-0612

Project: Eastern Avenue Sanitary Sewer and Surface Drain Rehabilitaion Project

Owner: City of Rochester, New Hampshire

Contractor: _____

Engineer: Weston & Sampson Engineers

Agreement Date: _____

Notice to Proceed Date: _____

Contractual Substantial Completion date as modified by change orders: _____

Actual Substantial Completion date _____

Contractual final completion date as modified by Change Orders _____

The work to which this certificate applies has been inspected by authorized representatives of Owner, Contractor, Engineer and NHDES, the punch list has been completed and the work of the contract is hereby declared to be Finally Complete in accordance with the Contract Documents on _____.

(Date of Final Completion)

This certificate does not constitute an acceptance of any work not in accordance with the Contract Documents nor is it a release of contractor's obligation to complete the work in accordance with the Contract Documents. The warranty for all work completed subsequent to the date of Substantial Completion expires one year from the date of this Final Acceptance.

Executed by Engineer on _____, 20__

By: _____

Contractor Accepts this Certificate of Final Completion on _____, 20__

By: _____

Owner Accepts this Certificate of Final Completion on _____, 20__

By: _____

CONTRACTORS AFFIDAVIT

STATE OF: _____

COUNTY OF: _____

Before me the undersigned a _____ (Notary Public, Justice of the Peace, Alderman) in and for said County and State Personally appeared _____ (Individual, partner or duly) who being duly sworn according to law deposes and says that the cost of all the Work, and outstanding claims and indebtedness of whatever nature arising out of the performance of the contract between the City of Rochester, NH(Owner) and _____ (Contractor) of _____ (Contractor Address) dated _____ for the construction of the Eastern Avenue Sanitary Sewer and Surface Drain Rehabilitation Project and necessary appurtenant installations have been paid in full.

(Individual, Partner, or duly authorized representative of corporate contractor)

(Title)

Sworn to and subscribed before me
this ____ day of _____, 20__

(Notary Public)

CONTRACTOR'S FINAL RELEASE AND WAIVER OF LIEN

Project Name: _____
 Project Address: _____
 Street Name City/Town State ZIP
 Owner Name: _____
 Contractor Name: _____
 Contractor Address: _____
 Street Name City/Town State ZIP

TO ALL WHOM IT MAY CONCERN:

For good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the undersigned Contractor hereby waives, discharges, and releases any and all liens, claims, and rights to liens against the above-mentioned project, and any and all other property owned by or the title to which is in the name of the above-referenced Owner and against any and all funds of the Owner appropriated and available for the construction of said project, and any and all warrants drawn upon or issued against any such funds or monies, which the undersigned Contractor may have or may hereafter acquire or process as a result of the furnishing of labor, materials and/or equipment, and the performance of work by the Contractor on or in connection with said project, whether under and pursuant to the above-mentioned contract between the Contractor and the Owner pertaining to said project or otherwise, and which said liens, claims or rights of lien may arise and exist.

The undersigned further hereby acknowledges that the sum of:

_____ Dollars (\$ _____) constitutes the entire **unpaid** balance due the undersigned in connection with said project whether under said contract or otherwise and that the payment of said sum to the contractor will constitute payment in full and will fully satisfy any and all liens, claims, and demands which the contractor may have or assert against the owner in connection with said contract or project.

Dated this _____ day of _____ 20__

 (Contractor)

Witness to Signature

BY: _____ BY: _____
 Title Title

NHDES Front End Documents Section C: General Conditions

General Conditions

Section C: General Conditions

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General Conditions

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1. Contract and Contract Documents.

The plans, information for bidders, bids, advertisement for bids, bid payment and performance bonds, agreements, change orders, notice to proceed, specifications and addenda, hereinafter enumerated in the agreement, shall form part of this Contract and the provisions thereof shall be as binding upon the parties hereto as if they were herein fully set forth. The table of contents, titles, headings, running headlines and marginal notes contained herein and in said documents are solely to facilitate reference to various provisions of the Contract Documents and in no way affect, limit or cast light on the interpretation of the provisions to which they refer.

2. Definitions.

- 2.1 "Addenda" means written or graphic instruments issued prior to the execution of the agreement which modify or interpret the Contract Documents, drawings and specifications, by additions, deletions, clarifications or corrections. Such written or graphic instruments will be issued no less than five days before the bid opening.
- 2.2 "Bid" means the offer or proposal of the bidder submitted on the prescribed form setting forth the prices for the work to be performed.
- 2.3 "Bidder" means any person, firm or corporation submitting a bid for the work.
- 2.4 "Bonds" means bid, performance, and payment bonds and other instruments of security, furnished by the Contractor and his surety in accordance with the Contract Documents.
- 2.5 "Change Order" means a written order to the Contractor authorizing an addition, deletion or revision in the work within the general scope of the Contract Documents, or authorizing an adjustment in the Contract Price or Contract Time.
- 2.6 "Contract Documents" means the Contract, including any advertisement for bids, information for bidders, bid, bid bond, agreement, payment bond, performance bond, notice of award, notice to proceed, change orders, drawings, specifications and addenda.
- 2.7 "Contract Price" means the total monies payable to the Contractor under the terms and conditions of the Contract Documents.
- 2.8 "Contract Time" means the number of calendar days stated in the Contract Documents for the completion of the work.
- 2.9 "Contractor" means the person, firm or corporation with whom the owner has executed the agreement.
- 2.10 "Division" means the state of New Hampshire Department of Environmental Services, Water Division.
- 2.11 "Drawings" mean the part of the Contract Documents which show the characteristics and scope of the work to be performed and which have been prepared or approved by the engineer.
- 2.12 "Engineer" means the person, firm or corporation named as such in the Contract Documents.
- 2.13 "Field order" means a written order effecting a change in the work not relating to an adjustment in the Contract price or an extension of the Contract time and issued by the engineer to the Contractor during construction.
- 2.14 "Notice of Award" means the written notice of the acceptance of the bid from the owner to the successful Bidder.

General Conditions

C-1.2

- 2.15 "Notice to Proceed" means the written communication issued by the owner to the Contractor authorizing him to proceed with the Work and establishing the date of commencement of the work.
- 2.16 "Owner" means a public or quasi-public body or authority, corporation, association, partnership, or individual for whom the work is to be performed.
- 2.17 "Plans" means the Contract drawings or exact reproductions thereof which show the scope, character, dimensions and details of the work and which have been prepared or approved by the engineer.
- 2.18 "Project" means the undertaking to be performed as provided in the Contract Documents.
- 2.19 "Resident Project Representative" means the authorized representative of the owner who is assigned to the project site or any part thereof.
- 2.20 "Shop Drawings" means all drawings, diagrams, illustrations, brochures, schedules and other data which are prepared by the Contractor, a subcontractor, manufacturer, supplier or distributor, which illustrates how specific portions of the work shall be fabricated or installed.
- 2.21 "Special conditions" means revisions or additions to these general conditions, supplemental general conditions or specifications applicable to an individual project.
- 2.22 "Specifications" means a part of the Contract Documents consisting of written descriptions of a technical nature of materials, equipment, construction systems, standards and workmanship.
- 2.23 "Subcontractor" means an individual, firm or corporation having a direct Contract with the Contractor or with any other Subcontractor for the performance of a part of the work at the site.
- 2.24 "Substantial Completion" means that date as certified by the engineer when the construction of the Project or a specified part thereof is sufficiently completed, in accordance with the Contract Documents, so that the project or specified part can be utilized for the purposes for which it is intended.
- 2.25 "Supplemental General Conditions" means modifications to these general conditions required by a federal agency for participation in the Project and approved by the agency in writing prior to inclusion in the Contract Documents, or such documents that may be imposed by applicable state laws.
- 2.26 "Supplier" means any person or organization who supplies materials or equipment for the work, including that fabricated to a special design, but who does not perform labor at the site.
- 2.27 "Work" means all labor necessary to produce the construction required by the Contract Documents, and all materials and equipment incorporated or to be incorporated in the project.
- 2.28 "Written Notice" means any notice to any party of the agreement relative to any part of this agreement in writing and considered delivered and the service thereof completed, when posted by certified or registered mail to the said party at his last given address, or delivered in person to said party or his authorized representative on the work.

3. Additional Instructions and Detail Drawings.

The Contractor may be furnished additional instructions and detail drawings as necessary to carry out the work included in the Contract. The additional drawings and instructions thus supplied to the Contractor will coordinate with the Contract Documents and will be so prepared that they can be reasonably interpreted as part thereof.

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- 4. Shop or Setting Drawings.** Shop or setting drawings shall be in accordance with the following:
- 4.1 The Contractor shall furnish 6 copies of the manufacturer's shop drawings, specific design data as required in the detailed specifications, and technical literature covering all equipment and fabricated materials which he proposes to furnish under this Contract in sufficient detail to indicate full compliance with the specifications. Shop drawings shall indicate the method of installing, the exact layout dimensions of the equipment or materials, including the location, size and details of valves, pipe connections, etc.
 - 4.2 No equipment or materials shall be shipped until the manufacturer's shop drawings and specifications or other identifying data, assuring compliance with these specifications, are approved by the engineer.
 - 4.3 The Contractor shall check and verify all field measurements and shall be responsible for the prompt submission of all shop and working drawings so that there shall be no delay in the work.
 - 4.4 Regardless of corrections made in or approval given to such drawings by the engineer, the Contractor will nevertheless be responsible for the accuracy of such drawings and for their conformity to the plans and specifications. The Contractor shall notify the engineer in writing of any deviations at the time he furnishes such drawings. He shall remain responsible for the accuracy of the drawings showing the deviations but not for the acceptance of the deviations from the original design shown in the plans and specification. Approval by the engineer and the owner of any deviation in material, workmanship or equipment proposed subsequent to approval of the shop drawings or design data, shall be requested in writing by the Contractor.
 - 4.5 When submitted for the engineer's review, shop drawings shall bear the Contractor's certification that he has reviewed, checked and approved the shop drawings and that they are in conformance with the requirements of the Contract Documents.
- 5. Materials, Services, Facilities and Workmanship** shall be furnished as follows:
- 5.1 Except as otherwise specifically stated in the Contract Documents, the Contractor shall provide and pay for all materials, labor, tools, equipment, water, light, power, transportation, superintendence, temporary construction of every nature, and all other services and facilities of every nature whatsoever necessary to execute, complete, and deliver the work within the specified time.
 - 5.2 Unless otherwise specifically provided for in the specifications, all workmanship, equipment, materials and articles incorporated in the work shall be new and the best grade of the respective kinds for the purpose.
 - 5.3 The Contractor shall furnish to the engineer for approval the manufacturer's detailed specifications for all machinery, mechanical and other special equipment, which he contemplates installing together with full information as to type, performance characteristics, and all other pertinent information as required.
 - 5.4 Materials which are specified by reference to the number or symbol of a specific standard, such as an ASTM standard, a federal specification or other similar standard, shall comply with requirements in the latest revision thereof and any amendment or supplement thereto in effect on the date of the advertisement for bids, except as limited to type, class or grade, or modified in such reference. The standards referred to shall have full force and effect as though printed therein.
 - 5.5 For equipment or for materials, when requested by the engineer, the Contractor shall submit certificates of compliance from the manufacturer, certifying that the equipment or the materials comply with the requirements of the specifications or the standards.

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- 5.6 Manufactured articles, materials, and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned as directed by the manufacturer.
- 5.7 Materials, supplies, and equipment shall be in accordance with samples submitted by the Contractor and approved by the engineer.

6. Contractor's Title To Materials.

No material, supplies, or equipment to be installed or furnished under this Contract shall be purchased subject to any chattel mortgage or under a conditional sale, lease purchase or other agreement by which an interest therein or in any part thereof is retained by the seller or supplier. The Contractor shall warrant good title to all materials, supplies, and equipment installed or incorporated in the work and upon completion of all work, shall deliver the same together with all improvements and appurtenances constructed or placed thereon by him to the owner free from any claims, liens, or charges. Neither the Contractor nor any person, firm or corporation furnishing any material or labor for any work covered by this Contract shall have any right to a lien upon any improvement or appurtenance thereon. Nothing contained in this paragraph, however, shall defeat or impair the right of persons furnishing materials or labor to recover under any bond given by the Contractor for their protection or any rights under any law permitting such persons to look to funds due the Contractor in the hands of the owner. The provisions of this paragraph shall be inserted in all Subcontracts and material Contracts and notice of its provisions shall be given to all persons furnishing materials for the work when formal Contract is entered into for such materials.

7. Inspection and Testing of Materials shall be as follows:

- 7.1 All materials and equipment used in the construction of the project shall be subject to inspection and testing by the engineer in accordance with accepted standards at any and all times during manufacture or during the project construction and at any or all places where such manufacture is carried on.
- 7.2 The Contractor shall furnish promptly upon request by the engineer, all materials required to be tested. All tests made by the engineer shall be performed in such manner and ahead of scheduled installation, as not to delay the work of the Contractor. When required, testing of concrete, masonry, soils, pipe and pipe materials will be made in accordance with provisions in the specifications.
- 7.3 Material required to be tested which is delivered to the job site shall not be incorporated into the work until the tests have been completed and approval or acceptance given in writing by the engineer.
- 7.4 Each sample submitted by the Contractor for testing shall carry an identification label containing such information as is requested by the engineer. It shall also include a statement that the samples are representative of the remaining materials to be used on the project.
- 7.5 Approval of any materials shall be general only and shall not constitute a waiver of the owner's right to demand full compliance with the Contract requirements.
- 7.6 The engineer may, at his own discretion, undertake the inspection of materials at the source. In the event plant inspection is undertaken, the following conditions shall be met:
 - a. The engineer shall have the cooperation and assistance of the Contractor and the producer with whom he has Contracted for materials.
 - b. The engineer shall have full entry at all reasonable times to such areas as may concern the manufacture or production of the materials being furnished.

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- c. If required, the Contractor shall arrange for a building for the use of the inspector; such building to be located near the plant, independent of any building used by the material producer, in which to house and use the equipment necessary to carry on the required tests. Cost for such arrangement shall be paid by the owner as a stated allowance in the bid.
 - d. Adequate safety measures shall be provided and maintained at all times.
- 7.7 Except as otherwise specifically stated in the Contract, the costs of sampling and testing will be divided as follows:
- a. The Contractor shall furnish the engineer, without extra cost, all samples required for testing purposes. All sampling and testing including the number and selection of samples shall be determined by the engineer for his own information and use.
 - b. When testing of materials is specified in the appropriate section of the specifications, the cost of the same shall be charged to the owner or Contractor, as detailed in the specifications. However, costs of equipment performance tests shall be borne by the Contractor, as detailed in the appropriate section of the specifications.
 - c. When the Contractor proposes a material, article or component as equal to the ones specified, reasonable tests may, or may not, be required by the engineer. If the engineer requires tests of a proposed equal item, the Contractor will be required to assume all costs of such testing.
 - d. Any material, article or component which fails to pass tests required by the Engineer or by the specifications, will be rejected and shall be removed from the project site. However, if, upon request of the Contractor, retesting or further tests are permitted by the Engineer, the Contractor shall assume all costs related to such retesting or further tests.
 - e. Neither the Owner nor the Engineer will in any way be charged for the manufacturer's costs in supplying certificates of compliance.
- 7.8 If the Contract Documents, laws, ordinances, rules, regulations or orders of any public authority having jurisdiction require any Work to specifically be inspected, tested or approved by someone other than the Contractor, the Contractor will give the Engineer timely notice of readiness. The Contractor will then furnish the Engineer with the required certificates of inspection, testing or approval.
- 7.9 Inspections, tests, or approvals by the engineer or others shall not relieve the Contractor from obligations to perform the Work in accordance with the requirements of the Contract Documents.
- 8. "Or Equal " Clause, Substitutions and Contractor Options.**
- 8.1 Whenever a material, article, or piece of equipment is identified on the plans or in the specifications by reference to manufacturer's or vendor's names, trade names, catalogue numbers, etc., it is intended merely to establish a standard of quality and performance. Any material, article, or equipment of other manufacturers and vendors, which will perform satisfactorily the duties imposed by the general design, shall be considered equally acceptable provided the material, article, or equipment so proposed is, in the opinion of the Engineer, of equal quality and function. The Engineer shall determine equality based on such information, tests, or other supporting data that may be required of the Contractor.
- 8.2 Upon acceptance and approval by the Engineer of an equal product, it shall remain the responsibility of the Contractor to coordinate installation of the item with all other items to be furnished to assure proper fitting together of all items. Similar responsibility applies to items which are left to the Contractor's option. Any

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additional cost of equal items and any additional cost incidental to the coordination and/or fitting together of such items shall be borne by the Contractor at no extra cost to the Owner.

- 8.3 If a specified or equal item is not available to meet the construction schedule, the Contractor may propose a substitute item of less than equal performance and quality. If this substitute is acceptable to the Engineer, any difference in purchase cost or costs incidental to the installation of such item will be negotiated between the parties to the Contract.
- 8.4 Neither equal nor substitute items shall be installed without written approval of the Engineer.
- 8.5 The Contractor shall warrant that if substitutes are approved, no major changes in the function or general design of the Project will result.
- 9. Patents.** Patent information is as follows:
- 9.1 The Contractor shall hold and save the owner and its officers, agents, servants, and employees harmless from liability of any nature or kind, including cost and expenses for, or on account of, any patented or unpatented invention, process, article, or appliance manufactured or used in the performance of the Contract, including its use by the owner, unless otherwise specifically stipulated in the Contract Documents.
- 9.2 License and/or royalty fees for the use of a process used in wastewater plant design which is authorized by the owner for the project, must be reasonable, and paid to the holder of the patent, or his authorized licensee.
- 9.3 If the Contractor uses any design, device or materials in the construction methods for the project covered by patents or copyrights, he shall provide for such use by suitable agreement with the owner of such patented or copyrighted design, device or material. It is mutually agreed and understood, that, without exception, the Contract prices shall include all royalties or costs arising from the use of such design, device or materials, in any way involved in the work. The Contractor and/or his sureties shall indemnify and save harmless the owner of the project from any and all claims for infringement by reason of the use of such patented or copyrighted design, device or materials or any trademark or copyright in connection with work agreed to be performed under this Contract, and shall indemnify the Owner for any cost, expense or damage which it may be obliged to pay by reason of such infringement at any time during the construction of the work or after completion of the work.
- 10. Surveys. Surveys of land, property and construction** shall be as follows:
- 10.1 The owner will provide all land surveys and will establish and locate all property lines relating to the project.
- 10.2 For structures, the Engineer will establish and stake out one or more base lines as needed and will establish bench marks in and around the project site for the use of the Contractor and for the Engineer's own reference in checking the work in progress. For structures such as pipelines, the Engineer will establish the location of the pipe, manholes and other appurtenances, and will establish bench marks along the route of the pipeline at intervals for the using of the Contractor and for his own reference in checking the pipe and manhole inverts and other elevations throughout the project. The Contractor shall utilize the lines and bench marks established by the Engineer to set up whatever specific detail controls he may need for establishing location, elevation lines and grades of all structures. All this work is subject to checking, approval, and continuous surveillance by the Engineer to avoid error. The Contractor shall provide the Engineer with a qualified man or men to assist in this checking as needed and on request of the Engineer.
- 10.3 For construction other than pipelines and appurtenances in roadways and cross country, the Contractor shall be responsible for the location and setting lines and grades. The Contractor shall establish the location for pump

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station and wastewater treatment facility structures, associated yard piping including electrical conduits, internal piping and all equipment. Base lines and benchmarks for setting of the lines and grades for the above shall be provided by the Engineer.

- 10.4 Protection of stakes. The Contractor shall protect and preserve all of the established baseline stakes, bench marks, or other controls placed by the Engineer. Any of these items destroyed or lost through fault of the Contractor will be replaced by the Engineer at the Contractor's expense.

11. Contractor's Obligations are as follows:

The Contractor shall and in good workmanlike manner, do and perform all work and furnish and pay for all supplies and materials, machinery, equipment, facilities and means, except as herein otherwise expressly specified, necessary or proper to perform and complete all the work required by this Contract, within the time stated in the proposal in accordance with the plans and drawings covered by this Contract, and any and all supplemental plans and drawings, in accordance with the directions of the Engineer as given from time to time during the progress of the work, whether or not he considers the direction in accordance with the terms of the Contract. He shall furnish, erect, maintain and remove such construction plant and such temporary works as may be required. The Contractor shall observe, comply with, and be subject to all terms, conditions, requirements, and limitations of the Contract Documents, and shall do, carry on and complete the entire work to the satisfaction of the Engineer and Owner.

Contractor shall carry on the work and adhere to the progress schedule during all disputes, disagreements or unresolved claims with the owner. No work shall be delayed or postponed pending the resolution of any disputes, disagreements, or claims except as the owner and Contractor may otherwise agree in writing.

12. Weather Conditions.

In the event of temporary suspension of work, or during inclement weather, or whenever the Engineer shall direct, the Contractor and his Subcontractors shall protect their work and materials against damage or injury from the weather. If, in the opinion of the Engineer, any work or material shall have been damaged or injured by reason of failure on the part of the Contractor or any of his Subcontractors to so protect his work, such materials shall be removed and replaced at the expense of the Contractor.

13. Protection of Work and Property shall be provided as follows:

- 13.1 The Contractor shall at all times safely guard the Owner's property from injury or loss in connection with this Contract. He shall at all times safely guard and protect his own work, and that of adjacent property, from damage. The Contractor shall replace or make good any such damage, loss or injury unless caused directly by errors contained in the Contract, or by the Owner, or his authorized representatives. The Contractor will notify owners of adjacent utilities when prosecution of the Work may affect them.
- 13.2 The Contractor shall take all necessary precautions for the safety of employees on the work site, and shall comply with all applicable provisions of federal, state and municipal safety laws and building codes to prevent accidents or injury to persons on, about or adjacent to the premises where the work is being performed. He shall erect and properly maintain at all times, as required by the conditions and progress of the work, all necessary safeguards for the protection of the workmen and the public and shall post danger signs warning against the hazards created by such features of construction as protruding nails, hoists, well holes, elevator hatchways, scaffolding, window openings, stairways, trenches and other excavations, and falling materials, and he shall designate a responsible member of his organization on the work, whose duty shall be the prevention of accidents. The name and position

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of any person so designated shall be reported to the Engineer by the Contractor. The person so designated shall be available by phone during nonworking hours.

- 13.3 In case of emergency which threatens loss or injury of property, and/or safety of life, the Contractor is allowed to act, without previous instructions from the Engineer. He shall notify the Engineer immediately thereafter. Any claim for compensation by the Contractor due to such extra work shall be promptly submitted in writing to the Engineer for approval.
- 13.4 When the Contractor has not taken action but has notified the Engineer of an emergency threatening injury to persons or damage to the work or any adjoining property, he shall act as instructed or authorized by the Engineer.
- 13.5 The intention is not to relieve the Contractor from acting, but to provide for consultations between Engineer and Contractor in an emergency which permits time for such consultations.
- 13.6 The amount of reimbursement claimed by the Contractor on account of any emergency action shall be determined in the manner provided in Article 17 (extra work and change orders) of the general conditions.

14. Inspection of work for conformance with plans and specifications.

- 14.1 For purposes of inspection and for any other purpose, the Owner, the Engineer, and agents and employees of the Division or of any funding agency may enter upon the work and the premises used by the Contractor, and the Contractor shall provide safe and proper facilities therefore. The Engineer shall be furnished with every facility for ascertaining that the work is in accordance with the requirements and intention of this Contract, even to the extent of uncovering or taking down portions of finished work.
- 14.2 During construction and on its completion, all work shall conform to the location, lines, levels and grades indicated on the drawings or established on the site by the Engineer and shall be built in a workmanlike manner, in accordance with the drawings and specifications and the supplementary directions given from time to time by the Engineer. In no case shall any work which exceeds the requirements of the drawings and specifications be paid for as extra work unless ordered in writing by the Engineer.
- 14.3 Unauthorized work and work not conforming to plans and specifications shall be handled as follows:
 - a. Work considered by the Engineer to be outside of or different from the plans and specifications and done without instruction by the Engineer, or in wrong location, or done without proper lines or levels, may be ordered by the Engineer to be uncovered or dismantled.
 - b. Work done in the absence of the Engineer or his agent may be ordered by the Engineer to be uncovered or dismantled.
 - c. Should the work thus exposed or examined prove satisfactory, the uncovering or dismantling and the replacement of material and rebuilding of the work shall be considered as "Extra Work" to be processed in accordance with article 17.
 - d. Should the work thus exposed or examined prove to be unsatisfactory the uncovering or dismantling and the replacement of material and rebuilding of the work shall be at the expense of the Contractor.

- 15. **Reports, Records and Data** shall be furnished as follows: The Contractor shall submit to the owner such schedule of quantities and costs, progress schedules, payrolls, reports, estimates, records and other data as are required by the Contract Documents or as the owner, division or any funding agency may request concerning work performed or to be performed under this Contract.

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- 16. Superintendence by Contractor** shall be furnished as follows: At the site of the work, the Contractor shall employ a competent construction superintendent or foreman who shall have full authority to act for the Contractor. The superintendent or foreman shall have been designated in writing by the Contractor as the Contractor's representative at the site. It is understood that such representative shall be acceptable to the Engineer and shall be the one who can be continued in that capacity for the particular job involved unless he ceases to be on the Contractor's payroll. Such representative shall be present on the site at all times as required to perform adequate supervision and coordination of the Work.
- 17. Extra Work and Change Orders** shall be processed as follows:
- 17.1 The Engineer may at any time by written order and without notice to the sureties require the performance of such extra work or changes in the work as may be found necessary. The amount of compensation to be paid to the Contractor for any extra work so ordered shall be made in accordance with one or more of the following methods in the order of precedence listed below:
- a. A price based on unit prices previously approved; or
 - b. A lump sum price agreed upon between the parties and stipulated in the order for the extra work;
 - c. A price determined by adding 15 percent to the "reasonable cost" of the extra work performed, such "reasonable cost" to be determined by the Engineer in accordance with the following paragraph.
- 17.2 The Engineer shall include the reasonable cost to the Contractor of all materials used, of all labor, both common and skilled, of foreman, trucks, and the fair-market rental rate for all machinery and equipment for the period employed directly on the work. The reasonable cost for extra work shall include the cost to the Contractor of any additional insurance that may be required covering public liability for injury to persons and property, the cost of workmen's compensation insurance, federal social security, and any other costs based on payrolls, and required by law. The cost of extra work shall not include any cost or rental of small tools, buildings, or any portion of the time of the Contractor, his project supervisor or his superintendent, as assessed upon the amount of extra work, these items being considered covered by the 15 percent added to the reasonable cost. The reasonable cost for extra work shall also include the premium cost, if any, for additional bonds and insurance required because of the changes in the work.
- 17.3 In the case of extra work which is done by Subcontractors under the specific Contract, or otherwise if so approved by the Engineer, the 15 percent added to the reasonable cost of the work will be allowed only to the Subcontractor performing the work. On such work an additional 5 percent for reasonable cost will be paid to the Contractor for their work in directing the operations of the Subcontractor, for administrative supervision, and for any overhead costs. If two or more tiers of Subcontractors are involved in the extra work, a maximum of 27 percent of the cost incurred by the Subcontractor actually performing the work will be allowed to be added to the reasonable cost of the work. The 27 percent maximum represents 15 percent added to the reasonable cost of the work allowed by the Subcontractor performing the work, an additional 5 percent allowed to the next tier higher subcontractor and 5 percent allowed to the Contractor for their work in directing the operations of the Subcontractor, for administrative supervision, and for any overhead costs.
- 17.4 The Engineer may authorize minor changes or alterations in the work not involving extra cost and not inconsistent with the overall intent of the Contract Documents. These shall be accomplished by a written field order. However, if the Contractor believes that any minor change or alteration authorized by the Engineer entitles him to an increase in the Contract price, he may make a claim therefore as provided in article 21.

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- 18. Time For Completion and Liquidated Damages.** The following paragraphs address time for completion and liquidated damages:
- 18.1 It is hereby understood and mutually agreed, by and between the Contractor and the Owner, that the date of beginning and the time for completion as specified in the Contract of the work to be done hereunder are Essential Conditions of this Contract; and it is further mutually understood and agreed that the work embraced in this Contract shall be commenced on a date to be specified in the "Notice to Proceed."
- 18.2 The Contractor agrees that said work shall be pursued regularly, diligently and continuously at such rate of progress as will insure full completion thereof within the time specified. It is expressly understood and agreed, by and between the Contractor and the Owner, that the time for the completion of the work described herein is a reasonable time, taking into consideration the average climatic range and usual industrial conditions prevailing in this locality.
- 18.3 If the Contractor shall neglect, fail or refuse to complete the work within the time herein specified, or any proper extension thereof granted by the Owner, then the Contractor does hereby agree, as a part consideration for the awarding of this Contract, to pay to the Owner the amount specified in the Contract, not as a penalty but as liquidated damages for such breach of Contract as hereinafter set forth, for each and every calendar day that the Contractor shall be in default after the time stipulated in the Contract for completing the work.
- 18.4 The liquidated damages amount is fixed and agreed upon by and between the Contractor and the Owner because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages the Owner would in such event sustain. Said amount is agreed to be the amount of damages which the Owner would sustain and said amount shall be deducted from time to time by the owner from current periodical payments.
- 18.5 It is further agreed that "time is of the essence" of each and every portion of this Contract and of the specifications wherein a definite and certain length of time is fixed for the performance of any act whatsoever; and where under the Contract an additional time is allowed for the completion of any work, the new time limit fixed by such extension shall "be of the essence." Provided, that the Contractor shall not be charged with liquidated damages or any excess cost when the Owner determines that the Contractor is without fault and the Contractor's reasons for the time extension are acceptable to the Owner; provided, further, that the Contractor shall not be charged with liquidated damages or any excess cost when the delay in the completion of the work is due to:
- a. A preference, priority or allocation order duly issued by the government.
 - b. An unforeseeable cause beyond the control and without the fault or negligence of the Contractor, including, but not restricted to, acts of God, or of the public enemy, acts of the Owner, acts of another Contractor in the performance of a Contract with the Owner, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes and severe weather.
 - c. Any delays of Subcontractors or suppliers occasioned by any of the causes specified in subsections (a) and (b) of this article.
- 18.6 The Contractor shall promptly notify the Owner in writing of the causes of the delay. The Owner shall ascertain the facts and extent of the delay and notify the Contractor within a reasonable time of his decision in the matter.

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19. Defective Work. Defective work shall be processed as follows:

- 19.1 The Contractor shall promptly remove from the premises all materials and work condemned by the Engineer as failing to meet Contract requirements, whether incorporated in the work or not, and the Contractor shall promptly replace and re-execute his own work in accordance with the Contract and without expense to the Owner and shall bear the expense of making good all work of other Contractors which was destroyed or damaged by such removal or replacement.
- 19.2 All removal and replacement work shall be done at the Contractor's expense. If the Contractor does not take action to remove such condemned work and materials within 10 days after receipt of written notice, the Owner may remove them and store the material at the expense of the Contractor. If the Contractor does not pay the expense of such removal and storage within 10 days time thereafter, the Owner may, upon 10 days written notice, sell such materials at auction or at private sale and shall pay to the Contractor any net proceeds thereof, after deducting all the costs and expenses that should have been borne by the Contractor.

20. Differing Site Conditions. Claims for differing site conditions shall be processed as follows:

- 20.1 The Contractor shall promptly and before such conditions are disturbed, notify the Engineer in writing of:
- a. Subsurface or latent physical conditions at the site differing materially from those indicated in this Contract; or,
 - b. Unknown physical conditions at the site, differing materially from those ordinarily encountered and generally recognized as inherent in the type of work provided for in this Contract.
- 20.2 The Engineer shall promptly investigate the conditions. If he finds that conditions differ materially and will cause an increase or decrease in the Contractor's cost or the time required to perform any part of the work under this Contract whether or not changed as a result of such conditions, the Engineer will notify the Owner and recommend an equitable adjustment. Contractor and Owner will enter into negotiations via the Engineer to modify the contract in writing.
- 20.3 No claim of the Contractor under this clause shall be allowed unless the Contractor has given proper notice as required in paragraph 20.1 of this clause.
- 20.4 No claim by the Contractor for an equitable adjustment shall be allowed if asserted after final payment under this Contract.

21. Claims For Extra Cost. Claims for extra cost shall be processed as follows:

- 21.1 No claim for extra work or cost shall be allowed unless the same was done pursuant to a written order by the Engineer, approved by the Owner and the claim presented for payment with the first estimate after the changed or extra work is done. When work is performed under the terms of article 17, the Contractor shall furnish satisfactory bills, payrolls and vouchers covering all items of cost when requested by the Owner and shall allow the Owner access to accounts relating thereto.
- 21.2 If the Contractor claims that any instructions by drawings or similar documents issued after the date of the Contract involve extra cost under the Contract, he shall give the Engineer written notice after the receipt of such instruction and before proceeding to execute the work, except in an emergency which threatens life or property, then the procedure shall be as provided for under article 17, "Extra Work & Change Orders." No claim shall be valid unless so made.

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22. Right of Owner to Terminate Contract.

- 22.1 In the event that any of the provisions of this Contract are violated by the Contractor, or by any of his Subcontractors, the Owner may serve written notice upon the Contractor and the surety of its intention to terminate the Contract, and unless within 10 days after the serving of such notice upon the Contractor, such violation or delay shall cease and satisfactory arrangement for correction be made, the Contract shall, upon the expiration of said 10 days cease and terminate. In the event of any such termination, the Owner shall immediately serve notice thereof upon the surety and the Contractor and the surety shall have the right to take over and perform the Contract; provided, however, that if the surety does not commence performance thereof within 10 days from the date of the mailing to such surety of notice of termination, the Owner may take over the work and prosecute the same to completion by Contract or by force account for the account and at the expense of the Contractor and the Contractor and his surety shall be liable to the Owner for any excess cost occasioned the Owner thereby, and in such event the Owner may take possession of and utilize in completing the work, such materials, appliances, and plant as may be on the site of the work and necessary therefore.
- 22.2 If the Contractor should be adjudged bankrupt, or if he should make a general assignment for the benefit of his creditors, or if a receiver should be appointed on account of his insolvency, or if he should refuse or should fail, except in cases for which extensions of time are provided, to supply enough skilled workmen or materials, or if he should fail to make payments to Subcontractors or for material or labor, so as to affect the progress of the work, or be guilty of a violation of the Contract, then the Owner, upon the written notice of the Engineer that sufficient cause exists to justify such action may, without prejudice to any other right or remedy and after giving the Contractor and his surety 7 days' written notice, terminate the employment of the Contractor and take possession of the premises and of all materials, tools, equipment and other facilities installed on the work and paid for by the Owner, and finish the work by whatever method he may deem expedient. In the case of termination of this Contract before completion from any cause whatever, the Contractor, if notified to do so by the Owner, shall promptly remove any part or all of his equipment and supplies at the expense of the Contractor. If such expense exceeds such unpaid balance, the Contractor shall pay the difference to the Owner. The expense incurred by the Owner as herein provided, and the damage incurred through the Contractor's default, shall be approved by the Engineer.
- 22.3 Where the Contract has been terminated by the Owner, said termination shall not affect or terminate any of the rights of the Owner as against the Contractor or his surety then existing or which may thereafter accrue because of such default. Any retention or payment of monies by the Owner due the Contractor under the terms of the Contract, shall not release the Contractor or his surety from liability for his default.
- 22.4 After ten (10) days from delivery of a Written Notice to the Contractor and the Engineer, the Owner may, without cause and without prejudice to any other remedy, elect to abandon the Project and terminate the Contract. In such case the Contractor shall be paid for all Work executed and any expense sustained plus reasonable profit.
- 22.5 If through no act or fault of the Contractor, the work is suspended for a period of more than ninety (90) days by the Owner or under an order of court or other public authority, or the Engineer fails to act on any request for payment within thirty (30) days after approved by the engineer, or the Owner fails to pay the Contractor substantially the sum approved by the Engineer or awarded by arbitrators within thirty (30) days of its approval and presentation, then the Contractor may, after ten (10) days from delivery of a Written Notice to the Owner and the Engineer terminate the Contract and recover from the Owner payment for all Work executed and all expenses sustained. In addition and in lieu of terminating the Contract, if the Engineer has failed to act on a request for payment or if the Owner has failed to make any payment as aforesaid, the Contractor may upon ten (10) days written notice to the Owner and the Engineer stop the Work until paid all amounts then due, in which event and

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upon resumption of the Work Change Orders shall be issued for adjusting the Contract Price or Extending the Contract Time or both to compensate for the costs and delays attributable to the stoppage of the work.

- 22.6 If the performance of all or any portion of the Work is suspended, delayed, or interrupted as a result of failure of the Owner or Engineer to act within the time specified in the Contract Documents, or if no time is specified, within a reasonable time, an adjustment in the Contract Price or an extension of the Contract Time, or both, shall be made by Change Order to compensate the Contractor for the costs and delays necessarily caused by the failure of the Owner or Engineer.

23. Construction Schedule and Periodic Estimates shall provide for the following:

- 23.1 Before starting the work or upon request by the Engineer during its progress, the Contractor shall submit to the Engineer a work plan showing construction methods and the various steps he intends to take in completing the work.
- 23.2 Before the first partial payment is made, the Contractor shall prepare and submit to the Engineer:
- a. A written schedule fixing the dates for submission of drawings; and
 - b. A written schedule fixing the respective dates for the start and completion of segments of the work. Each such schedule shall be subject to review and change during the progress of the work.
 - c. Respective dates for submission of Shop Drawings and for the beginning of manufacture, the testing, and the installation of materials, supplies, and equipment.
 - d. A schedule of payments that the Contractor anticipates will be earned during the course of the Work.

24. Payments to Contractor. Payments to the Contractor shall be made as follows:

- 24.1 Progress payments. The Owner will once each month make a progress payment to the Contractor on the basis of an estimate of the total amount of work done to the time of the estimate and its value as prepared by the Contractor and approved by the Engineer.
- 24.2 Retainage by Owner. The Owner will retain a portion of the progress payment, each month, in accordance with the following procedures:
- a. The Owner will establish an escrow account in the bank of the Owner's choosing. The account will be established such that interest on the principal will be paid to the Contractor. The principal will be the accumulated retainage paid into the account by the Owner. The principal will be held by the bank, available only to the Owner, until termination of the Contract.
 - b. Until the work is 50% complete, as determined by the Engineer, retainage shall be 10% of the monthly payments claimed. The computed amount of retainage will be deposited in the escrow account established above.
 - c. After the work is 50% complete, and provided the Contractor has satisfied the Engineer in quality and timeliness of the work, and provided further that there is no specific cause for withholding additional retainage no further amount will be withheld. The escrow account will remain at the same balance throughout the remainder of the project, unless drawn upon by the Owner in accordance with articles 19, 22, and 56.
 - d. Upon substantial or final completion (as defined in article 25), the amount of retainage will be reduced to 2% of the total Contract Price plus an additional retainage based on the Engineer's estimate of the fair value of

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the punch list items and the cost of completing and/or correcting such items of work, with specified amounts for each incomplete or defective item of work. As these items are completed or corrected, they shall be paid for out of the retainage until the entire project is declared completed (See article 25). The final 2% retainage shall be held during the one-year warranty period and released only after the Owner has accepted the project.

- 24.3 In reviewing monthly estimates for payments of the value of work done, the Engineer may accept in the estimate, prior to subtracting the retainage, the delivered cost of certain equipment and nonperishable material which have been delivered to the site or off-site location and which are properly stored and protected from damage. With the estimate, the Contractor shall submit to the Engineer invoices as evidence that the material has been delivered to the site. Prior to submitting the next monthly estimate, the Contractor shall provide the Engineer with paid invoices or other evidence that the materials have been paid for. If the Contractor fails to submit such evidence, the Engineer may then subtract the value of such materials or equipment for which the Owner has previously paid, from the next monthly estimate. The type of equipment and material eligible for payment prior to being incorporated in the work will be at the Engineer's discretion. Material and equipment made specifically for the subject job will be eligible for payment.
- 24.4 All material and work for which partial payments have been made shall thereupon become the sole property of the Owner. This provision shall not be construed as relieving the Contractor from the sole responsibility for the care and protection of materials and work upon which payments have been made or for the restoration of any damaged work, or as a waiver of the right of the Owner to require compliance with all of the terms of the Contract.
- 24.5 Owner's right to withhold payments and make application. The Contractor agrees that he will indemnify and save the Owner or the Owner's agents harmless from all claims growing out of the lawful demands of Subcontractors, laborers, workmen, mechanics, material men, and furnishers of machinery and parts, equipment, power, tools and all supplies, including commissary, incurred in the furtherance of the performance of this Contract. The Contractor shall, at the Owner's request, furnish satisfactory evidence that all claims of the nature hereinabove designated have been paid, discharged, or waived. If the Contractor fails to do so, then the Owner may, upon written notice to the Contractor either pay unpaid bills of which the Owner has written notice directly, or withhold from the Contractor's unpaid compensation a sum of money to pay any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged. Payment to the Contractor shall then be resumed in accordance with the terms of this Contract but in no event shall the above provisions be construed to impose any obligations upon the Owner to either the Contractor or his surety or any third party. In paying any unpaid bills of the Contractor, the Owner shall be deemed the agent of the Contractor, and any payment so made by the Owner shall be considered as payment made under Contract by the Owner to the Contractor and the Owner shall not be liable to the Contractor for any such payments made in good faith.
- 24.6 If the Owner fails to make payment forty-five (45) days after approval by the Engineer, in addition to other remedies available to the Contractor, there shall be added to each such payment interest at an annual rate of 10% commencing on the first day after said payment is due and continuing until the payment is received by the Contractor.
- 25. Acceptance and Final Payment** provisions shall be as follows:
- 25.1 Substantial completion and payment.
- a. Substantial completion shall be that point, as certified by the Engineer, at which the Contract or specified part thereof, has been completed to the extent that the Owner may occupy and/or make use of the work

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performed for the purposes for which it was intended. Upon substantial completion there may be minor items, such as seeding, landscaping, etc., yet to be completed or items of work to be corrected.

- b. Upon receipt of written notice from the Contractor that the work is substantially complete, the Engineer shall promptly make an inspection, and when he finds the work complies with the terms of the Contract and the Contract is substantially completed, he will issue a signed and dated certificate, and a list of all items to be completed or corrected, stating that the work required by this Contract has been substantially completed and is accepted by him.
 - c. Upon substantial completion, the entire balance due and payable to the Contractor less 2 percent of the Contract Price, and less a retention based on the Engineer's estimate of the fair value for the cost of completing or correcting listed items of work with specified amounts for each incomplete or defective item of work shall be made.
 - d. The general guarantee period for the work shall begin on the date certified by the Engineer that the work is substantially completed.
- 25.2 Final completion shall be that point at which all work has been completed and all defective work has been corrected. Unless the Engineer has issued a certificate of substantial completion, the general guarantee period shall begin upon certification by the Engineer of final completion.
- 25.3 At the end of the general guarantee period for the entire Contract which has been certified finally completed or substantially completed, the Owner, through the Engineer, shall make a guarantee inspection of all or portions of the work. When it is found that the work is satisfactory and that no work has become defective under the terms of the Contract, the Owner will accept the entire project and make final payment, including the reimbursement of monies retained pursuant to the guarantee period.
- 25.4 If the guarantee inspection discloses any work as being unsatisfactory, the Engineer will give the Contractor the necessary instructions for correction of such work, and the Contractor shall immediately execute such instructions. Upon correction of the work, another inspection will be made which shall constitute the guarantee inspection, provided the work has been satisfactorily completed.
- 25.5 Before issuance of final payment, the Contractor shall certify in writing to the Engineer that all payrolls, material bills, and other indebtedness connected with the work have been paid or otherwise satisfied; except that in case of disputed indebtedness or liens, if the Contract does not include a payment bond, the Contractor may submit in lieu of certification of payment a surety bond in the amount of the disputed indebtedness or liens, guaranteeing payment of all such disputed amounts, including all related costs and interest in connection with said disputed indebtedness or liens which the Owner may be compelled to pay upon adjudication.
- 25.6 If upon substantial completion, full completion is delayed through no fault of the Contractor, and the Engineer so certifies, the Owner may, upon certificate of the Engineer, and without termination of the Contract, make payment of the balance due for that portion of the work fully completed and accepted. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims.
- 25.7 The acceptance by the Contractor of final payment shall release the Owner from all claims and all liability to the Contractor for all things relating to this work and for every act and neglect of the Owner and others relating to or arising out of this work. No payment, however, final or otherwise, shall operate to release the Contractor or his sureties from any obligations of the performance and payment bond under this Contract.

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26. Payments by Contractor. The Contractor shall pay the costs:

- 26.1 For all transportation and utility services not later than the 20th day of the calendar month following that in which services are rendered;
- 26.2 For all materials, tools, and other expendable equipment to the extent of 90 percent of the cost thereof, not later than the 20th day of the calendar month following that in which such materials, tools and equipment are delivered at the site of the work and the balance of the cost thereof not later than the 30th day following the completion of that part of the work in or on which such materials, tools and equipment are incorporated or used; and
- 26.3 To each of his Subcontractors, not later than the 5th day following each payment to the Contractor, the respective amounts allowed the Contractor on account of the work performed by his Subcontractors to the extent of each Subcontractor's interest therein.

27. Insurance. The Contractor and any Subcontractor shall obtain all the insurance required under this article and such insurance shall be approved by the Owner.

- 27.1 The Contractor and all Subcontractors shall procure and shall maintain during the life of this Contract workmen's compensation insurance as required by applicable state law. The Contractor shall provide and shall cause each Subcontractor to provide adequate employer's liability insurance.

Limits of Liability: \$100,000 each accident;
\$500,000 disease - policy limit;
\$100,000 disease - each employee.

- 27.2 The Contractor shall procure and shall maintain during the life of this Contract Commercial General liability insurance to include Contractual liability, explosion, collapse and underground coverages.

Limits of liability: \$1,000,000 each occurrence bodily injury and property damage;
\$2,000,000 general aggregate-include per project aggregate endorsement;
\$2,000,000 products/completed operations aggregate.

If blasting or demolition or both is required by the Contract, the Contractor or Subcontractor shall obtain the respective coverage and shall furnish the Engineer a certificate of insurance evidencing the required coverages prior to commencement of any operations involving blasting or demolition or both.

- 27.3 The Contractor shall procure and shall maintain during the life of this Contract comprehensive automobile liability insurance to include all motor vehicles including owned, hired, borrowed and non-owned vehicles. Limits of liability: \$1,000,000 combined single limit for bodily injury and property damage.

- 27.4 The Contractor shall either:

a. Require each of his Subcontractors to procure and to maintain during the life of his subcontract commercial general liability insurance and comprehensive automobile liability insurance of the type and in the amounts specified in articles 27.2 and 27.3; or

b. Insure the activities of his Subcontractors in his policy.

- 27.5 The required insurance shall provide adequate protection for the Contractor and his Subcontractors, respectively, against damage claims which may arise from work under this Contract, whether such work be by the insured or by anyone employed by him and also against any of the special hazards which may be encountered in the performance of this Contract.

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- 27.6 The Contractor shall furnish the Owner with certificates showing the type, amount, class of operations covered, effective dates and dates of expiration of policies. Such insurance shall not be canceled or materially altered, except after 10 days written notice has been received by the Owner.
- 27.7 For builder's risk insurance (fire and extended coverage) and until the work is completed and accepted by the Owner, the Contractor is required to maintain builder's risk type insurance on a 100 percent completed value basis on the insurable portion of the work for the benefit of the Owner, the Contractor, and Subcontractors as their interests may appear.
- 27.8 The Contractor shall take out and furnish to the Owner and maintain during the life of this Contract, complete Owner's protective liability insurance.
- Limits of Liability: \$1,000,000 each occurrence;
\$2,000,000 aggregate.
28. **Contract Security.** The Contractor shall within ten (10) days after the receipt of the Notice of Award furnish the Owner with a performance bond and a payment bond in penal sums equal to the amount of the Contract price conditioned upon the performance by the Contractor of all undertakings, covenants, terms, conditions and agreements of the Contract Documents, and upon the prompt payment by the Contractor to all persons supplying labor and materials in the prosecution of the Work provided by the Contract Documents. Such Bonds shall be executed by the Contractor and a corporate bonding company licensed to transact business in the state in which the Work is to be performed and named on the current list of "Surety Companies Acceptable on Federal Bonds" as published in the Treasury Department Circular Number 570. The expense of these Bonds shall be borne by the Contractor.
29. **Additional or Substitute Bond.** If at any time a surety on any such Bond is declared as bankrupt or loses its right to do business in the state in which the Work is to be performed, or is removed from the list of Surety Companies accepted on Federal Bonds, the Contractor shall within ten (10) days after notice from the Owner to do so, substitute an acceptable bond (or bonds) in such form and sum and signed by such other surety or sureties as may be satisfactory to the Owner. The premiums on such bond shall be paid by the Contractor. No further payments shall be deemed due nor shall be made until the new surety or sureties shall have furnished such an acceptable bond to the Owner.
30. **Assignments.** The Contractor shall not assign the whole or any part of this Contract or any monies due or to become due hereunder without written consent of the Owner. In case the Contractor assigns all or any part of any monies due or to become due under this Contract, the instrument of assignment shall contain a clause substantially to the effect that it is agreed that the right of the assignee in and to any monies due or to become due to the Contractor shall be subject to prior claims of all persons, firms and corporations for services rendered or materials supplied for the performance of the work called for in this Contract.
31. **Mutual Responsibility of Contractors.** If, through acts of neglect on the part of the Contractor, any other Contractor or any Subcontractor shall suffer loss or damage on the work site, the Contractor agrees to settle with such other Contractor or Subcontractor by agreement or arbitration if such other Contractor or Subcontractors will so settle. If such other Contractor or Subcontractors shall assert any claim against the Owner on account of any damage alleged to have been sustained, the Owner shall notify the Contractor, who shall indemnify and save harmless the Owner against any such claim.

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32. Subcontracting. When subcontracting, the Contractor:

- 32.1 May utilize the services of specialty Subcontractors on those parts of the work which, under usual Contracting practices, are performed by specialty Subcontractors.
- 32.2 Shall be as fully responsible to the Owner for the acts and omissions of his Subcontractors, and of persons either directly or indirectly employed by them, as he is for the acts and omissions of persons directly employed by him.
- 32.3 Shall cause appropriate provisions to be inserted in all subcontracts relative to the work to bind Subcontractors to the Contractor by the terms of the Contract Documents insofar as applicable to the work of Subcontractors and to give the Contractor the same power as regards terminating any subcontract that the Owner may exercise over the Contractor under any provision of the Contract Documents.
- 32.4 Shall not create any Contractual relation between any Subcontractor and the Owner.
- 32.5 Shall not award Work to Subcontractor(s), in excess of fifty percent (50%) of the Contract Price, without prior written approval of the Owner.

33. Authority of the Engineer. In performing his duties, the Engineer or his representative shall:

- 33.1 Have the authority to suspend the work in whole or in part for such periods as he may deem necessary due to the failure of the Contractor to carry out provisions of the Contract or for failure of the Contractor to suspend work in weather conditions considered by the Engineer to be unsuitable for the prosecution of the work. The Engineer shall give all orders and directions under this Contract, relative to the execution of the work. The Engineer shall determine the amount, quality, acceptability, and fitness of the several kinds of work and materials which are to be paid for under this Contract and shall decide all questions which may arise in relation to the work. The Engineer's estimates and decisions shall be final and conclusive, except as otherwise provided. In case any question shall arise between the parties hereto relative to said Contract or specifications, the determination or decision of the Engineer shall be a condition precedent to the right of the Contractor to receive any money or payment for work under this Contract affected to any extent by such question. The Engineer shall decide the meaning and intent of any portion of the specifications and of any plans or drawings where the same may be found unclear. Any differences or conflicts in regard to their work which may arise between the Contractor under this Contract and other Contractors performing work for the Owner shall be adjusted and determined by the Engineer.
 - a. The purpose of the above article is not in any way to relieve the Contractor of his responsibilities for the safety of workmen or general public in the execution of the work. Attention is drawn to Article 13 of these Conditions which refers to the safety obligations of the Contractor.
 - b. The Engineer, acting on behalf of the Owner, has the authority to enforce corrective action for work not in accordance with the specifications.
 - c. In addition, the Engineer, acting on behalf of the Owner, is to ensure that the work is in accordance with the Contract Documents. He is not held responsible, however, for the methods of construction, sequences, schedules and procedures in the execution of the work. The Engineer does have the opportunity under 33.1 to reject the method of construction, work plan schedule, procedures, as he thinks appropriate.
- 33.2 Appoint assistants and representatives as he desires, and they shall be granted full access to the work under the Contract. They have the authority to give directions pertaining to the work, to approve or reject materials, to suspend any work that is being improperly performed, to make measurements of quantities, to keep records of

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costs, and otherwise represent the Engineer in all matters except as provided below. The Contractor may, however, appeal from their decision to the Engineer himself, but any work done pending its resolution is at the Contractor's own risk. Except as permitted and instructed by the Engineer, the assistants and representatives are not authorized to revoke, alter, enlarge, relax, or release any requirements of these specifications, nor to issue instructions contrary to the plans and specifications. They are not authorized to act as superintendents or foremen for the Contractor, or to interfere with the management of the work by the Contractor. Any advice which the assistants or representatives of the Engineer may give the Contractor shall not be construed as binding the Engineer or the Owner in any way, nor as releasing the Contractor from the fulfillment of the terms of the Contract. All transactions between the Contractor and the representatives of the Engineer which are liable to protest or where payments are involved shall be made in writing.

- 34. Stated Allowances.** The Contractor shall include in his proposal for costs of materials not shown in his bid under "cash allowances" or "allowed materials," any cash allowances stated in the supplemental general conditions or other Contract Documents. The Contractor shall purchase the "allowed materials" as directed by the Owner on the basis of the lowest and best bid of at least 3 competitive bids. If the actual price for purchasing the "allowed materials" is more or less than the "cash allowance," the Contract price shall be adjusted accordingly. The adjustment in Contract price shall be made on the basis of the purchase price without additional charges for overhead, profit, insurance or any other incidental expenses. The cost of installation of the "allowed materials" shall be included in the applicable sections of the Contract specifications covering this work.
- 35. Use of Premises, Removal of Debris, Sanitary Conditions.** In the use of premises or removal of debris, the Contractor expressly undertakes at his own expense: to take every precaution against injuries to persons or damage to property; to maintain sanitary conditions; to store his apparatus, materials, supplies and equipment in such orderly fashion at the site of the work as will not interfere with the progress of his work or the work of any other Contractors; to place upon the work or any part thereof only such loads as are consistent with the safety of that portion of the work; to clean up frequently all refuse, rubbish, scrap materials and debris caused by his operations, to the end that at all times the site of the work shall present an orderly and workmanlike appearance; before final payment to remove all surplus material falsework, temporary structures, including foundations thereof, plant of any description and debris of every nature resulting from his operations, and to put the site in an orderly condition; to effect all cutting, fitting or patching of his work required to make the same conform to the plans and specifications and, except with the consent of the Engineer, not to cut or otherwise alter the work of any other Contractor; to provide and maintain in a sanitary condition such toilet accommodations for the use of his employees as may be necessary to comply with the requirements of the state and local boards of health, or of other bodies or authorities having jurisdiction.
- 36. Quantities of Estimate.** Wherever the estimated quantities of work to be done and materials to be furnished under this Contract are shown in any of the documents including the proposal, they are given for use in comparing bids and the right is specifically reserved except as herein otherwise specifically limited, to increase or decrease them as may be deemed reasonably necessary by the Owner to complete the work contemplated by this Contract, and such increase or decrease shall in no way invalidate this Contract, nor shall any such increase or decrease give cause for claims or liability for damages. Such increases or decreases shall not exceed 25 percent of the estimated quantities of work. An increase or decrease in quantities for subsurface materials (e.g. ledge, unsuitable backfill), which overrun or underrun by 25% or more of the bid quantity may be the basis for a Contract price adjustment, at the rate of a negotiated adjusted unit rate. Negotiated unit price rates shall be equitable and shall take into account, but not be limited to the following factors; bid unit rate, distribution of rates and bid balance, and the scope of work as affected by the changed quantities. Claims for extra work resulting from changed quantities shall be processed under article 21.

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- 37. Lands and Rights-of-Way.** Acquisition and usage of lands and rights-of-way shall be as follows:
- 37.1 Prior to issuing the Notice to Proceed, the Owner shall legally obtain all lands and rights-of-way necessary for carrying out and completing the work to be performed under this Contract.
- 37.2 The Contractor shall not (except after written consent from the Owner) enter or occupy with men, tools, materials, or equipment, any land outside the rights-of-way or property of the Owner. A copy of the written consent shall be given to the Engineer.
- 37.3 The Owner shall provide to the Contractor information which delineates and describes the lands owned and the rights-of-way acquired.
- 37.4 The Contractor shall provide at its own expense and without liability to the Owner any additional land and access thereto that the Contractor may desire for temporary construction facilities, or for storage of materials.
- 38. General Guarantee.** With reference to warranties, neither the final certificate of payment nor any provision in the Contract Documents, nor partial or entire occupancy of the premises by the Owner, shall constitute an acceptance of work not done in accordance with the Contract Documents or relieve the Contractor of liability in respect to any express warranties or responsibility for faulty materials or workmanship. The Contractor shall remedy any defects in the work and pay for any damage to other work resulting therefrom, which appear within the warranty period one year or longer if required by the Contract, from the certified date of completion or substantial completion of the work. The Owner will give notice of observed defects within two working days of their discovery.
- 39. Errors and Inconsistencies.** With reference to errors and inconsistency in Contract Documents, any provisions in any of the Contract Documents which may be in conflict with the paragraphs in these general conditions shall be subject to the following order of precedence for interpretation:
- 39.1 Drawings will govern technical specifications.
- 39.2 General conditions will govern drawings and technical specifications.
- 39.3 Supplemental general conditions will govern general conditions, drawings and technical specifications.
- 39.4 Special conditions will govern supplemental general conditions, general conditions, drawings and technical specifications.
- 39.5 The Contractor shall take no advantage of any apparent error or omission in the plans or specifications. In the event the Contractor discovers such an error or omission, he shall notify the Engineer. The Engineer will then make such corrections and interpretations as may be deemed necessary for fulfilling the intent of the plans and specifications.
- 39.6 Figure dimensions on Drawings shall govern over general drawings.
- 40. Notice and Service Thereof.** Any notice to the Contractor from the Owner relative to any part of this Contract will be in writing and will be considered delivered and the service completed, when said notice is mailed, by certified registered mail, to the Contractor at his last given address, or delivered in person to the Contractor or his authorized representative on the work.
- 41. Required Provisions Deemed Inserted.** Each and every provision of law and clause required by law to be inserted in this Contract shall be deemed to be inserted herein and the Contract shall be read and enforced as though it were included herein, and if through mistake or otherwise any such provision is not inserted or is not correctly

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inserted (example; miswording, etc.), then upon the application of either party the Contract shall forthwith be physically amended to make such insertion or correction.

- 42. Protection of Lives and Health.** The work under this Contract is subject to the safety and health regulations (CRF 29, part 1926, and all subsequent amendments) as promulgated by the U.S. Department of Labor on June 24, 1974. Contractors are urged to become familiar with the requirements of these regulations.
- 43. OSHA Construction Safety Program.**
- 43.1 Pursuant to NHRSA 277:5-a, the Contractor shall provide an Occupational Health and Safety Administration (OSHA) 10-hour construction safety program for its on-site employees. All employees are required to complete the program prior to beginning work. The training program shall utilize an OSHA-approved curriculum. Graduates shall receive a card from OSHA certifying the successful completion of the training program.
- 43.2 Any employee required to complete the OSHA 10-hour construction safety program, and who cannot within 15 days provide documentation of completion of such program, shall be subject to removal from the jobsite.
- 43.3 The following individuals are exempt from the requirements of the 10-hour construction safety program: law enforcement officers involved with traffic control or jobsite security; flagging personnel who have completed the training required by the Department of Transportation; all relevant federal, state and municipal government employees and inspectors; and all individuals who are not considered to be on the site of work under the federal Davis-Bacon Act, including, but not limited to, construction and non-construction delivery personnel and non-trade personnel.
- 44. Equal Employment Opportunity.** Under equal employment opportunity requirements and during the performance of this Contract the Contractor agrees to the following:
- 44.1 The Contractor will not discriminate against any employee or applicant for employment because of race, creed, color, national origin, or sex. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, creed, color, national origin, or sex. Such action shall include, but not be limited to, the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.
- 44.2 The Contractor will in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment, without regard to race, creed, color, national origin, or sex.
- 44.3 The Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other Contract or understanding, a notice to be provided advising the labor union or worker's representative of the Contractor's commitment under section 202 of executive order no. 11246 of September 24, 1965, and 11375 of October, 13, 1967, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
- 44.4 The Contractor will comply with all provisions of executive orders no. 11246 and 11375.
- 44.5 The Contractor will furnish all information and reports required by executive orders no. 11246 and 11375.

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- 44.6 In the event of the Contractor's noncompliance with the nondiscrimination clauses of this Contract or with any of such rules, regulations, or orders, this Contract may be canceled, terminated, or suspended in whole or in part by the Owner or the Department of Labor and the Contractor may be declared ineligible for further government Contracts or federally-assisted construction, however, that in the event the Contractor becomes involved in, or is threatened with, litigation with a Subcontractor or vendor as a result of such direction by the Department of Labor, the Contractor may request the United States to enter into such litigation to protect the interests of the United States.
- 44.7 A breach of this article may be grounds for termination of this Contract and for debarment as provided in 29 CFR 5.6.
- 45. Interest of Federal, State or Local Officials.** No federal, state or local official shall be admitted to any share or part of this Contract or to any benefit that may arise therefrom, but this provision shall not be construed to extend to this Contract if made with a corporation for its general benefit.
- 46. Other Prohibited Interests.** No official of the Owner who is authorized in such capacity and on behalf of the Owner to negotiate, make, accept or approve, or to take part in negotiating, making, accepting, or approving any architectural, Engineering, inspection, construction or material supply Contract or any subcontract in connection with the construction of the project, shall become directly or indirectly interested personally in this Contract or in any part hereof. No officer, employee, architect, attorney, Engineer or inspector of or for the Owner who is authorized in such capacity and on behalf of the Owner to exercise any legislative, executive, supervisory or other similar functions in connection with the construction of the project, shall become directly or indirectly interested personally in this Contract or in any part thereof, any material supply Contract, subcontract, insurance Contract, or any other Contract pertaining to the project.
- 47. Use and Occupancy Prior to Acceptance.** Use and occupancy of a portion or unit of the project, upon completion of that portion or unit, and before substantial completion of the project, shall be a condition of this Contract with the following provisions:
- 47.1 The Owner will make his request for use or occupancy to the Contractor in writing.
- 47.2 There must be no significant interference with the Contractor's work or performance of duties under the Contract.
- 47.3 The Engineer, upon request of the Owner and agreement by the Contractor, will make an inspection of the complete part of the work to confirm its status of completion.
- 47.4 Consent of the surety and endorsement of the insurance carrier must be obtained prior to use and/or occupancy by the Owner. Also, prior to occupancy, the Owner will secure the required insurance coverage on the building.
- 47.5 The Owner will have the right to exclude the Contractor from the subject portion of the project after the date of occupancy but will allow the Contractor reasonable access to complete or correct items.
- 47.6 The warranty period shall begin upon substantial completion.
- 48. Suspension of Work.** The Owner may, at any time and without cause, suspend the work or any portion thereof for a period of not more than 90 days by notice in writing to the Contractor and the Engineer. The Owner shall fix the date on which work shall be resumed. The Contractor will be allowed an increase in the Contract price or an extension of the Contract time, or both, directly attributable to any suspension if he makes a claim therefore as provided in articles 17 and 21.

General Conditions

C-1.23

49. [Reserved]

50. [Reserved]

51. [Reserved]

~~52. **Project Sign.** Furnish and erect a sign at the project site to identify the project and to indicate that the State Government is participating in the development of the project. Place the sign in a prominent location as directed by the Engineer. Do not place or allow the placement of other advertising signboards at the project site or along rights of way furnished for the project work. See Exhibit 1 for details of construction.~~

53. [Reserved]

54. **Public Convenience and Traffic Control** requirements:

54.1 The Contractor shall at all times so conduct his work as to assure minimal obstruction to traffic. The safety and convenience of the general public and the residents along the work site route and the protection of property shall be provided for by the Contractor. The Contractor shall be responsible for timely notification to local residents before causing any interruptions of their access.

54.2 Fire hydrants and water holes for fire protection on or adjacent to the work site shall be kept accessible to fire apparatus at all times, and no obstructions shall be placed within 10 feet of any such facility. No footways, gutters, drain inlets, or portions of highways adjoining the work site shall be obstructed. In the event that all or part of a roadway is officially closed to traffic during construction, the Contractor shall provide and maintain safe and adequate traffic accessibility, satisfactory to the Engineer, for residences and businesses along and adjacent to the roadway so closed.

54.3 When the maintenance of traffic is considered by the Engineer to be minimal, the Contract may not show this work as a pay item. In such cases, the Contractor shall bear all expense of maintaining traffic over the sections of road undergoing improvement and of constructing and maintaining such approaches, crossings, intersections, and other features as may be necessary, without direct reimbursement.

55. **Pre-Construction Conference.** The Contractor shall not commence work until a pre-construction conference has been held at which representatives of the Contractor, Engineer, Division and Owner are present. The pre-construction conference shall be scheduled by the Engineer.

56. **Maintenance During Construction.**

56.1 The Contractor shall maintain the work during construction and until it is accepted by the Owner. This maintenance shall be continuous and effective work prosecuted day by day, with adequate equipment and forces, to the end that roads or structures are kept in satisfactory condition at all times.

56.2 All cost of maintenance during construction and before the work is accepted by the Owner shall be included in the unit prices bid on the various pay items and the Contractor shall not be paid an additional amount for such maintenance.

56.3 If the Contractor, at any time, fails to comply with the provisions above, the Engineer may direct the Contractor to do so. If the Contractor fails to remedy unsatisfactory maintenance within the time specified by the Engineer, the Engineer may immediately cause the project to be maintained and the entire cost of this maintenance will be deducted from money to become due the Contractor on this Contract.

General Conditions

C-1.24

57. Cooperation with Utilities.

- 57.1 The Owner will notify all utility companies, all pipe line owners, or other parties affected, and have all necessary adjustments of the public or private utility fixtures, pipe lines, and other appurtenances within or adjacent to the limits of construction made as soon as practicable.
- 57.2 Water lines, gas lines, wire lines, service connections, water and gas meter boxes, water and gas valve boxes, light standards, cableways, signals, and all other utility appurtenances within the limits of the proposed construction which are to be relocated or adjusted are to be moved by the owners of such utilities at their expense, except as may otherwise be provided for in the special conditions or as noted on the plans.
- 57.3 It is understood and agreed that the Contractor has considered in his bid all of the permanent and temporary utility appurtenances in their present or relocated positions as shown on the plans and as evident on the site, and that no additional compensation will be allowed for any delays, inconvenience, damage sustained by him due to any interference from such utility appurtenances or the operation of moving them.
- 57.4 The Contractor shall cooperate with the Owners of any underground or overhead utility lines in their removal and rearrangement operations in order that these operations may progress in a reasonable manner, that duplication of rearrangements may be reduced to a minimum, and that services rendered by those parties will be minimal.
- 57.5 In the event of interruption to a water or utility service as a result of accidental breakage or as a result of being exposed or unsupported, the Contractor shall promptly notify the proper authority and shall cooperate with said authority in the restoration of services. If water service is interrupted, repair work shall be continuous until the service is restored. No work shall be undertaken around fire hydrants until provisions for continued service have been approved by the local fire authority. If any utility service is interrupted for more than 4 hours, the Contractor shall make provisions for temporary service at his own expense until service is resumed.

58. Work Performed at Night and on Sundays and Holidays shall comply with the following:

- 58.1 No work will be permitted at night or on Sundays or holidays except as approved in writing by the Engineer, and provided such work is not in violation of a local ordinance. When working at night, the Contractor shall provide flood lighting sufficient to insure the same quality of workmanship and the same conditions regarding safety as would be achieved in daylight.
- 58.2 Whenever Memorial Day or Fourth-of-July is observed on a Friday or a Monday and during the weekend of Labor Day, the Contractor may be required to suspend work for the 3 calendar days. Prior to the close of work, the work site shall be placed in a condition acceptable to the Engineer for the comfort and safety of the traveling public. An arrangement shall be made for responsible personnel acceptable to the Engineer to maintain the project in the above conditions.

59. Laws to be Observed. With reference to laws that shall be observed:

- 59.1 The Contractor shall keep fully informed of all federal and state laws, all local laws, ordinances, and regulations, and all orders and decrees of tribunals having any jurisdiction or authority, which in any manner affect those engaged or employed on the work. He shall at all times observe and comply with all such laws, ordinances, regulations, orders, and decrees; and shall protect and indemnify the state and its representatives against any claim or liability arising from or based on the violation of any such law, ordinance, regulation, order, or decree, whether by himself or his employees.

General Conditions

C-1.25

59.2 Indemnification

The Contractor will indemnify and hold harmless the Owner and the Engineer and their agents and employees from and against all claims, damages, losses, and expenses including attorney's fees arising out of or resulting from the performance of the Work, provided that any such claims, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property including the loss of use resulting therefrom; and is caused in whole or in part by any negligent or willful act or omission of the Contractor, and Subcontractor, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable.

In any and all claims against the Owner or the Engineer, or any of their agents or employees, by any employees of the Contractor, and Subcontractor, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, the indemnification obligation shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by disability benefit or other employee benefit acts.

The obligation of the Contractor under this paragraph shall not extend to the liability of the Engineer, his agents or employees arising out of the preparation or approval of maps, Drawings, opinions, reports, surveys, Change Orders, designs or Specifications.

60. Permits. Permits to be obtained by the Contractor shall be in accordance with the following:

- 60.1 Permits and licenses of a temporary nature necessary for the prosecution of the work shall be obtained and paid for by the Contractor. Permits, licenses and easements for permanent structures or permanent changes in existing facilities will be secured and paid for by the Owner. Permits may include:
- a. New Hampshire Department of Transportation Highway Trench Permits.
 - b. RSA 485-A:17 and 483-A N.H. DES Wetlands Bureau Dredge and Fill Permit.
 - c. RSA 485-A:17 - N.H. DES Site Specific Permit (Water Quality)
 - d. RSA 149-M:10 N.H. DES Solid Waste Management Bureau - disposal of construction debris and/or demolition waste.
 - e. N.H. Department of Environmental Services Air Resources Division (burning permits).
 - f. Other permits, as required by State and Local laws and ordinances.
 - g. Notice of intent for coverage under EPA's General NPDES Permit for construction dewatering activities.

61. Control of Pollution due to construction shall comply with the following:

- 61.1 During construction, the Contractor shall take precautions sufficient to avoid the leaching or runoff of polluting substances such as silt, clay, fuels, oils, bitumens, calcium chloride and any other polluting materials which are unsightly or which may be harmful to humans, fish, or other life, into groundwaters and surface waters of the State.
- 61.2 In waters used for public water supply or used for trout, salmon, or other game or forage fish spawning or nursery, control measures must be adequate to assure that turbidity in the receiving water will be increased not more than 10 standard turbidity units (s.t.u.) in the absence of other more restrictive locally-established limitations, unless otherwise permitted by the Division. In no case shall the classification for the surface water be violated.

General Conditions

C-1.26

61.3 In water used for other purposes, the turbidity must not exceed 25 s.t.u. unless otherwise permitted by the Division.

62. Use of Explosives.

- 62.1 When the use of explosives is necessary for the prosecution of the Work, exercise the utmost care not to endanger life or property. The Contractor shall be responsible for any and all damage resulting from the use of explosives.
- 62.2 Store all explosives in a secure manner, in compliance with all State and local laws and ordinances, and legally mark all such storage places. Storage shall be limited to such quantity as may be needed for the work underway.
- 62.3 Designate as a "Blasting Area" all sites where electric blasting caps are located and where explosive charges are being placed. Mark all blasting areas with signs as required by law. Place signs as required by law from each end of the blasting area and leave in place while the above conditions prevail. Immediately remove signs after blasting operations or the storage of caps is over.
- 62.4 Notify each property Owner and public utility company having structures in proximity to the site of the work sufficiently in advance to enable the companies to take such steps as they may deem necessary to protect their property. Such notice shall not relieve the Contractor of any of his responsibility for damage resulting from his blasting operation. Warn all persons within the danger zone of blasting operations and do not perform blasting work until the area is cleared. Provide sufficient flagmen outside the danger zone to stop all approaching traffic and pedestrians. Provide watchmen during the loading period and until charges have been exploded. Place adequate protective covering over all charges before being exploded.

63. Arbitration by Mutual Agreement.

- 63.1 All claims, disputes, and other matters in question arising out of, or relating to, the Contract Documents or the breach thereof, except for claims which have been waived by making an acceptance of final payment as provided in Section 25, may be decided by arbitration if the parties mutually agree. Any agreement to arbitrate shall be specifically enforceable under the prevailing arbitration law. The award rendered by the arbitrators shall be final, and judgment may be entered upon it in any court having jurisdiction thereof.
- 63.2 Notice of the request for arbitration shall be filed in writing with the other party to the Contract Documents and a copy shall be filed with the Engineer. Request for arbitration shall in no event be made on any claim, dispute, or other matter in question which would be barred by the applicable statute of limitations.
- 63.3 The Contractor will carry on the Work and maintain the progress schedule during any arbitration proceedings, unless otherwise mutually agreed in writing.

64. Taxes. The Contractor shall pay all sales, consumer, use, and other similar taxes required by the laws of the place where the Work is performed.

65 Separate Contracts.

65.1 The Owner reserves the right to let other Contracts in connection with this Project. The Contractor shall afford other Contractors reasonable opportunity for the introduction and storage of their materials and the execution of their Work, and shall properly connect and coordinate the Work with theirs. If the proper execution or results of any part of the Contractor's Work depends upon the Work of any other Contractor, the Contractor shall inspect

General Conditions

C-1.27

and promptly report to the Engineer any defects in such Work that render it unsuitable for such proper execution and results.

- 65.2 The Owner may perform additional Work related to the Project or the Owner may let other Contracts containing provisions similar to these. The Contractor will afford the other Contractors who are parties to such Contracts (or the Owner, if the Owner is performing the additional Work) reasonable opportunity for the introduction and storage of materials and equipment and the execution of the Work, and shall properly connect and coordinate the Work with theirs.
- 65.3 If the performance of the additional Work by other Contractors or the Owner is not noted in the Contract Documents prior to the execution of the Contract, written notice shall thereof be given to the Contractor prior to starting such additional Work. If the Contractor believes that the performance of such additional Work by the Owner or others involves it in additional expense or entitles it to an extension of the Contract Time, the Contractor may make a claim thereof as provided in Sections 17 and 18.

TECHNICAL SPECIFICATIONS

SECTION 00331

TV INSPECTION LOGS

PART 1 - GENERAL

1.01 PURPOSE:

A. PURPOSE OF LOGS:

1. The purpose of the TV Inspection Logs was to determine the condition of the existing sewer system and assess the extent of cleaning, repairs and/or replacement required for the system.
2. The inspections and observations provided information to prepare the design specifications included in these contract documents and to meet the requirements of the Owner.
3. Information reported from the TV Inspection Logs are those observed in the field at the particular location and time the observations were made, and do not necessarily represent the present conditions.

1.02 SCOPE:

A. TV INSPECTION LOGS:

1. TV Inspection of existing pipelines has been performed, with reasonable care. The results of the inspection program are appended hereto and are a part of the Contract Documents. Videos of what was encountered at the time of the inspection may be seen by appointment, upon request, during the bidding period at the office of Weston & Sampson Engineers, Inc., 100 International Drive, Suite 152, Portsmouth, New Hampshire. Contractors may, after obtaining Owner's permission, carry out additional pipeline inspection, at no expense to the Owner.
2. TV Inspection Logs provided in the Contract Documents are limited by the methods used for obtaining and expressing such data and is subject to various interpretations. The terms used to describe conditions encountered are subject to local usage and individual interpretation.
3. TV Inspections have been taken substantially at the locations indicated on the drawings and shown on the logs. Information presented in the inspection logs, as to the pipe condition, material build up in the pipe; etc. is based on visual observation from the videos. Information reported on the TV Inspection logs are those observed in the field at the particular location and at the time the videos were taken, and do not necessarily represent the present conditions. Condition of the pipeline, material build up in the pipe, and other factors may differ now from those originally observed.

Contractors should be aware that present conditions might affect methods of construction.

B. FIELD OBSERVATIONS:

1. Observations of unusual field conditions if observed during the TV and Manhole Inspections are noted on the contract drawings.

PART 2 – PRODUCTS – NOT APPLICABLE

PART 3 - EXECUTION

3.01 EXECUTION:

- A. TV Inspection Logs are for the general information of the Contractors. The Contractors are obligated, to examine the site, records of investigations and other data pertinent to the site, and then, based upon their own interpretations and investigations, decide the character and quantity of material to be encountered, the difficulties or obstacles likely to be encountered, and other conditions affecting the work. The TV Inspection Logs are accurate only at the particular locations and times the original inspections were made. No other warranty, either expressed or implied, by the Owner, Engineer or their agents is made to the accuracy of the information contained on TV Inspection Logs or other data shown on the drawings or presented in the Contract Documents.

END OF SECTION

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SECTION 00890

PERMITS

PART 1 – GENERAL

1.01 DESCRIPTION:

This Section provides specific information and defines specific requirements of the Contractor regarding the preparation and acquisition of permits required to perform the work of this project.

1.02 RELATED WORK:

- A. Section 01110, CONTROL OF WORK AND MATERIALS
- B. Section 01140, SPECIAL PROVISIONS
- C. Section 01550, SIGNAGE (TRAFFIC CONTROL)
- D. Section 01562, DUST CONTROL
- E. Section 01570, ENVIRONMENTAL PROTECTION
- F. Section 02240, DEWATERING
- G. Section 02300, EARTHWORK

1.03 GENERAL REQUIREMENTS:

- A. The Owner has obtained or will obtain and pay for the permits listed below, which are required for this project. The Contractor shall assist in obtaining certain permits, as indicated. The Contractor shall obtain and pay for all other permits required, as defined under the Permits subsection of Section 00700, GENERAL CONDITIONS.

<u>Permits by Owner</u>	<u>Status</u>
<ul style="list-style-type: none"> • City of Rochester – Excavation Permit 	*
<ul style="list-style-type: none"> • State of New Hampshire DOT – Right of Way Activities Permit 	**
<p>*Contractor shall prepare permit application and obtain the permit after contract is awarded, bearing all expenses. Owner will pay for and/or waive the permit application fee, if applicable.</p> <p>**Contractor shall submit a detailed traffic control plan as part of the State of New Hampshire DOT Right of Way Activities Permit that has been submitted by the Engineer, included as Exhibit 1 of this section, and is pending approval by NHDOT.</p>	

PART 2 - PRODUCTS

Not Used.

PART 3 – EXECUTION

3.01 PERFORM WORK IN ACCORDANCE WITH REQUIREMENTS:

- A. The Contractor shall perform the work in accordance with the Contract Documents, including the attached permits/order of conditions, and any applicable municipal requirements.
- B. Prior to commencing any construction activities, the Contractor shall demonstrate to the Owner and the Engineer, through on-site inspection and submitting copies of permits or approvals, that it is in full compliance with the terms and conditions of all permits specified herein. The Contractor shall maintain full compliance with all permits throughout the performance of the work, and upon request, grant access to permitting authorities to inspect the site for the purpose of verifying such compliance.

END OF SECTION

EXHIBIT 1 TO SECTION 00890 PERMITS
PENDING NEW HAMPSHIRE DOT RIGHT OF WAY ACTIVITIES PERMIT

Individual Application
IA-0000000055

Account Tim Labrie	Application Status Awaiting Customer	Category Permit	Last Modified Date 1/17/2024, 1:26 PM
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Details Files

[Edit](#)

▾ APPLICATION FOR RIGHT OF WAY PERMIT

Applicant:
Design Professional

Has work already started or been completed:
No

Category of work: Repair/Replace	Purpose of work: Utility Main
Type of work: Water/Sewer	

Description:
Installation of CIPP (trenchless), and epoxy manhole rehabilitation for sections of severely deteriorated existing 18-inch RCP sewer on Highland Street in Rochester, NH near the intersection of Highland Street and Salmon Falls Road.

Ground's surface or subsurface disturbed:
No

Proposed Start Date: 2/1/2024	Proposed End Date: 5/1/2025
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▾ RIGHT OF WAY INFORMATION

District:
District 6, 271 Main St, Durham, NH 03824

Side Of The Road: East/West	Street Number: none
Road Name: Highland Street (202)	NH Town or City: Rochester

Location Description:
Crew will be working from SMH0180 (shown on attached plans) located near the centerline on Highland Street near the intersection of Salmon Falls Road.

Latitude: 43.325224	Longitude: -70.956306
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▾ COMMENTS ON UPLOADED FILES

Sketch or Plan Comments:
Attached are the Draft of the Bid Documents, Draft of the Construction Plans

Surety Bond Comments:
none

Traffic Control Comments:
Attached is a PDF of the anticipated construction work zone and traffic control plan. Please note additional police details may be required. Please reach out if anything else is needed.

Traffic Impact Comments:
none

Additional Documents Comments:
none

∨ APPLICANT CONTACT INFORMATION

First Name: Tim	Last Name: Labrie	
Company Name: Weston & Sampson Engineers Inc.		
Phone: (508) 340-4649	Alternate Phone: (207) 608-0567	
Email: labriet@wseinc.com		
Address: 100 International Drive, Suite 152		
City: Portsmouth	State: NH	Zip Code: 03801

∨ OWNER CONTACT INFORMATION

First Name: Peter	Last Name: Nourse	
Company Name: City of Rochester, NH - Director of City Services (public works)		
Phone: (603) 332-4096	Alternate Phone:	
Email: peter.nourse@rochesternh.gov		
Address: 209 Chestnut Hill Road		
City: Rochester	State: NH	Zip Code: 03867

∨ CONTRACTOR CONTACT INFORMATION

Contractor Name:		
Company Name:		
Phone:	Alternate Phone:	
Email:		
Address:		
City:	State:	Zip Code:

∨ SIGNATURE PAGE

Agreed information was correct and to the stipulations in permit application.

Signature Name: Tim Labrie	Submit Date: 12/20/2023
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SECTION 01110

CONTROL OF WORK AND MATERIALS

PART 1 – GENERAL

Not Used.

PART 2 – PRODUCTS

Not Used

PART 3 - EXECUTION

3.01 HAULING, HANDLING AND STORAGE OF MATERIALS:

- A. The Contractor shall, at its own expense, handle and haul all materials furnished by it and shall remove any of its surplus materials at the completion of the work.
- B. The Contractor shall provide suitable and adequate storage for equipment and materials furnished by it that are liable to injury and shall be responsible for any loss of or damage to any equipment or materials by theft, breakage, or otherwise.
- C. All excavated materials and equipment to be incorporated in the Work shall be placed so as not to injure any part of the Work or existing facilities and so that free access can be always had to all parts of the Work and to all public utility installations in the vicinity of the work. Materials and equipment shall be kept neatly piled and compactly stored in such location as will cause a minimum of inconvenience to public travel and adjoining owners, tenants, and occupants.
- D. The Contractor shall be responsible for all damages to the work under construction during its progress and until final completion and acceptance even though partial payments have been made under the Contract.

3.02 EASEMENTS:

- A. Not indicated on the drawings, the work is in easements obtained by the Owner. The Contractor has no rights outside of the easements unless they are obtained from the property owner.
- B. Contractor shall schedule work so that it will cause minimum inconvenience and nuisance to abutting property owners, over the shortest possible time.
- C. Easements shall be kept clean; no rubbish or discarded construction materials shall be allowed to accumulate. Storage of excess construction materials, including soil, ledge, equipment, or machinery on easements will not be allowed.

- D. Restoration of fences, shrubs, trees, and grass shall be completed promptly following completion of the work in an easement, to minimize disruption and inconvenience to property owners.
- E. Unless approved by the Engineer, the use of easements for ease of access to and egress from other areas of the project will not be permitted.

3.03 OPEN EXCAVATIONS:

- A. All open excavations shall be adequately safeguarded by providing temporary barricades, caution signs, lights, and other means to prevent accidents to persons, and damage to property. The Contractor shall, at its own expense, provide suitable and safe means for completely covering all open excavations and for accommodating travel when work is not in progress.
- B. Bridges provided for access to private property during construction shall be removed when no longer required.
- C. The length of open trench will be controlled by the surrounding conditions but shall always be confined to the limits prescribed by the Engineer.
- D. If the excavation becomes a hazard, or if it excessively restricts traffic at any point, then special construction procedures shall be taken, such as limiting the length of trench and prohibiting stocking excavated material in the street.
- E. All street excavations shall be completely closed at the end of each work day. Backfilling or use of steel plates of adequate strength to carry traffic shall be used.

3.04 MAINTENANCE OF TRAFFIC:

- A. Unless permission to close the street is received in writing from the proper authority, all excavated materials and equipment shall be placed so that vehicular and pedestrian traffic may be safely always maintained.
- B. Should the Chief of Police deem it necessary, uniformed officers will be assigned to direct traffic. The Contractor shall make all arrangements in obtaining uniformed officers required.
- C. The Contractor shall at its own expense, as directed by the Police Traffic Control/Safety Officer, provide and erect acceptable barricades, barrier fences, traffic signs, and all other traffic devices not specifically covered in a bid item, to protect the work from traffic, pedestrians, and animals. The Contractor shall provide sufficient temporary lighting such as lanterns/flashers (electric battery operated) or other approved illuminated traffic signs and devices to afford adequate protection to the traveling public, at no additional cost to the Owner.

- D. The Contractor shall furnish all construction signs that are deemed necessary by and in accordance with Part VI of the Manual on Uniform Traffic Control Devices as published by the U.S. Department of Transportation. In addition, the Contractor may be required to furnish up to 128 square feet of additional special construction warning signs. Size and exact wording of signs shall be determined by the Engineer during construction.
- E. The intent of policing is to ensure public safety by direction of traffic. Police officers are not to serve as guards to protect the Contractor's equipment and materials.
- F. Nothing contained herein shall be construed as relieving the Contractor of any of its responsibilities for protection of persons and property under the terms of the Contract.

3.05 CARE AND PROTECTION OF PROPERTY:

The Contractor shall be responsible for the preservation of all public and private property and shall use every precaution necessary to prevent damage thereto. If any direct or indirect damage is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work on the part of the Contractor, such property shall be promptly restored by the Contractor, at its expense, to a condition similar or equal to that existing before the damage was done, to the satisfaction of the Engineer.

3.06 PROTECTION AND RELOCATION OF EXISTING STRUCTURES AND UTILITIES:

- A. All existing buildings, utilities, pipes, poles, wires fences, curbing, property line markers and other structures which the Engineer decides must be preserved in place without being temporarily or permanently relocated, shall be carefully supported, and protected from damage by the contractor. Should such property be damaged, the Contractor shall restore it, at no additional cost to the Owner.
- B. The Contractor shall determine the location of all underground structures and utilities (including existing water services, drain lines, electrical lines, and sewers). Services to buildings shall be maintained, and all costs or charges resulting from damage thereto shall be paid by Contractor.
- C. When fences interfere with the Contractor's operations, it shall remove and (unless otherwise specified) promptly restore them in accordance with Section 01564 EXISTING FENCES.
- D. On paved surfaces the Contractor shall not use or operate tractors, bulldozers, or other power-operated equipment with treads or wheels which are shaped to cut or otherwise damage such surfaces.
- E. All property damaged by the Contractor's operations shall be restored to a condition at least equal to that in which it was found immediately before work was begun. Suitable materials and methods shall be used for such restoration.

- F. Restoration of existing property and structures shall be carried out as promptly as practicable and shall not be left until the end of the construction period.

3.07 MAINTENANCE OF FLOW:

- A. The Contractor shall at its own cost, provide for the flow of sewers and drains interrupted during the progress of the work, and shall immediately cart away and dispose of all offensive matter. The entire procedure of maintaining existing flow shall be fully discussed with the Engineer well in advance of the interruption of any flow.
- B. All existing drainage facilities including, but not limited to; brooks, streams, canals, channels, ditches, culverts, catch basins and drainage piping shall be adequately safeguarded so as not to impede drainage or to cause siltation of downstream areas in any manner whatsoever. If the Contractor damages or impairs any of the previously mentioned drainage facilities, it shall repair the same within the same day.
- C. At the conclusion of the work, the Contractor shall remove all silt in drainage structures caused by its operations as described in Section 01740, CLEANING UP.

3.08 REJECTED MATERIALS AND DEFECTIVE WORK:

- A. Materials furnished by the Contractor and condemned by the Engineer as unsuitable or not in conformity with the specifications shall forthwith be removed from the work by the Contractor and shall not be made use of elsewhere in the work.
- B. Any errors, defects or omissions in the execution of the work or in the materials furnished by the Contractor, even though they may have been passed or overlooked or have appeared after the completion of the work, discovered at any time before the final payment is made hereunder, shall be forthwith rectified and made good by and at the expense of the Contractor and in a manner satisfactory to the Engineer.
- C. The Contractor shall reimburse the Owner for any expense, losses or damages incurred in consequence of any defect, error, omission or act of the Contractor or its employees, as determined by the Engineer, occurring before the final payment.

3.09 SANITARY REGULATIONS:

Sanitary conveniences for the use of all persons employed on the work, properly screened from public observation, shall be provided in sufficient numbers in such manner and at such locations as may be approved. The contents shall be removed and disposed of in a satisfactory manner as the occasion requires. The Contractor shall rigorously prohibit the committing of nuisances within, on or about the work. Any employees found violating these provisions shall be discharged and not again employed on the work without the written consent of the Engineer. The sanitary conveniences specified above shall be the obligation and responsibility of the Contractor.

3.10 SAFETY AND HEALTH REGULATIONS:

This project is subject to the Safety and Health regulations of the U.S. Department of Labor set forth in 29 CFR, Part 1926, and to the New Hampshire Law, RSA, Title XXIII: Labor. The Contractor shall be familiar with the requirements of these regulations.

3.11 SITE INVESTIGATION:

The Contractor acknowledges that it has satisfied itself as to the conditions existing at the site of the work, the type of equipment required to perform this work, the quality and quantity of the materials furnished as far as this information is reasonably ascertainable from an inspection of the site, as well as from information presented by the drawings and specifications made a part of this contract. Any failure of the Contractor to acquaint itself with available information will not relieve it from the responsibility for estimating properly the difficulty or cost of successfully performing the work. The Owner assumes no responsibility for any conclusion or interpretation made by the Contractor based on the information made available by the Owner.

3.12 ELECTRIC SERVICE:

- A. The Contractor shall make all necessary applications and arrangements and pay for all fees and charges for electrical energy for power and light necessary for the proper completion of this contract during its entire progress. The Contractor shall provide and pay for all temporary wiring, switches, connections, and meters.
- B. There shall be sufficient electric lighting so that all work may be done in a skillful manner where there is not sufficient daylight.

3.13 HAZARDOUS WASTE:

Should the Contractor, while performing work under this contract, uncover hazardous materials (other than those identified in this specification to be addressed by the Contractor, if applicable), it shall immediately notify the Engineer. The Contractor is not, and has no authority to act as, a handler, generator, operator or disposer of hazardous or toxic substances found or identified at the site, and the Owner shall undertake all such functions.

3.14 SEWER SERVICE CONNECTIONS:

- A. All sewer service connections shall be identified and located prior to each segment replacement or rehabilitation to expedite reconnection.
- B. The Contractor shall affix a written notice to the door of each home that has sewer service on the segment to be replaced 48-hours prior to disconnection of the service and again the day of disconnection.
- C. Flow from the existing sewer services shall be bypass pumped as specified in Section

01575 HANDLING EXISTING FLOWS and in Section 01535 TEMPORARY BYPASS
PUMPING SYSTEM.

END OF SECTION

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SECTION 01140

SPECIAL PROVISIONS

PART 1 - GENERAL

Not used

PART 2 - PRODUCTS

Not used

PART 3 - EXECUTION

3.01 WATER FOR CONSTRUCTION PURPOSES:

- A. In locations where water is in sufficient supply, the Contractor may be allowed to use water without charge for jetting backfill and other construction purposes. The express approval of the Owner shall be obtained before water is used. Waste of water by the Contractor shall be sufficient cause for withdrawing the privilege of unrestricted use.
- B. If no water is available, the Contractor shall supply water at no additional cost to the Owner.

3.02 PIPE LOCATION:

Pipe shall be located substantially as indicated on drawings. The Owner reserves the right, acting through the Engineer, to make such modifications as may be deemed desirable to avoid interference with existing structures or for other reasons.

3.03 DIMENSIONS OF EXISTING STRUCTURES:

Where the dimensions and locations of existing structures are of critical importance in the installation or connections of new work, the Contractor shall verify such dimensions and locations in the field before the fabrication of any material or equipment that is dependent on the correctness of such information.

3.04 OCCUPYING PRIVATE PROPERTY:

The Contractor shall not enter upon nor occupy with men, equipment or materials any property outside of the public highways or Owner's easements, except with the written consent of the property owner or property owner's agent.

3.05 EXISTING UTILITY LOCATIONS – CONTRACTOR’S RESPONSIBILITY:

- A. The location of existing underground services and utilities shown on the drawings is based on available records. It is not warranted that all existing utilities and services are shown, or that shown locations are correct. The Contractor shall be responsible for having the utility companies locate their respective utilities on the ground prior to excavating.
- B. To satisfy the requirements of New Hampshire Statute RSA-374, Section 47-56, the Contractor shall, at least 72 hours, exclusive of Saturdays, Sundays and holidays, prior to excavation in the proximity of telephone, gas, cable television and electric utilities, notify the utilities concerned by calling “DIG SAFE” at telephone number: 1-888-344-7233.
- C. The Contractor shall coordinate all work involving utilities and shall satisfy itself as to the existing conditions of the areas in which it is to perform its work. It shall conduct and arrange its work so as not to impede or interfere with the work of other contractors working in the same or adjacent areas.

3.06 COORDINATION OF WORK:

The General Contractor shall be responsible for coordinating its own work as well as that of any subcontractors. It shall be responsible for notification of the Engineer when each phase of work is expected to begin and the approximate completion date.

3.07 TIME FOR COMPLETION OF CONTRACT:

The time for completion of this contract is stipulated in the Form of/for General Bid. The Bidder shall base its bid on completing the proposed work by the completion date stipulated in Section A – 3.1, BID.

3.08 MAINTENANCE OF TRENCH SURFACE:

After backfilling and compacting the trench, the Contractor shall be responsible for keeping the ground surface dry and passable at all times until the surface has been restored to original conditions.

3.09 DESIGN OF EQUIPMENT:

Attention is directed to the fact that the layout of certain equipment is based on that of one manufacturer. If other equipment is submitted for approval, the Contractor shall prepare and submit for approval at its expense, detailed structural, mechanical and electrical drawings, equipment lists, maintenance requirements, and any other data required by the Engineer, showing all necessary changes and embodying all special features of the equipment it proposes to furnish. Such changes, if approved, shall be made at the expense of the Contractor.

3.10 SERVICES OF MANUFACTURER'S REPRESENTATIVE:

- A. The Contractor shall arrange for a qualified service representative, at a time suitable to the Engineer, from the company manufacturing or supplying certain equipment as indicated on the detailed specifications, to perform the duties described herein.
- B. After installation of the listed equipment has been completed and the equipment is presumably ready for operation, but before others operate it the representative shall inspect, operate, test, and adjust the equipment. The inspection shall include, but shall not be limited to, the following points as applicable:
 - 1. Soundness (without cracks or otherwise damaged parts); completeness in all details, as specified; correctness in setting, alignment, and relative arrangement of various parts; adequacy and correctness of packing, sealing and lubricants.
 - 2. The operation, testing, and adjustment shall be as required to prove that the equipment is left in proper condition for satisfactory operation under the conditions specified. Where called for in the specifications, vibration readings shall be made and the equipment balanced accordingly.
 - 3. On completion of its work, the Contractor shall submit in triplicate to the Engineer the manufacturer's or supplier representative's complete signed report of the results of its inspection, operation, adjustments, and test. The report shall include detailed descriptions of the points inspected, tests and adjustments made, quantitative results obtained if such are specified, and suggestions for precautions to be taken to ensure proper maintenance. The report shall also include a certificate that the equipment conforms to the requirements of the contract and is ready for permanent operation and that nothing in the installation will render the manufacturer's warranty null and void.
 - 4. After the Engineer has reviewed the reports from the manufacturer's representative, the Contractor shall make arrangements to have the manufacturer's representative present when the field acceptance tests are made.

3.11 COMPLIANCE WITH PERMITS:

- A. The Contractor shall perform all work in conformance with requirements of the Permits, which appear in Section 00890 – PERMITS.

3.12 CUTTING, FITTING AND PATCHING:

- A. The Contractor shall do all cutting, fitting, or patching of its work that may be required to make its several parts come together properly and fit it to receive or be received by work of other Contractors, as shown upon or reasonably implied by the drawings and the specifications for the completed structure, including all existing work.

- B. The Contractor shall not endanger any work by cutting, digging, or otherwise and shall not cut or alter the work of any other Contractor, save with the consent of the Engineer.
- C. All holes or openings required to be made in new or existing work, particularly at pipe, conduit, or other penetrations not covered by escutcheons or plates shall be neatly patched. All such holes shall be made completely watertight as approved by the Engineer.
- D. Size and locations of holes required in steel, concrete, or other structural or finish materials for piping, wiring, ducts, etc., which have not been located and detailed on the drawings shall be approved by the Engineer prior to layout and cutting thereof. All holes shall be suitably reinforced as required by the Engineer.
- E. Workmanship and materials of patching and repair work shall match the adjacent similar work and shall conform to the applicable sections of the specification. Patches and joints with existing work shall provide, as applicable in each case, visual, structural, and waterproofing continuity.

3.13 CONNECTIONS TO EXISTING WATER SYSTEMS:

- A. The Owner will, upon 72-hour notice from the Contractor, assist the Contractor by locating and opening or closing any and all valves required for draining or admitting water to the various sections of the water main as required to perform the proposed work. No damages shall be claimed by the Contractor for delays in dewatering pipelines nor shall any damages be claimed because of water leaking through closed valves after dewatering is completed.
- B. Connections to the existing distribution system shall be made with the mains under pressure unless the lines can be temporarily taken out of service as approved by the Owner.
- C. The Contractor will be required to make test excavations to ascertain that the proposed position of the connections will be clear of joints, fittings, or other obstructions.
- D. If any failure occurs in connection to existing mains, service shall be restored in the shortest possible time, the Contractor working around the clock, if necessary. The Contractor shall cooperate with the Owner in notifying the consumers or supplying emergency water. If required by Owner, the Contractor shall make connections to water mains during night hours, on Sunday or at other times of off-peak demand for water.

3.14 CONTRACTOR'S REPRESENTATIVE:

The Contractor shall designate a representative who will be available to respond to emergency calls by the Owner at any time day and night and on weekends and holidays should such a situation arise.

3.15 OPERATOR TRAINING:

A trained representative of the manufacturer of all equipment shall instruct the plant operating personnel on the operation and maintenance of the equipment. The Owner reserves the right to videotape all training sessions.

3.16 HOURS OF CONSTRUCTION ACTIVITY:

- A. The Contractor shall conduct all construction activity between 7:00 a.m. and 5:00 p.m., Monday through Friday. No construction work shall be allowed on Saturdays, Sundays or Holidays without written authorization from the Owner.
- B. The Owner will provide personnel for assistance in locating and operating valves at no cost to the Contractor during the Owner's normal working hours (Monday through Friday 7:00 a.m. to 5:00 p.m.). When this assistance is required by the Contractor outside of the Owner's normal working hours the cost will be incurred by the Contractor at the prevailing overtime rate of pay for the personnel providing the assistance. The Owner will bill the Contractor directly.

3.17 CONSTRUCTION CREWS:

The Contractor shall not increase the number of construction crews assigned to the work without providing one-week advance notice to the Engineer.

END OF SECTION

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SECTION 01270

MEASUREMENT AND PAYMENT

PART 1 - DESCRIPTION

1.01 GENERAL:

- A. The following subsections describe the measurement of and payment for the work to be done under the items listed in Section A – BIDDING REQUIREMENTS.
- B. All work performed as described in these contract documents will be paid for under one or more of the items listed in the BIDDING REQUIREMENTS. All other activities required in connection with performance of the work, including all work required under Section A: BIDDING REQUIREMENTS, whether described in the contract documents or mandated by applicable codes, permits and laws, will not be separately paid for unless specifically provided for in the form of general bid, but will be considered incidental to performance of the overall project.
- C. Each unit or lump-sum price stated in the BIDDING REQUIREMENTS shall constitute full compensation as herein specified for each item of work completed in accordance with the drawings and specifications.
- D. The payment items listed herein and in the BIDDING REQUIREMENTS are intended to provide full payment for the work shown on the drawings and specified herein. Any work called for or implied in the documents but not listed as a payment item shall be considered incidental to the overall project.
- E. Unless otherwise noted, each item shall be furnished and installed in accordance with the technical section whether a specific applicable payment item exists or not.

1.02 INSTALLATION OF WATER MAINS AND FITTINGS:

- A. The lump sum price for the Installation of Water Mains and Fittings shall constitute full compensation for furnishing all labor, materials, tools and equipment to construct the watermain relocation, complete, as shown on the drawings. Payment for the Installation of Water Mains and Fittings shall include; water mains, including all fittings, compacted select backfill (as shown in the water main trench detail), couplings, joint and thrust restraints, valves, erosion controls, excavation, backfilling, dewatering, support of excavation, concrete, testing water mains, repair of 18-inch RCP Sewer and necessary fittings, handling existing flows, 12 inches of gravel sub-base, temporary and permanent pavement, detectable tracer tape, loaming and seeding, wyes, tees, sidewalk restoration, rock excavation and disposal, and all other work included for the complete relocation and re-installation of the water main.

- B. Reconstruction of existing drains, sewers, gas lines, and other utilities shall be considered incidental to the work and shall not be measured separately for payment.
- C. All other work required shall be paid for under the lump sum price for this Item.
- D. All fittings used to provide clearance above and beneath existing utilities or laterals that are not shown on the plans shall be considered incidental to the work and shall not be measured separately for payment.
- E. Ten percent of the payment for the subdivisions of the item "Installation of Water Mains and Fittings" shall be withheld until the pipeline has satisfactorily passed the pressure test and disinfection requirements.
- F. The cost of making connections to existing water mains shall be considered incidental to the work and shall not be measured separately for payment.
- G. Bypass pumping and plugging or blocking of existing flow shall be considered incidental to the work and shall not be measured separately for payment.
- H. The work under this section shall be paid at the contract lump sum price under Item 1a.

1.03 STRUCTURAL AND STRUCTURAL ULTRAVIOLET CURED-IN-PLACE PIPE

- A. The work of this item shall be measured at the contract unit price bid per linear foot of structural cured-in-place pipe installed from edge of manhole to edge of manhole.
- B. Measurement, including all material, labor, tools and equipment shall be based on the actual length of pipes lined as determined by the Engineer. Structural Cured-In-Place Pipe shall be installed as specified in Section 02428, CURED-IN-PLACE PIPE and Section 02431, GLASS REINFORCED PLASTIC CURED-IN-PLACE PIPE.
- C. Locating active and inactive service connections and television inspection in conjunction with investigation shall be considered incidental to the work and shall not be measured separately for payment.
- D. Repairing the pipe invert in accordance with specification Section 02428, CURED-IN-PLACE PIPE shall be considered incidental to the work and shall not be measured separately for payment.
- E. Reinstating, inspecting, testing and grouting of service connections, service connection materials, and excavations for the purpose of reinstating connections shall be considered incidental to the work and shall not be measured separately for payment.

- F. Television inspection and cleaning (pre and post inspection), removal of roots, tuberculation, obstacles, debris, etc. of sewer and surface drain lines associated with the installation of structural cured-in-place pipe shall be considered incidental to the work and shall not be measured separately for payment.
- G. Flushing/dyed water testing for active/inactive service connections in conjunction with the television inspection of sewer and surface drain lines associated with the installation of structural cured-in-place pipe shall be considered incidental to the work and shall not be measured separately for payment.
- H. The Contractor shall affix a written notice to the door of each home that has sewer service through the pipe being lined one week prior to the lining operation and again one day before the lining operation. A notice shall also be distributed following service connection reinstatement stating that the service connection has been restored to service. The printing and distribution of notices to the homeowners by the Contractor shall be considered incidental to the lining operation and shall not be measured separately for payment.
- I. Installation of a pre-liner or use of grout to stop infiltration sources, if required, prior to the installation of the cured-in-place pipe shall be considered incidental to the work and shall not be measured separately for payment.
- J. Bypass pumping and plugging or blocking of sewer and surface drain flow, except where paid under item 8a, shall be considered incidental to the work and shall not be measured separately for payment.
- K. The work shall be paid for at the contract unit bid price under Items 2a, 2b, 2c, 10a, 10b, and 16a.
- L. Ten percent of the payment for the subdivisions of the item "Structural Cured-in-Place Pipe" shall be withheld until the pipeline rehabilitation's have satisfactorily completed and passed field testing/inspection(s) as specified in Section 02428, CURED-IN-PLACE PIPE and Section 02431, GLASS REINFORCED PLASTIC CURED-IN-PLACE PIPE.

1.04 SERVICE CONNECTION REHABILITATION:

A. CUT PROTRUDING SERVICE CONNECTIONS

1. The work under this item shall be measured at the contract unit bid price per service.
2. Measurement shall be based on per service cut. Services shall be cut as specified in Section 02443, SERVICE CONNECTION REHABILITATION.
3. Bypass pumping and plugging or blocking of sewer and drain line flow, except where paid under item 8a, shall be considered incidental to the work and shall not be

measured separately for payment.

4. The work under this section shall be paid at the contract unit bid price under Item 3a and 12a.

1.05 MANHOLE REHABILITATION:

A. CEMENTITIOUS LINING OF MANHOLES

1. The work of this item shall be measured from the top of the manhole bench to the bottom of the manhole frame at the contract unit price bid per vertical foot of manhole lined.
2. Measurement shall be based on the actual vertical footage of manhole lined and shall constitute full compensation for supplying all material, labor, tools, and equipment required to line the manhole as specified in Section 02435, SEWER MANHOLE REHABILITATION. No additional payment shall be made for material sprayed in the manhole invert or manhole frame.
3. Cleaning and plugging or sealing of active leaks in the manhole structure prior to lining, invert sealing, and exterior sealing shall be considered incidental to the work and will not be measured separately for payment.
4. Bypass pumping and plugging or blocking of sewer and drain line flow, except where paid under item 8a, shall be considered incidental to the work and shall not be measured separately for payment.
5. The work under this section shall be paid at the contract unit bid price under Item 4a.

B. EPOXY LINING OF MANHOLES

1. The work of this item shall be measured from the top of the manhole bench to the bottom of the manhole frame at the contract unit price bid per vertical foot of manhole lined
2. Measurement shall be based on the actual vertical footage of manhole lined and shall constitute full compensation for supplying all material, labor, tools, and equipment required to line the manhole as specified in Section 02435, SEWER MANHOLE REHABILITATION. No additional payment shall be made for material sprayed in the manhole invert or manhole frame. Cementitious lining prior to applying the epoxy lining shall be considered incidental to the work and will not be measured separately for payment.
3. Cleaning and plugging or sealing of active leaks in the manhole structure prior to lining, invert sealing, exterior sealing, and cementitious lining prior to applying the epoxy lining shall be considered incidental to the work and will not be measured separately for payment.

4. Bypass pumping and plugging or blocking of sewer and drain line flow, except where paid under item 8a, shall be considered incidental to the work and shall not be measured separately for payment.
5. The work under this section shall be paid at the contract unit bid price under Item 4b.

C. SEALING OF MANHOLE INVERTS

1. The work of this item shall be incidental and shall include all necessary materials, labor, tools, and equipment required to seal the manhole inverts as specified in Section 02435, SEWER MANHOLE REHABILITATION.

D. MANHOLE EXTERIOR SEALING

1. The work of this item shall be incidental and shall include all necessary materials, labor, tools, and equipment required to seal the manhole exterior as specified in Section 02435, SEWER MANHOLE REHABILITATION.

E. CHEMICAL ROOT TREATMENT OF SANITARY SEWER MANHOLES

1. The work of this item shall be measured at the contract unit bid price per manhole treated.
2. The contract unit price per manhole to be paid shall constitute full compensation for supplying all material, labor, tools, and equipment required to chemically treat the manholes for root control as specified in Section 02435, SEWER MANHOLE REHABILITATION and Section 02437, SEWER LINE AND MANHOLE CHEMICAL ROOT TREATMENT.
3. The work under this section shall be paid at the contract unit price under Item 5a.

F. BUILD MANHOLE BENCHES AND INVERTS

1. The work of this item shall be measured per manhole bench and invert built.
2. The contract unit price to be paid per manhole bench and invert built shall constitute full compensation for supplying all material, labor, tools, and equipment required to build the manhole bench and invert as specified in Section 02435, SEWER MANHOLE REHABILITATION.
3. The work under this section shall be paid at the contract unit price under Item 4c.

- G. Ten percent of the payment for the subdivision 4a, 4b, 4c, and 5a shall be withheld until the manhole rehabilitations have satisfactorily completed and passed field testing/inspection(s) as specified in Section 02435, SEWER MANHOLE

REHABILITATION.

1.06 PORTABLE CHANGEABLE MESSAGE SIGNS:

- A. Portable changeable message signs shall be measured per sign under the item “Portable Changeable Message Signs”.
- B. The unit price under this item shall include furnishings, maintaining, transporting, and using two (2) Trailer Mounted Changeable Message Signs for the duration of the work, excluding the re-test inspection.
- C. The work under this section shall be paid at the contract lump sum price under Item 6a, 13a, and 17a.

1.07 TRAFFIC CONTROL:

- A. The services of flaggers and when required, uniformed officers, shall be measured as an allowance based on the dollar amount of invoices from the flagging company or police department, submitted without Contractor Markup and paid at the contract allowance under the subdivisions of the item "Traffic Control." The allowance under this item include administration charges required by the police if not waived. Invoices must only reflect the actual hours worked in the field. Hours billed to the Contractor for minimum time requirements that are not hours actually on duty are excluded from payment under this item.
- B. Payment will be made based on invoices submitted by the traffic authority to the Contractor. The Contractor shall forward copies of these invoices to the Engineer and include the cost in his Application for Payment. Actual payment to the traffic authority shall be made by the Contractor and the Contractor shall be reimbursed by the Owner through the payment estimate.
- C. The work under this section shall be paid at the contract unit bid price under Item 7a, 14a, and 18a.

1.08 TEMPORARY BYPASS PUMPING USING SEPTIC TRUCKS FOR CONSTRUCTION ON HIGHLAND STREET

- A. The services of septic trucks shall be measured as an allowance based on the dollar amount of invoices from the septic truck company, submitted without Contractor Markup and paid at the contract allowance under the subdivisions of the item 8a, “Temporary Bypass Using Septic Trucks for Highland Street Installation”. Invoices must only reflect the actual hours worked in the field. Hours billed to the Contractor for minimum time requirements that are not hours actually on duty are excluded from payment under this item.
- B. Payment will be made based on invoices submitted by the septic truck company to the

Contractor. The Contractor shall forward copies of these invoices to the Engineer and include the cost in his Application for Payment. Actual payment to the septic truck company shall be made by the Contractor and the Contractor shall be reimbursed by the Owner through the payment estimate.

- C. The work under this section shall be paid at the contract unit bid price under Item 8a.

1.09 STRUCTURAL ULTRAVIOLET CURED PULL-IN-PLACE PIPE

- A. The work of this item shall be included in the contract lump sum bid for item 11a.
- B. All material, labor, tools and equipment shall be based on the actual length of pipes lined as determined by the Engineer. Structural Pull-In-Place Pipe shall be installed as specified in Section 02431, GLASS REINFORCED PLASTIC CURED-IN-PLACE PIPE.
- C. Locating active and inactive service connections and television inspection in conjunction with investigation shall be considered incidental to the work and shall not be measured separately for payment.
- D. Repairing the pipe invert in accordance with specification Section 02431, GLASS REINFORCED PLASTIC CURED-IN-PLACE PIPE shall be considered incidental to the work and shall not be measured separately for payment.
- E. Reinstating, inspecting, testing and grouting of service connections, service connection materials, and excavations for the purpose of reinstating connections shall be considered incidental to the work and shall not be measured separately for payment.
- F. Television inspection and cleaning (pre and post inspection), removal of roots, tuberculation, obstacles, debris, etc. of sewer and surface drain lines associated with the installation of structural cured-in-place pipe shall be considered incidental to the work and shall not be measured separately for payment.
- G. Flushing/dyed water testing for active/inactive service connections in conjunction with the television inspection of sewer and surface drain lines associated with the installation of structural pull-in-place pipe shall be considered incidental to the work and shall not be measured separately for payment.
- H. Installation of a pre-liner or use of grout to stop infiltration sources, if required, prior to the installation of the cured-in-place pipe shall be considered incidental to the work and shall not be measured separately for payment.
- I. Bypass pumping and plugging or blocking of sewer and drain line flow, except where paid under item 8a, shall be considered incidental to the work and shall not be measured separately for payment.

- J. The work shall be paid for at the contract lump sum bid for item 11a.
- K. Ten percent of the payment for the subdivisions of the item “Structural Pull-in-Place Pipe” shall be withheld until the pipeline rehabilitation’s have satisfactorily completed and passed field testing/inspection(s) as specified in Section 02428, CURED-IN-PLACE PIPE and Section 02431, GLASS REINFORCED PLASTIC CURED-IN-PLACE PIPE.

1.10 MOBILIZATION:

- A. The lump sum for this item shall constitute full compensation to the Contractor for the general mobilization necessary to make the contract operational, exclusive of the cost of materials. The total for mobilization shall not exceed 5 percent of the total of all bid items excluding this item and items 7a, 8a, 14a, and 18a.

1.11 SEWER MAINLINE AND LATERAL EQUIPMENT TESTING:

- A. The work of this section shall not be separately measured for payment, but shall be considered incidental to the project.

1.12 SURFACE RESTORATION:

- A. The work for surface restoration shall include loaming and seeding and all incidentals thereto for all disturbed areas. This work shall not be separately measured for payment, but shall be considered incidental to the project.
- B. Any existing fences which are required to be removed and reset shall not be separately measured for payment, but shall be considered incidental to the project.

1.13 ENVIRONMENTAL PROTECTION:

- A. The work of this section shall not be separately measured for payment, but shall be considered incidental to the project.

1.14 LOAMING AND SEEDING:

The work of this section shall not be separately measured for payment, but shall be considered incidental to the project.

1.15 DOCUMENTATION:

All documentation, as described in Specification Section 01331 – DOCUMENTATION, to be provided to the Owner shall not be separately measured for payment but shall be considered incidental to the project.

1.16 WARRANTY INSPECTION:

All warranty inspections and related work shall not be separately measured for payment but shall be considered incidental to the project.

1.17 DEWATERING:

The work of this section shall not be separately measured for payment, but shall be considered incidental to the project.

1.18 SUPPORT OF EXCAVATION:

The work of this section shall not be separately measured for payment, but shall be considered incidental to the project.

1.19 ELECTRICAL:

The work of this section shall not be separately measured for payment, but shall be considered incidental to the project.

1.20 CONSTRUCTION ZONE SAFETY PLAN:

The work of this section shall not be separately measured for payment, but shall be considered incidental to the project.

1.21 CONNECTIONS TO EXISTING STRUCTURES:

Connections to existing structures shall be considered incidental to the work and shall not be measured separately for payment.

1.22 DUST CONTROL

The work of this section shall not be separately measured for payment, but shall be considered incidental to the project.

1.23 PAVEMENT REPLACEMENT

The work of this section shall not be separately measured for payment, but shall be considered incidental to the project.

1.24 FIELD CONCRETE:

Unless otherwise indicated, the work of this section shall not be separately measured for payment but shall be considered incidental to the project.

1.25 REMOVAL AND RESETTING OF EXISTING FENCES

The work of this section shall not be separately measured for payment, but shall be considered incidental to the project.

1.26 HANDLING EXISTING FLOWS:

- A. Handling existing sewage flows in accordance with the specifications, including providing, installing, and removing all required equipment, piping, and pumping as required shall not be measured separately for payment, but shall be considered incidental to the project.

1.27 SIGNAGE:

- A. The work of this section shall not be separately measured for payment, but shall be considered incidental to the project.

1.28 PERMITS

The required permits and requirements as outlined in Section 00890 shall not be measured separately for payment but shall be considered incidental to the project.

1.29 CURBING REPLACEMENT:

Unless otherwise indicated, the work of this section shall not be separately measured for payment, but shall be considered incidental to the project.

1.30 PROTECTION AND RELOCATION OF EXISTING STRUCTURES AND UTILITIES:

Unless otherwise indicated, protection or temporary removal and replacement of existing utilities and structures as described in Section 01110 shall not be separately measured for payment, but shall be considered incidental to the project.

1.31 TRACER TAPE:

Unless otherwise indicated, the work of this section shall not be separately measured for payment, but shall be considered incidental to the project.

1.32 LANDSCAPING:

Unless otherwise indicated, the work of this section shall not be separately measured for payment, but shall be considered incidental to the project.

END OF SECTION

SECTION 01330

SUBMITTALS

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. The Contractor shall provide the Engineer with submittals as required by the contract documents.

1.02 RELATED WORK:

- A. Divisions 1 – 3 of these specifications that require submittals.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.01 GENERAL:

- A. As required by the General Conditions, Contractor shall submit a schedule of shop and working drawing submittals.
- B. The Contractor shall submit the shop and working drawing submittals either electronically or hard copy.

3.02 ELECTRONIC SUBMITTALS:

- A. In accordance with the accepted schedule, the Contractor shall submit promptly to the Engineer by email (Mahoney.Carolyn@wseinc.com) or on Compact Disc (mail to Weston & Sampson Engineers, attention: CSD), one electronic copy in Portable Document Format (PDF) of shop or working drawings required as noted in the specifications, of equipment, structural details and materials fabricated especially for this Contract.
- B. Each electronic copy of the shop or working drawing shall be accompanied by the Engineer's standard shop drawing transmittal form, included as Exhibit 1 of this section (use only for electronic submittals), on which is a list of the drawings, descriptions and numbers and the names of the Owner, Project, Contractor and building, equipment or structure.
- C. The Contractor shall receive a shop drawing memorandum with the Engineer's approval or comments via email.

3.03 HARD COPY SUBMITTALS:

- A. In accordance with the accepted schedule, the Contractor shall submit promptly to the Engineer, by mail (to Weston & Sampson Engineers, attention: CSD), six (6) copies each of shop or working drawings required as noted in the specifications, of equipment, structural details and materials fabricated especially for this Contract.
- B. Each shipment of drawings shall be accompanied by the Engineer's (if applicable) standard shop drawing transmittal form on which is a list of the drawings, descriptions and numbers and the names of the Owner, Project, Contractor and building, equipment or structure.


3.04 SHOP AND WORKING DRAWINGS:

- A. Shop and working drawings shall show the principal dimensions, weight, structural and operating features, space required, clearances, type and/or brand of finish of shop coat, grease fittings, etc., depending on the subject of the drawings. When it is customary to do so, when the dimensions are of particular importance, or when so specified, the drawings shall be certified by the manufacturer or fabricator as correct for this Contract.
- B. All shop and working drawings shall be submitted to the Engineer by and/or through the Contractor, who shall be responsible for obtaining shop and working drawings from its subcontractors and returning reviewed drawings to them. All shop and working drawings shall be prepared on standard size, 24-inch by 36-inch sheets, except those, which are made by changing existing standard shop or working drawings. All drawings shall be clearly marked with the names of the Owner, Project, Contractor and building, equipment or structure to which the drawing applies, and shall be suitably numbered. Each shipment of drawings shall be accompanied by the Engineer's (if applicable) standard shop drawing transmittal form on which is a list of the drawings, descriptions and numbers and the names mentioned above.
- C. Only drawings that have been prepared, checked and corrected by the fabricator should be submitted to the Contractor by its subcontractors and vendors. Prior to submitting drawings to the Engineer, the Contractor shall check thoroughly all such drawings to satisfy himself that the subject matter thereof conforms to the Contract Documents in all respects. Shop drawings shall be reviewed and marked with the date, checker's name and indication of the Contractor's approval, and only then shall be submitted to the Engineer. Shop drawings unsatisfactory to the Contractor shall be returned directly to their source for correction, without submittal to the Engineer. Shop drawings submitted to the Engineer without the Contractor's approval stamp and signature will be rejected. Any deviation from the Contract Documents indicated on the shop drawings must be identified on the drawings and in a separate submittal to the Engineer, as required in this section of the specifications and General Conditions.
- D. The Contractor shall be responsible for the prompt submittal and resubmittal, as necessary, of all shop and working drawings so that there will be no delay in the work due to the absence of such drawings.

- E. The Engineer will review the shop and working drawings as to their general conformance with the design concept of the project and general compliance with the information given in the Contract Documents. Corrections of comments made on the drawings during the review do not relieve the Contractor from compliance with requirements of the Contract Documents. The Contractor is responsible for: confirming and correlating all quantities and dimensions; selecting fabrication processes and techniques of construction; coordinating its work with that of all other trades; and performing its work in a safe and satisfactory manner. The review of the shop drawings is general and shall not relieve the Contractor of the responsibility for details of design, dimensions, code compliance, etc., necessary for interfacing with other components, proper fitting and construction of the work required by the Contract and for achieving the specified performance. The Engineer will review submittals two times: once upon original submission and a second time if the Engineer requires a revision or corrections. The Contractor shall reimburse the Owner amounts charged to the Owner by the Engineer for performing any review of a submittal for the third time or greater.
- F. With few exceptions, shop drawings will be reviewed and returned to the Contractor within 30 days of submittal.
- G. No material or equipment shall be purchased or fabricated especially for this Contract nor shall the Contractor proceed with any portion of the work, the design and details of which are dependent upon the design and details of equipment or other features for which review is required, until the required shop and working drawings have been submitted and reviewed by the Engineer as to their general conformance and compliance with the project and its Contract Documents. All materials and work involved in the construction shall then be as represented by said drawings.
- H. Two copies of the shop and working drawings and/or catalog cuts will be returned to the Contractor. The Contractor shall furnish additional copies of such drawings or catalog cuts when it needs more than two copies or when so requested.

END OF SECTION

EXHIBIT 1 TO SECTION 01330 SUBMITTALS
SHOP DRAWING TRANSMITTAL FORM

		Shop Drawing Transmittal	
<p>Instruction for Preparing Transmittal No action will be taken on any item unless accompanied by this form. TRANSMITTAL NOS. to be consecutive (1, 2, 3, etc.). Each resubmittal of same item shall use same number with suffix letter (A, B, etc.). SPEC. SECT. NO: Only one spec. section no. to each transmittal. DESCRIPTION: Complete identification of document or group of documents. SOURCE: Originator of document(s) being submitted.</p>		<p>DRAWING NO.: Identification of document(s). CONTRACT DRAWING REFERENCE: Contract drawing number(s) showing details of document(s). SPECIAL INSTRUCTIONS: Special cases and emergencies, changes in distribution and special handling requests, etc. should be entered here. SIGNATURE OF CONTRACTOR: Signature of individual who reviews and approves material prior to submittal to engineer.</p>	
THIS SECTION TO BE COMPLETED BY CONTRACTOR			
TRANSM. NO.	SPEC. SECT. NO.	DATE	CONTRACTORS JOB NO. W&S JOB NO.
PROJECT NAME & CONTRACT NO. LOCATION			
Attention: CSD (Mahoney.Carolyza@wseinc.com) Weston & Sampson Engineers, Inc. 55 Walkers Brook Drive Reading, MA 01867			
ITEM NO.	DESCRIPTION	SOURCE	BY W&S
1			ACTION CODE REVIEWED BY
2			CONTRACT DRAWING REF.
3			NO. OF COPIES
4			DRAWING NO. CATALOG NO. BROCHURE, ETC
THIS CERTIFIES THAT ALL ITEMS SUBMITTED HEREWITH HAVE BEEN CHECKED BY THE CONTRACTOR, ARE IN CONFORMANCE WITH THE REQUIREMENTS OF THE CONTRACT DOCUMENTS, EXCEPT AS NOTED, AND ARE APPROVED BY THE CONTRACTOR FOR THIS PROJECT.			SIGNATURE & TITLE
THIS SECTION TO BE COMPLETED BY W&S			
ACTION CODE: 1. FURNISH AS SUBMITTED 2. FURNISH AS NOTED 3. REVISE AND RESUBMIT 4. REJECTED- SEE REMARKS 5. ACKNOWLEDGEMENT 6. SUBMITTAL NOT REQUIRED, RETURNED WITHOUT REVIEW			a. INSTALLATION SHALL PROCEED ONLY WHEN ACTION CODE IS 1 OR 2 b. ACTION CODED 3 SHALL BE RESUBMITTED WITHIN TIME LIMIT SET IN CONTRACT c. REVIEW DOES NOT RELIEVE CONTRACTOR FROM RESPONSIBILITY OF COMPLIANCE WITH ALL REQUIREMENTS OF THE CONTRACT DOCUMENTS
			Weston & Sampson

SECTION 01331
DOCUMENTATION

PART 1 – GENERAL

1.01 WORK INCLUDED:

- A. This section covers the requirements for documentation to be furnished by the Contractor on this project.

1.02 RELATED WORK:

- A. Section 02428, CURED-IN-PLACE PIPE
- B. Section 02437, SEWER LINE AND MANHOLE CHEMICAL ROOT TREATMENT
- C. Section 02435, SEWER MANHOLE REHABILITATION
- D. Section 02443, SERVICE CONNECTION REHABILITATION

1.03 DOCUMENTATION:

- A. The Contractor shall maintain printed television inspection logs of sewer segments, for each sewer line segment undergoing repair/rehabilitation under this contract and provide one (1) copy of the logs within five (5) working days of the work being performed. Log sheet format shall be approved by Engineer prior to start of work.
- B. The log sheet(s) as a minimum shall clearly identify:
 - 1. Project Name
 - 2. Street Location, Name, Intersection, Station
 - 3. Date of inspection
 - 4. Total Length of Line Inspected
 - 5. Line Size(s)/Joint Spacing/Type
 - 6. Line and Manhole(s) Condition
 - 7. Significant observations such as service connections, offset joints, drop joints, broken/cracked pipe, protruding services, roots, collapsed sections, infiltration, presence of scale and corrosion and other discernible features.

8. Filename.
- C. All logs shall be provided to the Engineer in PDF format (one log per PDF file) at the completion of the project.
- D. All television inspection shall be recorded in accordance with NASCCO specifications and as follow:
- File Format: MPEG-4 (.mp4)
 - Codec: AVC (H.264)
 - Frame Size 16/9: 1280 x 720 or Frame Size 4/3: 960 x 720
 - Frame Rate: 60 fps
 - Pixel Aspect Ratio 1:1 (square pixels)
 - Video Standard: NTSC
 - Scan Type: Progressive

All television inspection shall include accompanying audio and shall be cross-referenced in an Access Database provided by the ENGINEER. Inspections shall be recorded one at a time, with each segment recorded as a separate file on the external hard drive. The contractor shall provide two (2) original and labeled copies of each external hard drive to the Engineer. All external hard drives shall have a typed label with the following:

[Date work was performed]

**Eastern Avenue Sanitary Sewer and Surface Drain Rehabilitation Project
Rochester, NH
Engineer: Weston & Sampson**

File names for television inspection of pipes (video, report files, and photographs taken during television inspection) shall be provided as following:

AssetID_Date_Media_Iteration

Where:

- AssetID is identifying number for the pipe asset (this must match GIS Asset ID, if available)
- Date is in the format “YYYYMMDD”,
- Media can be “Report”, “Video”, or “Photo”
- Iteration starts at “1” and increases by one (1) for each subsequent video in the same pipe asset.

For example, if pipe Asset ID SP26765 on Dallas Street were inspected on August 1, 2018, the Video file name would be:

SP26765_20180801_Video_1

And the Report file name would be:

SP26765_20180801_Report_1

In the event of a reverse setup, the next filenames would be:

SP26765_20180801_Video_2

SP26765_20180801_Report_2

Stationing shall be recorded at a minimum of every foot and at all points of interest, to allow instant access to any given footage. Manhole to manhole sewer segments shall not be split between two (2) external hard drives.

- E. The Contractor shall additionally provide one (1) copy of all logs relative to work performed on sewer manholes within five (5) working days of the work being performed.
- F. The Contractor shall take a digital photograph, in JPEG format, at each manhole before and after manhole rehabilitation. Digital photographs shall have a minimum resolution of ten (10) megapixels. The files shall be provided on the external hard drives as specified in 1.03.D.

File names for the inspection and/or rehabilitation of manholes (photographs, report files, and video files) shall be provided as the followings:

AssetID_Date_Media_Iteration

Where:

- AssetID is identifying number for the manhole asset (this must match GIS Asset ID, if available)
- Date is in the format “YYYYMMDD”,
- Media can be “Internal_Photo”, or “Report”
- Iteration starts at “1” and increases by one (1) for each subsequent photo in the same manhole asset.

For example, if a photograph was taken of the pre-rehabilitation work performed on manhole Asset ID SMH26765 on Dallas Street on August 1, 2018, the photograph would be:

SMH26765_20180801_Internal_Photo_1

And the Report file name would be:

SMH26765_20180801_Report_1

And the post-rehabilitation photograph would be:

SMH26765_20180801_Internal_Photo_2

In the event that the rehabilitation work was not completed until the following day, August 2, 2018, the post-rehabilitation photograph would be:

SMH26765_20180802_ Internal_Photo _1

G. The Contractor shall deliver to the Owner, at no additional cost, two (2) external hard drives each including the following information at the end of the project. The external hard drives shall be USB powered and capable of USB 3.0 connectivity and will become the property of the Owner upon delivery. The Contractor shall use file folders to organize individual types of data on the external hard drives. The Contractor shall include the following data on the external hard drives prior to delivery to the Engineer.

- **Sewer Manhole Rehabilitation**
 - Pre and Post Rehabilitation Manhole Inspection Photos in JPEG format
 - File names shall be in accordance with 1.03F of this section.
 - Each manhole rehabilitation log as a separate PDF file
 - File names shall be in accordance with 1.03F of this section.

- **Structural and Structural Ultraviolet Cured-in-Place Pipe – Organized per Inversion**
 - Pre-inversion Television Inspection MPEG Files
 - File names shall be in accordance with 1.03D of this section.
 - Each pre-inversion television inspection log as a separate PDF file
 - File names shall be in accordance with 1.03D of this section.
 - Each liner order sheet (describing the material ordered) as a separate PDF file
 - Each service connection reinstatement sign-off sheet as a separate PDF file
 - Each thermo couple log kept during inversion process as a separate PDF file
 - Post-inversion Television Inspection MPEG Files
 - File names shall be in accordance with 1.03D of this section.
 - Each post-inversion television inspection log as a separate PDF file
 - File names shall be in accordance with 1.03D of this section.
 - Each material testing results report as a separate PDF file

- **Sewer Line and Manhole Chemical Root Treatment**
 - Field logs as a PDF file

- **Service Connection Test and Grout**
 - Television Inspection MPEG Files
 - File names shall be in accordance with 1.03D of this section.
 - Each television inspection log as a separate PDF file
 - File names shall be in accordance with 1.03D of this section.

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

Not Used.

END OF SECTION

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SECTION 01380

HEALTH AND SAFETY PLAN

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. Prior to the start of work on the site, Contractor shall prepare and submit a site-specific health and safety plan that includes consideration of all known and potential hazards at the site. Work may not proceed at the project site until the Contractor's health and safety plan has been received and reviewed by the Engineer.

1.02 REFERENCES:

- A. OSHA 29 CFR 1910.120

PART 2 – PRODUCTS

2.01 HEALTH AND SAFETY PLAN:

- A. The health and safety plan shall include, but not necessarily be limited to the following:
 1. Identification of Contractor's Site Safety Officer.
 2. Identification of Hazards and Risks Associated with Project.
 3. Contractor's Standard Operating Procedures, Including Personnel Training and Field Orientation.
 4. Respiratory Protection Training Requirements.
 5. Levels of Protection and Selection of Equipment Procedures.
 6. Type of Medical Surveillance Program.
 7. Personal Hygiene Requirements and Guidelines.
 8. Zone Delineation of the Project Site.
 9. Site Security and Entry Control Procedures.
 10. Field Monitoring of Site Contaminants.
 11. Contingency and Emergency Procedures.
 12. Listing of Emergency Contacts.

PART 3 - EXECUTION

3.01 PERSONAL PROTECTIVE EQUIPMENT:

- A. The personal protective equipment required to provide the appropriate level of dermal and respiratory protection shall be determined based on the results of continuous air monitoring performed by the Contractor and the standards set forth in the Contractor's health and safety plan. The Engineer may conduct duplicate air monitoring for quality control purposes. Modified Level D protection shall be the minimum requirement for all on-site personnel.

END OF SECTION

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SECTION 01550

SIGNAGE (TRAFFIC CONTROL)

PART 1 - GENERAL

1.01 WORK INCLUDED:

This Section covers furnishing and installing traffic control signs and other devices.

1.02 SYSTEM DESCRIPTION:

The Contractor shall furnish and install all construction signs deemed necessary by and in accordance with the latest edition of Part VI of the Manual on Uniform Traffic Control Devices(MUTCD) as published by the U.S. Department of Transportation.

PART 2 - PRODUCTS

2.01 TRAFFIC WARNING AND REGULATING DEVICES:

Contractor shall provide warning signs, barricades and other devices in accordance with the specifications provided in the MUTCD. Size of signs, lettering, colors, method of support and other factors prescribed in the MUTCD shall be adhered to.

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. Contractor shall erect barricades, barrier fences, traffic signs, and other traffic control devices as required by the MUTCD, or as required by the Engineer, to protect the work area from traffic, pedestrians, and animals.
- B. Contractor shall relocate barricades, signs and other devices as necessary as the work progresses.
- C. Unless extended protection is required for specific areas, when the work has been completed, all temporary warning and regulatory devices used by the Contractor shall be removed so that traffic can move unimpeded through the area.

END OF SECTION

SECTION 01551

PORTABLE CHANGEABLE MESSAGE SIGN

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. The work covered under this section shall consist of furnishing, maintaining, transporting and using a Trailer - Mounted Changeable Message Sign.
- B. All messages displayed shall be approved by the Engineer.

1.02 REFERENCES:

- A. The following standards form part of these specifications and indicates a minimum required standard:

Manual on Uniform Traffic Control Devices (MUTCD)

PART 2 - PRODUCTS

2.01 GENERAL:

- A. Materials required under this Section need not be new but must be in first class condition and acceptable to the Engineer. Any materials that in the judgment of the Engineer are unsatisfactory in appearance and/or performance shall be immediately replaced by acceptable units.

2.02 SPECIFIC REQUIREMENTS:

Refer to Sections 01330-Submittals and Section 01140-Special Provisions for information regarding required certification that all materials, products, equipment and/or services.

- A. The Trailer-Mounted Changeable Message Sign shall meet the requirements of this specification and shall consist of the following major components;
 - 1. Message Board
 - 2. Operator Interface (CPU and Keyboard)
 - 3. Power Supply
 - 4. Towable Trailer
- B. Message Board
 - 1. Type - The display can be Flip Disk, LED or a combination of both Flip Disk and LED (Hybrid).

2. Colors - The display shall be either fluorescent yellow or ITE amber.
3. Lines - The sign board shall have the capability of displaying at least three lines of 18- inch high characters with 1 to 8 characters per line.
4. Visibility and Viewing Angle - The sign shall be visible for one-half mile and legible from a minimum distance of 650 feet with a viewing angle of no less than 30 degrees, during both daytime and nighttime operation.
5. The entire message code shall be readable at least twice by the motorists when traveling at the posted speed limit.

2.03 OPERATOR INTERFACE:

- A. A means of creating/controlling the on-site display message(s) shall be provided with each sign. The operator interface shall contain as a minimum the following:
 1. Operator's Display terminal with keyboard will provide a full screen display to allow the operator to preview the message content and format before it is sent to the sign panel. The keyboard shall be of a standard design.
 2. Controller (CPU)
 3. Lockable weatherproof enclosure for interface components.

2.04 CONTROLLER:

- A. The controller shall possess, as a minimum, the following features:
 1. Full 32K user memory with the option for an additional 32K archive memory.
 2. Capacity to store a minimum of 199 pre-defined messages and a minimum of 50 user-created messages (not to exceed 32K).
 3. Changeable message flash rate capability.
 4. A minimum of 24 hour battery back-up.
 5. Password activation shall be software available.

2.05 POWER-SUPPLY:

- A. The sign shall be capable of operation from the following sources:
 1. A diesel powered generator with a battery backup.

2. A battery with diesel generator charging or solar charging.
3. The power supply shall have a cover for weather protection and shall be lockable for security.

2.06 TOWABLE TRAILER:

- A. The trailer shall be of rugged construction suitable for towing at highway speeds and at low speed over rugged construction site terrain. The trailer shall have at least the following features:
 1. Complete lighting to standard highway specifications.
 2. A single axle with two (2) – 15-inch wheels (3500 GVW rated).
 3. Two (2) inch ball coupler with heavy duty safety chains.
 4. Four (4) corner-located leveling swivel jacks capable of leveling the trailer on one (1) in six (6) grade and capable of stabilizing the trailer in high winds of up to 80 MPH. in addition, a tongue leveling swivel jack shall be provided.
 5. Surge breaks with lockable parking in conformance with Federal weight regulations.
 6. The sign shall be capable of being locked in a stowed position while being towed.
 7. A hydraulic lift mechanism shall be provided to elevate the sign to its operating position.
 8. It shall be possible to lock the sign panel in several off-angle positions with respect to the trailer axis for enhanced visibility.

2.07 ENVIRONMENTAL:

- A. The Trailer-Mounted Changeable Message Sign shall be capable of performing all functions at ambient temperatures ranging from -30 degrees F to +165 degrees F. There shall be no degradation of operation due to fog, rain or snow.

2.08 MAINTENANCE:

- A. All components of the Trailer-Mounted Changeable Message Sign shall be readily accessible for ease of maintenance. Standard commercially available parts shall be used where possible.
- B. The sign shall require no special scheduled maintenance. Maintenance shall include periodic cleaning. When not being used, at the discretion of the Engineer, the sign shall

be stored in an approved secure area.

2.09 DOCUMENTATION:

- A. As a minimum, the following documentation shall be supplied with each Trailer-mounted Changeable Message Sign:
 - 1. Operating Manual
 - 2. Parts Manual
 - 3. Wiring Diagrams
 - 4. Troubleshooting Guide

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. All warning devices shall be subject to removal, replacement and/or repositioning as often as necessary. The changeable message unit shall be available for immediate use on the project and be positioned as required by the Engineer. The Contractor shall be responsible for the maintenance of such device and appurtenances, throughout its use on the project, with no additional compensation thereof, other than as provided under the contract unit price. Should the unit be found defective in any way it shall be replaced immediately at the Contractor's expense.
- B. For work under this contract, Contractor shall provide up to 120 unit days of message sign operation, with possibly up to two sign units operating for 120 days simultaneously, as required by the Engineer.

END OF SECTION

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SECTION 01553

UNIFORMED OFFICERS FOR TEMPORARY TRAFFIC CONTROL

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. This Section covers the provisions for furnishing Uniformed Officers for Traffic Control and Maintenance of Traffic as described in Section 01110 CONTROL OF WORK AND MATERIALS.

1.02 DESCRIPTION:

- A. The Contractor shall coordinate with the local jurisdiction's Traffic Control Officer to determine the number of Officers deemed necessary to provide for public safety and to maintain a smooth flow of traffic through the construction area(s) affected.

1.03 RELATED WORK:

- A. SECTION 01110, CONTROL OF WORK AND MATERIALS
- B. SECTION 01550, SIGNAGE (TRAFFIC CONTROL)
- C. SECTION 01554, ROAD FLAGGERS FOR TEMPORARY TRAFFIC CONTROL

PART 2 - PRODUCTS

2.01 UNIFORMED OFFICERS:

- A. Contractor shall provide the Traffic Control Officer with a minimum of 24 hours notice indicating the time of day, street location and confirm number of officers required for traffic control.
- B. Contractor shall give the Traffic Control Officer a minimum of 4 hours prior cancellation notice should Contractor determine that due to weather or conditions beyond its control it would not need the scheduled officers.
- C. Contractor shall pay for officer(s) at the prevailing rate established by the local police department should officers not be needed and the Contractor fails to cancel the officers as noted in 2.01.B above.
- D. Where the Owner is paying directly for Traffic Officers and the Contractor cancels scheduled officers, the Contractor shall be responsible for payment of the wages for cancellations if not cancelled in accordance with 2.01.B and 2.01.C above.

PART 3 - EXECUTION

3.01 OPERATION:

- A. Contractor shall provide barricades, barrier fences, traffic signs, and other traffic control devices as required by the Owners Traffic Control Officer, or as required by the Engineer, to protect the work area from traffic, pedestrians, and animals.
- B. Contractor shall relocate barricades, signs and other devices as necessary as the work progresses as required by the Owners Traffic Control Officer or the Engineer.

END OF SECTION

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SECTION 01554

ROAD FLAGGERS FOR TEMPORARY TRAFFIC CONTROL

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. This Section covers the provisions for complying with requirements for construction zone safety plans on public works projects where roadway traffic flaggers are specified.

1.02 DESCRIPTION:

The Contractor shall utilize roadway traffic flaggers (flaggers), where applicable, to maintain the flow of traffic during construction.

1.03 REFERENCES:

New Hampshire Department of Transportation Standard specifications for Highways and Bridges – latest edition

1.04 FLAGGER TRAINING AND CERTIFICATION REQUIREMENTS:

- A. Flaggers utilized during the performance of the work must possess a certificate of satisfactory completion from a NHDOT-approved flagger training program, such as, but not limited to, those offered by the Associated General Contractors, American Traffic Safety Services Association, American Flagging and Traffic Control, or the National Safety Council, within the previous three (3) years.
- B. Prior to the start of work, the Contractor shall provide to the Engineer a written list of certified flaggers to be used, including the most recent date of certification or recertification for each person listed.
- C. All flaggers shall carry their approved flagging training program certification card with them while performing flagging duties.
- D. All flaggers shall have completed CPR and First Aid training according to the standards and guidelines of the American Heart Association or the American Red Cross. All flaggers shall carry their CPR/First Aid certification cards with them while performing flagging duties.
- E. All certifications shall remain valid for the duration of the project or the flagger shall be removed from the project.

PART 2 - PRODUCTS

- A. Each flagger shall be equipped with the following high visibility clothing, signaling, and safety devices:
- (1) A white protective hard hat with a minimum level of reflectivity per the requirements of ANSI, Type I, Class E&G.
 - (2) A clean, unfaded, untorn lime/yellow reflective safety vest and safety pants meeting the requirements of ANSY 107 Class 3 with the words "Traffic Control" on the front and rear panels in minimum two (2) inch (50 millimeter) high letters.
 - (3) A "STOP/SLOW" traffic paddle conforming to the requirements of Part 6E.03 of the Manual on Uniform Traffic Control Devices, a reflectorized red flag, flagger station advance warning signage, and two-way radios capable of providing clear communication within the work zone between flaggers, the Contractor, and the Engineer. The traffic paddle shall be mounted on a pole of sufficient length to be seven (7) feet above the ground as measured from the bottom of the paddle.
 - (4) A working flashlight with a minimum of 15,000 candlepower and a six (6) inch red attachable wand, a whistle with an attached lanyard, and a First Aid kit that complies with the requirements of ANSI Z308.1.

PART 3 - EXECUTION

3.01 OPERATION:

- A. Flaggers shall be utilized in accordance with the appropriate traffic management plan or that the Owner's Authorized Representative deems necessary for the direction and control of traffic.
- B. Any flagger determined by the Authorized Representative or Engineer to be ineffective in controlling traffic may be removed at the discretion of the Engineer. If a flagger is directed to be removed, the contractor shall immediately comply with the directive from the Engineer and shall suspend operations as necessary until a qualified replacement can be provided. Such a suspension of operations shall not be considered as a basis for a claim or an extension of time.

END OF SECTION

SECTION 01562

DUST CONTROL

PART 1 - GENERAL

1.01 DESCRIPTION:

This section of the specification covers the control of dust via calcium chloride and water, complete.

PART 2 - PRODUCTS

2.01 CALCIUM CHLORIDE:

- A. Calcium chloride shall conform to the requirements of AASHTO-M 144, Type I or Type II and Specification for Calcium Chloride, ASTM D98. The calcium chloride shall be packaged in moisture proof bags or in airtight drums with the manufacturer, name of product, net weight, and percentage of calcium chloride guaranteed by the manufacturer legibly marked on each container.
- B. Calcium chloride failing to meet the requirements of the aforementioned specifications or that which has become caked or sticky in shipment, may be rejected by the Engineer.

2.02 WATER:

- A. Water shall not be brackish and shall be free from oil, acid, and injurious alkali or vegetable matter.

PART 3 - EXECUTION

3.01 APPLICATION:

- A. Calcium chloride shall be applied when ordered by the Engineer and only in areas which will not be adversely affected by the application. See Section 01570, ENVIRONMENTAL PROTECTION.
- B. Calcium chloride shall be uniformly applied at the rate of 1-1/2 pounds per square yard or at any other rate as required by the Engineer. Application shall be by means of a mechanical spreader, or other approved methods. The number and frequency of applications shall be determined by the Engineer.
- C. Water may be sprinkler applied with equipment including a tank with gauge-equipped pressure pump and a nozzle-equipped spray bar.

- D. Water shall be dispersed through the nozzle under a minimum pressure of 20 pounds per square inch, gauge pressure.

END OF SECTION

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SECTION 01564

EXISTING FENCES

PART 1 - GENERAL

1.01 DESCRIPTION:

- A. This section of the specification covers the removal and resetting of existing fences.
- B. Where the removal of existing fences, at locations shown on the plans and where required by the Engineer, is required, the Contractor shall remove and reset such fences as required by the Engineer.

PART 2 - PRODUCTS

2.01 FENCING:

- A. The materials removed shall be utilized to reset the fence. Where necessary, new posts and bases shall be furnished and installed by the Contractor. Any materials damaged or lost during or subsequent to removal shall be replaced by the Contractor without additional compensation.
- B. All new materials required shall be equal in quality and design to the materials in the present fences.

PART 3 - EXECUTION

3.01 REMOVAL OF EXISTING FENCES:

- A. The present fences shall be carefully removed together with all appurtenances and satisfactorily stored and protected until required for resetting.

3.02 ERECTION:

- A. Fences shall be reset plumb and to the grades required and shall conform to the original fence or as the Engineer requires. Backfilling around the posts shall consist of suitable material satisfactorily compacted. If the fence posts were originally set in concrete bases they shall be reset in concrete bases.

3.03 PAINTING:

- A. Painting, if required, shall be done as required by the Engineer.

END OF SECTION

SECTION 01570

ENVIRONMENTAL PROTECTION

PART 1 – GENERAL

1.01 DESCRIPTION:

- A. The work covered by this section of the specifications consists of furnishing all labor, materials, tools and equipment and performing all work required for the prevention of environmental pollution during and as a result of construction operations under this contract.
- B. The requirements set forth in this section of the specifications apply to cross-country areas, river and stream crossings, and construction in and adjacent to wetlands, unless otherwise specifically stated.
- C. Prior to commencement of work, the Contractor shall meet with representatives of the Engineer to develop mutual understandings relative to compliance of the environmental protection program.

1.02 RELATED WORK:

- A. Section 01330, SUBMITTALS

1.03 SUBMITTALS:

- A. The Contractor shall submit details and literature fully describing environmental protection methods to be employed in carrying out construction activities within 100 feet of wetlands or across areas designated as wetlands.

PART 2 - PRODUCTS

2.01 CATCH BASIN PROTECTION:

- A. To trap sediment and to prevent sediment from clogging drainage systems, catch basin protection in the form of a siltation sack (Siltsack as manufactured by ACF Environmental, Inc. or approved equal) shall be provided as approved by the Engineer.

PART 3- EXECUTION

3.01 NOTIFICATION AND STOPPAGE OF WORK:

- A. The Engineer will notify the Contractor in writing of any non-compliance with the provisions of the Order of Conditions. The Contractor shall, after receipt of such notice, immediately take corrective action. Such notice, when delivered to the Contractor or its authorized representative at the site of the work, shall be deemed sufficient for the purpose. If the Contractor fails to act promptly, the Owner may order stoppage of all or part of the work through the Engineer until satisfactory corrective action has been taken. No claim for an extension of time or for excess costs or damage incurred by the Contractor as a result of time lost due to any stop work orders shall be made unless it was later determined that the Contractor was in compliance.

3.02 AREA OF CONSTRUCTION ACTIVITY:

- A. Insofar as possible, the Contractor shall confine its construction activities to those areas defined by the plans and specifications. All land resources within the project boundaries and outside the limits of permanent work performed under this contract shall be preserved in their present condition or be restored to a condition after completion of construction at least equal to that which existed prior to work under this contract.

3.03 PROTECTION OF WATER RESOURCES:

- A. The Contractor shall not pollute streams, lakes or reservoirs with fuels, oils, bitumens, calcium chloride, acids or other harmful materials. It is the Contractor's responsibility to comply with all applicable Federal, State, County and Municipal laws regarding pollution of rivers and streams.
- B. Special measures should be taken to insure against spillage of any pollutants into public waters.

3.04 LOCATION OF STORAGE AREAS:

- A. The location of the Contractor's storage areas for equipment and/or materials shall be upon cleared portions of the job site or areas to be cleared as a part of this project, and shall require written approval of the Engineer. Plans showing storage facilities for equipment and materials shall be submitted for approval of the Engineer.
- B. No excavated materials or materials used in backfill operations shall be deposited within a minimum distance of one hundred (100) feet of any watercourse or any drainage facility. Adequate measures for erosion and sediment control such as the placement of baled hay or straw around the downstream perimeter of stockpiles shall be employed to protect any downstream areas from siltation.
- C. There shall be no storage of equipment or materials in areas designated as wetlands.

- D. The Engineer may designate a particular area or areas where the Contractor may store materials used in its operations.
- E. Storage areas in cross-country locations shall be restored to pre-construction conditions with the planting of native species of trees and shrubs.

3.05 PROTECTION OF LANDSCAPE:

- A. The Contractor shall not deface, injure, or destroy trees or shrubs nor remove or cut them without written authority from the Owner. No ropes, cables, or guys shall be fastened to or attached to any existing nearby trees for anchorages unless specifically authorized by the Engineer. Excavating machinery and cranes shall be of suitable type and be operated with care to prevent injury to trees which are not to be removed, particularly overhanging branches and limbs. The Contractor shall, in any event, be responsible for any damage resulting from such use.
- B. Branches, limbs, and roots shall not be cut except by permission of the Engineer. All cutting shall be smoothly and neatly done without splitting or crushing. When there is unavoidable injury to branches, limbs and trunks of trees, the injured portions shall be neatly trimmed and covered with an application of grafting wax or tree healing paint as directed.
- C. Where, in the opinion of the Engineer, trees may possibly be defaced, bruised, injured, or otherwise damaged by the Contractor's equipment or by its blasting or other operations, the Engineer may require the Contractor to adequately protect such trees by placing boards, planks, poles or fencing around them. Any trees or landscape feature scarred or damaged by the Contractor's equipment or operations shall be restored as nearly as possible to its original condition at the expense of the Contractor. The Engineer will decide what method of restoration shall be used, and whether damaged trees shall be treated and healed or removed and disposed of.
- D. Cultivated hedges, shrubs, and plants which could be injured by the Contractor's operations shall be protected by suitable means or shall be dug up, balled and temporarily replanted and maintained. After construction operations have been substantially completed, they shall be replanted in their original positions and cared for until growth is re-established. If cultivated hedges, shrubs, and plants are injured to such a degree as to affect their growth or diminish their beauty or usefulness, they shall be replaced by items of a kind and quality at least equal to that existing at the start of the work.

3.06 DISCHARGE OF DEWATERING OPERATIONS:

- A. Any water that is pumped and discharged from the trench and/or excavation as part of the Contractor's water handling shall be filtered by an approved method prior to its discharge into a receiving water or drainage system.

- B. Under no circumstances shall the Contractor discharge water to the areas designated as wetlands. When constructing in a wetlands area, the Contractor shall discharge water from dewatering operations directly to the nearest drainage system, stream, or waterway after filtering by an approved method.
- C. The pumped water shall be filtered through filter fabric and baled **hay/straw**, a vegetative filter strip or a vegetated channel to trap sediment occurring as a result of the construction operations. The vegetated channel shall be constructed such that the discharge flow rate shall not exceed a velocity of more than 1 foot per second. Accumulated sediment shall be cleared from the channel periodically.

3.07 DUST CONTROL:

- A. During the progress of the work, the Contractor shall conduct its operations and maintain the area of its activities, including sweeping and sprinkling of streets as necessary, to minimize creation and dispersion of dust. If the Engineer decides it is necessary to use calcium chloride for more effective dust control, the Contractor shall furnish and spread the material, as directed. Calcium chloride shall be as specified under Section 01562, DUST CONTROL.
- B. Calcium Chloride shall not be used for dust control within a drainage basin or in the vicinity of any source of potable water.

3.08 CATCH BASIN PROTECTION:

- A. Catch basin protection shall be used for every catch basin, shown on the plans or as required by the Engineer, to trap sediment and prevent it from clogging drainage systems and entering wetlands. Siltation sacks shall be securely installed under the catch basin grate. Care shall be taken to keep the siltation sacks from breaking apart or clogging. All deposited sediment shall be removed periodically and at times prior to predicted precipitation to allow free drainage flow. Prior to working in areas where catch basins are to be protected, each catch basin sump shall be cleaned of all debris and protected. The Contractor shall properly dispose of all debris at no additional cost to the Owner.
- B. All catch basin protection shall be removed by the Contractor after construction is complete.

END OF SECTION

SECTION 01575

HANDLING EXISTING FLOWS

PART 1 - GENERAL

1.01 WORK INCLUDED:

This Section covers all materials, equipment, and labor required to handle existing sanitary and combined sewage flows and installation and maintenance of all temporary connections, plugs, and by-pass pumping. Upon completion of the project, all temporary plugs and connections shall be removed and flows returned or transferred to the new and existing pipes.

1.02 RELATED WORK:

Section 01330, SUBMITTALS

1.03 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF GENERAL SPECIFICATIONS, SUBMIT THE FOLLOWING:

Submit complete, checked shop drawings, showing equipment, method of by-passing, and the method of transferring flows from the existing system to the new system. Prior to starting work, the Contractor shall submit flow calculations for each pipeline to be bypassed that show pump capacity to be provided. Comply with requirements of Section 01330.

PART 2 - PRODUCTS - NOT APPLICABLE

PART 3 - EXECUTION

3.01 MAINTAINING EXISTING FLOWS:

- A. The Contractor shall maintain all flows in the existing system until construction is complete and ready for safe operation.
- B. The Contractor shall protect against surcharging of the existing system upstream of the work area by installing adequate temporary by-pass pumping to handle dry weather and wet weather flows. The bypass system shall have a sufficient capacity to handle full pipe capacity for the pipeline section to be bypassed times 1.25 and shall provide and maintain sufficient flow at all times to prevent any backwater flooding due to obstructions caused by the construction.
- C. The Contractor shall repair any damage that occurs to existing pipes and structures to the satisfaction of the Engineer. Work performed under this section shall be considered incidental and shall not be measured separately for payment.

- D. The Contractor shall not allow sanitary flow to discharge to any salt or fresh water body by means of overflow, by-pass pumping, or any other method that may contaminate these water areas.

END OF SECTION

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SECTION 01740

CLEANING UP

PART 1 - GENERAL

1.01 DESCRIPTION:

The Contractor must employ at all times during the progress of its work adequate cleanup measures and safety precautions to prevent injuries to persons or damage to property. The Contractor shall immediately, upon request by the Engineer provide adequate material, equipment and labor to cleanup and make safe any and all areas deemed necessary by the Engineer.

1.02 RELATED WORK:

- A. Section 01110 CONTROL OF WORK AND MATERIALS
- B. Section 01140 SPECIAL PROVISIONS
- C. Section 01570 ENVIRONMENTAL PROTECTION

PART 2 - PRODUCTS

Not applicable

PART 3 - EXECUTION

3.01 DAILY CLEANUP:

- A. The Contractor shall clean up, at least daily, all refuse, rubbish, scrap and surplus material, debris and unneeded construction equipment resulting from the construction operations and sweep the area. The site of the work and the adjacent areas affected thereby shall at all times present a neat, orderly and workmanlike appearance.
- B. Upon written notification by the Engineer, the Contractor shall within 24 hours clean up those areas, which in the Engineer's opinion are in violation of this section and the above referenced sections of the specifications.
- C. If in the opinion of the Engineer, the referenced areas are not satisfactorily cleaned up, all other work on the project shall stop until the cleanup is satisfactory.

3.02 MATERIAL OR DEBRIS IN DRAINAGE FACILITIES:

- A. Where material or debris has washed or flowed into or has been placed in existing watercourses, ditches, gutters, drains, pipes, structures, such material or debris shall be

entirely removed and satisfactorily disposed of during progress of the work, and the ditches, channels, drains, pipes, structures, and work shall, upon completion of the work, be left in a clean and neat condition.

3.03 RESTORATION OF DAMAGED PROPERTY:

- A. The Contractor shall restore or replace, when and as required, any property damaged by its work, equipment or employees, to a condition at least equal to that existing immediately prior to the beginning of operations. To this end the Contractor shall do as required all necessary highway or driveway, walk and landscaping work. Materials, equipment, and methods for such restoration shall be as approved by the Engineer.

3.04 FINAL CLEANUP:

- A. Before acceptance by the Owner, the Contractor shall perform a final cleanup to bring the construction site to its original or specified condition. This cleanup shall include removing all trash and debris off of the premises. Before acceptance, the Engineer shall approve the condition of the site.

END OF SECTION

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SECTION 01770

PROJECT CLOSEOUT

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. This Section covers administrative and procedural requirements for closing out the project, including, but not limited to:
 - 1. Project as-built documents
 - 2. Final Cleaning
 - 3. Substantial Completion
 - 4. Closeout Procedures
 - 5. Final Completion
 - 6. Correction/Warranty Period
- B. Closeout checklist to be completed by the Engineer.

1.02 RELATED WORK:

- A. General Requirements in their entirety.
- B. Section 01740, CLEANING UP
- C. Division 2 through Division 3.

1.03 AS-BUILT DOCUMENTS:

- A. Contractor shall maintain on site, separate from the documents used for construction, one set of the documents listed below, and as construction progresses, shall legibly record on these documents all changes made during construction.
 - 1. Contract Drawings.
 - 2. Specifications.
 - 3. Addenda.
 - 4. Change Orders and other Modifications to the Contract.

5. Reviewed shop drawings, product data, and samples.
 6. Written interpretations and clarifications.
 7. Field Orders.
 8. Field test reports properly verified.
- B. The completed set of as-built documents shall be submitted to the Engineer with the final Application for Payment.

1.04 FINAL CLEANING:

- A. Complete the following cleaning operations before requesting inspection for Certification of Substantial Completion.
1. Clean the site, including landscape development areas of rubbish, litter and other foreign substances. Sweep paved areas broom clean; remove stains, spills and other foreign deposits. Rake grounds that are neither paved nor planted, to smooth, even textured surfaces.
 2. Remove waste and surplus materials, rubbish, fencing equipment, temporary utilities and construction facilities from the site, unless otherwise required by the Engineer.
 3. Comply with requirements of Section 01740 CLEANING UP.

1.05 SUBSTANTIAL COMPLETION:

- A. Substantial Completion is officially defined in the General and Supplementary Conditions. The date of substantial completion will be certified by the Engineer. This date will not be certified until the following requirements have been satisfied by the Contractor:
1. All field tests have been satisfactorily completed and reports forwarded to the Engineer.

1.06 CLOSEOUT PROCEDURES:

- A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and is complete in accordance with Contract Documents and ready for Engineer's and Owner's inspection.
- B. Accompany Engineer and Owner on inspection to verify conformance with the Contract Documents. Prepare a punch list of work items that have been determined by inspection to not conform to Contract Documents. Punch list items shall include work items that are missing, incomplete, damaged, incorrect items, or improperly installed or constructed.

The Contractor shall correct the punch list deficiencies by re-work, modifications, or replacement, as appropriate, until the items conform to the Contract Documents. The initial punch list shall be produced by the Contractor, with copies to the Engineer and Owner. When the Contractor has reduced the number of deficient items to a reasonable level, the Engineer will develop a definitive punch list for the use of the Contractor.

- C. Provide submittals to Engineer that are required by governing or other authorities.
- D. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due. The Contractor shall submit the following documents with or prior to Final Application for Payment: Set of as-built documents, Contract Completion and Acceptance Certificate, Consent of Surety to Final Payment, Release and Waiver of Liens and Claims (SECTION B), Affidavit of Payment of Debts and Claims, and remaining releases, waivers, warranties/guarantees, and all other data required by the Contract Documents.

1.07 FINAL COMPLETION:

- A. Prior to final completion, the following tasks shall be completed:
 - 1. All items in the punch list shall be completed.
 - 2. All Contract closeout documentation shall be submitted to and accepted by the Engineer.

1.08 CORRECTION/WARRANTY PERIOD:

- A. During the correction period, the Contractor shall correct all deficiencies in equipment and materials.
- B. During the warranty period, the Contractor shall perform all corrective work on warranty deficiencies.
- C. Corrective work will be identified by the Engineer or Owner, as appropriate. The Contractor will be notified of the item(s) requiring corrective work.
- D. The Contractor shall begin work on all corrective work within ten days of being notified of the deficiency by the Engineer and shall then work continuously until the deficiency is corrected. Upon completion of the corrective work, the Contractor shall submit a letter report to the Engineer describing the deficiency and the corrective action that was taken.
- E. The Contractor shall coordinate all corrective work with the Engineer and/or the Owner.

1.09 COMPLETION CHECKLIST:

- A. When the project has been fully completed, Final Payment can be approved.

PROJECT COMPLETION CHECKLIST

Owner _____ Job No.

Project

As part of the project closeout, all items listed below must be checked off as being complete or otherwise accounted for. The person verifying completion of the item shall list the completion date and their initials.

Project Closeout Checklist		
	Date Completion Verified	Verified by
AS-BUILT DOCUMENTS HANDED OVER		
1. Contract Drawings		
2. Specifications		
3. Addenda		
4. Change Orders/Contract Modifications		
5. Reviewed Shop Drawings, Product Data and Samples		
6. Written Interpretations/Clarifications		
7. Field Orders		
8. Field Test Reports		
EQUIPMENT CHECKOUT AND CERTIFICATIONS		
1. Construction Complete per Drawings/Specifications		
2. Equipment Installed and Adjusted		
3. All Shop Drawings have Final Approval		
4. All Shop Tests Complete and Results Submitted		

Project Closeout Checklist		
	Date Completion Verified	Verified By
START-UP AND TESTING		
1. All Checkout and Certifications Complete		
2. All O&M Manuals Approved		
3. All Preliminary Training by Manufacturers Rep. Completed		
FINAL CLEANING		
1. All Construction Facilities Removed		
2. All Construction Debris Removed		
3. All Areas Swept/Cleared		
SUBSTANTIAL COMPLETION		
1. All Items Coordinated Into a Fully Operational System		
2. All Equipment Units Operational at Specified Efficiencies		
3. All Field Tests Completed and Reports Submitted		
4. All Final Training by Manufacturer's Rep. Completed		
5. All Spare Parts and Lubricants Provided		
CLOSEOUT PROCEDURES		
1. Written Certification Submitted that Work is Ready for Owner & Engineer Inspector		
2. Inspection by Owner, Engineer, Contractor completed		
3. Punch List of Nonconforming Items Prepared		
4. Documents Required by Governing or Other Authorities Submitted (List Them)		
5. Final Application for Payment Received		
6. Contract Completion and Acceptance Certificate Submittal		
7. Consent of Surety to Final Payment Submittal		
8. Release and Waiver of Liens and Claims Submitted		
9. Affidavit of Payment of Debts and Claims Submitted		

Project Closeout Checklist

	Date Completion Verified	Verified By				
10. Warranties/Guarantees Submitted						
11. Other Required Releases and Waivers Submitted (List Them)						
12. Permits Submitted (List Them)						
13. Weekly Payrolls Submitted as Required by Law						
FINAL COMPLETION						
1. All Items in Punch List Completed						
2. All Other Required Documentation Submitted (List It)						
CORRECTION/WARRANTY PERIOD						
1. Correction Period Start Date: _____ End Date: _____						
2. Specific Warranties Provided						
<table border="0" style="width: 100%;"> <tr> <td style="text-align: center;"><u>Item</u></td> <td style="text-align: center;"><u>Warranty Duration</u></td> </tr> <tr> <td style="height: 150px;"></td> <td></td> </tr> </table>	<u>Item</u>	<u>Warranty Duration</u>				
<u>Item</u>	<u>Warranty Duration</u>					

Full name of persons signing their initials on this checklist:

END OF SECTION

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PROJECT CLOSEOUT
ATTACHMENT A
RELEASE AND WAIVER OF LIEN

GENERAL CONTRACTOR'S OR SUBCONTRACTOR'S

RELEASE AND WAIVER OF LIEN

For and in consideration of the receipt of \$ _____, in payment for labor and/or materials furnished, the undersigned does hereby waive, release and relinquish any and all claims, demands and rights of lien for all work, labor, materials, machinery or other goods, equipment or services done, performed or furnished for the construction located at the site hereinafter described, to wit:

_____ (name of project)

_____ (location)

_____ (name of project owner)

The undersigned further warrants and represents that any and all valid labor and/or materials and equipment bills, now due and payable on the property herein above described in behalf of the undersigned, have been paid in full to date of this waiver.

\$ _____

Total Paid to Date This Contract

\$ _____

Balanced Owed After This Payment

\$ _____

Total Billed to Date This Contract

Contractor/Subcontractor

Witness Signature

By: _____

Witness Printed Name

Printed Name

Title: _____

Date

SECTION 02080

DUCTILE IRON PIPE AND FITTINGS FOR WATER MAINS

PART 1 - GENERAL

1.01 WORK INCLUDED:

This Section covers the furnishing, handling, hauling, laying, jointing, testing and disinfecting of all ductile iron pipe, including fittings and appurtenant work as indicated on the drawings and as specified.

1.02 RELATED WORK:

- A. Section 02300, EARTHWORK
- B. Section 02515, WATER SERVICE CONNECTIONS
- C. Section 02516, CONNECTIONS TO EXISTING WATER MAINS

1.03 QUALITY ASSURANCE:

- A. All pipe and fittings shall be inspected and tested at the foundry as required by the standard specifications to which the material is manufactured. The Contractor shall furnish in duplicate to the Engineer sworn certificates of such tests.
- B. In addition, the Owner reserves the right to have any or all pipe, fittings and special castings inspected and/or tested by an independent service at either the manufacturer's plant or elsewhere. Such inspection and/or tests shall be at the Owner's expense.

1.04 REFERENCES:

- A. The following standards, latest revision thereof, form a part of this specification as referenced:

American Water Works Association (AWWA)

AWWA	C104	Cement-Mortar Lining for Ductile- Iron Pipe and Fittings
AWWA	C105	Polyethylene Encasement for Ductile Iron Pipe Systems
AWWA	C110	Ductile-Iron and Gray-Iron Fittings
AWWA	C111	Rubber Gasket Joints for Ductile- Iron Pressure Pipe and Fittings
AWWA	C116	Protective Fusion-Bonded Epoxy Coatings for the Interior and Exterior Surfaces of Ductile-Iron and Gray-Iron Fittings

AWWA	C150	Thickness Design of Ductile-Iron Pipe
AWWA	C151	Ductile-Iron Pipe, Centrifugally Cast
AWWA	C153	Ductile-Iron Compact Fittings for Water Service.
AWWA	C600	Installation of Ductile-Iron Water Mains and Their Appurtenances
AWWA	C651	Disinfecting Water Mains

1.05 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF SECTION 01330 SUBMITTALS, SUBMIT THE FOLLOWING:

- A. Shop drawings shall be submitted to the Engineer for review.
- B. Shop drawings shall consist of manufacturer's scale drawings, cuts or catalogs including descriptive literature and complete characteristics and specifications, and code requirements. Shop drawings shall be submitted for the ductile iron pipe, type of joint, fittings, couplings, filling rings, restrained joints, and lining and coating in accordance with specifications.

PART 2 - PRODUCTS

2.01 PIPE:

- A. The Contractor shall use push-on joint type ductile iron pipe unless otherwise indicated on the plans or specified herein.
- B. All ductile iron pipe shall be designed in accordance with AWWA C150 and shall be manufactured in accordance with AWWA C151.
- C. Unless otherwise indicated or specified, ductile iron pipe shall be Thickness Class 52.

2.02 JOINTS:

- A. Joints for ductile iron pipe shall conform to AWWA C111.
- B. Pipe and fittings shall be furnished with approved joint restraining appurtenances as specified herein, or within the limits as indicated on the drawings, to keep the piping from pulling apart under pressure.

2.03 FITTINGS:

- A. Fittings shall conform to the requirements of AWWA C110 or C153 as appropriate and shall be of a pressure classification at least equal to that of the pipe with which they are used.

- B. The Contractor shall use ductile iron fittings. Cast-iron, Class 250 fittings may be substituted, upon approval of the Engineer, for ductile iron fittings.
- C. Unless otherwise indicated, fittings shall have all bell mechanical joint ends.

2.04 GASKETS, GLANDS, NUTS AND BOLTS:

- A. Gaskets, glands, nuts, bolts and accessories shall conform to AWWA C111 or C153 as appropriate.
- B. Gaskets shall be of plain tipped rubber, suitable for exposure to the liquid within the pipe.
- C. Glands shall be ductile or cast iron.
- D. Bolts and nuts shall be high strength alloy.

2.05 LINING AND COATING:

- A. The inside of pipe and fittings shall be given a cement lining and asphaltic seal coat in accordance with AWWA C104. The thickness of the lining shall be double that specified in AWWA C104.
- B. The outside of pipe and fittings shall be coated with the standard asphaltic coating specified under the appropriate AWWA Standard Specification for pipe and fittings.
- C. Machined surfaces shall be cleaned and coated with a suitable rust preventative coating at the shop immediately after being machined.

2.06 FLEXIBLE COUPLINGS:

- A. The Contractor shall use solid sleeve coupling fittings for joining pipe. Sleeve-type flexible couplings may be substituted only with the approval of the Engineer.
- B. All couplings and accessories shall be of a pressure rating at least equal to that of the pipeline in which they are to be installed.
- C. Couplings shall be cast or ductile iron and shall be provided with gaskets of a composition suitable for exposure to the liquid within the pipe.
- D. Sleeve-type couplings shall be made by Dresser Mfg. Div., Bradford, PA; Smith-Blair, Inc., San Francisco, CA; Romac Industries Inc., Seattle, WA; Ford Meter Box Co., Wabash, IN; or be an approved equal.
- E. Couplings for buried pipe shall be Dresser 153; Smith-Blair Type 441 or 443; Romac Style 501; Ford Style FC1 or FC2; or approved equal.

2.07 JOINT RESTRAINTS:

- A. Where indicated or necessary to prevent joints or sleeve couplings from pulling apart under pressure, anchoring and joint restraint methods shall be utilized. Methods shall be restrained joint systems. The number of joints to be restrained shall be determined in accordance with Table 1, as shown on the construction plans or provided by the Engineer.
- B. Restrained joint systems for standard mechanical joint fittings or push on joint pipe shall be restraining glands (Megalug by EBAA Iron Sales Inc., Eastland, TX; StarGrip by Star Pipe Products, Houston, TX; RomaGrip by Romac Industries, Inc., Sultan, WA; Sigma One-Lok by Sigma Corporation, Cream Ridge, NJ; or approved equal) and restraining gaskets (Fast-grip joint by American Cast Iron Pipe Company, Birmingham, AL; Field Lok 350 Gasket by United States Pipe and Foundry Company, Birmingham, AL; Sure Stop 350 Restrained Joint Gaskets by McWane Ductile, Phillipsburg, NJ; or approved equal). Methods that rely on the use of friction clamps and/or retainer glands with set screws alone are not acceptable.
- C. Restrained joint systems for non-standard or modified joints shall be Flex-Ring or Lok-Ring by American Cast Iron Pipe Company, Birmingham, AL; T.R. Flex Joint by McWane Ductile, Phillipsburg, NJ; TR-Flex Joint by United States Pipe and Foundry Company, Birmingham, AL; Snap-Lok or Bolt-Lok by United States Pipe and Foundry Company, Birmingham, AL; or approved equal.
- D. Concrete thrust blocks may only be used for 6-inch, 8-inch, 10-inch, or 12-inch pipe where use of a joint restraint system is not feasible. Use of concrete thrust blocks shall be installed with the minimum bearing area (in square feet) against undisturbed material in accordance with the following:

Size of Main	90° Bends, Tees, Caps and Plugs	45° Bends and Wyes	22-1/2° Bends	11-1/4° Bends
6- & 8-inch	5	4	2	2
10- & 12-inch	12	9	5	2

- E. Tie rods may only be used for 6-inch, 8-inch, 10-inch, or 12-inch pipe where use of a joint restraint system is not feasible. Bolts shall have adequate length to allow nuts on both sides of the gland. Tie bolts shall have the same diameter as the tie rods and be in accordance with the following:

Pipe Size	Tie Rod	
	Number	Diameter
6	2	1/2"
8	2	3/4"
10	2	3/4"
12	4	3/4"

- F. Location of restrained joints shall be based on Table 1, as shown on the construction plans or provided by the Engineer. All joints that occur within the restrained length listed in Table 1, for the specific application, shall be restrained. For example, for a 90° bend, 8-inch unwrapped pipe, the restrained length required is 33 feet. Therefore, all joints within 33 feet of the 90° bend must be restrained.

PART 3 - EXECUTION

3.01 INSPECTION BEFORE INSTALLATION:

Pipes and fittings shall be subjected to a careful inspection just before being laid or installed.

3.02 HANDLING AND CUTTING:

- A. Any pipe or fitting which has a damaged lining, scratched or marred machine surface and/or abrasion of the pipe coating or lining shall be rejected and removed from the job-site.
- B. Any fitting showing a crack and any fitting or pipe which has received a severe blow that may have caused incipient fracture, even though no such fracture can be seen, shall be marked as rejected and removed at once from the work.
- C. In any pipe showing a distinct crack and in which it is believed there is no incipient fracture beyond the limits of the visible crack, the cracked portions, if so approved, may be cut off by and at the expense of the Contractor before the pipe is laid so that the pipe used will be perfectly sound. The cut shall be made in the sound barrel at a point at least 12-inches from the visible limits of the crack.
- D. Except as otherwise approved, all cutting shall be done with a machine suitable for cutting ductile iron pipe. Hydraulic squeeze cutters are not acceptable for cutting ductile iron pipe. Travel type cutters or rotary type abrasive saws may be used. All cut ends shall be examined for possible cracks caused by cutting.
- E. Lined and coated pipe and fittings shall be assembled and installed with approved packing or gaskets of the type recommended by the pipe manufacturer for the particular lining used.

3.03 INSTALLATION:

A. DEPTH:

- 1. The pipe shall be installed with a minimum of 5'-0" of cover, unless specifically indicated otherwise on the plans or required by the Engineer.

2. Where pipe is installed at less than the required cover, the Contractor shall furnish and install insulation in accordance with Section 02513, INSULATION FOR PIPELINES, or as required by the Engineer.

B. PIPE AND FITTINGS:

1. No defective pipe or fittings shall be laid or placed in the piping, and any piece discovered to be defective after having been laid or placed shall be removed and replaced by a sound and satisfactory piece.
2. Each pipe and fitting shall be cleared of all debris, dirt, etc., before being laid and shall be kept clean until accepted in the complete work.
3. Pipe and fittings shall be laid accurately to the lines and grades indicated on the drawings or as required. Care shall be taken to ensure good alignment both horizontally and vertically.
4. In buried pipelines, each pipe shall have firm bearing along its entire length.
5. Castings to be encased in masonry shall be accurately set, with the bolt holes, if any, carefully aligned.
6. Immediately prior to being set, castings shall be thoroughly cleaned of all rust, scale and other foreign material.
7. Fittings shall not be used to clear beneath or above an existing structure or pipeline unless approved by the Engineer. The water main shall be brought to a depth sufficient to clear the structure or pipeline without the use of bends.

C. TEMPORARY PLUGS:

At all times when pipe laying is not actually in progress, the open ends of pipe shall be closed by temporary watertight plugs or by other approved means. If water is in the trench when work is resumed, the plug shall not be removed until all danger of water entering the pipe has passed.

D. PUSH ON JOINTS:

1. Joining of push-on joint pipe shall conform to AWWA C600.
2. If effective sealing of the joint is not attained, the joint shall be disassembled, thoroughly cleaned, a new gasket inserted and joint reassembled.
3. Deflection of alignment at a joint shall not exceed the appropriate permissible deflection as specified in AWWA C600. The tables in AWWA C600 indicate the maximum permissible deflection for 18 and 20-foot pipe lengths. Maximum permissible deflections for other lengths shall be in proportion to such lengths.

E. MECHANICAL JOINTS:

1. Assembling of fittings with mechanical joint ends shall conform to AWWA C600.
2. If effective sealing of the joint is not attained at the maximum torque indicated in the above standard, the joint shall be disassembled and thoroughly cleaned, then reassembled. Bolts shall not be overstressed to tighten a leaking joint.
3. The deflection of alignment at a joint shall not exceed the appropriate permissible deflection as specified in the following table. These values indicate the maximum permissible deflection for 18-foot lengths. Maximum permissible deflections for other lengths shall be in proportion to such lengths.

Pipe Deflection Allowances
Maximum permissible deflection, inches

<u>Diameter of Pipe (inches)</u>	<u>Mechanical-Joint</u>
6	27
8-12	20
16	13.5
20	11
24	9

F. RESTRAINED JOINTS:

1. Joining of restrained joint piping shall conform to the manufacturer's recommendations.
2. If effective sealing of the joint is not attained, the joint shall be disassembled, thoroughly cleaned, a new gasket inserted and joint reassembled.
3. Deflection of alignment at a joint shall not exceed the appropriate permissible deflection recommended by the manufacturer.
4. All restraining appurtenances (and tie rods) shall be coated with an approved bituminous paint after assembly. The completed joint shall be inspected and the paint repaired/touched-up as necessary.

G. SLEEVE-TYPE COUPLINGS:

1. Pipe ends shall be cleaned thoroughly prior to installation. After the bolts have been inserted and all nuts have been made up finger tight, diametrically opposite nuts shall be progressively and uniformly tightened all around the joint, preferable by use of a torque wrench of the appropriate size and torque for the bolts. The correct torque as indicated by a torque wrench shall not exceed 90 foot-lb. for joints up to 24-inches.

3.04 TESTING:

- A. Prior to the hydrostatic pressure test, the piping shall be thoroughly flushed clean of all dirt, dust, oil, grease and other foreign material. This work shall be done with care to avoid damage to linings and coatings. Flushing velocity shall be a minimum of 2.5 ft./sec.

- B. The installed pipe shall be pressure tested in accordance with AWWA Standard C600.

C. HYDROSTATIC PRESSURE TEST:

1. Unless otherwise approved, all pipelines shall be given a hydrostatic pressure test between line valves. The Contractor shall furnish and install suitable temporary testing plugs or caps; all necessary pressure pumps, pipe connections, meters, gates, and other necessary equipment; and all labor required. The Owner or Engineer shall have the privilege of using its own gauges.
2. Subject to approval and provided that the tests are made within a reasonable time considering the progress of the project as a whole, and the need to put the section into service, the Contractor may make the tests when desired.
3. Pipelines intended for buried service shall be tested after backfill and compaction of the trench.
4. The section of pipe to be tested shall be filled with water of approved quality and all air shall be expelled from the pipe. The Contractor shall follow established procedures for filling the pipe and expelling trapped air to avoid exposing the piping system to water-hammer. If blowoffs are not available at high points for releasing air, the Contractor shall excavate as required and install the necessary taps. If the Contractor changes the grade of pipe installation, he will be responsible for locating the taps at the correct location in the system for testing. Taps shall be installed at the beginning and end of each disinfection run. After completion of the test, if so required by the Engineer, the Contractor shall remove corporations used for testing; plug the holes; and backfill as necessary.

5. The section under test shall be maintained full of water at working pressure for a period of 24 hours prior to the hydrostatic pressure test being applied to stabilize the pipeline with respect to movement under pressure, water absorption by the lining, etc. The pipeline may require several cycles of pressurizing and bleeding trapped air prior to beginning the test.
6. When hydrants are in the pipeline test section, the hydrostatic test shall be made against the main valve in the hydrant. The hydrostatic test shall not be conducted against the branch valve.
7. The hydrostatic test shall consist of raising the water pressure within the test section to a pressure not less than 1.25 times the working pressure of the pipeline measured at the highest elevation along the test section and not less than 1.5 times the working pressure of the lowest elevation of the test section. The specified test pressure shall be corrected to the elevation of the test gauge.
8. The hydrostatic test shall be of at least a 2 hour duration. The test pressure shall not vary by more than +/- 5 psi for the duration of the test. Test pressure shall be maintained within this tolerance by adding makeup water through the pressure test pump into the pipeline test section.
9. The amount of makeup water (testing allowance) added to the test section shall be accurately measured by suitable methods and shall not exceed the maximum allowable quantity of makeup water. No pipe installation will be accepted if the quantity of makeup water is greater than that determined by the following formula:

$$L = \frac{S D \sqrt{P}}{148,000}$$

Where:

- L = makeup water, in gallons per hour
- S = length of test section, in feet
- D = nominal diameter of pipe, in inches
- P = average test pressure, in psi (gauge)

10. If the section fails to pass the hydrostatic pressure test, the Contractor shall do everything necessary to locate, uncover, and repair or replace the defective pipe, fitting, or joint, all at his own expense and without extension of time for completion of the work. Additional tests and repairs shall be made until the section passes the specified hydrostatic test.

3.05 DISINFECTION AND FLUSHING:

- A. The Contractor shall disinfect the lines carrying potable water.

- B. The Contractor shall furnish all equipment and materials necessary to do the work of disinfecting, and shall perform the work in accordance with the procedure outlined in AWWA C651 and all amendments thereto.
- C. In general, the procedure of disinfecting the main shall be to apply the chlorine through a tap in one end of the section and bleed it off through a tap at the other end. Powdered chlorine placed in each length of pipe during installation is not an acceptable method of disinfection.
- D. The applied dosage shall be such as to produce a chlorine concentration of not less than 10 mg/l after a contact time of not less than 24 hours.
- E. During the disinfection period, care shall be exercised to prevent contamination of water in existing mains.
- F. Any temporary connection to the mains or other facilities required to accomplish the disinfection of the mains shall be at the Contractor's expense.
- G. After treatment, the main shall be flushed with clean water until the residual chlorine concentration is less than 0.2 mg/l. The flushing rate shall be 3.0 ft. /sec to achieve full scour of sand particles.
- H. Before disposing of the water used in disinfecting and flushing water mains the Contractor shall thoroughly neutralize it through the application of a reducing agent, as referenced in AWWA C651 and C655.
- I. Bacteriological sampling and testing shall be done in accordance with AWWA C651 (Option A – One sample taken after flushing is complete followed by another sample taken 16 hours after the first sample or Option B – Two samples taken 15 minutes apart after a 16 hour post flushing rest period) for each main and each branch. Sampling shall be accomplished with sterile bottles treated with sodium thiosulfate, as required by Standard Methods. No hose or fire hydrants shall be used in collection of samples. A corporation stop installed on the main, with a removable copper tube gooseneck assembly, is the recommended method.
- J. Bacteriological sampling and testing shall be conducted by a state certified laboratory certified for total and fecal coliform analyses of potable water.
- K. Testing shall be done by a laboratory approved by the Engineer, in accordance with Standard Methods, and shall show the absence of coliform organisms. A standard plate count may be required at the option of the Engineer.

END OF SECTION

SECTION 02085

POLYVINYL CHLORIDE GRAVITY PIPE AND FITTINGS(SDR-35)

PART 1 - GENERAL

1.01 WORK INCLUDED:

This section covers the furnishing and installation of Polyvinyl Chloride (PVC) pipe and fittings, as indicated on the drawings and as specified herein.

1.02 RELATED WORK:

- A. Section 02252, SUPPORT OF EXCAVATION
- B. Section 02300, EARTHWORK
- C. Section 02518, TRACER TAPE

1.03 REFERENCES:

- A. The following standards form a part of these specifications as referenced:

ASTM International (ASTM)

ASTM	D2321	Recommended Practice for Underground Installation of Flexible Thermoplastic Sewer Pipe
ASTM	D3034	Specification for Type PSM Polyvinyl Chloride (PVC) Sewer Pipe and Fittings
ASTM	D3212	Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
ASTM	F679	Specification for Polyvinyl Chloride (PVC) Large Diameter Plastic Gravity Sewer Pipe and Fittings

1.04 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF SECTION 01330 SUBMITTALS, SUBMIT THE FOLLOWING:

Manufacturer's literature of the materials of this section.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. PVC nonpressure sewer pipe 4-inches through 15-inches diameter shall conform to ASTM D3034, 18-inches through 60-inches diameter to ASTM F679, all with SDR of 35 unless noted, and shall meet the specific requirements and exceptions to the aforementioned specifications that follow.
- B. PVC nonpressure sewer pipe shall be furnished in standard lengths.
- C. One pipe bell consisting of an integral wall section with a solid cross section rubber ring, factory assembled, shall be furnished with each standard, random and short length of pipe. Rubber rings shall be provided to the requirements of ASTM D3212.
- D. The rubber ring shall be retained within the bell of the pipe by a precision formed groove or recess designed to resist fishmouthing or creeping during assembly of joints.
- E. Spigot pipe ends shall be supplied with bevels from the manufacturer to ensure proper insertion. Each spigot end shall have an "assembly stripe" imprinted thereon to which the bell end of the mated pipe will extend upon proper jointing of the two pipes.
- F. PVC fittings shall be provided with bell and/or spigot configurations with rubber gasketed joints compatible with that of the pipe. Bend fittings with spigot ends shorter than the pipe recess bells will not be allowed. The shorter spigot end would not allow proper seating of the spigot in the mating bell and would permit undesired contact between the mating bell and the outside of the fitting bell.
- G. All pipe delivered to the job site shall be accompanied by independent testing laboratory reports certifying that the pipe and fittings conform to the above-mentioned specifications. In addition, the pipe shall be subject to thorough inspection and tests, the right being reserved for the Engineer to apply such of the tests specified as it may from time to time deem necessary.
- H. All cutting of pipe shall be done with a machine suitable for cutting PVC pipe. Cut ends shall be beveled when recommended by the pipe manufacturer.

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. Except as modified herein, installation of the PVC pipe shall be in accordance with ASTM D2321.
- B. Each pipe length shall be inspected before being laid to verify that it is not cracked. Pipe shall be laid to conform to the lines and grades indicated on the drawings or given by the Engineer. Each pipe shall be so laid as to form a close joint with the next adjoining pipe and bring the inverts continuously to the required grade.

- C. The pipe shall be supported by compacted crushed stone. Crushed stone shall be as specified under Section 02300, EARTHWORK.
- D. The pipe shall not be driven down to grade by striking it with a shovel handle, timber, rammer, or other unyielding object. When each pipe has been properly bedded, enough of the backfill material shall be placed and compacted between the pipe and the sides of the trench to hold the pipe in correct alignment.
- E. Before a joint is made, the pipe shall be checked to assure that a close joint with the next adjoining pipe has been maintained and that inverts are matched and conform to the required line and grade.
- F. For pipe placed on crushed stone, immediately after the joint is made, the jointing area shall be filled with suitable materials so placed and compacted that the ends of either pipe will not settle under backfill load.
- G. No pipe or fitting shall be permanently supported on saddles, blocking, or stones.
- H. Branches and fittings shall be laid by the Contractor as indicated on the drawings, and/or as required by the Engineer. Open ends of pipe and branches shall be closed with PVC caps secured in place with premolded gasket joints or as required by the Engineer.
- I. All pipe joints shall be made as nearly watertight as practicable. There shall be no visible leakage at the joints and there shall be no sand, silt, clay, or soil of any description entering the pipeline at the joints. Where there is evidence of water or soil entering the pipeline, connecting pipes, or structures, the defects shall be repaired to the satisfaction of the Engineer.
- J. The Contractor shall build a tight bulkhead in the pipeline where new work enters an existing sewer. This bulkhead shall remain in place until the Engineer authorizes its removal.
- K. Care shall be taken to prevent earth, water, and other materials from entering the pipe, and when pipe laying operations are suspended, the Contractor shall maintain a suitable stopper in the end of the pipe and also at openings for manholes.
- L. As soon as possible after the pipe and manholes are completed on any street, the Contractor shall flush out the new pipeline using a rubber ball ahead of the water, and none of the flushing water or debris shall be permitted to enter any existing sewer.

3.02 QUALITY CONTROL

A. TELEVISION INSPECTION:

1. On completion of a section of sewer, including building connections installed to the property line, the Contractor shall TV inspect the section prior to CIPP installation, in accordance with Section 02428, Cured-in-Place Pipe, at no additional cost to the Owner.

2. The Contractor shall be responsible for the satisfactory water-tightness of the entire section of the sewer. Should the Engineer determine that the sections inspected are unsatisfactory, the Contractor shall do all work required to locate and repair the defects and re-inspect as the Engineer may require without additional compensation.
3. A plan of the method for repairing any defects that are found shall be submitted to the Engineer for review.

END OF SECTION

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SECTION 02240

DEWATERING

PART 1 - GENERAL

1.01 WORK INCLUDED:

This section specifies designing, furnishing, installing, maintaining, operating and removing temporary dewatering systems as required to lower and control water levels and hydrostatic pressures during construction; disposing of pumped water; constructing, maintaining, observing and, except where indicated or required to remain in place, removing of equipment and instrumentation for control of the system.

1.02 RELATED WORK:

- A. Section 00890, PERMITS
- B. Section 01570, ENVIRONMENTAL PROTECTION
- C. Section 02252, SUPPORT OF EXCAVATION
- D. Section 02300, EARTHWORK

1.03 SYSTEM DESCRIPTION:

- A. Dewatering includes lowering the water table and intercepting seepage which would otherwise emerge from the slopes or bottom of the excavation; increasing the stability of excavated slopes; preventing loss of material from beneath the slopes or bottom of the excavation; reducing lateral loads on sheeting and bracing; improving the excavation and hauling characteristics of sandy soil; preventing rupture or heaving of the bottom of any excavation; and disposing of pumped water.

1.04 QUALITY ASSURANCE:

- A. The Contractor is responsible for the adequacy of the dewatering systems.
- B. The dewatering systems shall be capable of effectively reducing the hydrostatic pressure and lowering the groundwater levels to a minimum of 2 feet below excavation bottom, unless otherwise required by the Engineer, so that all excavation bottoms are firm and dry.
- C. The dewatering system shall be capable of maintaining a dry and stable subgrade until the structures, pipes and appurtenances to be built therein have been completed to the extent that they will not be floated or otherwise damaged.

- D. The dewatering system and excavation support (see Section 02252, SUPPORT OF EXCAVATION) shall be designed so that lowering of the groundwater level outside the excavation does not adversely affect adjacent structures, utilities or wells.

1.05 SUBMITTALS:

- A. In accordance with Section 01330, Contractor shall submit a plan indicating how it intends to control the discharge from any dewatering operations on the project, whether it is discharge of groundwater from excavations or stormwater runoff during the life of the project.

PART 2 - PRODUCTS: NOT APPLICABLE

PART 3 - EXECUTION

3.01 DEWATERING OPERATIONS:

- A. All water pumped or drained from the work shall be disposed of in a manner that will not result in undue interference with other work or damage to adjacent properties, pavements and other surfaces, buildings, structures and utilities. Suitable temporary pipes, flumes or channels shall be provided for water that may flow along or across the site of the work. All disposal of pumped water shall conform to the provisions of Section 01570 ENVIRONMENTAL PROTECTION and Section 00890 PERMITS.
- B. Dewatering facilities shall be located where they will not interfere with utilities and construction work to be done by others.
- C. Dewatering procedures to be used shall be as described below:
 - 1. Crushed stone shall encapsulate the suction end of the pump to aid in minimizing the amount of silt discharged.
 - 2. For dewatering operations with relatively minor flows, pump discharges shall be directed into straw bale sedimentation traps lined with filter fabric. Water is to be filtered through the straw bales and filter fabric prior to being allowed to seep out into its natural watercourse.
 - 3. For dewatering operations with larger flows, pump discharges shall be into a steel dewatering basin. Steel baffle plates shall be used to slow water velocities to increase the contact time and allow adequate settlement of sediment prior to discharge into waterways.
 - 4. Where indicated on the contract drawings or in conditions of excess silt suspended in the discharge water, silt control bags shall be utilized in catch basins.
- D. The Contractor shall be responsible for repair of any damage caused by its dewatering operations, at no cost to the Owner.

END OF SECTION

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SECTION 02252

SUPPORT OF EXCAVATION

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. This section of the specification covers wood sheeting and bracing for support of excavations. The requirements of this section shall also apply, as appropriate, to other methods of excavation support and underpinning which the Contractor elects to use to complete the work.
- B. The Contractor shall furnish and place timber sheeting of the kinds and dimensions required, complying with these specifications, where indicated on the drawings or required by the Engineer.

1.02 RELATED WORK:

- A. Section 02240, DEWATERING.
- B. Section 02300, EARTHWORK.

1.03 QUALITY ASSURANCE:

- A. This project is subject to the Safety and Health regulations of the U.S. Department of Labor set forth in 29 CFR, Part 1926, and to the New Hampshire Law, RSA, Title XXIII: Labor. Contractors shall be familiar with the requirements of these regulations.
- B. The excavation support system shall be of sufficient strength and be provided with adequate bracing to support all loads to which it will be subjected. The excavation support system shall be designed to prevent any movement of earth that would diminish the width of the excavation or damage or endanger adjacent structures.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Timber sheeting shall be sound spruce, pine, or hemlock, planed on one side and either tongue and grooved or splined. Timber sheeting shall not be less than nominal 2-inches thick.
- B. Timber and steel used for bracing shall be of such size and strength as required in the excavation support design. Timber or steel used for bracing shall be new or undamaged used material which does not contain splices, cutouts, patches, or other alterations which would impair its integrity or strength.

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. Work shall not be started until all materials and equipment necessary for their construction are either on the site of the work or satisfactorily available for immediate use as required.
- B. The sheeting shall be securely and satisfactorily braced to withstand all pressures to which it may be subjected and be sufficiently tight to minimize lowering of the groundwater level outside the excavation, as required in Section 02240, DEWATERING.
- C. The sheeting shall be driven by approved means to the design elevation. No sheeting may be left so as to create a possible hazard to safety of the public or a hindrance to traffic of any kind.
- D. If boulders or very dense soils are encountered, making it impractical to drive a section to the desired depth, the section shall, as required, be cut off.
- E. The sheeting shall be left in place where indicated on the drawings or required by the Engineer in writing. At all other locations, the sheeting may be left in place or salvaged at the option of the Contractor. Steel or wood sheeting permanently left in place shall be cut off at a depth of not less than two feet below finish grade unless otherwise required.
- F. All cut-off will become the property of the Contractor and shall be removed by it from the site.
- G. Responsibility for the satisfactory construction and maintenance of the excavation support system, complete in place, shall rest with the Contractor. Any work done, including incidental construction, which is not acceptable for the intended purpose shall be either repaired or removed and reconstructed by the Contractor at its expense.
- H. The Contractor shall be solely responsible for repairing all damage associated with installation, performance, and removal of the excavation support system.

END OF SECTION

SECTION 02300

EARTHWORK

PART 1 - GENERAL

1.01 WORK INCLUDED:

The Contractor shall make excavations of normal depth in earth for trenches and structures, shall backfill and compact such excavations to the extent necessary, shall furnish the necessary material and construct embankments and fills, and shall make miscellaneous earth excavations and do miscellaneous grading.

1.02 RELATED WORK:

- A. Section 00890, PERMITS
- B. Section 01110, CONTROL OF WORK AND MATERIALS
- C. Section 01570, ENVIRONMENTAL PROTECTION
- D. Section 02240, DEWATERING
- E. Section 02252, SUPPORT OF EXCAVATION
- F. Section 02920, LOAMING AND SEEDING

1.03 REFERENCES:

ASTM International (ASTM)

- | | | |
|------|-------|--|
| ASTM | C131 | Test Method for Resistance to Degradation of Small Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine. |
| ASTM | C330 | Specification for Lightweight Aggregate for Structural Concrete. |
| ASTM | D1557 | Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft ³) (2700 kN-m/m ³) |
| ASTM | D6938 | Test Methods for Density of Soil and Soil-aggregate in Place by Nuclear Methods (Shallow Depth). |

ASTM D6913 Standard Test Method Particle Size Analysis of Soils

State of New Hampshire Department of Transportation (NHDOT) Standard Specifications for Road and Bridge Construction

1.04 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF GENERAL SPECIFICATIONS, SUBMIT THE FOLLOWING:

- A. Material Test Reports: From a qualified independent testing agency indicating and interpreting test results for compliance of the following with requirements indicated:
 - 1. Classification according to ASTM D 2487 and moisture content according to ASTM D 2216 of each on-site and borrow soil and/or fill material proposed for fill and backfill.
 - 2. Laboratory compaction curve according to ASTM D 1557 for each onsite and borrow soil and/or fill material proposed for fill and backfill.

1.05 PROTECTION OF EXISTING PROPERTY:

- A. The work shall be executed in such manner as to prevent any damage to facilities at the site and adjacent property and existing improvements, such as but not limited to streets, curbs, paving, service utility lines, structures, monuments, benchmarks, observation wells, and other public or private property. Protect existing improvements from damage caused by settlement, lateral movements, undermining, washout and other hazards created by earthwork operations.
- B. In case of any damage or injury caused in the performance of the work, the Contractor shall, at its own expense, make good such damage or injury to the satisfaction of, and without cost to, the Owner. Existing roads, sidewalks, and curbs damaged during the project work shall be repaired or replaced to at least the condition that existed at the start of operations. The Contractor shall replace, at its own cost, existing benchmarks, observation wells, monuments, and other reference points, which are disturbed or destroyed.
- C. Buried drainage structures and pipes, observation wells and piezometers, including those which project less than eighteen inches (18") above grade, which are subject to damage from construction equipment shall be clearly marked to indicate the hazard. Markers shall indicate limits of danger areas, by means which will be clearly visible to operators of trucks and other construction equipment and shall be maintained at all times until completion of project.

1.06 DRAINAGE:

- A. The Contractor shall provide, at its own expense, adequate drainage facilities to complete all work items in an acceptable manner. Drainage shall be done in a manner so that runoff will not adversely affect construction procedures or cause excessive disturbance of underlying natural ground or abutting properties.

1.07 FROST PROTECTION AND SNOW REMOVAL:

- A. The Contractor shall, at its own expense, keep earthwork operations clear and free of accumulations of snow as required to carry out the work.

- B. The Contractor shall protect the subgrade beneath new structures and pipes from frost penetration when freezing temperatures are expected.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. GRAVEL BORROW:

Gravel Borrow shall satisfy the requirements listed in MassDOT Specification Section M1.03.0, Type b.

B. CRUSHED STONE:

Crushed stone shall satisfy the requirements listed in MassDOT Specification Section M2.01.4 (3/4-inch crushed stone) unless otherwise required.

C. SAND BORROW:

Sand Borrow shall satisfy the requirements listed in MassDOT Specification Section M1.04.0.

D. PEASTONE:

Peastone shall be smooth, hard, naturally occurring, rounded stone meeting the following gradation requirements:

Passing 5/8 inch square sieve opening	-	100%
Passing No. 8 sieve opening	-	0%

E. BACKFILL MATERIALS:

1. Class B Backfill:

Class B backfill shall be granular, well graded friable soil; free of rubbish, ice, snow, tree stumps, roots, clay and organic matter; with 30 percent or less passing the No. 200 sieve; no stone greater than two-third (2/3) loose lift thickness, or six inches, whichever is smaller.

2. Select Backfill:

Select backfill shall be granular, well graded friable soil, free of rubbish, ice, snow, tree stumps, roots, clay and organic matter, and other deleterious or organic material; graded within the following limits:

<u>Sieve Size</u>	<u>Percent Finer by Weight</u>
3"	100
No. 10	30-95
No. 40	10-70
No. 200	0-10

F. PROCESSED GRAVEL:

1. Processed gravel shall consist of inert material that is hard, durable stone and coarse sand, free from loam and clay, surface coatings and deleterious materials. The coarse aggregate shall have a percentage of wear, by the Los Angeles Abrasion Test, of not more than 50.
2. The gradation shall meet the following requirements:

<u>Sieve Designation</u>	<u>Percentage Passing</u>
3-in.	100
1 ½-in.	70-100
¾-in.	50-85
No. 4	30-60
No. 200	0-10

3. The approved source of bank-run gravel material shall be processed by mechanical means. The equipment for producing crushed gravel shall be of adequate size with sufficient adjustments to produce the desired materials. The processed material shall be stockpiled in such a manner to minimize segregation of particle sizes. All processed gravel shall come from approved stockpiles.

PART 3 - EXECUTION

3.01 DISTURBANCE OF EXCAVATED AND FILLED AREAS DURING CONSTRUCTION:

- A. Contractor shall take the necessary steps to avoid disturbance of subgrade during excavation and filling operations, including restricting the use of certain types of construction equipment and their movement over sensitive or unstable materials, dewatering and other acceptable control measures.
- B. All excavated or filled areas disturbed during construction, all loose or saturated soil, and other areas that will not meet compaction requirements as specified herein shall be removed and replaced with a minimum 12-inch layer of compacted crushed stone wrapped all around in non-woven filter fabric. Costs of removal and replacement shall be borne by the Contractor.

- C. The Contractor shall place a minimum of 12-inch layer of special bedding materials and crushed stone wrapped in filter fabric over the natural underlying soil to stabilize areas which may become disturbed as a result of rain, surface water runoff or groundwater seepage pressures, all at no additional cost to the Owner. The Contractor also has the option of drying materials in-place and compacting to specified densities.

3.02 EXCAVATION:

A. GENERAL:

1. The Contractor shall perform all work of any nature and description required to accomplish the work as shown on the Drawings and as specified.
2. Excavations, unless otherwise required by the Engineer, shall be carried only to the depths and limits shown on the Drawings. If unauthorized excavation is carried out below required subgrade and/or beyond minimum lateral limits shown on Drawings, it shall be backfilled with gravel borrow and compacted at the Contractor's expense as specified below, except as otherwise indicated. Excavations shall be kept in dry and good conditions at all times, and all voids shall be filled to the satisfaction of the Engineer.
3. In all excavation areas, the Contractor shall strip the surficial topsoil layer and underlying subsoil layer separate from underlying soils. In paved areas, the Contractor shall first cut pavement as specified in paragraph 3.02 B.1 of this specification, strip pavement and pavement subbase separately from underlying soils. All excavated materials shall be stockpiled separately from each other within the limits of work.
4. The Contractor shall follow a construction procedure, which permits visual identification of stable natural ground. Where groundwater is encountered, the size of the open excavation shall be limited to that which can be handled by the Contractor's chosen method of dewatering, and which will allow visual observation of the bottom and backfill in the dry.
5. The Contractor shall excavate unsuitable materials to stable natural ground where encountered at proposed excavation subgrade, as required by the Engineer. Unsuitable material includes topsoil, loam, peat, other organic materials, snow, ice, and trash. Unless specified elsewhere or otherwise required by the Engineer, areas where unsuitable materials have been excavated to stable ground shall be backfilled with compacted special bedding materials or crushed stone wrapped all around in non-woven filter fabric.

B. TRENCHES:

1. Prior to excavation, trenches in pavement shall have the traveled way surface cut in a straight line by a concrete saw or equivalent method, to the full depth of pavement. Excavation shall only be between these cuts. Excavation support shall

be provided as required to avoid undermining of pavement. Cutting operations shall not be done by ripping equipment.

2. The Contractor shall satisfy all dewatering requirements specified in Section 02240 DEWATERING, before performing trench excavations.
3. Trenches shall be excavated to such depths as will permit the pipe to be laid at the elevations, slopes, and depths of cover indicated on the Drawings. Trench widths shall be as shown on the Drawings or as specified.
4. Where pipe is to be laid in bedding material, the trench may be excavated by machinery to, or just below, the designated subgrade provided that the material remaining in the bottom of the trench is not disturbed.
5. If pipe is to be laid in embankments or other recently filled areas, the fill material shall first be placed to a height of at least 12-inches above the top of the pipe before excavation.
6. Pipe trenches shall be made as narrow as practicable and shall not be widened by scraping or loosening materials from the sides. Every effort shall be made to keep the sides of the trenches firm and undisturbed until backfilling has been completed.
7. If, in the opinion of the Engineer, the subgrade, during trench excavation, has been disturbed as a result of rain, surface water runoff or groundwater seepage pressures, the Contractor shall remove such disturbed subgrade to a minimum of 12 inches and replace with crushed stone wrapped in filter fabric. The cost of removal and replacement shall be borne by the Contractor.
8. The Contractor shall obtain a trench permit from the municipality where the trench is located prior to making any excavations of trenches (any subsurface excavation greater than three (3) feet in depth and fifteen (15) feet or less between soil walls as measured from the bottom).
9. All trenches required to be permitted must be attended, covered, barricaded, or backfilled. Covers must be road plates at least ¾-inch thick or equivalent, barricades must be fences at least 6-feet high with no openings greater than 4-inches between vertical supports and all horizontal supports required to be located on the trench-side of the fencing.

C. EXCAVATION NEAR EXISTING STRUCTURES:

1. Attention is directed to the fact that there are pipes, manholes, drains, and other utilities in certain locations. An attempt has been made to locate all utilities on the drawings, but the completeness or accuracy of the given information is not guaranteed.
2. As the excavation approaches pipes, conduits, or other underground structures, digging by machinery shall be discontinued and excavation shall be done by means

of hand tools, as required. Such manual excavation, when incidental to normal excavation, shall be included in the work to be done under items involving normal excavation.

3. Where determination of the exact location of a pipe or other underground structure is necessary for properly performing the work, the Contractor shall excavate test pits to determine the locations.

3.03 BACKFILL PLACEMENT AND COMPACTION:

A. GENERAL:

1. Prior to backfilling, the Contractor shall compact the exposed subgrade to a firm and unyielding condition with at least 4 passes of fully loaded, ten cubic yard dump truck over the subgrade or other acceptable compaction equipment subject to the approval of the Engineer.
2. After approval of subgrade by the Engineer, the Contractor shall backfill areas to required contours and elevations with specified materials.
3. The Contractor shall place and compact materials to the specified density in continuous horizontal layers, not to exceed nine (9) inches in uncompacted lifts. The degree of compaction shall be based on maximum dry density as determined by ASTM Test D1557, Method C. The minimum degree of compaction for fill placed shall be as follows:

<u>Location</u>	<u>Percent of Maximum Density</u>
Below pipe centerline	95
Above pipe centerline	92
Below pavement (upper 3 ft.)	95
Embankments	95
Below pipe in embankments	95
Adjacent to structures	92
Below structures	95

4. The Engineer reserves the right to test backfill for conformance to the specifications and the Contractor shall assist as required to obtain the information. Compaction testing will be performed by the Engineer or by an inspection laboratory designated by the Engineer, engaged and paid for by the Owner. If test results indicate work does not conform to specification requirements, the Contractor shall remove or correct the defective Work by recompacting where appropriate or replacing as necessary and approved by the Engineer, to bring the work into compliance, at no additional cost to the Owner. All backfilled materials under structures and buildings shall be field tested for compliance with the requirements of this specification.

5. Where horizontal layers meet a rising slope, the Contractor shall key each layer by benching into the slope.
6. If the material removed from the excavation is suitable for backfill with the exception that it contains stones larger than permitted, the Contractor has the option to remove the oversized stones and use the material for backfill or to provide replacement backfill at no additional cost to the Owner.
7. The Contractor shall remove loam and topsoil, loose vegetation, stumps, large roots, etc., from areas upon which embankments will be built or areas where material will be placed for grading. The subgrade shall be shaped as indicated on the Drawings and shall be prepared by forking, furrowing, or plowing so that the first layer of the fill material placed on the subgrade will be well bonded to the subgrade.

B. TRENCHES:

1. Bedding as detailed and specified shall be furnished and installed beneath the pipeline prior to placement of the pipeline. A minimum bedding thickness shall be maintained between the pipe and undisturbed material, as shown on the Drawings.
2. As soon as practicable after the pipes have been laid, backfilling shall be started.
3. Unless otherwise indicated on the Drawings, select backfill shall be placed by hand shovel in 6-inch thick lifts up to a minimum level of 12-inches above the top of pipe. This area of backfill is considered the zone around the pipe and shall be thoroughly compacted before the remainder of the trench is backfilled. Compaction of each lift in the zone around the pipe shall be done by use of power-driven tampers weighing at least 20 pounds or by vibratory compactors. Care shall be taken that material close to the bank, as well as in all other portions of the trench, is thoroughly compacted to densities required.
4. Class B backfill shall be placed from the top of the select backfill to the specified material at grade (loam, pavement subbase, etc.). Fill compaction shall meet the density requirements of this specification.
5. If the materials above the trench bottom are unsuitable for backfill, the Contractor shall furnish and place backfill materials meeting the requirements for trench backfill, as shown on the drawings or specified herein.
6. Should the Engineer order crushed stone for utility support or for other purposes, the Contractor shall furnish and install the crushed stone as directed.
7. In shoulders of streets and road, the top 12-inch layer of trench backfill shall consist of processed gravel for sub-base, satisfying the requirements listed in MassDOT standard specification M1.03.1.

C. BACKFILLING ADJACENT TO STRUCTURES:

1. The Contractor shall not place backfill against or on structures until they have attained sufficient strength to support the loads to which they will be subjected. Excavated material approved by the Engineer may be used in backfilling around structures. Backfill material shall be thoroughly compacted to meet the requirements of this specification.
2. Contractor shall use extra care when compacting adjacent to pipes and drainage structures. Backfill and compaction shall proceed along sides of drainage structures so that the difference in top of fill level on any side of the structure shall not exceed two feet (2') at any stage of construction.
3. Where backfill is to be placed on only one side of a structural wall, only hand-operated roller or plate compactors shall be used within a lateral distance of five feet (5') of the wall for walls less than fifteen feet (15') high and within ten feet (10') of the wall for walls more than fifteen feet (15') high.

3.04 DISPOSAL OF SURPLUS MATERIALS:

- A. Surplus excavated materials, which are acceptable to the Engineer, shall be used to backfill normal excavations in rock or to replace other materials unacceptable for use as backfill. Upon written approval of the Engineer, surplus excavated materials shall be neatly deposited and graded so as to make or widen fills, flatten side slopes, or fill depressions; or shall be neatly deposited for other purposes as indicated by the Owner, within its jurisdictional limits; all at no additional cost to the Owner.
- B. Surplus excavated material not needed as specified above shall be hauled away and disposed of by the Contractor at no additional cost to the Owner, at appropriate locations, and in accordance with arrangements made by it. Disposal of all rubble shall be in accordance with all applicable local, state and federal regulations.
- C. No excavated material shall be removed from the site of the work or disposed of by the Contractor unless approved by the Engineer.

END OF SECTION

SECTION 02428

STRUCTURAL CURED-IN-PLACE PIPE

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. This section covers installation of cured-in-place pipe as called for herein and on the drawings. The work includes furnishing all equipment, material and labor required to perform the services described herein.

1.02 RELATED WORK:

- A. Section 00331, TELEVISION INSPECTION LOGS
- B. Section 00890, PERMITS
- C. Section 01014, SCOPE AND SEQUENCE OF WORK
- D. Section 01330, SUBMITTALS
- E. Section 01331, DOCUMENTATION
- F. Section 01575, HANDLING EXISTING FLOWS
- G. Section 02440, SEWER CLEANING, INSPECTION, TESTING AND SEALING
- H. Section 02443, SERVICE CONNECTION REHABILITATION

1.03 QUALITY CONTROL:

- A. The work described herein shall be performed by a company with not less than five (5) years of experience in providing the required services, employing experienced workers and experienced supervisory personnel. Supervisory personnel shall have not less than three (3) years of experience in providing the required services and shall be present at the jobsite during all work related to the required services.

1.04 REFERENCES:

The following standards form a part of this specification as referenced:

ASTM International (ASTM)

ASTM F1216 Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube

The National Association of Sewer Service Companies (NASSCO)

Performance Specification Guideline for the Installation of Cured-in-Place Pipe (CIPP)

Guideline for the Safe Use and Handling of Styrene-Based Resins in Cured-in-Place Pipe

Environmental Protection Agency (EPA)

Determination of Volatile Organic Compounds (VOCs) In Air Collected In Specially-Prepared Canisters and Analyzed By Gas Chromatography/Mass Spectrometry (GC/MS)

1.05 SYSTEM DESCRIPTION:

- A. Unless otherwise indicated herein, installation of cured-in-place pipe shall be carried out in accordance with ASTM F1216, Section 7.
- B. Curing of liner tube using steam or hot water shall be acceptable.
- C. The Contractor shall design all cured-in-place liners assuming partially deteriorated pipe conditions and a groundwater height above the crown of the pipe equal to one-half (50%) of the distance between the ground surface and the invert of the sanitary sewer line to be rehabilitated unless otherwise noted below.
- D. The Contractor shall design all cured-in-place structural liners assuming fully deteriorated pipe conditions and a groundwater height above the crown of the pipe equal to one-half (50%) of the distance between the ground surface and the invert of the sanitary sewer line to be rehabilitated unless otherwise noted below.
- E. The Contractor may propose alternative cured-in-place processes and/or products for review and approval by the Engineer.
- F. The location, length, and approximate interior dimensions of the cured-in-place pipe to be installed are as shown on the drawings.
- G. The Contractor shall provide MSDS for all chemicals used in the lining process.

1.06 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF SECTION 01330 SUBMITTALS, SUBMIT THE FOLLOWING:

- A. Prior to beginning the work, submit the following:
 - 1. Qualifications of the firm/personnel who will perform the Work.

2. Descriptions of system proposed for handling existing flows, if necessary, during the procedures to be carried out.
 3. Description of the system, equipment and material proposed for the cured-in-place pipe.
 4. Description of system proposed for handling and mitigating cured-in-place pipe emissions, during the procedures to be carried out. The description shall include the minimum requirements described in section 3.04.
 5. Manufacturer's warranty.
- B. Prior to beginning the work, the Contractor shall submit, a written plan for contacting homeowners whose service connections may be affected due to the installation of liner. Such a plan is subject to approval by the Engineer and the Owner.
- C. The Contractor shall submit the following information for each inversion within 21 days following completion of the liner installation. The information shall also be included on external hard drives as described in Section 01331, DOCUMENTATION.
- Pre-inversion television inspection logs and videos
 - Liner order sheet describing the material ordered
 - Service connection reinstatement sign-off sheet
 - Thermo couple log kept during inversion process
 - Post-inversion television inspection logs and videos
 - Material testing results

Information should be organized by inversion and two (2) copies shall be delivered.

1.07 WARRANTY:

The cured-in-place pipe shall be warranted against infiltration and defects for one (1) year from the date the project is accepted by the Owner. Defects shall include, but not be limited to, dry spots; lifts; wrinkles; fins; delaminations; pinholes (with or without infiltration); mineral deposits; staining; and infiltration. Defects shall also include reinstated non-active service connections and reinstated connections specifically identified on the drawings to not be reinstated.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Materials used for the cured-in-place pipe shall meet the requirements of ASTM F1216.
- B. Cured-in-place pipe shall be as manufactured by Insituform Technologies, National Liner, En-Tech Corporation, or approved equal.

- C. Hydrophylic rubber gaskets shall swell to a minimum of 120% of their dry size when in contact with water and shall have a maximum swell size of 6 millimeters high. Gaskets must be adhered to the host pipe to ensure proper installation by either an adhesive sealant or mechanical fastener. Gaskets, fasteners and adhesives shall be manufactured by Hydrotite, Adeka, LMK Technologies or approved equal.
- D. Air monitoring devices used for monitoring CIPP emissions shall be capable of measuring concentrations of TO-15 volatile organic compounds (VOCs) as defined by the US Environmental Protection Agency's (EPA) TO-15 list "Determination of Volatile Organic Compounds (VOCs) In Air Collected In Specially-Prepared Canisters and Analyzed By Gas Chromatography/Mass Spectrometry (GC/MS)" to a minimum of 2 parts per million (ppm). Air monitoring devices shall be capable of continuously monitoring air quality or shall manually measure.

PART 3 - EXECUTION

3.01 PIPE CLEANING AND INSPECTION:

Pipe cleaning and inspection shall be carried out in accordance with Section 02440, SEWER CLEANING, INSPECTION, TESTING AND SEALING and shall not be measured separately for payment.

3.02 FLOW CONTROL:

Flow control, if required, shall be in accordance with Section 01575, HANDLING EXISTING FLOWS.

3.03 ODOR CONTROL:

- A. The contractor shall adhere to NASSCO recommendations for the safe handling of styrene-based resin emissions. An odor control and mitigation plan shall be submitted for review and approval in accordance with the submittal requirements of 1.06A.4 described herein.
- B. The Contractor shall provide the following safety measures to limit emission exposure for workers and the general public.
 - 1. The Contractor shall provide an emission stack a minimum of 6-feet in height above the work area.
 - 2. The Contractor shall establish a perimeter around the emission stack and exhaust manhole. The perimeter shall be erected so that the public cannot inadvertently enter the work zone.

3. A work zone perimeter shall be established and maintained around the job site to prevent the public from entering. The limits of the perimeter shall be based on general construction hazards as well as proper distancing from steam emission sources and open refrigerated units. Steam emissions sources that conflict with start/stop traffic lanes or pedestrian access shall be included in the work zone perimeter.
4. Other sources of steam exhaust (loose connections, glands, etc.) resulting in the release of rogue emissions shall be promptly repaired or adjusted.
5. The Contractor shall provide air monitoring devices. Air monitoring devices shall be used to sample and record emissions as required by the Engineer. Air monitoring devices shall be in accordance with 2.01D. Air monitoring shall not be measured separately for payment.

3.04 WATER FOR CONSTRUCTION PURPOSES:

The availability of water for construction purposes shall be in accordance with Section 01140, SPECIAL PROVISIONS.

3.05 NOTIFICATION:

- A. The Contractor shall affix a written notice to the door of each home and/or building that has sewer service through the pipe being lined one week prior to the lining operation and again one day before the lining operation. A notice shall also be distributed following the service connection reinstatement stating that the service connection has been restored to service.
- B. The written notice must include the recommendation that all drains not regularly used shall be filled with water to prevent sewer gasses and sewer lining emissions from entering the home and/or building.
- C. The written notice must be approved by the Engineer prior to its distribution.
- D. The printing and distribution of notices to the homeowners by the Contractor shall be considered incidental to the lining operation.

3.06 INSTALLATION:

- A. Each sewer segment shall be television inspected prior to the installation of the cured-in-place liner. The inspection shall be performed in "dry-pipe" conditions with no flow in the pipe. The pipe shall be clean and free of all obstructions prior to installation of the liner.

- B. Prior to installation of the cured-in-place pipe the Contractor shall install a hydrophilic rubber gasket on the inside of each pipe where it meets a manhole such that the hydrophilic rubber gasket is between the host pipe and the cured-in-place pipe. The annular space shall be made watertight at the ends of the liner in the manholes.
- C. The Contractor shall make television inspection camera available for confirming service connections to be reinstated. At the Engineer's discretion, the Contractor shall dye test service connections to confirm that each service connection that should be reinstated is included on the attached Service Connection Reinstatement Certification Form. Contractor shall not reinstate inactive service connections. Contractor shall make reasonable efforts to confirm if a service is active, including review of available tie cards with the Owner's Representative (Owner's Representative shall obtain available tie cards) and dye testing/television inspection of properties as required. No additional payment will be made for television inspection of mainline or service line from mainline to property in conjunction with dye testing of service connections.
- D. The Contractor shall install a pre-liner or grout infiltration sources if required to install the cured-in-place pipe. Infiltration source control prior to installation of cured-in-place pipe shall be not be measured separately for payment.
- E. Installation of the cured-in-place pipe shall be in accordance with ASTM F1216, Section 7.
- F. The Contractor shall account for the existing pipe material, resin system, and ground conditions during the cure and cool down of the cured-in-place pipe. Prior to installation, the Contractor shall install thermocouples and/or a continuous temperature monitoring system to monitor temperature during curing and cool down. Continuous temperature monitoring systems shall be used for cured-in-place pipe installations where the existing pipeline will act as an insulator (PVC or other plastic pipes) or where the diameter is greater than or equal to 18-inches or as required on the plans. Curing and cool down procedures shall be in accordance with the approved cured-in-place pipe manufacturer recommendations. Deviations from the manufacturer's recommendations to accelerate the curing time and/or cool down time shall not be permitted without written authorization from the manufacturer.
- G. After the liner has been cured in place, the Contractor shall reinstate and brush all active service connections as required by the Engineer. Branch connections to buildings shall be reinstated and brushed to 100% of the inside diameter of the existing service connection without excavation, utilizing a remotely controlled cutting and brushing device, monitored by a video TV camera. The service connection shall be brushed flush with the invert of the service connection to prevent debris accumulation. No additional payment will be made for excavations for the purpose of reinstating connections and the contractor will be responsible for all cost and liability associated with such excavation and restoration work.

- H. The service connections to be reinstated for each inversion will be listed on the attached form (Service Connection Reinstatement Certification Form) and will be signed by an authorized representative of the Contractor.
- I. All reinstated service connections shall be sealed with grout in accordance with Section 02443, SERVICE CONNECTION REHABILITATION. The Contractor shall make certain that the annular space between the host pipe and the cured-in-place pipe is fully sealed with grout. Grouting of the reinstated service after installation of cured-in-place pipe shall be not be measured separately for payment.
- J. Each sewer segment shall be television inspected after the liner installation and service grouting have been completed. The inspection shall be performed in “dry-pipe” conditions with no flow in the pipe. Post rehabilitation television inspection shall be performed prior to removing any sewer bypass equipment. Post rehabilitation television inspection shall be considered incidental to the lining process and shall not be measured separately for payment.

3.07 TESTING REQUIREMENTS:

- A. Cured-in-place pipe samples shall be prepared and tested by the Contractor in accordance with ASTM F1216 Section 8.1 unless otherwise stated in this section.
- B. The Contractor shall obtain samples for each pipe inversion.
- C. If field conditions or pipe shape prevent the Contractor from obtaining the samples as specified in ASTM F1216 Section 8.1 the samples shall be taken as required by the Engineer.
- D. An independent testing laboratory shall test the cured-in-place pipe samples and the results are to be sent directly to the Engineer within 21 calendar days following the completion of each inversion.
- E. The cost of obtaining the samples and testing shall be the sole responsibility of the Contractor and shall be considered incidental to the lining process.
- F. Inversions where the cured-in-place pipe samples that do not meet the requirements of ASTM D790 and D638 as indicated in ASTM F1216 Section 8 will be televised by the Contractor, as required by the Engineer, at no additional cost to the Owner, for review by the Engineer. Liner deemed unacceptable by the Engineer will be removed and replaced at no additional cost to the Owner.

3.08 FIELD TESTING/INSPECTION:

- A. Prior to expiration of the warranty period, during periods of high groundwater, and at a time to be approved by the Engineer, the Contractor shall clean and television inspect each of the cured-in-place pipes in accordance with Section 02440, SEWER CLEANING, INSPECTION, TESTING AND SEALING. The Contractor shall repair any defects found in the cured-in-place pipe. Defects shall include, but not be limited to, dry spots; lifts; wrinkles; fins; delaminations; pinholes (with or without infiltration); mineral deposits; staining; and infiltration. Defects shall also include reinstated non-active service connections, reinstated connections specifically identified on the drawings to not be reinstated, and over cut reinstated service connection. Removal and replacement of cured-in-place pipe with defects shall be performed if required by the Engineer. Defects shall be repaired by cured-in-place pipe, short liners, or lateral liners, as required by the Engineer. Short liners shall be a minimum of four (4) linear feet per defect location. The Contractor shall reseal the annular space between the sewer main and the cured-in-place pipe at manhole locations and service connections until there are no visible leaks through television inspection.

- B. All inspecting, resealing, cured-in-place lining, short lining, or other repairs within the warranty period shall be provided at no additional cost to the Owner and as required by the Engineer.

SERVICE CONNECTION REINSTATEMENT CERTIFICATION FORM

The Contractor shall review sewer tie cards, television inspection tapes, and perform dye tests as necessary to determine which service connections should be reinstated following installation of a Cured-in-Place Liner. Details regarding the location of each service connection that will be reinstated, including Manhole-to-Manhole reach, stationing, and clock position shall be recorded on this form.

Service Connections to be Reinstated (Clock Position)

Inversion # _____	MH _____ to MH _____	_____
	MH _____ to MH _____	_____
	MH _____ to MH _____	_____
	MH _____ to MH _____	_____
	MH _____ to MH _____	_____
	MH _____ to MH _____	_____
	MH _____ to MH _____	_____
	MH _____ to MH _____	_____

The Contractor shall be responsible for reinstatement of **all active** service connections following Cured-in-Place Lining. If active service connections are found, prior to the project being complete, not to have been reinstated, the Contractor shall reinstate them within one (1) calendar day of notification, at its sole expense. If active service connections are found, at any future date, not to have been reinstated, the Contractor shall reinstate them within three (3) calendar days of notification, at its sole expense.

Contractor	_____	_____
	Signature	Date

	Print Name	

END OF SECTION

SECTION 02431

GLASS REINFORCED PLASTIC CURED-IN-PLACE PIPE

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. This section covers installation of glass reinforced plastic cured-in-place pipe (GRP-CIPP) using ultraviolet light curing as called for herein and on the drawings. The work includes furnishing all equipment, material and labor required to perform the services described herein.

1.02 RELATED WORK:

- A. Section 00331, TELEVISION INSPECTION LOGS
- B. Section 00890, PERMITS
- C. Section 01014, SCOPE AND SEQUENCE OF WORK
- D. Section 01330, SUBMITTALS
- E. Section 01331, DOCUMENTATION
- F. Section 01575, HANDLING EXISTING FLOWS
- G. Section 02440, SEWER CLEANING, INSPECTION, TESTING AND SEALING
- H. Section 02443, SERVICE CONNECTION REHABILITATION

1.03 QUALITY CONTROL:

- A. The work described herein shall be performed by a company with not less than five (5) years of experience in providing the required services, employing experienced workers and experienced supervisory personnel. Supervisory personnel shall have not less than three (3) years of experience in providing the required services and shall be present at the jobsite during all work related to the required services.

1.04 REFERENCES:

The following standards form a part of this specification as referenced:

ASTM International (ASTM)

ASTM F2019: Rehabilitation of Existing Pipelines and Conduits by the Pulled in Place

Installation of Glass Reinforced Plastic Cured-in-Place (GRP-CIPP) Using the UV-Light Curing Method

The National Association of Sewer Service Companies (NASSCO)

Performance Specification Guideline for the Installation of Cured-in-Place Pipe (CIPP)

1.05 SYSTEM DESCRIPTION:

- A. Unless otherwise indicated herein, installation of GRP-CIPP shall be carried out in accordance with ASTM F2019, Section 6.
- B. The Contractor shall design all GRP-CIPPs assuming partially deteriorated pipe conditions and a groundwater height to be equal to; one-half (50%) of the distance between the ground surface and the invert of the sanitary sewer line to be rehabilitated, 60-inches above the invert of the sanitary sewer line to be rehabilitated, or 4-inches above the crown of the liner, whichever is greater (but in no case should this height exceed the cover depth of the host pipe).
- C. The Contractor shall design all structural GRP-CIPPs assuming fully deteriorated pipe conditions and a groundwater height to be equal to; one-half (50%) of the distance between the ground surface and the invert of the sanitary sewer line to be rehabilitated, 60-inches above the invert of the sanitary sewer line to be rehabilitated, or 4-inches above the crown of the liner, whichever is greater (but in no case should this height exceed the cover depth of the host pipe).
- D. The Contractor may propose alternative GRP-CIPP processes and/or products for review and approval by the Engineer.
- E. The location, length, and approximate interior dimensions of the GRP-CIPP to be installed are as shown on the drawings.
- F. The Contractor shall provide SDS for all chemicals used in the lining process.

1.06 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF SECTION 01330 SUBMITTALS, SUBMIT THE FOLLOWING:

- A. Prior to beginning the work, submit the following:
 - 1. Qualifications of the firm/personnel who will perform the Work.
 - 2. Descriptions of system proposed for handling existing flows, if necessary, during the procedures to be carried out.
 - 3. Description of the system, equipment and material proposed for the GRP-CIPP.

4. Warranty as described in Section 1.07.
- B. Prior to beginning the work, the Contractor shall submit a written plan for contacting homeowners whose service connections may be affected due to the installation of liner. Such plan is subject to approval by the Engineer and the Owner.
- C. The Contractor shall submit the following information for each installation within 21 days following completion of the liner installation. The information shall also be included on external hard drives as described in Section 01331, DOCUMENTATION.
- Pre-installation television inspection logs and videos
 - Liner order sheet describing the material ordered
 - Manufacturer's shipping, storing, and handling requirements for GRP-CIPP liners
 - Service connection reinstatement sign-off sheet
 - Light train sensor readings
 - Post-installation television inspection logs and videos
 - Material testing results

Information should be organized by installation and two (2) copies shall be delivered.

1.07 WARRANTY:

The GRP-CIPP shall be warranted against infiltration and defects for one (1) year from the date the project is accepted by the Owner. Defects shall include, but not be limited to, dry spots; lifts; wrinkles; fins; delaminations; pinholes (with or without infiltration); mineral deposits; staining; and infiltration. Defects shall also include reinstated non-active service connections and reinstated connections specifically identified on the drawings to not be reinstated.

PART 2 - PRODUCTS

2.01 MATERIALS:

- A. Materials used for the GRP-CIPP shall meet the requirements of ASTM F2019.
- B. GRP-CIPP shall be as manufactured by Insituform Technologies, IMPREG Group, or approved equal.
- C. Materials shall be shipped, stored, and handled in a manner consistent with the submitted manufacturer's recommendations to avoid damage. Damage shall include but not be limited to gouging, abrasion, flattening, cutting, puncturing, or ultraviolet degradation. The GRP-CIPP shall be inspected upon delivery and prior to curing to confirm the liner is free of damage. All damaged liners shall be promptly removed from the project site at the contractor's expense and disposed of in accordance with all current applicable agency regulations.

- D. Hydrophilic rubber gaskets shall swell to a minimum of 120% of their dry size when in contact with water and shall have a maximum swell size of 6 millimeters high. Gaskets must be adhered to the host pipe to ensure proper installation by either an adhesive sealant or mechanical fastener. Gaskets, fasteners and adhesives shall be as manufactured by Hydrotite, Adeka, or approved equal.

PART 3 - EXECUTION

3.01 PIPE CLEANING AND INSPECTION:

Pipe cleaning and inspection shall be carried out in accordance with Section 02440, SEWER CLEANING, INSPECTION, TESTING AND SEALING and shall not be measured separately for payment.

3.02 FLOW CONTROL:

Flow control, if required, shall be in accordance with Section 01575, HANDLING EXISTING FLOWS.

3.03 WORK PERIMETER:

A work zone perimeter shall be established and maintained around the job site to prevent the public from entering.

3.04 NOTIFICATION:

- A. The Contractor shall affix a written notice to the door of each home that has sewer service through the pipe being lined one week prior to the lining operation and again one day before the lining operation. A notice shall also be distributed following the service connection reinstatement stating that the service connection has been restored to service.
- B. The written notice must be approved by the Engineer prior to its distribution.
- C. The printing and distribution of notices to the homeowners by the Contractor shall be considered incidental to the lining operation.

3.05 INSTALLATION:

- A. Each sewer segment shall be television inspected prior to the installation of the GRP-CIPP. The inspection shall be performed in “dry-pipe” conditions with no flow in the pipe. The pipe shall be clean and free of all obstructions prior to installation of the liner.
- B. Prior to installation of the GRP-CIPP the Contractor shall install a hydrophilic rubber gasket on the inside of each pipe where it meets a manhole such that the hydrophilic rubber gasket is between the host pipe and the GRP-CIPP. The annular space shall be

made watertight at the ends of the liner in the manholes.

- C. The Contractor shall make a television inspection camera available for confirming service connections to be reinstated. At the Engineer's discretion, the Contractor shall dye test service connections to confirm that each service connection that should be reinstated is included on the attached Service Connection Reinstatement Certification Form. Contractor shall not reinstate inactive service connections. Contractor shall make reasonable efforts to confirm if a service is active, including review of available tie cards with the Owner's Representative (Owner's Representative shall obtain available tie cards) and dye testing/television inspection of properties as required. No additional payment will be made for television inspection of mainline or service line from mainline to property in conjunction with dye testing of service connections.
- D. The Contractor shall install a pre-liner or grout infiltration sources if required to install the GRP-CIPP. Infiltration source control prior to installation of cured-in-place pipe shall be not be measured separately for payment.
- E. Installation of the GRP-CIPP shall be in accordance with ASTM F2019, Section 6.
- F. After the liner has been cured in place, the Contractor shall reinstate and brush all active service connections as required by the Engineer. Branch connections to buildings shall be reinstated to 100% of the inside diameter of the existing service connection without excavation, utilizing a remotely controlled cutting and brushing device, monitored by a video camera. The service connection shall be brushed flush with the invert of the service connection to prevent debris accumulation. No additional payment will be made for excavations for the purpose of reinstating connections and the contractor will be responsible for all cost and liability associated with such excavation and restoration work. Reinstated service connections that have been over-cut past the contours of the existing service connection exposing adjacent voids shall be short-lined or lateral-lined over, whichever the Engineer deems necessary, at no additional cost to the Owner.
- G. The service connections to be reinstated for each installation will be listed on the attached form (Service Connection Reinstatement Certification Form) and will be signed by an authorized representative of the Contractor.
- H. All reinstated service connections shall be sealed with grout in accordance with Section 02443, SERVICE CONNECTION REHABILITATION. The Contractor shall make certain that the annular space between the host pipe and the cured-in-place pipe is fully sealed with grout. Grouting of the reinstated service after installation of cured-in-place pipe shall be not be measured separately for payment.
- I. Each sewer segment shall be television inspected after the liner installation and service grouting have been completed. The inspection shall be performed in "dry-pipe" conditions with no flow in the pipe. Post rehabilitation television inspection shall be performed prior to removing any sewer bypass equipment. Post rehabilitation television inspection shall be considered incidental to the lining process and shall not be measured

separately for payment.

3.06 TESTING REQUIREMENTS:

- A. GRP-CIPP samples shall be prepared and tested by the Contractor in accordance with ASTM F2019 Section 7.1 unless otherwise stated in this section.
- B. The Contractor shall obtain samples for each pipe installation.
- C. If field conditions or pipe shape prevent the Contractor from obtaining the samples as specified in ASTM F2019 Section 7.1 the samples shall be taken as required by the Engineer.
- D. An independent testing laboratory shall test the GRP-CIPP samples and the results are to be sent directly to the Engineer within 21 calendar days following the completion of each inversion.
- E. The cost of obtaining the samples and testing shall be the sole responsibility of the Contractor and shall be considered incidental to the lining process.
- F. Installations where the GRP-CIPP samples that do not meet the requirements of ASTM D790 as indicated in ASTM F2019 Table 1, or where samples were not collected, will be televised by the Contractor, as required by the Engineer, at no additional cost to the Owner, for review by the Engineer. Liner deemed unacceptable by the Engineer will be removed and replaced at no additional cost to the Owner.

3.07 FIELD TESTING/INSPECTION:

- A. Prior to expiration of the warranty period, during periods of high groundwater, and at a time to be approved by the Engineer, the Contractor shall clean and television inspect each of the GRP-CIPPs in accordance with Section 02440, SEWER CLEANING, INSPECTION, TESTING AND SEALING. The Contractor shall repair any defects found in the GRP-CIPP. Defects shall include, but not be limited to, dry spots; lifts; wrinkles; fins; delaminations; pinholes (with or without infiltration); mineral deposits; staining; and infiltration. Defects shall also include reinstated non-active service connections and reinstated connections specifically identified on the drawings to not be reinstated. Removal and replacement of GRP-CIPP with defects shall be performed if required by the Engineer. Defects shall be repaired by cured-in-place pipe or short liners, as required by the Engineer. Short liners shall be a minimum of four (4) linear feet per defect location. The Contractor shall reseal the annular space between the sewer main and the GRP-CIPP at manhole locations and service connections until there are no visible leaks through television inspection.
- B. All inspecting, resealing, GRP-CIPP lining, short lining, or other repairs within the

warranty period shall be provided at no additional cost to the Owner and as required by the Engineer.

SERVICE CONNECTION REINSTATEMENT CERTIFICATION FORM

The Contractor shall review sewer tie cards, television inspection tapes, and perform dye tests as necessary to determine which service connections should be reinstated following installation of a GRP-CIPP. Details regarding the location of each service connection that will be reinstated, including Manhole-to-Manhole reach, stationing, and clock position shall be recorded on this form.

Service Connections to be Reinstated (Clock Position)

Installation # _____	MH _____ to MH _____	_____
	MH _____ to MH _____	_____
	MH _____ to MH _____	_____
	MH _____ to MH _____	_____
	MH _____ to MH _____	_____
	MH _____ to MH _____	_____
	MH _____ to MH _____	_____
	MH _____ to MH _____	_____

The Contractor shall be responsible for reinstatement of **all active** service connections following Cured-in-Place Lining. If active service connections are found, prior to the project being complete, not to have been reinstated, the Contractor shall reinstate them within one (1) calendar day of notification, at its sole expense. If active service connections are found, at any future date, not to have been reinstated, the Contractor shall reinstate them within three (3) calendar days of notification, at its sole expense.

Contractor

Signature

Date

Print Name

END OF SECTION

SECTION 02435

SEWER MANHOLE REHABILITATION

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. This Section covers the rehabilitation of sewer manholes as called for herein and on the drawings. It is the intent of this specification to provide for the waterproofing, sealing, and structural enhancement of existing manholes by chemical grout exterior sealing of sewer manhole inverts, walls and corbels, and by application of a uniform cementitious layer of high-quality mortar. Additional manhole rehabilitation related items include manhole root treatment, install epoxy liner, and build manhole bench and invert.
- B. The work shall include elimination of infiltration by external chemical grout sealing; removal and patching of loose and/or unsound material; cleaning and preparation of surfaces; repair of invert, bench, and walls; and chemical grout sealing of the invert, bench, walls, and pipe connections; and spray application of a cementitious mix to form a liner. Other repairs shall be completed as indicated on the drawings and described herein.
- C. The contractor shall furnish all equipment, material and labor required to perform all manhole rehabilitations described in this specification.
- D. External grouting of inverts, bench, walls, corbel, and pipe connections shall be performed prior to application of cementitious mix.

1.02 RELATED WORK:

- A. Section 01014, SCOPE AND SEQUENCE OF WORK
- B. Section 01330, SUBMITTALS
- C. Section 01331, DOCUMENTATION
- D. Section 01575, HANDLING EXISTING FLOWS
- E. Section 02437, SEWER LINE AND MANHOLE CHEMICAL ROOT TREATMENT

1.03 QUALITY CONTROL:

- A. The work described herein shall be performed by a company with not less than five (5) years of experience in providing the required services, employing experienced workers and experienced supervisory personnel. Supervisory personnel shall have not less than

three (3) years of experience in providing the required services and shall be present at the jobsite during all work related to the required services.

1.04 REFERENCES:

- A. The following standards form a part of this specification as referenced:

The National Association of Sewer Service Companies (NASSCO)

Performance Specification Guideline for Manhole Rehabilitation

ASTM International (ASTM)

ASTM C94	Ready-Mix Concrete
ASTM C109	Comprehensive Strength
ASTM C267	Chemical Resistance
ASTM C596	Shrinkage
ASTM C666, Method A	Freeze/Thaw Resistance
ASTM D4414	Standard Practice for Measurement of Wet Film Thickness for Organic Coatings
ASTM 543	Resistance of Plastics to Chemical Reagents
ASTM 638	Tensile Properties of Plastic
ASTM 695	Comprehensive Properties of Rigid Plastics
ASTM D790	Flexural Properties of Unreinforced and Reinforced Plastics

1.05 CEMENTITIOUS LINING SYSTEM DESCRIPTION:

- A. Unless otherwise indicated herein, sewer manhole sealing shall be carried out in accordance with the current edition of the Performance Specification Guideline for Manhole Rehabilitation (NASSCO).
- B. The Contractor may propose alternative processes and/or products for review and approval by the Engineer.
- C. The locations of the cementitious lining work to be completed are as shown on the drawings.

1.06 EPOXY LINER SYSTEM DESCRIPTION:

- A. Unless otherwise indicated herein, the application of an epoxy liner shall be carried out in accordance with the current edition of the PROTECTION OF UNDERGROUND CONCRETE AND MASONRY STRUCTURES AND MANHOLES (As provided by Raven Lining Systems) of NASSCO Recommended Specifications for Sewer Collection System Rehabilitation.

- B. The Contractor may propose alternative processes and/or products for review and approval by the Engineer.
 - C. Cementitious lining prior applying the epoxy liner shall be considered incidental to the work and will not be measured separately for payment.
 - D. The locations where the epoxy liner is to be applied are indicated on the drawings.
- 1.07 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF SECTION 01330 SUBMITTALS, SUBMIT THE FOLLOWING:
- A. Prior to beginning the work, submit the following:
 - 1. Qualifications of the firm/personnel who will perform the work.
 - 2. Provide at least five (5) references of different projects in which at least 50 manholes have been rehabilitated by the firm within the past three (3) years.
 - 3. Provide at least three (3) references of different projects completed in the last three (3) years in which an epoxy finish was applied to sanitary sewer manholes.
 - 4. Description of the system, equipment and material with MSDS Data Sheets proposed for sewer manhole rehabilitation.
 - 5. Description of the system proposed for bypass pumping during the procedures to be carried out.
 - 6. Manufacturer's warranty
 - B. Refer to Section 01331, DOCUMENTATION, for required documentation to be submitted.

1.08 WARRANTY:

- A. The manhole rehabilitation work performed shall be warrantied against infiltration and faulty workmanship and materials for a period of one (1) year after the project is accepted by the Owner.

PART 2 - PRODUCTS

2.01 REHABILITATION MATERIALS:

All products used for lining, sealing, patching, and cleaning shall be environmentally safe. The contractor shall submit MSDS Data Sheets for all materials used.

2.02 SEALING OF INVERT, STOPPING ACTIVE LEAKS AND EXTERIOR CHEMICAL SEALING:

The contractor shall use a chemical grout that is environmentally safe for the sealing of sewers. The chemical grout shall be in accordance with Part 2, Products, of the NASSCO Suggested Standard Specification for Pressure Testing and Grouting of Sewer Joints, Laterals and Lateral Connections (Using the Packer Method with Solution Grouts).

2.03 PATCHING MIX:

A quick-setting cementitious material shall be used as a patching mix and is to be mixed and applied according to the manufacturer's recommendation and shall have the following minimum requirements.

Compressive Strength	ASTM C-109	6 hr. 1,400 psi
Shrinkage	ASTM C-596	0% AT 90% Relative Humidity

2.04 INFILTRATION CONTROL MIX:

A rapid-setting cementitious product specifically for leak control shall be used to stop water infiltration and shall be mixed and applied according to the manufacturer's recommendations and shall have the following minimum requirements.

Compressive Strength	ASTM C-109	1 hr. 600 psi
Compressive Strength	ASTM C-109	24 hr. 1,800 psi

2.05 LINER MIX:

- A. The cementitious liner mix shall be used to form a structural enhancing monolithic liner covering all interior manhole surfaces and shall have the following minimum requirements at 28 days:

Compressive Strength	ASTM C-109	6,000 psi
Shrinkage	ASTM C-596	0%, 90% humidity
Freeze/Thaw Resistance	ASTM C-666	No visible damage after 100 cycles

- B. The liner mix shall be applied in one monolithic layer.

2.06 EPOXY MIX:

The epoxy liner mix shall be composed of 100% solids, solvent-free, moisture tolerant, two-component epoxy resin system, thixotropic in nature and filled with select fillers to minimize permeability. The epoxy liner mix shall form an interlocking bond to freshly applied cementitious mortars and conform to the manufacturer's specifications to prevent delaminating powders from forming during hydration. The epoxy liner shall have the following minimum requirements.

Compressive Strength	ASTM D695	>4,000 psi
Tensile Strength, psi	ASTM D638	>2,700 psi
Flexural Modulus, psi	ASTM D790	>600,000 psi
Bond Strength Concrete	ASTM D7234	>Tensile Strength of Concrete
Chemical Resistance to:	ASTM D543	
Wastewater		Immersion Service
Sulfuric Acids, 10%		Immersion Service

2.07 BRICK MATERIALS:

- A. Brick shall be sound, hard, and uniformly burned brick, regular and uniform in shape and size, of compact texture, and satisfactory to the Engineer. Bricks shall comply with ASTM C32, for Grade SS, hard brick, except that the mean of five tests for absorption shall not exceed 8 percent by weight.
- B. Rejected brick shall be immediately removed from the work and brick satisfactory to the Engineer substituted.
- C. Mortar shall be composed of Portland cement, hydrated lime, and sand in which the volume of sand shall not exceed three times the sum of the volumes of cement and lime. The proportions of cement and lime shall be as directed and may vary from 1:1/4 for dense hard-burned brick to 1:3/4 for softer brick. In general, mortar for Grade SS Brick shall be mixed in the volume proportions of 1:1/2:4-1/2; Portland cement to hydrated lime to sand.
- D. Cement shall be Type II Portland cement as specified for concrete masonry.
- E. Hydrated lime shall be Type S conforming to ASTM C207.
- F. Sand shall comply with ASTM C144 specifications for "Fine Aggregate," except that all of the sand shall pass a No. 8 sieve.

2.08 CONCRETE:

- A. Cement shall be domestic Portland cement conforming to ASTM C150, Type II.

- B. Fine aggregate shall be washed natural sand conforming to ASTM C33.
- C. Coarse aggregate shall be well graded crushed stone conforming to ASTM C33, size No. 67.
- D. No admixtures shall be used unless approved by the Engineer in writing.

2.09 WATER:

Water used in mixing shall be potable.

2.10 DELIVERY, STORAGE, AND HANDLING:

- A. Materials shall be delivered to the site in the Manufacturer's original, unopened containers and packaging, with labels clearly identifying the product name and manufacturer.
- B. All materials shall be stored properly and in accordance with Manufacturer's instructions.

PART 3 - EXECUTION

3.01 SAMPLING AND TESTING OF LINER:

- A. The Owner reserves the right to test all materials.
- B. Products that fail to meet the requirements of these specifications shall not be incorporated in the work.

3.02 SURFACE PROTECTION:

- A. During progress of work, where appearance is important, adjacent areas or grounds which may be permanently discolored, stained, or otherwise damaged by dust and rebound, shall be adequately protected and, if contacted, shall be cleaned by early scraping, brushing or washing, as the surroundings permit.
- B. No street markings shall be removed or covered throughout the progress of work.

3.03 MANHOLE CHEMICAL ROOT TREATMENT:

The Contractor shall provide manhole chemical root treatment where indicated on the drawings. The chemical root treatment shall be in accordance with Section 02437, SEWER LINE AND MANHOLE CHEMICAL ROOT TREATMENT.

3.04 EXISTING FLOWS:

The Contractor shall divert flows as required for the work and in accordance with the requirements specified in Section 01575, HANDLING EXISTING FLOWS.

3.05 CEMENTITIOUS LINING:

A. Preparation

1. Remove all foreign material from the manhole wall and bench using a high-pressure water spray (minimum 5,000 psi). Loose and protruding brick, mortar, and concrete shall be removed using a mason's hammer and chisel and/or scraper. Fill any large voids with quick-setting patching mix. Surfaces to be repaired shall be clean and free of loose materials. Additional surface preparation shall be as recommended by the manufacturer of the materials to be applied.
2. Leaks shall be stopped using a chemical grout, which shall be applied as per the manufacturer's recommendations. Leaks may require weep holes drilled at the manhole base to localize the infiltration during the application, after which the weep holes shall be sealed with a chemical grout and plugged with the quick-setting infiltration control mix prior to the final liner application. Areas with evidence of previous leakage (e.g., mineral deposits) shall also be grouted.
3. All pipe connections in brick and block manholes shall be grouted regardless of whether they are leaking or have signs of previous leakage. Grout ports shall be located near the pipe connections to ensure the sealing material is injected at the manhole/pipe connections. Grout ports shall also be located and drilled in the bench and invert for all brick and block manholes as necessary to seal the manhole base.

B. Invert Sealing

1. The Contractor shall carry out all work as described in the latest edition of the Performance Specification Guideline for Manhole Rehabilitation, Section 3.2C (NASSCO) using sealing materials and procedures accepted by the Engineer.
2. A minimum of four (4) grout ports shall be located and drilled in the manhole bench and invert of brick and block manholes as necessary to seal the invert and manhole base.
3. A quick setting patch mix shall be troweled uniformly not to exceed 1/2-inch, onto the damaged invert extended out onto the base of the manhole sufficiently to tie into the structurally enhanced monolithic liner to be applied.

C. Exterior Grouting

1. For precast manholes, grout ports shall be located two (2) feet (maximum) around the circumference of the manhole, approximately one (1) foot below and one (1) foot above each joint to seal all joints. Additional grout ports shall be located so as to seal any other defects not occurring at a joint.
2. For brick/block manholes, grout ports shall be located and drilled at 90-degree intervals and every two (2) vertical feet (maximum) around the circumference every two (2) feet (maximum) of the manhole to ensure proper grouting of the soil outside the manhole.
3. The Contractor shall prohibit debris from entering the invert by either covering the invert or plugging it during application.
4. The chemical sealing material used shall be as described in chemical sealing (grouting) materials of the Performance Specification for Manhole Rehabilitation (NASSCO).

D. Interior Sealing

1. Interior lining of the manholes shall be conducted only after all other manhole rehabilitations have been completed.
2. Unless otherwise indicated herein, the Contractor shall carry out all work as described in the Performance Specification Guideline for Manhole Rehabilitation, Section 3.2 (NASSCO) using lining materials and procedures accepted by the Engineer.
3. Preparation, as described in section 3.05A, shall be completed prior to the placement of the cementitious liner.
4. Sealant shall not be placed on a frozen surface or during freezing weather. Sealant shall not be placed when it is anticipated that the temperature during the following 24 hours will drop below 32 degrees Fahrenheit.
5. Pipes and/or service connections shall be temporarily plugged prior to the application of the cementitious manhole interior liner. A flash coat of the liner material shall be applied three (3) inches into each service connection. Temporary plugs shall be removed once the liner has cured sufficiently to prevent erosion of the new liner.
6. Thickness shall be verified with a wet gauge at random points of the new interior surfaces as required by the Engineer. Minimum thickness of one-half (½) inch is required.

7. Application shall be with low velocity, continuous flow equipment to prevent the adverse effects of rebound. A smooth trowel finish shall be applied.
8. The Contractor shall prohibit debris from entering the invert by either covering the invert or plugging during application.

E. Digital Photographs

1. The Contractor shall take a digital photograph of the interior of each manhole, before and after rehabilitation, in JPEG format. Filenames shall contain subarea and manhole designations (e.g. "G-05A-001"). Digital photographs shall have a minimum resolution of 10 megapixels.

3.06 EPOXY LINER:

- A. The application of an epoxy liner to the interior of the sewer manholes shall be conducted only after all other manhole rehabilitations have been completed. When the epoxy lining is applied over the cementitious mortar, as indicated on the contract drawings, the epoxy shall form an interlocking bond to the cementitious mortar and conform to the manufacturer's specifications to prevent delaminating powders forming during hydration. To allow for adequate curing of the cementitious lining, a minimum of twenty four (24) hours shall elapse between the application of the cementitious mortar and the epoxy lining. No additional payment shall be made for cementitious lining prior to applying the epoxy lining.
- B. Unless otherwise indicated herein, the Contractor shall carry out all work as described in the current edition of the PROTECTION OF UNDERGROUND CONCRETE AND MASONRY STRUCTURES AND MANHOLES (As provided by Raven Lining Systems) of NASSCO Recommended Specifications for Sewer Collection System Rehabilitation using lining materials and procedures accepted by the Engineer.
- C. The manhole surface must be clean and structurally sound prior to the application of the epoxy liner. Surfaces must be entirely free of oil, grease, paint, detergent, rust, surface water, or other surface contaminants. After the cementitious mortar has been applied to the manhole, and more that 24-hours has elapsed, the Engineer shall determine if the surface is properly prepared for the application of the epoxy liner. The Engineer may require the Contractor to perform an additional pressure wash of the manhole, without harming the cementitious liner, to reach optimal surface conditions for the epoxy liner. All pressure washing shall be completed at no additional cost to the Owner.
- D. The epoxy liner shall not be placed on a frozen surface or during freezing weather. The epoxy coating materials are to be stored and applied between 50 degrees Fahrenheit and 90 degrees, Fahrenheit and shall be handled in accordance to their material data sheets.

- E. Pipes and/or service connections shall be temporarily plugged prior to the application of the epoxy interior liner. Temporary plugs shall be removed once the liner has cured sufficiently to prevent erosion of the new liner.
- F. Application procedures shall conform to the epoxy coating manufacturer, including material handling, mixing, environmental controls during application, safety, and spray equipment. The spray equipment shall be specifically designed to accurately ratio and apply the specified epoxy coating materials.
- G. Where indicated on the drawings, specified surfaces shall be sprayed with the epoxy coating to achieve a void free film consisting of one (1) coat wet film thickness of 100 mils. During the application a wet film thickness gauge meeting ASTM D4414 shall be used to ensure a monolithic coating and uniform thickness during the application. Manhole corbels, walls, benches and inverts shall be sprayed with the epoxy coating.
- H. After the epoxy coating has set hard to the touch, it shall be inspected with high-voltage holiday detection equipment. An induced holiday shall be made onto the coated concrete surface and shall serve to determine the minimum/maximum voltage to be used to test the coating for holidays at that particular area. The spark tester shall be initially set at 100 volts per 1 mil (25 microns) of minimum film thickness applied but may be adjusted as necessary to detect the induced holiday. All detected holidays shall be marked and repaired by abrading the coating surface with grit paper or other hand tooling methods. After abrading and cleaning, additional epoxy coating material can be hand applied to the repair area. All touch-up procedures shall follow the epoxy coating manufacturer's recommendations.
- I. A final visual inspection shall be made by the ENGINEER and the CONTRACTOR. Any deficiencies in the finished coating shall be marked and repaired.
- J. The Contractor shall prohibit debris from entering the invert by either covering the invert or plugging during application.
- K. Epoxy coated structures shall be allowed to cure for a minimum of three (3) days prior to reinstating sewer service.

3.07 BUILD MANHOLE BENCH AND INVERT:

- A. Existing manhole bench and invert (including debris, deteriorated brick, block, and mortar) shall be removed and disposed of.
- B. Bricks shall be moistened by suitable means, as required, until they are neither so dry as to absorb water from the mortar nor so wet as to be slippery when laid.
- C. Each brick shall be laid as a header in a full bed and joint of mortar without requiring subsequent grouting, flushing or filling, and shall be thoroughly bonded as required.

- D. Channels and shelves shall be constructed of brick and concrete as shown on the Drawings. The brick lined channels shall correspond in shape with the lower half of the pipe. The top of the shelf shall be set at the elevation of the crown of the highest pipe and shall be sloped 1 inch per foot to drain toward the flow through channel. Brick surfaces exposed to sewage flow shall be constructed with a nominal 2-inch by 8-inch face exposed (i.e. bricks on edge).
- E. Bench and invert shall be constructed to allow television inspection camera and rehabilitation equipment to be inserted into the adjacent sewers.

3.08 FIELD TESTING/INSPECTION:

- A. Prior to the expiration of the warranty period, the Contractor shall inspect each of the sewer manholes rehabilitated during this project in accordance with the Performance Specification Guideline for Manhole Rehabilitation (NASSCO) at a timetable to be approved by the Engineer. The Contractor shall repair any defects found until there are no visible leaks.
- B. All inspecting, testing, and reworking within the warranty period shall be provided at no additional cost to the Owner.

END OF SECTION

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SECTION 02437

SEWER LINE AND MANHOLE CHEMICAL ROOT TREATMENT

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. This Section covers chemical root treatment of sewer lines and manholes as called for herein and on the drawings. The work includes furnishing all equipment, material and labor required to perform the services described herein.

1.02 RELATED WORK:

- A. Section 00331, TELEVISION INSPECTION LOGS
- B. Section 00890, PERMITS
- C. Section 01014, SCOPE AND SEQUENCE OF WORK
- D. Section 01330, SUBMITTALS
- E. Section 01331, DOCUMENTATION
- F. Section 01575, HANDLING EXISTING FLOWS
- G. Section 02435, SEWER MANHOLE REHABILITATION
- H. Section 02440, SEWER CLEANING, INSPECTION, TESTING AND SEALING

1.03 QUALITY CONTROL:

- A. The work described herein shall be performed by a company with not less than five (5) years of experience in providing the required services, employing experienced workers and experienced supervisory personnel. Supervisory personnel shall have not less than three (3) years of experience in providing the required services and shall be present at the jobsite during all work related to the required services.

1.04 REFERENCES:

- A. The following standards form a part of this specification as referenced:

The National Association of Sewer Service Companies (NASSCO)

Sewer Line Chemical Root Control – Technical Specifications (Duke’s Root Control)
Foaming Root Control Herbicide – Technical Specifications (Vaporooter)

1.05 SYSTEM DESCRIPTION:

- A. Unless otherwise indicated herein, chemical root treatment of the specified lengths of pipe and manholes shall be carried out in accordance with Foaming Root Control Herbicide – Technical Specifications (Vaporooter) of the NASSCO Specification Guidelines.
- B. The Contractor may propose alternative processes and/or products for review and approval by the Engineer.

1.06 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF SECTION 01330 SUBMITTALS, SUBMIT THE FOLLOWING:

- A. Prior to beginning the work, submit the following:
 - 1. Qualifications of the firm/personnel who will perform the work.
 - 2. Description of system proposed for handling existing flows, if necessary, during the procedures to be carried out.
 - 3. Description of the system, equipment and material proposed for root treatment and cleaning of the pipe and manholes, including MSDS Data Sheets for all chemicals intended to be used.
 - 4. Manufacturer's warranty.
- B. Refer to Section 01331, DOCUMENTATION, for required documentation to be submitted.

1.07 WARRANTY:

- A. The Contractor shall provide a written guarantee that meets or exceeds any claims or warranties made by the manufacturer in published advertising. As a minimum, the Contractor shall guarantee that, prior to scheduled cleaning, virtually all root tissue present in the sewer pipe will be dead or unable to sustain life.

PART 2 - PRODUCTS

2.01 ROOT TREATMENT MATERIALS:

- A. The chemical root treatment material shall be EPA registered and labeled for use in sewer lines and acceptable to the state agencies having jurisdiction over its use. The Contractor shall submit a specimen product label of the material to be used in chemical root treatment to the Engineer. The chemical root treatment material shall not permanently affect parts of trees distant from the treated roots.
- B. Materials shall meet the requirements of the Foaming Root Control Herbicide – Technical Specifications (Vaporooter) of the NASSCO Specification Guidelines.

PART 3 - EXECUTION

3.01 ROOT TREATMENT:

- A. The Contractor shall carry out all preparatory work, including flow control, and apply root treatment as described in the Foaming Root Control Herbicide – Technical Specifications (Vaporooter) of the NASSCO Specification Guidelines, using treatment materials accepted by the Engineer.

3.02 ROOT CLEANING:

- A. Root cleaning shall be carried out under Section 02440, SEWER CLEANING, INSPECTION, TESTING AND SEALING.

END OF SECTION

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SECTION 02440

SEWER CLEANING, INSPECTION, TESTING AND SEALING

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. This section covers cleaning, inspection, testing and sealing of pipelines as called for herein and on the drawings. The work includes furnishing all equipment, material and labor required to perform the services described herein. The sewer lines were previously cleaned and televised. The television inspection logs are included as **Appendix __** for reference.

1.02 RELATED WORK:

- A. Section 00331, TELEVISION INSPECTION LOGS
- B. Section 01014, SCOPE AND SEQUENCE OF WORK
- C. Section 01330, SUBMITTALS
- D. Section 01331, DOCUMENTATION
- E. Section 01575, HANDLING EXISTING FLOWS
- F. Section 02428, CURED-IN-PLACE PIPE
- G. Section 02437, SEWER LINE AND MANHOLE CHEMICAL ROOT TREATMENT
- H. Section 02443, SERVICE CONNECTION REHABILITATION

1.03 QUALITY CONTROL:

- A. The work described herein shall be performed by a company with not less than five (5) years of experience in providing the required services, employing experienced workers and experienced supervisory personnel. Supervisory personnel shall have not less than three (3) years of experience in providing the required services and shall be present at the jobsite during all work related to the required services.

1.04 REFERENCES:

- A. The following standards form a part of this specification as referenced:

The National Association of Sewer Service Companies (NASSCO)

Suggested Standard Specification for Pressure Testing and Grouting of Sewer Joints, Laterals and Lateral Connections (Using the Packer Method with Solution Grouts)

ASTM International (ASTM)

ASTM F2304 Standard Practice for Rehabilitation of Sewers Using Chemical Grouting

1.05 SYSTEM DESCRIPTION:

- A. Unless otherwise indicated herein, the pipe cleaning, inspection, testing and sealing of the specified length of pipe shall be carried out in accordance with Section 3, Execution, of the latest edition of NASSCO Suggested Standard Specification for Pressure Testing and Grouting of Sewer Joints, Laterals and Lateral Connections (Using the Packer Method with Solution Grouts). Sewer flow control shall comply with Section 01575, HANDLING OF EXISTING FLOWS. Sealing materials shall comply with Part 2, Products, of the NASSCO Suggested Standard Specification for Pressure Testing and Grouting of Sewer Joints, Laterals and Lateral Connections (Using the Packer Method with Solution Grouts).
- B. The Contractor may propose alternative processes and/or products for review and approval by the Engineer.

1.06 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF SECTION 01330 SUBMITTALS, SUBMIT THE FOLLOWING:

- A. Prior to beginning work, submit the following:
 - 1. Qualifications of the firm/personnel who will perform the work.
 - 2. Description of system proposed for handling existing flows during the various procedures to be carried out.
 - 3. Description of the system and equipment proposed for cleaning the pipe.
 - 4. Description of the equipment and system proposed for inspecting the pipe after cleaning.
 - 5. Description of the equipment and system proposed for testing the joints.
 - 6. Description of the equipment, the sealing compound and the system proposed for sealing selected joints and circular cracks.
 - 7. Manufacturer's warranty.
 - 8. Submit MSDS for the sealing compound to be used.

- B. Refer to Section 01331, DOCUMENTATION for required documentation to be submitted.

1.07 WARRANTY:

- A. The joint and circular crack sealing shall be warrantied for one year after the project is accepted by the Owner.

PART 2 - PRODUCTS

2.01 CLEANING AND SEALING MATERIALS:

- A. The Contractor shall use a chemical grout which is environmentally safe for the sealing of sewers. The chemical sealing materials shall be in accordance with Part 2, Products, of the NASSCO Suggested Standard Specification for Pressure Testing and Grouting of Sewer Joints, Laterals and Lateral Connections (Using the Packer Method with Solution Grouts)s. All other products used for sealing, patching and cleaning of sewers shall also be environmentally safe.
- B. The chemical sealing material shall be EPA registered and labeled for use in sewer lines and acceptable to the State Agencies having jurisdiction over its use.
- C. The Contractor shall submit MSDS data sheets for all materials used.

PART 3 - EXECUTION

3.01 PIPE CLEANING:

- A. Chemical root treatment, where required, shall be applied under Section 02437, SEWER LINE AND MANHOLE CHEMICAL ROOT TREATMENT before the cleaning operation is carried out. Sufficient time shall be allowed between the two operations as described in SEWER LINE CHEMICAL ROOT TREATMENT (FOAMING METHOD) of the NASSCO Standard Specifications.
- B. The Contractor may elect to use either high velocity jet, or mechanically powered equipment, as described in the NASSCO Suggested Standard Specification for Pressure Testing and Grouting of Sewer Joints, Laterals and Lateral Connections (Using the Packer Method with Solution Grouts). Selection of equipment shall be based upon field conditions such as access to manholes, quantity of debris, size of sewer, depth of flow, etc.
- C. All sludge, dirt, sand, rocks, grease, and other solid or semisolid material resulting from the cleaning operation shall be disposed of in accordance with all applicable regulations and in a method acceptable to the Owner. Pipe cleaning shall be performed in advance of pipe television inspection.

- D. The Contractor shall be responsible for the legal disposal of all debris removed from the sewers during the cleaning operation including any costs incurred. The Contractor shall not expect the Owner to provide a dump site.
- E. Acceptance by the Engineer of the cleaning results will be based on the results of television inspection. If the results are unsatisfactory, the Contractor shall repeat the cleaning until accepted by the Engineer at no additional cost to the Owner.

3.02 PIPE INSPECTION:

- A. Pipe shall be visually inspected by means of closed-circuit television. The television camera used for the inspection shall be one specifically designed and constructed for such inspection. Lighting for the camera shall be suitable to allow a clear picture, with minimal reflective glare, for the entire periphery of the pipe. The camera shall be operative in 100% humidity conditions. The camera, television monitor and other components of the video system shall be capable of producing a minimum 400 line resolution color video picture. Picture quality and definition shall be to the satisfaction of the Engineer.
 - 1. Refer to Section 01331, DOCUMENTATION, in regard to external hard drives to be given to the Owner upon completion of project and before the project is accepted by the Owner.
- B. The camera shall have a remote controlled, pan and tilt type lens and lighting system capable of turning perpendicular to the direction of flow and rotating 360 degrees while inside the pipe. The camera shall be able to view a minimum service connection length of 4 feet in order to determine whether the connection is active or inactive.
- C. Electronic video equipment shall be capable of displaying and recording during the entire inspection, as a minimum, the following data for each sewer reach videotaped:
 - 1. Project identification
 - 2. Date recorded
 - 3. Sewer reach identification (street location, MH to MH)
 - 4. Footage counter
- D. The camera shall be moved through the line in either direction at a uniform rate, stopping when necessary to ensure proper identification of the sewer's condition. Manual winches, power winches, television cable and powered rewinds or other devices that do not obstruct the camera view or interfere with proper documentation of the sewer conditions shall be used to move the camera through the sewer line. If, during the inspection operation the television camera will not pass through the entire sewer section, the Contractor shall re-set its equipment in a manner so that the inspection can be performed from the opposite manhole.
- E. Flow control shall be in accordance with Section 01575, HANDLING OF EXISTING FLOWS.

- F. Standing water within a sagging pipe shall be removed so that the pipe can be adequately television inspected. A minimum of 80% of the pipe shall be visible before television inspection.
- G. Removal of obstruction caused by protruding taps shall be in accordance with Section 02443, SERVICE CONNECTION REHABILITATION.
- H. Television inspection shall be performed in advance of pipe joint testing, sealing, pipe repair and pipe lining activities.

END OF SECTION

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SECTION 02442

POINT REPAIR OF GRAVITY SEWERS
(OPEN-CUT)

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. This Section covers the point repair of gravity sewers using open cut construction methods. The Work includes furnishing all equipment, material and labor required to point repair a sewer pipe section as described herein.
- B. A point repair shall be identified as a repair made at a specified location on a sanitary sewer line. The point repairs are identified on the drawings; see the television inspection logs for additional information.

1.02 RELATED WORK:

- A. Section 01575, HANDLING EXISTING FLOWS
- B. Section 01740, CLEANING UP
- C. Section 02085, POLYVINYL CHLORIDE GRAVITY PIPE AND FITTINGS
- D. Section 02252, SUPPORT OF EXCAVATION
- E. Section 02300, EARTHWORK
- F. Section 02533, CONNECTION TO EXISTING STRUCTURES
- G. Section 02745, PAVING
- H. Section 02920, LOAMING and SEEDING

1.03 QUALITY CONTROL:

The Work described herein shall be performed by a company with not less than two years of experience in providing the required services, employing experienced supervisory personnel.

1.04 REFERENCES:

The following standards form a part of this specification as referenced:

The National Association of Sewer Service Companies (NASSCO) Specifications
Guidelines for Sewer Collection System Maintenance & Rehabilitation.

1.05 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF SECTION 01330
SUBMITTALS, SUBMIT THE FOLLOWING:

Prior to beginning the Work, submit the following:

1. Qualifications of the firm/personnel who will perform the Work.
2. Description of system proposed for handling existing flows, if necessary.
3. Description of the system, equipment and material proposed, including the source and name of manufacturer.
4. Specifications and Data Sheets of all materials to be used, including a list of applicable ASTM standards.
5. Material and structural details of the point repair method proposed, including typical cross-sections and strength calculations.

PART 2 - PRODUCTS

2.01 GENERAL:

All workmanship and materials used for making point repairs shall be of the highest quality. The materials shall be the products of a manufacturer actively engaged in research, development and manufacturing of said materials.

2.02 REPAIR PIPE:

The repair pipe shall be POLYVINYL CHLORIDE GRAVITY PIPE as specified in Section 02085. The inside diameter of the replacement pipe size shall be the same as the existing pipe.

2.03 JOINT MATERIALS:

When connecting together joints of plain-end spigot pipe, suitable adaptors shall be used for joining dissimilar pipe materials. The adapters shall be Fernco Couplings, or approved equal. All materials shall pass the strength and chemical requirements of current ASTM requirements. Adapters and methods of connecting pipes shall be approved by the Engineer. The Contractor shall submit to the Engineer descriptive literature and materials on the adaptors and connection method it proposes to use.

2.04 BUILDING CONNECTIONS:

Any building connection replaced during a point repair shall conform to pipe manufacturer's recommendations and specifications and applicable ASTM specifications, for furnishing and installing the building connection. The connection materials shall be similar to the connecting sewer pipe.

2.05 SEALING OPEN JOINTS:

Any open joint to be sealed during a point repair shall be yarned, wiped and encased with concrete. The encasement shall be centered on the joint, have a minimum thickness of six (6) inches of concrete, and have a minimum length equal to the pipe diameter, but not less than twelve (12) inches. Any alternative method for sealing open joints shall be submitted to the Engineer for approval.

PART 3 - EXECUTION

3.01 SAFETY:

The Contractor shall perform all work in strict accordance with all applicable OSHA standards. Particular attention is drawn to those safety requirements regarding confined space entry.

3.02 POINT REPAIR METHOD:

The method by which the point repair shall be made shall include all supervision, labor, equipment and materials necessary to perform and successfully complete the following items of work:

1. Excavate a trench deep enough to uncover the gravity sewer line and wide enough and long enough to work in, in accordance with the latest OSHA requirements.
2. Remove any existing fences, base material, storm sewers, water mains, and other items that interfere with the repair made at each specific point, and replace the fences, base material, storm sewers, water mains, and other removed items in the same or better condition than found, as determined by the Engineer.
3. Replace and reshape the bottom of the trench so that the grade of the pipe replaced will match that required for the existing sewer line. Any material replaced in the bottom of the trench shall be tamped so as to prevent sags in the sewer line due to settlement of trench material. If the material in the bottom of the trench is not stable, the Contractor shall stabilize the trench bottom by placing suitable materials at the request of the Engineer.
4. Repair and replace the section of damaged sewer identified in Appendix A herein. The damaged section of pipe shall be removed and a replacement section of PVC pipe shall be spliced in its place, using Fernco couplings at each end of the splice.

5. Repair and replace any service wye or tee encountered within the required point repair, or any service wye or tee connection or service line judged to be a source of infiltration/inflow by the Engineer. All service lines broken by the Contractor shall be replaced by the Contractor at its expense.
6. Seal open joints exposed within the pipe excavation, where the barrel of the pipe is still satisfactory but the joints are not. Any roots in open joints shall be removed before sealing. Determination as to whether or not roots exist shall be made by the Engineer. The materials to use when sealing open joints are listed in subsection 2.05.
7. Connect all newly laid sewer pipe to existing pipe, and main sewer lines to services, so that no possible source of infiltration/inflow (a leak in the line) may be created. When applicable, the main sewer line shall be cut so that a smooth plain-end spigot exists at both ends of the trench and connected, as specified in subsection 2.03. The materials used to make the tie-ins shall be properly sized as specified in section 2.01. Any sewer pipe broken by the Contractor shall be replaced at the Contractor's expense. All such occurrences shall be pointed out to the Engineer.
8. Backfill the excavation, and replace the trench pavement as specified in Section 02745, so that the finished elevation will match the natural ground elevation and no ponding will occur after the backfilled material has settled.
9. Clean up the area as specified in Section 01740 CLEANING UP.

3.03 ABANDONMENT:

- A. If a decision is made by the Engineer in the field that a point repair will not satisfactorily correct the problem, or if the Contractor excavates at the required location and does not find the source of the problem, the Engineer shall verify the condition, declare the point repair to be abandoned and the excavation shall be backfilled.
- B. At such time as the point repair has been declared abandoned, the Engineer shall determine how to proceed or whether to reclassify the sewer line for further investigation.

3.04 FIELD JUDGEMENTS:

At any time during a point repair, the Engineer shall make field judgements which shall govern the point repair process until such time that the specifications will again prevail. Field judgements shall include the following situations and any other questionable situation that may arise:

1. Determination of the length of sewer pipe to repair.
2. Determination of method of payment for additional work outside the original point repair area.

3. Determination of dewatering requirements.
4. Determination of abandonment.
5. By-pass pumping of sewage.
6. Determination of the amount of asphalt, concrete driveway, curb or sidewalk, or any other surface feature to be replaced.

3.05 BY-PASS PUMPING:

On all point repairs, the normal flow of sewage shall be re-routed by by-pass pumping so as not to interrupt the flow of sewage to the treatment plant. By-pass pumping shall be as specified in Section 01575 HANDLING OF EXISTING FLOWS.

3.06 RESTORATION:

- A. The Contractor shall replace all streets, roadways, sidewalks, and driveways which may be removed, disturbed, or damaged in connection with its operation under this Contract. The Contractor shall reconstruct same to the original lines and grades and in such a manner as to leave all such surfaces in fully as good or better condition than that which existed prior to its operations. The re-use of materials removed in making excavations will be permitted in the manner described, provided said materials are in good condition and are acceptable to the Engineer.
- B. In easements and other unpaved areas, the Contractor shall return the area as close as is practicable to its original condition to the satisfaction of the Engineer, at no additional cost to the Owner.

3.07 INSPECTION

- A. Prior to the end of the warranty period, the section of pipe where the point repair is located shall be television inspected for defects in accordance with Section 02440, SEWER CLEANING, INSPECTION, TESTING, AND SEALING.

END OF SECTION

SECTION 02443

SERVICE CONNECTION REHABILITATION

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. This Section covers the rehabilitation of service connections, including cutting of protruding services, television inspection and testing of services, and grouting of services as called for herein and on the drawings. The work includes furnishing all equipment, material and labor required to perform the services described herein.

1.02 RELATED WORK:

- A. Section 00331, TELEVISION INSPECTION LOGS
- B. Section 01014, SCOPE AND SEQUENCE OF WORK
- C. Section 01330, SUBMITTALS
- D. Section 01331, DOCUMENTATION
- E. Section 01575, HANDLING EXISTING FLOWS
- F. Section 02428, CURED-IN-PLACE PIPE
- G. Section 02431, GLASS REINFORCED PLASTIC CURED-IN-PLACE PIPE
- H. Section 02440, SEWER CLEANING, INSPECTION, TESTING AND SEALING

1.03 QUALITY CONTROL:

- A. The work described herein shall be performed by a company with not less than five (5) years of experience in providing the required services, employing experienced workmen and experienced supervisory personnel. Supervisory personnel shall have not less than three (3) years of experience in providing the required services and shall be present at the jobsite during all work related to the required services.

1.04 REFERENCES:

- A. The following standards form a part of this specification as referenced:

The National Association of Sewer Service Companies (NASSCO)

Suggested Standard Specification for Pressure Testing and Grouting of Sewer Joints, Laterals and Lateral Connections (Using the Packer Method with Solution Grouts)

ASTM International (ASTM)

ASTM F2454 Standard Practice for Sealing Lateral Connections and Lines from the Mainline Sewer Systems by the Lateral Packer Method, Using Chemical Grouting

1.05 SYSTEM DESCRIPTION:

- A. Unless otherwise indicated herein, service connection rehabilitation shall be carried out in accordance with Lateral Connection Sealing from the Mainline by Packer Injection Grouting, Section 3.10, of the NASSCO Suggested Standard Specification for Pressure Testing and Grouting of Sewer Joints, Laterals and Lateral Connections (Using the Packer Method with Solution Grouts).
- B. The Contractor may propose alternative processes and/or products for review and approval by the Engineer.
- C. The location of the service connection rehabilitations are indicated on the drawings.

1.06 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF SECTION 01330 SUBMITTALS, SUBMIT THE FOLLOWING:

- A. Prior to beginning the work, submit the following:
 - 1. Qualifications of the firm/personnel who will perform the work.
 - 2. Descriptions of system proposed for handling existing flows, if necessary, during the procedures to be carried out.
 - 3. Description of the system, equipment and material proposed for the service connection rehabilitations.
 - 4. Manufacturer's warranty.
 - 5. Submit MSDS Data Sheets for proposed chemicals to be used.
- B. Refer to Section 01331, DOCUMENTATION, for documentation required to be submitted.

1.07 WARRANTY:

- A. The service connection rehabilitations shall be warrantied against infiltration and faulty workmanship and materials for one year from the date the project is accepted by the Owner.

PART 2 - PRODUCTS

2.01 CHEMICAL GROUT:

- A. The Contractor shall use chemical grout which is environmentally safe for the sealing of sewers. The chemical sealing materials shall be used in accordance with Part 2, Products, of the latest edition of NASSCO Suggested Standard Specification for Pressure Testing and Grouting of Sewer Joints, Laterals and Lateral Connections (Using the Packer Method with Solution Grouts). All other products used for sealing, patching and cleaning of sewers shall also be environmentally safe.

PART 3 - EXECUTION

3.01 PIPE CLEANING AND INSPECTION:

- A. Pipe cleaning and inspection shall be carried out in accordance with Section 02440, SEWER CLEANING, INSPECTION, TESTING AND SEALING.

3.02 FLOW CONTROL:

- A. Flow control, if required, shall be in accordance with Section 01575, HANDLING EXISTING FLOWS.

3.03 CUTTING OF PROTRUDING SERVICE CONNECTIONS:

- A. The Contractor shall cut protruding service connections where called for on the drawings. The protruding services shall be cut flush with the wall of the sewer, using either a lateral cutter or grinder.
- B. After the protruding services are cut, the service connections shall be grouted in accordance with paragraph 3.06 of this Section. No additional payment shall be made for grouting service connections.

3.04 EQUIPMENT TESTING:

- A. The Contractor shall perform an above ground demonstration test in a test cylinder with the same diameter as the proposed pipe being tested to simulate a pipe leak. The setup shall have a valve and pressure gauge to simulate leaks and monitor pressure. The tests shall be performed in accordance with the latest edition of ASTM F2454, Standard Practice for Sealing Lateral Connections and Lines from the Mainline Sewer Systems by the Lateral Packer Method, Using Chemical Grouting, Section 11.3.3, Initial Testing.

- B. The pressure displayed by the testing equipment shall be within ± 0.5 psi of the gauge pressure to pass successfully. The void pressure should drop to within ± 0.5 psi of the pre-test pressure displayed by the testing equipment after the pressure is released to pass successfully. Test pressures shall be between 7 and 10 psi.
- C. If the demonstration test cannot be performed successfully, the Contractor shall repair or modify the equipment and perform the test again until the results are satisfactory to the Engineer
- D. The Contractor shall perform the demonstration test for each chemical sealing unit prior to the equipment being used on the Project. Additional tests may be required by the Engineer at various times during the Project.

3.05 TELEVISION INSPECTION AND TESTING OF SERVICE CONNECTIONS:

- A. The Contractor shall television inspect and test service connections where called for on the drawings. Television inspection of services shall utilize a pan and tilt camera which shall inspect a minimum of 4 feet of the service connection from the main sewer.
- B. Pressure Testing: Air testing is accomplished by isolating the area to be tested with the packer and applying positive pressure into the isolated VOID area. VOID area shall include a minimum 3 feet of service connection pipe.
- C. Pressure testing shall be carried out in accordance with Section 3.7, Lateral Connection Testing Procedure, of the latest edition of NASSCO Suggested Standard Specification for Pressure Testing and Grouting of Sewer Joints, Laterals and Lateral Connections (Using the Packer Method with Solution Grouts).
- D. Pressure testing shall be equal to 0.5 psi per vertical foot of pipe depth plus 2 psi; however, test pressure shall not exceed 10 psi. Once the designated pressure in the isolated void is displayed on the meter of the control panel, the application of air pressure will be stopped and a 15 second waiting period will commence. If the void pressure drop is greater than 2.0 psi within 15 seconds, the lateral shall be considered to have failed the air test.
- E. The television inspection and testing equipment shall be capable of inspecting and testing 4-inch, 5-inch and 6-inch diameter service connections.
- F. If the service fails the pressure test, the service shall be grouted in accordance with paragraph 3.06 of this Section and retested.

3.06 GROUTING OF SERVICE CONNECTIONS:

- A. The Contractor shall grout service connections where indicated on the drawings or when a service fails the pressure test, as described in paragraph 3.05 of this Section. The Contractor shall grout all service connections reinstated as described in Section 02428, CURED-IN-PLACE PIPE or Section 02429, CURED-IN-PLACE SHORT LINER,

regardless of the results of the pressure test. Grouting of service connections shall be carried out in accordance with Section 3.10, Lateral Connection Sealing from the Mainline by Packer Injection Grouting, of the NASSCO Suggested Standard Specification for Pressure Testing and Grouting of Sewer Joints, Laterals and Lateral Connections (Using the Packer Method with Solution Grouts).

- B. When pumping grout commences, operate the pump until a minimum back pressure of 8 psi is achieved.
- C. The grouting equipment shall be capable of grouting 4-inch, 5-inch and 6-inch diameter service connections.
- D. The chemical sealing materials shall be as described in Part 2, Products of the latest edition of NASSCO Suggested Standard Specification for Pressure Testing and Grouting of Sewer Joints, Laterals and Lateral Connections (Using the Packer Method with Solution Grouts).
- E. If a service connection becomes clogged with grout, the Contractor shall clear the grout from the lateral. This work shall be done at no additional cost to the Owner.

3.07 FIELD TESTING/INSPECTION:

- A. Prior to the expiration of the warranty period, an initial test sample of approximately 10% of the original service connection rehabilitation work will be selected and approved by the Engineer. The test sample will consist of manhole sections from throughout the project area that are representative of the sealing work originally performed. The Contractor shall television inspect and test all previously grouted service connections within the initial test sample as specified in paragraph 3.05 of this Section. Any service connections failing the re-test shall be re-grouted as specified in paragraph 3.06 of this Section. If the failure rate in the initial test sample is less than 10%, the work will be considered satisfactory and no further testing will be required.
- B. If the failure rate in the initial test sample equals or exceeds 10%, an additional 15% test sample will be selected and approved by the Engineer. If the failure rate in the additional test sample is less than 10%, the work will be considered satisfactory and no further testing will be required. No previously tested service connection can be included in the additional test sample.
- C. If the failure rate in the additional test sample equals or exceeds 10%, the Contractor shall television inspect and test 100% of the service connections.
- D. Any remaining service connection rehabilitation work not television inspected and tested as part of a test sample shall be television inspected. The Contractor shall repair any defects found and shall re-grout the services until there are no visible leaks through television inspection.

- E. Television inspecting, testing, and re-grouting of service connections shall be performed prior to the expiration of the warranty period, during periods of high groundwater and at a time to be approved by the Engineer.
- F. All inspecting, re-testing, and re-grouting shall be provided at no additional cost to the Owner and shall be completed within the warranty re-test period.

END OF SECTION

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SECTION 02511

TEMPORARY WATER SERVICE

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. The Contractor shall furnish, install, maintain, and remove temporary water service pipe of the size required from which connections shall be made to all water customers. The temporary water system shall consist of mains, services and fire department outlets adequately sized to provide uninterrupted water and fire service to all water customers. Temporary service pipe shall not be installed without prior approval of the Engineer.
- B. The Contractor shall do all excavating for connections of temporary service pipes to existing live water mains and services, make and maintain all such connections and reinstate them to the new water main upon completion of the required disinfection and testing. The Contractor shall also furnish, install, maintain, connect, disconnect, and remove individual temporary service lines to all water customers.

1.02 REFERENCES:

The following standard forms a part of this specification, as referenced:

American Water Works Association (AWWA)

AWWA C651 Disinfecting Water Mains

1.03 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF THE GENERAL SPECIFICATIONS, SUBMIT THE FOLLOWING:

Shop drawings shall consist of manufacturer's scale drawings, cuts, or catalogs including descriptive literature. Shop drawings shall be submitted for the pipe, type of joint, fittings, couplings, and valves. A plan of the temporary bypass system, showing location and size of all pipelines, services and fire department outlets, shall be submitted to the Engineer for review prior to installation of the bypass system.

PART 2 - PRODUCTS

- 2.01 The temporary service pipe, connections, and branches shall be of the highest quality and shall be fully adequate to withstand the pressures and all conditions of use. The temporary service shall be made of fused-joint HDPE, steel or PVC suitable for above-ground use. The installation shall be watertight.

PART 3 - EXECUTION

3.01 RESPONSIBILITIES:

- A. Before starting any work that will affect service to customers, the Contractor shall notify the Owner at least 48 hours in advance to allow the time to notify the customers accordingly.
- B. The Owner shall shut off curb stops or pull water meters on individual services after the Contractor has installed temporary services to the satisfaction of the Engineer and prior to the Contractor starting work which will affect service to customers.
- C. The Contractor shall be responsible for all repairs and maintenance required to the temporary services, regardless of reason for temporary service pipe failure. The Contractor shall immediately repair and/or replace any leaking or faulty temporary service pipe as ordered by the Engineer. If the Contractor is unable to repair leaking or faulty temporary service pipe in what the Owner determines is a timely fashion, the Owner shall provide the repairs directly and be reimbursed by the Contractor for time and expenses for the work performed.
- D. The work of providing suitable safety precautions to prevent any interruptions of water service during the temporary service period, including taking any steps necessary to prevent freezing, shall be the responsibility of the Contractor. If freezing does occur, the Contractor shall thaw the lines, make any necessary repairs, and promptly restore temporary service.
- E. Before placing the temporary water pipe into service, a representative from the local Fire Department shall inspect any connections to existing fire hydrants, the placement of emergency fire connections, and shall be familiar with the operation of the emergency fire connections. The Contractor shall make any adjustments to the layout of the temporary water piping and hydrants requested by the local Fire Department. The Contractor shall provide any tools required to operate the emergency fire connections to the Fire Department. The Fire Department shall be contacted at least 48 hours in advance of placing the temporary water pipe into service

3.02 INSTALLATION:

- A. Generally, temporary service pipe shall be laid in gutters or several feet back from the edge of pavement. At driveways, crossings over the pipe shall be made by hot-mix pavement berm, wood or rubber mat ramp or other approved method. At street intersections and road crossings, pipe shall be laid in a shallow trench covered with temporary surfacing.
- B. All service pipe shall be suitably valved to meet the approval of the Engineer. Line valves shall be located at all intersecting streets but no further than 1,000 feet apart.

- C. Suitably threaded 2-1/2-inch valved emergency fire connections shall be installed and maintained adjacent to each fire hydrant which is scheduled to be out of service. Hydrant nozzle caps shall be placed on all emergency fire connections.
- D. Temporary connections to live hydrants or water mains shall be of the same size as the temporary pipe that they feed. No restrictions or reduction in size will be allowed.
- E. All hydrants that are out of service shall be covered with burlap bags, securely held in place.
- F. The Contractor shall be responsible for all consumer connections. The connection shall be made via a temporary hose from the temporary main to a suitable location in the house; via a temporary pipe or hose from the temporary main to the meter pit, if one exists; or by making a below-ground connection at the street edge to the existing service (for services greater than 2-inch in size).
- G. The Owner shall enter all private property and assist the Contractor in making or removing temporary service connections. The Contractor shall notify the Owner at least 48 hours in advance so that personnel may be available when required.
- H. All service connections shall be valved at the temporary service pipe.
- I. See Section 02745 - PAVING, for both temporary and permanent paving over the temporary service pipe trench.
- J. The temporary water main driveway crossings shall have compacted gravel placed on top for a smooth transition which will be maintained during the entire duration of the temporary water main.
- K. The temporary water main roadway crossings shall be set below grade and covered with temporary hot asphalt which will be maintained during the entire duration of the temporary water main.

3.03 DISINFECTING AND FLUSHING:

- A. The Contractor shall disinfect the temporary mains and services carrying temporary water.
- B. The Contractor shall furnish all equipment and materials necessary to do the work of disinfecting, and shall perform the work in accordance with the procedure outlined in AWWA C651 and all amendments thereto.
- C. In general, the procedure of disinfecting the main shall be to apply the chlorine through a tap in one end of the section and bleed off through a tap at the other end.
- D. The applied dosage shall be such as to produce a chlorine concentration of not less than 10 mg/l after a contact time of not less than 24 hours.

- E. During the disinfection period, care shall be exercised to prevent contamination of water in existing mains.
- F. Any temporary connection to the mains or other facilities required to accomplish the disinfection of the mains as described below, shall be at the Contractor's expense.
- G. After treatment, the main shall be flushed with clean water until the residual chlorine concentration is less than 0.2 mg/l.
- H. The Contractor shall dispose of the water used in disinfecting and flushing in an approved manner.
- I. Bacteriological sampling and testing shall be done by the Contractor in accordance with AWWA C651 for each main and each branch. Sampling shall be accomplished with sterile bottles treated with sodium thiosulfate, as required by Standard Methods. No hose or fire hydrants shall be used in collection of samples. A corporation stop installed on the main, with a removable copper tube gooseneck assembly, is the recommended method.
- J. Testing shall be done by a laboratory approved by the Engineer, in accordance with Standard Methods, and shall show the absence of coliform organisms. A standard plate count may be required at the option of the Engineer.
- K. The Contractor shall handle all sampling and coordinating of testing of such samples through a laboratory approved by the Engineer.

END OF SECTION

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SECTION 02515

WATER SERVICE CONNECTIONS

PART 1 - GENERAL

1.01 WORK INCLUDED:

This section covers the furnishing and installation of new water service connections and the repair, replacement, and/or transfer of existing water service connections as shown on the drawings, as specified herein, and as required by the Engineer.

1.02 RELATED WORK:

- A. Section 02080, DUCTILE IRON PIPE AND FITTINGS FOR WATER MAINS

1.03 REFERENCES:

- A. The following standards form a part of this specification:

ASTM International (ASTM)

ASTM	B88	Seamless Copper Water Tube
ASTM	B584	Copper Alloy Sand Castings for General Applications
ASTM	D2737	Polyethylene (PE) Plastic Tubing

American Water Works Association (AWWA)

AWWA	C800	Water-Service Line Fittings
AWWA	C651	Disinfecting Water Mains
AWWA	C901	Polyethylene Pressure Pipe & Tubing, 1/2-inch through 3-inch for Water Service

Federal Specifications (FS)

FS	WW-T-799C	Tube, Copper, Seamless
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1.04 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF SECTION 01330 SUBMITTALS, SUBMIT THE FOLLOWING:

Manufacturer's literature of the materials of this section for review.

PART 2 - PRODUCTS

2.01 SERVICE PIPING:

- A. Piping for buried polyethylene (PE 4710) water services shall conform to ASTM D2737 and be as specified in AWWA C901. Polyethylene piping shall be designed for 200 psi minimum service and tested at 330 psi for 1,000 hours or greater. The tubing shall be copper O.D. size and be suitable for use with standard industry brass compression fittings without special adapters. Stainless steel insert stiffeners shall be provided for use with all compression joint connections. Locating tape shall be placed over polyethylene tubing before burial. Polyethylene tubing shall be sand encased.
- B. Couplings, if required, for existing to new service pipe connections shall have compression connections on the inlet and compression connections on the outlet. Couplings shall be made of brass as specified in AWWA C800. All brass components that come into contact with potable water shall be made from either CDA/UNS Brass Alloys C89520 or C89833 and shall not contain more than twenty five hundredths of one percent (0.25% or less) total lead content by weight. The lead leach limit of the coupling shall be 5 parts per billion (ppb). Couplings shall be NSF/ANSI 61 Annex F and Annex G and NSF/ANSI 372 certified by an ANSI accredited organization and shall be stamped or embossed with a mark or name indicating that the product is manufactured from a low-lead alloy, as specified above.

2.02 CORPORATION STOPS:

- A. Corporation stops shall be of brass as specified in AWWA C800. The inlet shall have AWWA taper thread (CC) connections and the outlet shall have compression connections. The operating nut shall be 3/8 inches wide by 1 1/2-inch long (no square head type). Corporation stops shall open right.

All brass components that come into contact with potable water shall be made from either CDA/UNS Brass Alloys C89520 or C89833 and shall not contain more than twenty five hundredths of one percent (0.25% or less) total lead content by weight. The lead leach limit of the corporation stops shall be 5 ppb. Corporation stops shall be NSF/ANSI 61 Annex F and Annex G and NSF/ANSI 372 certified by an ANSI accredited organization and shall be stamped or embossed with a mark or name indicating that the product is manufactured from a low-lead alloy.

- B. Service clamps shall be installed with all corporation stops 2 inches and larger in size and with all corporation stops installed in PVC pipe. Clamps shall be all bronze, ductile iron or stainless steel double strap, AWWA taper thread (CC) with O-ring seal.
- C. Corporation stops shall be by Ford Meter Box Co., Inc., Wabash, IN; Red Hed Manufacturing Co., Lincoln, RI; Mueller Co., Decatur, IL; Hayes of Zurn Industries, Inc., Gastonia, NC; or approved equal.

2.03 CURB STOPS:

- A. Curb stops shall be of brass composition without drain and as specified in AWWA C800. The inlet and the outlet shall have compression or flared connections. Curb stops shall open right.

All brass components that come into contact with potable water shall be made from either CDA/UNS Brass Alloys C89520 or C89833 and shall not contain more than twenty five hundredths of one percent (0.25% or less) total lead content by weight. The lead leach limit of the curb stops shall be 5 ppb. Curb stops shall be NSF/ANSI 61 Annex F and Annex G and NSF/ANSI 372 certified by an ANSI accredited organization and shall be stamped or embossed with a mark or name indicating that the product is manufactured from a low-lead alloy.

- B. Curb stops shall be the of the inverted key style. They shall be the “T” head type.
- C. Curb stops shall be by Red Hed Manufacturing Co., Lincoln, RI; Ford Meter Box Co., Inc., Wabash, IN; Mueller Co., Decatur, IL; Hayes of Zurn Industries, Inc., Gastonia, NC; or approved equal.
- D. See paragraph 2.04 B below for extension rod requirements.

2.04 CURB BOXES:

- A. The cast iron box shall be Buffalo top and slide type. The curb box cover shall be cast iron and North American made. The cast iron box shall be the extension type with arch pattern. Minimum inside diameter of the upper section shall be 2-1/2-inch for 3/4-inch and 1-inch curb stops and 3-inch for 1-1/2-inch and 2-inch curb stops. The top section shall be slide type, a minimum of 24 inches long. Bottom section shall be slide type, a minimum of 39 inches long.
- B. Boxes shall contain an extension rod with centering ring adapter with 1/2-inch solid shank head, shaft to be 5/8-inch carbon steel, 1-foot long, yoke to be ductile iron 5/16-inch stock, yoke pin brass or stainless steel. Center ring shall fit a standard type Buffalo service box.

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. Where new water mains are being installed and existing water services are to be transferred to the new main, the Contractor shall discontinue the existing water services by shutting down the corporation stop at the old water main, unless specifically otherwise required by the Engineer. The Contractor shall take special care to minimize the interruption of existing water service.

- B. The Contractor shall tap a new corporation stop, cut the existing service piping and connect the new service piping to the old service piping using an approved coupling at a point between the main and the existing curb stop and box.
- C. Where transfers are to be made and the existing curb stop and box cannot be utilized or a new curb stop and box is required, the Contractor shall connect the new service piping to the existing service piping using an approved coupling approximately 12-inches from the curb stop on the building side of the stop.
- D. Where transfers are being made and the existing service is of lead, galvanized steel, or iron, the service shall be replaced to the curb stop and box unless otherwise required. If required, the curb stop and box shall be replaced as specified above.
- E. Curb stops and boxes shall be set plumb, flush with the ground or paved surface, and centered with the box located directly over the stop. The box shall be set on a concrete block or flat stone. Earth fill shall be carefully tamped around the boxes to a distance of 4 feet on all sides of the box or to the undisturbed face of the trench, if less than 4 feet.
- F. Curb stops shall be operational and accessible at all times during construction and warranty period. The Contractor shall verify the proper operation of all curb stops in the presence of the Engineer and/or Owner following completion of the project and prior to the acceptance of substantial completion.
- G. All services shall be installed at 5 feet 0 inches of cover unless otherwise required by the Engineer.
- H. Service connections shall be tested and disinfected in accordance with AWWA standards.

END OF SECTION

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SECTION 02516

CONNECTIONS TO EXISTING WATER MAINS

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. This section covers connections to existing water mains, complete.
- B. The Contractor shall furnish all pipe, fittings, valves, tapping machines, if required, and appurtenances. The Contractor shall do all excavation and backfill as required.

1.02 RELATED WORK:

- A. Section 02080, DUCTILE IRON PIPE AND FITTINGS.
- B. Section 02511, TEMPORARY WATER SERVICE.
- C. Section 03302, FIELD CONCRETE.

PART 2 - PRODUCTS: NOT APPLICABLE

PART 3 - EXECUTION

3.01 CONTRACTOR OPERATIONS:

- A. The Contractor shall make all connections to the existing mains as indicated on the drawings and as herein specified.
- B. The Contractor shall develop a program for the construction and putting into service of the new work subject to the approval of the Engineer. All work involving cutting into and connecting to the existing work shall be planned so as to interfere with operation of the existing facilities for the shortest possible time and when the demands on the system best permit such interference even to the extent of working outside of normal working hours to meet these requirements.
- C. The Contractor shall have all possible preparatory work done prior to making the connection and shall provide all labor, tools, material, and equipment required to do the work in one continuous operation.
- D. The Contractor shall have no claim for additional compensation, by reason of delay or inconvenience, for adapting its operations to the needs of the Owner's water supply. No damages shall be claimed by the Contractor for delays in dewatering pipelines nor shall

any damages be claimed because of water leaking through closed valves after dewatering is completed.

- E. Under no circumstances shall any customers be without water for a period of more than 4 hours without prior approval of the Owner. Should it appear that any customer will be without water for more than 4 hours, the Contractor shall install temporary water service as specified in Section 02511, TEMPORARY WATER SERVICE where required by the Engineer.
- F. Existing pipeline that is not to be abandoned but is damaged by the Contractor during the work shall be replaced by it at its own expense in a manner approved by the Engineer.

3.02 TAPPING CONNECTION TO EXISTING MAINS:

- A. Tapping connections to the existing mains, where indicated on the drawings, shall be made with service pressure in the main, using tapping sleeves and valves and a suitable tapping machine.
- B. Other connections to existing mains shall be made with the main out of service, unless otherwise required by the Engineer. Such connections will not require tapping sleeves and valves but connections as indicated on the drawings.

END OF SECTION

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SECTION 02518

TRACER TAPE

PART 1 - GENERAL

1.01 WORK INCLUDED:

This section covers the furnishing, handling and installation of tracer tape, as called for on the drawings.

1.02 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF SECTION 01330 SUBMITTALS, SUBMIT THE FOLLOWING:

- A. Manufacturer's literature on the materials, colors and printing specified herein, shall be submitted to the Engineer for review.
- B. Tape samples shall also be submitted to the Engineer for review.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS:

Tracer tape shall be by Reef Industries, Houston, TX; Empire Level, Mukwonago, WI; Pro-Line Safety Products Co., W. Chicago, IL; or approved equal.

2.02 TRACER TAPE:

- A. Tracer tape shall be at least 3-inches wide.
- B. Tracer tape for non-ferrous pipe or conduit shall be constructed of a metallic core bonded to plastic layers. The metallic tracer tape shall be a minimum 5-mil thick and must be locatable at a depth of 18-inches with ordinary pipe locaters.
- C. Tracer tape for ferrous pipe or conduit shall consist of multiple bonded plastic layers. The non-metallic tracer tape shall elongate at least 500% before breaking.
- D. The tape shall bear the wording: "BURIED DRAIN LINE BELOW" (with "DRAIN" replaced by "WATER", "SEWER", "ELECTRICAL", "GAS", "TELEPHONE", or "CHEMICAL" as appropriate), continuously repeated every 30-inches to identify the pipe.
- E. Tape colors shall be as follows, as recommended by the American Public Works Association (APWA):

Electric	Red
Gas & Oil	Yellow

Communications	Orange
Water	Blue
Sewer & Drain	Green
Chemical	Red (not APWA)

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. Tracer tape shall be installed directly above the pipe or conduit it is to identify, approximately 12-inches below the proposed ground surface.
- B. The Contractor shall follow the manufacturer's recommendations for installation of the tape, as approved by the Engineer.

END OF SECTION

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SECTION 02533

CONNECTIONS TO EXISTING STRUCTURES

PART 1 - GENERAL

1.01 WORK INCLUDED:

The Contractor shall furnish materials, tools, labor and equipment to cut suitable openings into the existing sewer manholes, make connections to existing sewers and all other work necessary to direct the existing sewage flow as indicated on the drawings and as herein specified.

1.02 RELATED WORK:

Section 02630, BUILDING MANHOLE INVERTS

1.03 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF THE GENERAL SPECIFICATIONS, SUBMIT THE FOLLOWING:

Prior to start of work, submit details of the methods proposed for doing the work and for maintaining the sewage flow as herein specified.

PART 2 - PRODUCTS - NOT APPLICABLE

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. The Contractor shall provide temporary plugs or provide other suitable means for maintaining the new sewer free of sewage flow until such time as it can be inspected and tested for leakage.
- B. Connections to the new sewer shall be made when required by the Engineer and only after the new pipeline has been inspected and has successfully passed the leakage test.
- C. The Contractor shall modify each existing structure for installation of the necessary piping, but in so doing shall confine the cutting to the smallest amount possible consistent with the work to be done.
- D. All new piping connected to existing structures shall be encased in concrete in a manner satisfactory to the Engineer.
- E. All work shall be done with the proper tools and by careful workmen competent to do work.

- F. The Contractor shall cut, reshape and fill the existing manhole tables and plug existing outlets as indicated on the drawings and as required by the Engineer, to accommodate the new connections. Reshaped manhole invert channels shall be smoothly shaped to permit the flow of sewage. Manhole invert channels shall be reconstructed as specified under Section 02630, BUILDING MANHOLE INVERTS.

END OF SECTION

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SECTION 02534

RECONSTRUCTION OF EXISTING SEWERS AND DRAINS

PART 1 - GENERAL

1.01 WORK INCLUDED:

This Section covers work required to reconstruct affected piping where proposed water mains cross existing street sewers, house sewer connections (referred to as sewers) and drains.

PART 2 - PRODUCTS

2.01 REPLACEMENT PIPE FOR SEWERS AND DRAINS:

- A. The Contractor shall furnish all pipe, couplings, jointing materials, labor, tools and equipment necessary to reconstruct the sections of existing sewers, surface drains, or water mains removed.
- B. The size of replacement pipe shall closely approximate the size of existing section to be replaced, allowing a watertight joint to be made while maintaining the existing invert and slope.

PART 3 - EXECUTION

3.01 INSTALLATION:

- A. Unless field conditions or the plans require otherwise, water mains shall pass over sewers and drains, except where, in the opinion of the Engineer, suitable cover and insulation cannot be provided. In such cases water mains shall pass under sewers and drains.
- B. The vertical clear distance between water mains and sewers or drains will be no less than 18-inches, unless otherwise approved by the Engineer, or specifically indicated on the drawings. In locations where water mains shall pass over or under existing sewers or drains, the Contractor shall plan the laying of the mains such that the joints of a section of water main at least 18 feet long are equally distant from the sewer or drain.
- C. Where proposed water mains pass under existing sewers, and damage to the sewer line cannot be prevented, and if approved by the Engineer, the sewer line shall be reconstructed using a minimum 9-foot section of ductile iron pipe or PVC sewer pipe. The pipe shall be installed such that joints of the reconstructed sewer are at a minimum distance of 4.5 feet on either side of the proposed water main.
- D. Drains which are shown on the plans or located in the field and are damaged by the Contractor shall be replaced with identical materials at the Contractor's expense unless the Engineer agrees in writing that the Contractor was not at fault.

- E. Joints between existing pipe and replacement pipe shall be made with suitable watertight sleeves or couplings.
- F. Joints shall not be backfilled until approved for watertightness by the Engineer.
- G. Watertightness shall be determined by allowing water to flow through the repaired pipeline (street sewers, drains and house connections). If there is any visual leakage under these conditions, the pipe will not be accepted as watertight and shall be repaired at the Contractor's expense.

3.02 EXISTING SEWERS:

The composition, diameter, flow direction, approximate locations and depths to inverts of street sewers are indicated on the drawings, if known.

3.03 EXISTING DRAINS:

- A. Present information indicates that the existing drains are constructed of reinforced concrete pipe (RCP) unless otherwise noted on the drawings.
- B. The diameter, flow direction and approximate locations and depths to inverts of drains are indicated on the drawings, if known.

3.04 DIVERSION OF SEWAGE FLOWS:

- A. During construction of the water mains under existing street sewers and replacement of required sections of street sewers, sewage flows shall be diverted away from said street sewer. This may be accomplished by plugging both ends of the street sewer at the nearest manhole and pumping the sewage from the upstream manhole to the next downstream manhole.
- B. The Contractor shall furnish all labor, materials, tools and equipment necessary to divert sewage flows from such street sewers.
- C. During construction of water mains under house sewer connections, and replacement of required section of house sewer connections, no sewage flow shall be allowed in the house sewer connections.

END OF SECTION

SECTION 02630

BUILDING MANHOLE INVERTS

PART 1 - GENERAL

1.01 WORK INCLUDED:

This Section covers all manholes complete, including, but not limited to, bases, mortar, and inverts.

1.02 RELATED WORK:

- A. Section 01014, SCOPE AND SEQUENCE OF WORK
- B. Section 01330, SUBMITTALS
- C. Section 01331, DOCUMENTATION
- D. Section 01575, HANDLING EXISTING FLOWS
- E. Section 02631, CONNECTION TO EXISTING STRUCTURES

1.03 SYSTEM DESCRIPTION:

- A. Invert channel shall be formed of brick and mortar upon the base.

1.04 REFERENCES:

- A. The following standards form a part of this specification as referenced:

ASTM International (ASTM)

ASTM C32	Sewer and Manhole Brick
ASTM C144	Aggregate for Masonry Mortar
ASTM C207	Hydrated Lime for Masonry Purposes
ASTM C923	Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures and Pipes
ASTM C1244	Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test.

1.05 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF SECTION 01330 SUBMITTALS, SUBMIT THE FOLLOWING:

- A. Manufacturer's literature of the materials of this section.
- B. Tests reports as required by the Engineer.

PART 2 – INVERT MATERIALS

2.01 The invert shall be formed of brick and mortar, as specified in this specification section.

2.02 BRICK MATERIALS:

- A. Brick shall be sound, hard, and uniformly burned brick, regular and uniform in shape and size, of compact texture, and satisfactory to the Engineer. Bricks shall comply with ASTM C32, for Grade SS, hard brick, except that the mean of five tests for absorption shall not exceed 8 percent by weight.
- B. Rejected brick shall be immediately removed from the work and brick satisfactory to the Engineer substituted.
- C. Mortar shall be composed of portland cement, hydrated lime, and sand in which the volume of sand shall not exceed three times the sum of the volumes of cement and lime. The proportions of cement and lime shall be as required and may vary from 1:1/4 for dense hard-burned brick to 1:3/4 for softer brick. In general, mortar for Grade SS Brick shall be mixed in the volume proportions of 1:1/2:4-1/2; portland cement to hydrated lime to sand.
- D. Cement shall be Type II portland cement as specified for concrete masonry.
- E. Hydrated lime shall be Type S conforming to ASTM C207.
- F. The sand shall comply with ASTM C144 specifications for "Fine Aggregate," except that all of the sand shall pass a No. 8 sieve.

PART 3 - EXECUTION

3.01 INSTALLATION:

A. INVERT BRICK WORK:

- 1. All debris shall be removed from the bottom of the manhole before the invert is constructed.
- 2. Bricks shall be moistened by suitable means, as required, until they are neither so dry as to absorb water from the mortar nor so wet as to be slippery when laid.

3. Each brick shall be laid as a header in a full bed and joint of mortar without requiring subsequent grouting, flushing or filling, and shall be thoroughly bonded as required.
4. The brick inverts shall conform accurately to the size of the adjoining pipes. Side inverts shall be curved and main inverts (where direction changes) shall be laid out in smooth curves of the longest possible radius which is tangent to the centerlines of adjoining pipe.

3.02 CLEANING:

All manholes shall be thoroughly cleaned of all silt, debris and foreign matter of any kind, prior to final inspection.

END OF SECTION

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SECTION 02745

PAVING

PART 1 - GENERAL

1.01 WORK INCLUDED:

The Contractor shall furnish all labor, materials and equipment and shall replace the pavements as indicated on the drawings and as herein specified.

1.02 RELATED WORK:

- A. Section 00890 PERMITS
- B. Section 01562, DUST CONTROL
- C. Section 02300, EARTHWORK

1.03 SYSTEM DESCRIPTION:

A. GENERAL

The types of pavement systems to be utilized on this project are as follows:

TYPE 1. PERMANENT TRENCH PAVEMENT

PAVEMENT SCHEDULE

B. TYPE 1. PERMANENT TRENCH PAVEMENT

Areas shall be paved with temporary trench binder course pavement, 2-inches thick, as soon as practicable after installation of individual pipeline segments. Temporary pavement shall be maintained a minimum of 90 days prior to installation of permanent trench binder course pavement, 2 ½-inches thick and permanent trench top course pavement, and 1- ½- inches thick. This may require that the temporary pavement be maintained until the following year, at which time the permanent pavement shall be installed. Permanent trench binder course and trench top course pavement shall be installed only with the approval of the Engineer.

1.04 REFERENCES

The following standards form a part of these specifications and indicate the minimum standards required:

American Society for Testing and Materials (ASTM)

ASTM D1557 Test for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 Pound Rammer and 18-Inch Drop

State of New Hampshire Department of Transportation (NHDOT) Standard Specifications for Road and Bridge Construction

NHDOT 304 Aggregate Base Course

NHDOT 306 Reclaimed Stabilized Base

NHDOT 401 Plant Mix Pavements - General

NHDOT 403 Hot Bituminous Pavement

NHDOT 411 Plant Mix Surface Treatment

NHDOT 417 Cold Planing of Bituminous Surfaces

NHDOT 632 Retroreflective Pavement Markings

Federal Specifications

SS-S-1401C Sealants, Joint, Non-Jet-Fuel-Resistant, Hot Applied, for Portland Cement and Asphalt Concrete Pavement

American Association of State Highway and Transportation Officials

AASHTO M 220 Standard Specifications for Preformed Polychloroprene Elastomeric Joint Seals for Concrete Pavements

1.05 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF GENERAL SPECIFICATIONS, SUBMIT THE FOLLOWING:

Six sets of complete job mix formula shall be submitted to the Engineer at least two weeks before any of the work of this section is to begin.

PART 2 - PRODUCTS

2.01 GRAVEL SUBBASE:

- A. Gravel subbase shall consist of inert material that is hard durable stone and coarse sand, free from loam and clay, surface coatings and deleterious materials.
- B. Gradation requirements for gravel subbase shall be as specified in Section 02300, EARTHWORK for Gravel Borrow.

2.03 HOT MIX ASPHALT (HMA) PAVEMENT:

- A. HMA pavements shall comply with Section 401 Plant Mix Pavements – General.
- B. HMA mixtures shall be within the aggregate size limits of base courses, binder courses, top courses and surface treatment, in accordance with Section 401 Plant Mix Pavements - General, Table 401-1 Design Control Points.
- C. The elastomeric joint seal shall conform to AASHTO M 220.
- D. The tack coat shall be an asphalt emulsion, RS-1, conforming to Section 702 Bituminous Materials.

2.04 PAVEMENT MARKINGS:

- A. Pavement markings shall conform to the requirements of Sections 708 Paints and 711 Preformed Retroreflective Pavement Marking Tape.
- B. Paint and glass spheres shall conform to the following:
 - 1. Fast drying traffic paint – NH 4.11 (White) and NH 4.12 (Yellow).
 - 2. Glass beads – Section 632.2.2 Glass Beads
- C. Tape shall consist of glass beads of a high optical quality imbedded into a bonder on a suitable backing that is pre-coated with a pressure-sensitive adhesive. Tape must meet the requirements of Section 711 for retroreflectance, adhesion, skid resistance and removability.
- D. Temporary pavement marking tape, to be in service for no longer than three months, shall be non-removable and shall be intended to be obliterated by over-paving or removal of pavement on which it is placed. Tape shall consist of retroreflective films on a comfortable backing, precoated with a pressure-sensitive adhesive. Tape must meet the requirements of Section 711 for retroreflectance, adhesion, skid resistance, abrasion resistance and removability.

PART 3 - EXECUTION

3.01 GENERAL:

Paving courses required for the project shall be as shown on the drawings and as specified herein. Pavement thicknesses specified are measured in compacted inches. If a pavement course thickness exceeds 2-1/2 compacted inches, the course shall be installed in multiple lifts with each lift not exceeding 2-1/2 compacted inches in thickness.

3.03 GRAVEL SUBBASE:

- A. The gravel subbase to be placed under pavement shall consist of 12-inches of gravel evenly spread and thoroughly compacted.
- B. The gravel shall be spread in layers not more than 4-inches thick, compacted measure. All layers shall be compacted to not less than 95 percent of the maximum dry density of the material as determined by ASTM D1557 Method C at optimum moisture content.

3.04 TEMPORARY BITUMINOUS PAVEMENT:

- A. Where specified and required by the Engineer and after placement of the gravel subbase, the Contractor shall place 2-inches of temporary bituminous pavement above the trench, between the edges of the existing pavement. It shall consist of a base course meeting the requirements of Section 401.
- B. The temporary pavement shall be repaired as necessary to maintain the surface of the pavement until replaced by permanent pavement. When so required by the Engineer, the Contractor shall remove the temporary pavement and install or regrade the subbase for installation of permanent pavement.

3.05 PERMANENT BITUMINOUS PAVEMENT:

- A. The bituminous paving mixture, equipment, methods of mixing and placing, and the precautions to be observed as to weather, condition of base, etc., shall be in accordance with Section 401.

B. BASE COURSE AND BINDER COURSE PAVEMENT:

- 1. Immediately prior to installing the base and/or binder course, the trimmed edges shall be made stable and unyielding, free of loose or broken pieces and all edges shall be thoroughly broomed clean. Contact surfaces of trench sides, curbing, manholes, catch basins, or other appurtenant structures in the pavement shall be painted thoroughly with a uniform coating of asphalt emulsion (tack coat), just before any mixture is placed against them.
- 2. The binder course shall be repaired as necessary to maintain the surface of the pavement until placement of the permanent overlay. If required, the Contractor shall place a leveling course before placing the permanent overlay.

C. TOP (WEARING) COURSE OR SURFACE TREATMENT PAVEMENT (PERMANENT OVERLAY):

- 1. Top course or surface treatment shall be placed over the trench or full width as shown on the drawings or as specified.

2. Prior to placement of the top course or surface treatment, the entire surface over which the top course or surface treatment is to be placed shall be broom cleaned and tack coated.
3. Top course or surface treatment pavement placed over trenches may be feathered to meet existing paved surfaces, if approved by the Engineer.
4. Prior to placing full width top course or surface treatment pavements, keyways shall be cut in all intersecting streets.

3.08 PAVEMENT PLACEMENT:

- A. Unless otherwise permitted by the Engineer for particular conditions, only machine methods of placing the pavement shall be used. The equipment for spreading and finishing shall be mechanical, self-powered pavers, capable of spreading and finishing the mixture true to line, grade, width and crown. The mixtures shall be placed and compacted only at such times as to permit proper inspection and checking by the Engineer.
- B. After the paving mixtures have been properly spread, initial and final compaction shall be obtained by the use of steel wheel rollers having a weight of not less than 8 tons. Intermediate compaction shall be done by a pneumatic-tired roller. The rollers shall provide an operating weight of not less than 2,000 pounds per wheel.
- C. Final rolling of the top course or surface treatment pavement shall be performed at a mix temperature and time sufficient to allow for final smoothing of the surface and thorough compaction.
- D. Immediately after placement of top course or surface treatment pavement, all joints between the existing and new top course or surface treatment pavements shall be sealed with hot poured rubberized asphalt sealant meeting the requirements of Federal Specification SS-S-1401.
- E. Where there is no backing for the edges of the curb-to-curb pavement, the Contractor shall provide a gravel transition. The gravel transition shall be installed immediately after the pavement is placed, shall be feathered and extend a minimum of 18-inches, and shall be compacted using the same equipment as for pavement compaction. The gravel shall be uniformly graded material with a maximum size of 3/8- to 1/2-inch.
- F. When required by the Engineer, the Contractor shall furnish and install additional paving to provide satisfactory transition for driveways and walkways impacted by a new curb-to-curb pavement installation. The transition installation will be considered incidental to the curb-to-curb pavement installation.

3.09 ADDITIONAL PAVING:

- A. If the Engineer determines that the existing bituminous concrete pavement on local streets is thicker than the permanent pavement specified herein, the Contractor may be required to install additional Type B binder course to obtain the depth of the existing pavement.
- B. If for the installation of full width paving, the Engineer determines that the existing road surface requires additional leveling pavement, then the Contractor shall install additional Type B binder course to bring the section to proper line and cross section for the installation of the top course. Additional paving required to restore the proper line and cross section of binder course installed by the Contractor which has become rough and uneven shall be furnished and installed at the expense of the Contractor.

3.11 RAISING AND ADJUSTING CASTINGS:

- A. In areas of permanent top course paving, existing municipally-owned catch basin and manhole castings and valve boxes shall be raised to the proper grade where required by the Engineer.
- B. Castings owned by private utilities shall be raised by their own forces. The Contractor shall be responsible for coordinating this work.
- C. The method of adjusting these castings shall be as follows: Cut around catch basin or manhole castings a minimum of 8-inches from casting. Excavate and if required rebuild up to 12-inches of masonry below the bottom of the casting. Backfill with suitable material and compact to bottom of casting. Place high, early strength cement or bituminous concrete collar, as directed, to approximately 1½-inches below the raised casting grade.
- D. In some areas, raising of castings may not be required. Where required by the Engineer, castings not to be raised shall have at least 12-inches of bituminous concrete pavement chipped and removed around the casting. New bituminous concrete pavement shall be placed and compacted around such castings to approximately 1-1/2-inches below the top of the casting. The overlay course shall then be sloped down to the level of the casting.
- E. The method of raising valve boxes shall be as follows: Cut around valve box a minimum of 8-inches from valve box. Excavate as required and raise the valve box. Pour high early strength cement or bituminous concrete collar, as directed, to approximately 1-1/2-inches below the top of the valve box.
- F. Castings, which need to be raised or adjusted to complete permanent curb to curb paving, shall be done immediately prior to paving.

3.12 PAVEMENT MARKINGS:

- A. The Contractor shall replace all pavement markings removed or covered-over in carrying out the work, and as required by the Engineer, no sooner than 48 hours after completion of permanent pavement. The markings shall be 4-inches wide, white or yellow, single or double lines as required.
- B. When required by the Engineer, the Contractor shall provide temporary markings at no additional cost to the Owner.

3.13 PAVEMENT REPAIR:

- A. If required in the contract or if permanent pavement becomes rough or uneven, permanent pavement patches and trenches shall be repaired and brought to grade utilizing "infrared" paving methods following completion of the construction.
- B. The Contractor performing the work shall use care to avoid overheating the pavement being repaired.
- C. Pavement repair shall extend a minimum of 6-inches beyond all edges of the pavement patch to assure adequate bonding at the pavement joints.

END OF SECTION

SECTION 02771

CURBING

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. This section covers furnishing and installation of granite curb, bituminous curb and precast parking curb, where required, as shown on the Drawings and herein specified.
- B. This section also covers replacement of curbing removed during construction.

1.02 RELATED WORK:

- A. Required earthwork is specified under Section 02300, EARTHWORK.
- B. Section 02745, PAVING.
- C. Section 02775, SIDEWALK REPLACEMENT.

1.03 REFERENCES:

The following standards form a part of these specifications, as referenced:

New Hampshire Department of Transportation (NHDOT)
Standard Specifications for Road and Bridge Construction

1.04 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF GENERAL SPECIFICATIONS, SUBMIT THE FOLLOWING:

Six sets of shop drawings, showing dimensions of typical curb sections, shall be submitted to the Engineer for review.

PART 2 - PRODUCTS

2.01 GRANITE CURBING:

- A. Granite curbing shall conform to Subsection 609.2.2 of the latest edition of the NHDOT Standard Specifications for Road and Bridge Construction.
- B. Special shapes and corners shall be supplied as required.

2.02 BITUMINOUS CURB:

- A. Bituminous curb shall meet the requirements of Section 609.2.4 of the latest edition of the NHDOT Standard Specifications for Road and Bridge Construction.

2.03 PRECAST PARKING LOT CURB:

- A. Precast parking lot curb shall be formed with concrete rated at 3500 psi at 28 days.
- B. The manufacturer shall maintain at the manufacturing site a record of material used and their sources, and a copy of concrete mix designs.
- C. Precast parking lot curb shall be the Standard Precast Bumper Curb as manufactured by Durastone Co., Lincoln, RI, or approved equal.

PART 3 - EXECUTION

3.01 GRANITE CURBING:

- A. Removal and resetting and/or removal and replacing of granite curbing shall be in accordance with Section 609 of the latest edition of the NHDOT Standard Specifications for Road and Bridge Construction and all amendments thereto. The curbing shall have a 7-inch reveal unless otherwise required by the Engineer.
- B. Except as modified herein or on the drawings, installation of curbing shall conform to Section 609 of the NHDOT Standard Specifications for Road and Bridge Construction.
- C. Excavation shall be made to the bottom of the 6-inch gravel base below the curbing, the trench being sufficiently wide to permit thorough tamping. The base shall be compacted to a firm, even surface and shall be approved by the Engineer.
- D. The curbing shall be set on edge and settled into place with a heavy wooden hand-rammer, to the line and grade required, straight and true for the full depth. The joints of the stone curbing shall be pointed with mortar for the full depth of the curbing. At approximately 50-foot intervals, a 1/2-inch joint shall not be filled with mortar but left free for expansion. The ends of the stone curbing at driveways and intersections shall be cut at a bevel or rounded as required by the Engineer.
- E. The trench for the stone curbing shall be backfilled with approved material; the first layer to be 4-inches in depth, thoroughly rammed; the other layers to be more than 6-inches in depth and thoroughly rammed until the trench is filled.
- F. Where indicated on the plans, or as required, drainage openings shall be made through the curbing at the elevations and of the size required.

3.02 BITUMINOUS CURB:

- A. Unless modified herein, installation shall conform to Section 609 of the NHDOT Standard Specifications for Road and Bridge Construction.
- B. When indicated on the plans, or as required, drainage openings shall be made through the curb at the elevations and of the size required.

3.03 PRECAST PARKING LOT CURBING:

- A. Precast parking lot curbing shall be furnished and installed as indicated on the drawings.
- B. Any units which are cracked, chipped, spalled, or otherwise damaged shall be removed and replaced with units meeting the specified requirements.

END OF SECTION

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SECTION 02775

SIDEWALK CONSTRUCTION AND REPLACEMENT

PART 1 - GENERAL

1.01 WORK INCLUDED:

The Contractor shall furnish all labor, materials, equipment and incidentals required to restore gravel sidewalks and/or construct new or replacement bituminous or concrete sidewalks where required or where existing sidewalks are disturbed by the Contractor, as shown on the drawings and described herein. The Contractor shall also furnish all materials and install sidewalk ramps where shown on the drawings or as required by the Engineer.

1.02 RELATED WORK:

- A. Section 02300, EARTHWORK
- B. Section 02771, CURBING

1.03 REFERENCES

The following standards form a part of these specifications, as referenced:

State of New Hampshire Department of Transportation (NHDOT)
Standard Specifications for Road and Bridge Construction

1.04 SYSTEM DESCRIPTION:

A. Gravel Sidewalks

Gravel sidewalks shall be restored to a condition at least equal to that existing immediately before the work was started.

B. Bituminous and Concrete Sidewalks and Sidewalk Ramps

1. Except as otherwise indicated, bituminous and concrete sidewalks and sidewalk ramps shall be constructed in accordance with the requirements of Section 608 of the NHDOT Standard Specifications for Road and Bridge Construction.
2. Sidewalk ramps shall be installed in new sidewalks at intersections in accordance with the contract documents. When curbs or sidewalks are constructed or reconstructed on one side of the street, curb cuts shall also be installed on the opposite sides of the street, where there is a pedestrian path of travel. Curb cuts shall be located within the crosswalk and/or the pedestrian path of travel.

- C. Water boxes, manhole frames, and all other castings shall be carefully set to the proposed finished grade.
- D. Sidewalks shall not be less than 48-inches in width, excluding curbing. An unobstructed path of travel shall be provided which is at least 36-inches clear, excluding curbing.

PART 2 - PRODUCTS

2.01 BITUMINOUS SIDEWALKS AND SIDEWALK RAMPS:

- A. Bituminous sidewalks and sidewalk ramps shall conform to the requirements of Section 401 of the Standard Specifications.
- B. Bituminous concrete base course shall conform to the requirements of Subsection 209.2.1.2 of the Standard Specifications.

2.02 CEMENT CONCRETE SIDEWALKS AND SIDEWALK RAMPS:

- A. Cement concrete sidewalks and sidewalk ramps shall be constructed with air entrained Cement Concrete with a minimum compressive strength of 4000 psi at 28 days.
- B. Cement concrete shall conform to the requirements of Section 520 of the Standard Specifications.
- C. Reinforcement shall conform to Subsection 544.25 of the Standard Specifications.

PART 3 - EXECUTION:

3.01 BITUMINOUS SIDEWALKS AND SIDEWALK RAMPS:

- A. The subgrade for the bituminous concrete sidewalks and sidewalk ramps shall be shaped parallel to the proposed surface of the sidewalks and shall be thoroughly rolled and tamped. All depressions occurring shall be filled with suitable material and again rolled or tamped until the surface is smooth and hard in order for a gravel foundation to be placed upon it.
- B. The bituminous sidewalk shall be a minimum of 2½ compacted inches thick, laid in two equal courses. The sidewalk pitch shall be 3/16-inch per foot of width or shall match the existing sidewalk.

3.02. CEMENT CONCRETE SIDEWALKS AND SIDEWALK RAMPS:

- A. Concrete for sidewalks and wheelchair ramps shall be a minimum of 4-inches thick. At driveways, the sidewalks shall be 6-inches thick.

- B. The subgrade for the walk or driveway shall be shaped to a true surface conforming to the proposed slope of the walk, thoroughly rolled at optimum moisture content and tamped with a power roller weighing not less than one ton and not more than 5 tons. All depressions occurring shall be filled with suitable material and again rolled or tamped until the surface is smooth and hard.
- C. After the subgrade has been prepared as hereinbefore specified, a subbase of gravel borrow at optimum moisture content shall be placed, thoroughly rolled by a power roller, and tamped. The gravel borrow shall be a minimum of 8-inches in thickness.
- D. The forms for sidewalks shall be smooth, free from warp, strong enough to resist springing out of shape, and deep enough to conform to the thickness of the proposed walk. All mortar or dirt shall be completely removed from forms that have been previously used. The forms shall be well staked, thoroughly braced, and set to the established lines with their upper edge conforming to the grade of the finished walk. The finished walk shall have sufficient pitch from the outside to the edge of the walk to provide for surface drainage. This pitch shall be ¼-inch per foot unless otherwise required by the Engineer. Before the concrete is placed, the subbase for sidewalks shall be thoroughly dampened until it is moist throughout but without puddles of water.
- E. Concrete shall be conveyed from the place of mixing to the place of deposit in such a manner that no mortar will be lost, and the composition of the mix shall be uniform, showing neither excess nor lack of mortar in any one place. The consistency shall be such that water will float to the surface under heavy tamping. The concrete shall be placed as close to its final position as practicable and thoroughly consolidated, with precautions taken not to overwork it while it is still plastic. The concrete shall be thoroughly spaded along the forms or screeds to eliminate voids and honeycombs at the edges. Retempering of concrete will not be permitted.
- F. Concrete shall be placed in alternate slabs not exceeding 30 feet in length. Slabs shall be separated by transverse preformed expansion joint filler ½-inch thick. The surface of all concrete sidewalks shall be uniformly scored into block units of not more than 40 square feet. The depth of the scoring shall be at least one quarter of the thickness of the sidewalk.
- G. When concrete sidewalks are constructed adjacent to curbing, building foundations, retaining walls, light pole bases or fixed structures, ½-inch thick premolded joint filler shall be used between the newly constructed sidewalk and the structure.
- H. Finishing of the concrete surface shall be done by experienced and competent cement finishers as soon as is practicable. Finishing shall be delayed until all bled water and water sheen has left the surface and the concrete has begun to stiffen. The concrete surface shall be finished as required with a steel trowel or wood float to give a smooth, uniform and attractive surface finish and uniformly scored into block units or areas of not more than 36 square feet. Following this, the Contractor shall draw a nylon push broom lightly over the surface to produce a non-slip surface. Application of neat cement to the surface to hasten hardening is prohibited.

- I. The Contractor shall protect the newly placed concrete surface against vandalism and marking or defacing and must stand ready to replace any blocks which, in the opinion of the Engineer, are excessively marked or defaced, at no additional cost to the Owner. When completed the walks shall be kept moist and protected from traffic and weather for at least 3 days.
- J. Concrete shall be cured for a minimum of 7 days. Curing compounds will not be allowed. Curing shall be by moist burlap or plastic sheets, or by other approved materials placed in close contact with the finished concrete as soon as the concrete has set sufficiently to avoid damage from the placement of the coverings. During the curing period, all traffic, both pedestrian and vehicular, shall be excluded. Vehicular traffic shall be excluded for such additional time as may be required.
- K. Adequate protection shall be provided where temperatures of 40°F or lower occur during placing of concrete and during the early curing period. The minimum temperature of fresh concrete after placing and for the first 3 days shall be maintained above 55°F. In addition to the above requirements, an additional 3 days of protection from freezing shall be maintained.
- L. Protective coating shall be applied in accordance with Section 534.3 of the Standard Specifications.

END OF SECTION

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SECTION 02920

LOAMING AND SEEDING

PART 1 - GENERAL

1.01 WORK INCLUDED:

This section covers all labor, materials, and equipment necessary to do all loaming, seeding and related work as indicated on the drawings and as herein specified. All lawns disturbed by the Contractor's operations shall be repaired as herein specified.

1.02 RELATED WORK: NOT APPLICABLE

1.03 QUALITY ASSURANCE:

- A. For a particular source of loam, the Engineer may require the Contractor to send approximately 10 pounds of loam to an approved testing laboratory and have the following tests conducted:

1. Organic concentration
2. pH
3. Nitrogen concentration
4. Phosphorous concentration
5. Potash concentration

- B. These tests shall be at the Contractor's expense. Test results, with soil conditioning and fertilizing recommendations, shall be forwarded to the Engineer.

1.04 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF SECTION 01330 SUBMITTALS, SUBMIT THE FOLLOWING:

- A. Information detailing the seed mixes, fertilizers, mulch material, slope protection material (if required) and origin of loam.
- B. Test results.

PART 2 - PRODUCTS

2.01 MATERIALS:

A. LOAM:

1. Loam shall be a natural, fertile, friable soil, typical of productive soils in the vicinity, obtained from naturally well-drained areas, neither excessively acid nor alkaline, and containing no substances harmful to grass growth. Loam shall not be

delivered to the site in frozen or muddy condition and shall be reasonably free of stumps, roots, heavy or stiff clay, stones larger than 1-inch in diameter, lumps, coarse sand, noxious weeds, sticks, brush or other litter.

2. The loam shall contain not less than 4 percent nor more than 20 percent organic matter as determined by the loss of weight by ignition of oven-dried samples. Test samples shall be oven-dried to a constant weight at a temperature of 230 degrees F.

B. LIME:

Lime shall be standard commercial ground limestone containing at least 50 percent total oxides (calcium oxide and magnesium oxide), and 50 percent of the material must pass through a No. 100 mesh sieve with 98 percent passing a No. 2 mesh sieve.

C. FERTILIZER:

Fertilizer shall be commercial fertilizer, 10-10-10 fertilizer mixture containing at least 40 percent of organic nitrogen. It shall be delivered to the site in the original sealed containers, each showing the manufacturer's guaranteed analysis. Fertilizer shall be stored so that when used it will be dry and free flowing. No fertilizer shall be used which has not been marketed in accordance with State and Federal Laws, relating to fertilizers.

D. MULCH:

1. Materials to be used in mulching shall conform to the following requirements:
2. Straw Mulch - Straw Mulch shall consist of stalks or stems of grain after threshing.
3. Wood Fibre Mulch - Wood Fibre Mulch shall consist of wood fibre produced from clean, whole uncooked wood, formed into resilient bundles having a high degree of internal friction and shall be dry when delivered to the project.

E. SEED:

1. Seed shall be of an approved mixture, the previous year's crop, clean, high in germinating value, a perennial variety, and low in weed seed. Seed shall be obtained from a reliable seed company and shall be accompanied by certificates relative to mixture purity and germinating value.
2. Grass seed for lawn areas shall conform to the following requirements:

	Proportion by Weight	Germination Purity	Purity Minimum
Chewing's Fescue	30%	70%	97%
Kentucky 31 Fescue	30%	90%	98%
Kentucky Blue Grass	20%	80%	85%
Domestic Rye Grass	20%	90%	98%

Grass seed for cross-country areas, slopes and other areas not normally mowed shall conform to the following requirements:

	Proportion by Weight	Germination Minimum	Purity Minimum
Creeping Red Fescue	50%	85%	95%
Kentucky 31	30%	85%	95%
Domestic Rye	10%	90%	98%
Red Top	5%	85%	92%
Ladino Clover	5%	85%	96%

F. TEMPORARY COVER CROP:

1. Temporary cover crop shall conform to the following requirements:

	% Weight	Germination Minimum
Winter Rye	80 min.	85%
Red Fescue (creeping)	4 min.	80%
Perennial Rye Grass	3 min.	90%
Red Clover	3 min.	90%
Other Crop Grass	0.5 max.	
Noxious Weed Seed	0.5 max.	
Inert Matter	1.0 max.	

G. SLOPE EROSION PROTECTION:

1. Erosion control blanket shall be 100% degradable plastic mesh with 100% degradable straw or straw/coconut fill. Fill shall be held together by degradable fastening. Weight shall be 0.50 lb/sq. yd. Erosion control blankets shall be applied parallel to direction of water flow. The erosion control blankets shall be by North American Green, Evansville, IN or approved equal. For slopes 2:1 or greater, Model SC150 shall be used. For slopes less than 2:1, Model S150 shall be used.
2. Six-inch wire staples shall be placed according to manufacturers recommendations to anchor the mesh material. Staples shall be designed to decompose.

PART 3 - EXECUTION

3.01 SURFACE PREPARATION:

- A. After approval of rough grading, loam shall be placed on areas affected by the Contractor's operations. Loam shall be at least 6-inches compacted thickness.

- B. Lime shall be applied to bring the pH to 6.5 or, without a soil test, at the rate of 2-3 tons of lime per acre.
- C. Fertilizer shall be applied according to the soil test, or without a soil test, at the rate of 1000 pounds per acre.
- D. Loam shall be worked a minimum of 3-inches deep, thoroughly incorporating the lime and fertilizer into the soil. The loam shall then be raked until the surface is finely pulverized and smooth and compacted with rollers, weighing not over 100 pounds per linear foot of tread, to an even surface conforming to the prescribed lines and grades. Minimum depth shall be 6-inches after completion.

3.02 SEEDING:

- A. Seeding shall be done when weather conditions are approved as suitable, in the periods between April 1 and May 30 or August 15 to October 1, unless otherwise approved.
- B. If there is a delay in seeding, during which weeds grow or soil is washed out, the Contractor shall remove the weeds or replace the soil before sowing the seed, without additional compensation. Immediately before seeding is begun, the soil shall be lightly raked.
- C. Seed shall be sown at the approved rate, on a calm day by machine.
- D. One half the seed shall be sown in one direction and the other half at right angles. Seed shall be raked lightly into the soil to a depth of 1/4-inch and rolled with a roller weighing not more than 100 pounds per linear foot of tread.
- E. The surface shall be kept moist by a fine spray until the grass shows uniform germination over the entire area. Wherever poor germination occurs in areas larger than 3 sq. ft., the Contractor shall reseed, roll, and water as necessary to obtain proper germination.
- F. The Contractor shall water, weed, cut and otherwise maintain and protect seeded areas as necessary to produce a dense, healthy growth of perennial lawn grass.
- G. If there is insufficient time in the planting season to complete the fertilizing and seeding, permanent seeding may be left until the following planting season, at the option of the Contractor or as required by the Engineer. In that event, a temporary cover crop shall be sown. This cover crop shall be cut and watered as necessary until the beginning of the following planting season, at which time it shall be plowed or harrowed into the soil, the area shall be fertilized and the permanent seed crop shall be sown as specified.

3.03 PLACING MULCH:

- A. Straw Mulch shall be loosely spread to a uniform depth over all areas designated on the plans, at the rate of 4-1/2 tons per acre, or as otherwise required.

- B. Straw Mulch may be applied by mechanical apparatus, if in the judgment of the Engineer the apparatus spreads the mulch uniformly and forms a suitable mat to control slope erosion. The apparatus shall be capable of spreading at least 80 percent of the hay or straw in lengths of 6-inches or more, otherwise it shall be spread by hand without additional compensation.
- C. Wood Fibre Mulch shall be uniformly spread over certain selected seeded areas at the minimum rate of 1,400 pounds per acre unless otherwise required. It shall be placed by spraying from an approved spraying machine having pressure sufficient to cover the entire area in one operation.

3.04 SEEDING AND MULCHING BY SPRAY MACHINE:

- A. The application of lime, fertilizer, grass seed and mulch may be accomplished in one operation by the use of an approved spraying machine. The materials shall be mixed with water in the machine and kept in an agitated state in order that the materials may be uniformly suspended in the water. The spraying equipment shall be so designed that when the solution is sprayed over an area, the resulting deposits of lime, fertilizer, grass seed and mulch shall be equal to the specified quantities.
- B. A certified statement shall be furnished, prior to start of work, to the Engineer by the Contractor as to the number of pounds of limestone, fertilizer, grass seed and mulch per 100 gallons of water.
- C. This statement should also specify the number of square yards of seeding that can be covered with the solution specified above. If the results of the spray operation are unsatisfactory, the Contractor will be required to abandon this method and to apply the lime, fertilizer, grass seed and mulch by other methods.

3.05 INSPECTION AND ACCEPTANCE:

At the beginning of the planting season following that in which the permanent grass crop is sown, the seeded areas will be inspected. Any section not showing dense, vigorous growth at that time shall be promptly reseeded by the Contractor at its own expense. The seeded areas shall be watered, weeded, cut and otherwise maintained by the Contractor until the end of that planting season, when they will be accepted if the sections show dense, vigorous growth.

END OF SECTION

SECTION 03302
FIELD CONCRETE

PART 1 - GENERAL

1.01 WORK INCLUDED:

- A. This Section covers concrete and all related items necessary to place and finish the concrete work.
- B. Concrete thrust, and anchor blocks, to be provided at all water main bends, tees, plugs and wyes and at other locations required by the Engineer shall be installed in accordance with the details shown on the drawings and as specified in this section.
- C. Concrete encasement for piping with shallow cover and for encasement of telephone, and electrical duct bank when specified shall be installed in accordance with the details shown on the drawings and as specified in this section.

1.02 RELATED WORK:

- A. Section 02300, EARTHWORK
- B. Section 02080, DUCTILE IRON PIPE AND FITTINGS
- C. Section 02089, DUCTILE IRON GRAVITY PIPE AND FITTINGS FOR SEWERS

1.03 REFERENCES:

- A. The following standards form a part of this specification:

American Concrete Institute (ACI)

- ACI 304 Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete.
- ACI 305 Recommended Practice for Hot Weather Concreting
- ACI 306 Recommended Practice for Cold Weather Concreting
- ACI SP-66 ACI Detailing Manual
- ACI 318 Building Code Requirements for Reinforced Concrete

ASTM International (ASTM)

ASTM A615	Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
ASTM C33	Concrete Aggregates
ASTM C94	Ready-Mixed Concrete
ASTM C143	Test for Slump of Portland Cement Concrete
ASTM C150	Portland Cement
ASTM C260	Air Entraining Admixtures for Concrete
ASTM C494	Chemical Admixtures for Concrete

1.04 SUBMITTALS: IN ACCORDANCE WITH REQUIREMENTS OF SECTION 01330 SUBMITTALS, SUBMIT THE FOLLOWING:

Statement of materials constituting the design of mixes for each size aggregate as required by ASTM C94 shall be submitted to the Engineer within one week following award of the Contract.

PART 2 - PRODUCTS

2.01 CONCRETE:

- A. All concrete, reinforced or non-reinforced shall have a 28 day compressive strength of 3000 psi unless otherwise noted on the design drawings. A minimum of 5.5 sacks of cement per cubic yard and a maximum water cement ratio of 6.9 gallons per sack shall be used.
- B. Concrete shall conform to ASTM C94. The Contractor shall be responsible for the design of the concrete mixtures. Slump shall be a maximum of 4-inches and a minimum of 2-inches, determined in accordance with ASTM C143.
- C. Admixtures shall be as specified in subsection 2.05. No additional admixtures shall be used unless approved by the Engineer.
- D. No additional water, except for the amount indicated by the design mix shall be added to the concrete without the prior permission of the Engineer.

2.02 CEMENT:

The cement shall be an approved brand of American manufactured Portland Cement, Type II conforming to the applicable requirements of ASTM C150.

2.03 AGGREGATES

- A. Except as otherwise noted, aggregate shall conform to the requirements of ASTM C33.
- B. Maximum size aggregate shall be 3/4-inch.

2.04 ADMIXTURES:

- A. All concrete (unless otherwise directed) shall contain an air entraining agent. Air entrained concrete shall have air content by volume of 4 to 8 percent for 3/4-inch aggregate.
- B. Air entraining agent shall be in accordance with ASTM C260 and shall be Darex AEA, as manufactured by W.R. Grace & Company; Placewel (air entraining Type), as manufactured by Johns Manville; Sika AER as manufactured by Sika Chemical Company; or an approved equal product.
- C. Water reducing agent shall be WRDA, as manufactured by W.R. Grace & Company; Placewel (non-air entraining Type), as manufactured by Johns Manville; Sika Plastiment as manufactured by Sika Chemical Company; or an approved equal product.
- D. Water reducing agent-retarder shall be "Daratard," as manufactured by W.R. Grace & Company; Sika Plastiment as manufactured by Sika Chemical Company; or an approved equal product.

2.05 WATER:

- A. Water for concrete shall be potable, free of deleterious amounts of oil, acid, alkali, organic matter and other deleterious substances.

PART 3 - EXECUTION

3.01 PREPARATION:

- A. Before placing concrete, forms and the space to be occupied by the concrete shall be thoroughly cleaned, and reinforcing steel and embedded metal shall be free from dirt, oil, mill scale, loose rust, paint or the material which would tend to reduce the bond.
- B. Earth, concrete, masonry, or other water permeable material against which concrete is to be placed shall be thoroughly saturated with water immediately before concrete is placed.

3.02 FILL CONCRETE:

- A. Fill concrete shall be placed in those locations as indicated on the design drawings. Fill concrete shall consist of materials as previously specified, with a minimum 28-day compressive strength of 3000 psi.

- B. Before fill concrete is placed, the following procedures shall be used to prepare surfaces; all dirt, scum and laitance shall be removed by chipping and washing. The clean, roughened base surface shall be saturated with water, but shall have no free water on the surface. A coat of 1:2 cement-sand grout, approximately 1/8-inch thick, shall be well scrubbed into the thoroughly dampened concrete base. The concrete fill shall be placed immediately, before grout has dried or set.
- C. Fill concrete shall be brought to lines and grades as shown on the design drawings.

3.04 CONCRETE PLACING DURING COLD WEATHER:

- A. Concrete shall not be placed on frozen ground, and no frozen material or material containing ice shall be used. Materials for concrete shall be heated when temperature is below 40°F, or is expected to fall to below 40°F, within 73 hours, and the concrete after placing shall be protected by covering, heat, or both.
- B. All details of Contractor's handling and protecting of concrete during freezing weather shall be subject to the approval of the Engineer. All procedures shall be in accordance with provisions of ACI 306.

3.05 CONCRETE PLACING DURING HOT WEATHER:

- A. Concrete just placed shall be protected from the direct rays of the sun and the forms and reinforcement just prior to placing, shall be sprinkled with cold water. The Contractor shall make every effort to minimize delays, which will result in excessive mixing of the concrete after arrival on the job.
- B. During periods of excessively hot weather (90°F or above), ingredients in the concrete shall be cooled insofar as possible and cold mixing water shall be used to maintain the temperature of the concrete at permissible levels all in accordance with the provisions of ACI 305. Any concrete with a temperature above 90°F, when ready for placement, will not be acceptable, and will be rejected.

3.06 FIELD QUALITY CONTROL:

- A. Concrete inspection and testing shall be performed by the Engineer or by an inspection laboratory, designated by the Engineer, engaged and paid for by the Owner. Testing equipment shall be supplied by the laboratory, and the preparation of samples and all testing shall be performed by the laboratory personnel. Full assistance and cooperation, concrete for samples, and such auxiliary personnel and equipment as needed shall be provided by the Contractor.

- B. At least 4 standard compression test cylinders shall be made and tested and 1 slump test from each day's placement of concrete. A minimum of four compression test cylinders shall be made and tested for each 100 cubic yards of each type and design strength of concrete placed. One cylinder shall be tested at 7 days, and two at 28 days. The fourth cylinder from each set shall be kept until the 28 day test report on the second and third cylinders in the same set has been received. If the average compressive strength of the two 28 day cylinders do not achieve the required level, the Engineer may elect to test the fourth cylinder immediately or test it after 56 days. If job experience indicates additional cylinder tests or other tests are required for proper control or determination of concrete quality, such tests shall be made.

- C. The Engineer shall have the right to reject concrete represented by low strength tests. Rejected concrete shall be promptly removed and replaced with concrete conforming to the specification. The decision of the Engineer as to whether substandard concrete is to be accepted or rejected shall be final.

END OF SECTION

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Bid Bond

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned as _____ Principal, and as _____ Surety, are hereby held and firmly bound unto the City of Rochester, NH as OWNER in the penal sum of _____ for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, successors and assigns.

Signed, this _____ day of _____ in the year ____.

The condition of the above obligation is such that whereas the Principal has submitted to _____ a certain BID, attached hereto and hereby made a part hereof to enter into a contract in writing, for the Eastern Avenue Sanitary Sewer and Surface Drain Rehabilitation Project

NOW, THEREFORE,

- (a) If said BID shall be rejected, or
- (b) If said BID shall be accepted and the Principal shall execute and deliver a contract in the Form of Contract attached hereto (Properly completed in accordance with said BID) and shall furnish a BOND for faithful performance of said contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said BID, then this obligation shall be void, otherwise, the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its BOND shall be in no way impaired or affected by any extension of the time within which the OWNER may accept such BID; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

Principal Signature

Witnessed By:

Surety Signature

Witnessed By:

IMPORTANT-Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state of New Hampshire.

Bid

Proposal of _____ [company](hereinafter called the "BIDDER", organized and existing under the laws of the State of __ doing business as Corporation, Partnership, Individual to the City of Rochester, NH (herein after called "OWNER").

In compliance with your Advertisement for Bids, BIDDER hereby proposes to perform all WORK For the construction of Eastern Avenue Sanitary Sewer and Surface Drain Rehabilitation Project in strict accordance with the CONTRACT DOCUMENTS, within the time set forth therein, and at the prices stated below.

By submission of this BID, each BIDDER certifies, and in the case of a joint BID each party thereto certifies as to their own organization, that this BID has been arrived at independently, without consultation, communication, or agreement as to any matter relating to the BID with any other BIDDER or with any competitor.

BIDDER hereby agrees to commence WORK under this contract on or before a date to be specified in the NOTICE TO PROCEED and to complete the PROJECT within:

- 90 calendar days for substantial completion (excluding re-test inspection).
- 120 calendar days for final completion (excluding re-test inspection).
- 21 calendar days for re-rest inspection

Liquidated damages will be in the amount of \$1,260 for each calendar day of delay from the date established for substantial completion and \$1,260 for each calendar day of delay from the date established for final completion, as provided in Section 18 of the General Conditions.

BIDDER acknowledges receipt of the following ADDENDUM:

- 1 _____
- 2 _____
- 3 _____
- 4 _____
- 5 _____

The Bidder shall state below what works of a similar character to that of the proposed contract they have performed and provide such references as will enable the Owner to judge their experience, skill, and business standing.

All questions must be answered, and the data given must be clear and comprehensive. This statement must be notarized. If necessary, add separate sheets.

Bidder Name:			
Permanent Main Office Address:			
	Street # and name	City/Town	State ZIP
When was it organized?		Where incorporated?	
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Is the bidder registered with the Secretary of State to do business in NH?	
For how many years has your firm engaged in the contracting business under its present name?			
Please list previous firm names and dates if applicable.			
Years	Previous Name		
Contracts on hand, attach a schedule or list showing gross amount of each contract and the approximate anticipated dates of completion.			
Describe the general character of work performed by your company.			
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Have you ever failed to complete any work awarded you in the scheduled contract time, including approved time extensions? If so where and why?	
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Have you ever defaulted on a contract? If so where and why?	
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Have you ever had liquidated damages assessed on a contract? If so where and why?	
List the more important contracts recently executed by your company:			
Recent Contract Name	Approximate Cost	Month/Year Completed	
List your major equipment available for this contract: (Attach additional sheets as necessary.)			
List your key personnel available for this contract: (Attach additional sheets as necessary.)			
Staff Name	Role (i.e. Project Superintendent, Foreman)		

List any subcontractors whom you would expect to use for the following (unless this work is to be done by your own organization)		
Civil Engineering Utility Installation Other please describe:		
Please list banks with whom you conduct business.		
<input type="checkbox"/> Yes	<input type="checkbox"/> No	Do you grant the Engineer permission to contact this (these) institutions?
NOTE: Bidders may be required to furnish their latest financial statement as part of the award process.		
Respectfully Submitted:		
Signature: _____		Date: _____
Printed Name: _____		Title: _____
Street # and name	City/Town	State ZIP
[Signed Name] Being duly sworn, deposes and says that they are [Position Title] of [Organization]		
and all the answers to the foregoing questions and all statement contained therein are true and correct.		
Sworn to before me this _____ day of _____, 20____		
_____, Notary Public		
My Commission Expires _____		
Seal		
Attest:		
BIDDER agrees to perform all the work described in the CONTRACT DOCUMENTS for the following unit prices or lump sum:		
NOTE: BIDS shall include sales tax and all other applicable taxes and fees.		

CITY OF ROCHESTER, NEW HAMPSHIRE

EASTERN AVENUE SANITARY SEWER AND SURFACE DRAIN REHABILITATION PROJECT

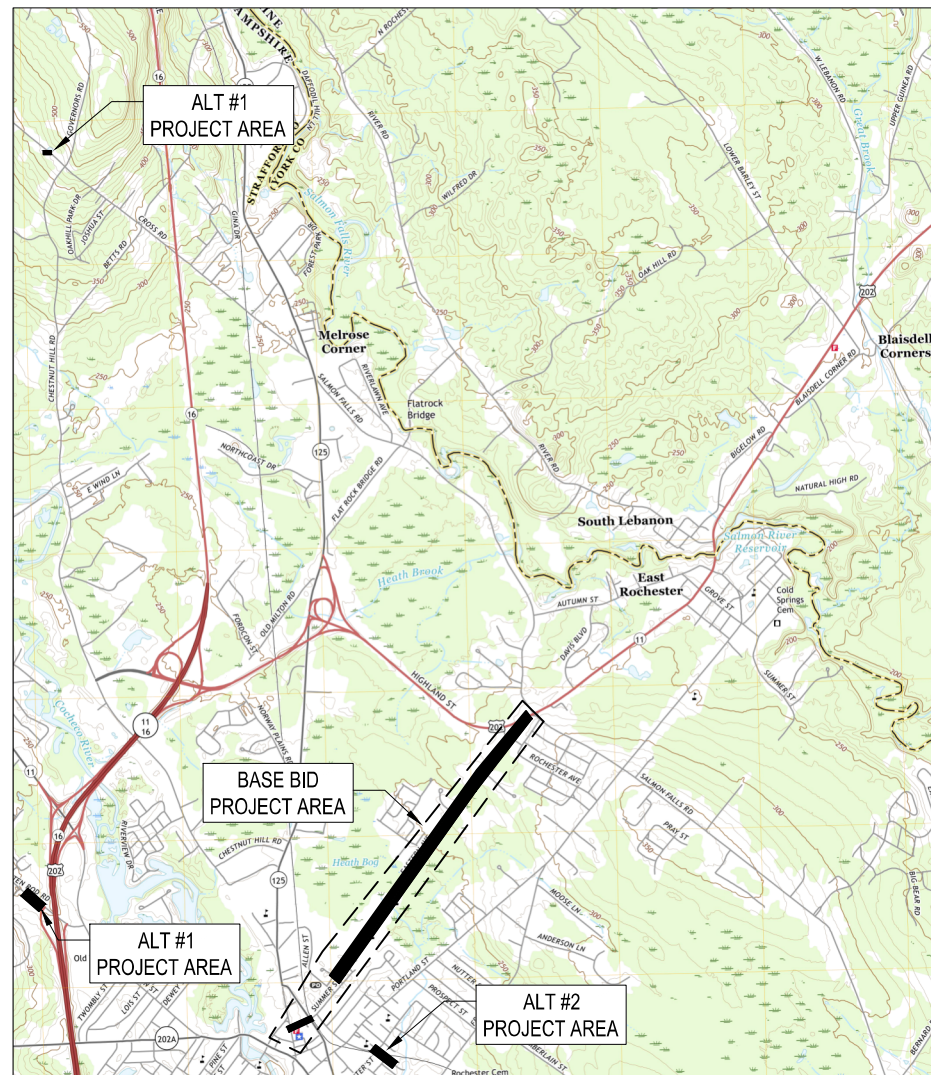
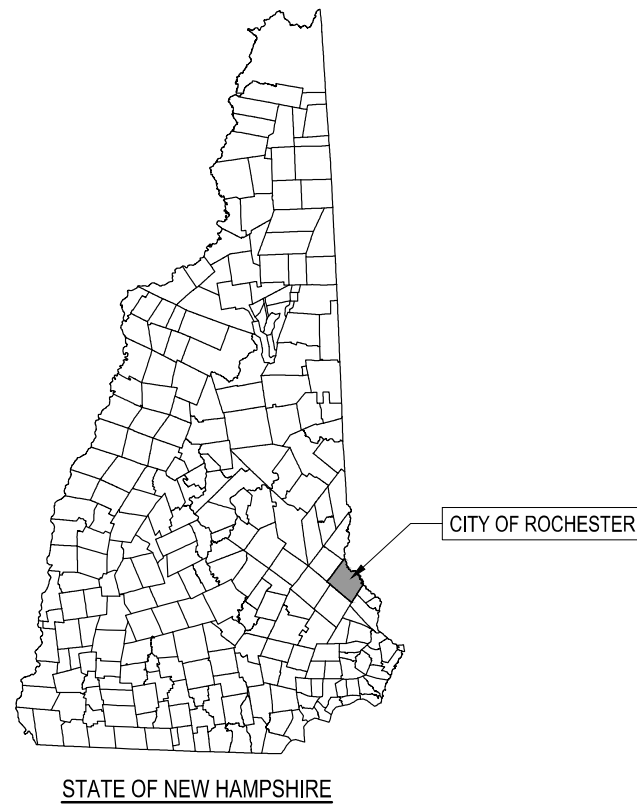
DEPARTMENT OF PUBLIC WORKS

CITY OF ROCHESTER: BID 24-27



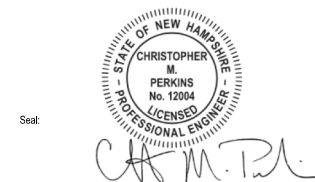
Weston & Sampson Engineers, Inc.
100 International Drive, Suite 152
Portsmouth, NH 03801
978.532.1900 800.SAMPSON
www.westonandsampson.com

Consultants:



LOCATION MAP
SCALE: 1" = 2,000'

DRAWING INDEX	
SHEET	TITLE
G000	COVER AND DRAWING INDEX
G001	ABBREVIATIONS, NOTES, AND LEGEND
C100	BASE BID PLANS AND TABLES
C101	BASE BID AND ALTERNATE BIDS 1&2 PLANS AND TABLES
C501	CONSTRUCTION DETAILS
C502	CONSTRUCTION ZONE SAFETY PLAN



Issued Date:

02/29/2024



Know what's below.
Call before you dig.

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Issued For:

BIDDING

LEGEND		
DESCRIPTION	EXISTING	PROPOSED REHABILITATIONS
SANITARY SEWER	—	—
SANITARY SEWER MANHOLE	SMH01234 ○	SMH01234 ○
SURFACE DRAIN MANHOLE	DMH01234 ○	DMH01234 ○
SURFACE DRAIN	---	---
CATCH BASIN	□	□
BUILDING	■	■
MARSH/WOODED MARSH/WOODED AREA	▨	▨
WATER GATE	⊕	
HYDRANT	⊕	
WATER SHUT OFF	⊕	

CONSTRUCTION NOTES:

1. THE CONTRACTOR SHALL CALL DIG SAFE AT 811 OR 1-888-344-7233 AT LEAST 72 HOURS, SATURDAYS, SUNDAYS, AND HOLIDAYS EXCLUDED, PRIOR TO EXCAVATING AT ANY LOCATION. A COPY OF THE DIG SAFE PROJECT REFERENCE NUMBER(S) SHALL BE GIVEN TO THE OWNER PRIOR TO EXCAVATION.
2. LOCATIONS OF EXISTING PIPES, CONDUITS, UTILITIES, FOUNDATIONS AND OTHER UNDERGROUND OBJECTS ARE NOT WARRANTED TO BE CORRECT AND THE CONTRACTOR SHALL HAVE NO CLAIM ON THAT ACCOUNT SHOULD THEY BE OTHER THAN SHOWN.
3. STONE WALLS, FENCES, MAIL BOXES, SIGNS, CURBS, LIGHT POLES, ETC. SHALL BE REMOVED AND REPLACED AS NECESSARY TO PERFORM THE WORK. UNLESS OTHERWISE INDICATED, ALL SUCH WORK SHALL BE INCIDENTAL TO CONSTRUCTION OF THE PROJECT.
4. ALL PAVEMENT DISTURBED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPLACED IN ACCORDANCE WITH THE SPECIFICATIONS.
5. ALL AREAS DISTURBED BY THE CONTRACTOR BEYOND PAYMENT LIMITS SHALL BE RESTORED AT NO ADDITIONAL COST TO THE OWNER.
6. THE CONTRACTOR SHALL NOT STORE ANY APPARATUS, MATERIALS, SUPPLIES, OR EQUIPMENT ON DRAINAGE STRUCTURES OR WITHIN 100 FEET OF WETLANDS.
7. IN PAVED AREAS, THE TOP OF THE MANHOLE COVER SHALL BE SET FLUSH WITH THE PAVED SURFACE. FOR MANHOLES LOCATED OFF THE PAVED SURFACE ON EASTERN AVENUE, THE TOP OF THE COVER SHALL BE 6 INCHES BELOW THE FINISHED GRADE, OR AS SHOWN ON THE DRAWINGS, OR AS REQUIRED BY THE ENGINEER.
8. THE CONTRACTOR SHALL GIVE THE ENGINEER AT LEAST 10 DAYS' NOTICE PRIOR TO PERFORMING ANY WORK IN WETLANDS.
9. EXISTING UTILITY INFORMATION WAS TAKEN FROM CITY RECORD DRAWINGS. THE CONTRACTOR SHALL VISIT THE PREMISES TO FAMILIARIZE HIMSELF THOROUGHLY WITH ALL THE DETAILS OF THE WORK AND OF WORKING CONDITIONS, TO VERIFY ALL DIMENSIONS IN THE FIELD, AND TO ADVISE THE ENGINEER IN WRITING OF ANY DISCREPANCY BEFORE PERFORMING ANY WORK. THE CONTRACTOR SHALL CONSULT OFFICIAL RECORDS OF EXISTING UTILITIES, BOTH SURFACE AND SUBSURFACE, AND THEIR CONNECTIONS, AND SHALL FULLY INFORM HIMSELF OF ALL EXISTING CONDITIONS AND LIMITATIONS AS THEY APPLY TO THE WORK.
10. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE LOCATION OF SEWER SERVICES AS NECESSARY TO PERFORM THE WORK.
11. THE CONTRACTOR SHALL MAINTAIN LOCAL TRAFFIC TO ALL STREETS THROUGHOUT THE DURATION OF THE PROJECT.
12. CONTRACTOR SHALL MAINTAIN EXISTING FLOWS IN THE SYSTEM, BYPASSING AS NECESSARY TO PREVENT SURCHARGING, AS APPROVED OR REQUIRED BY THE ENGINEER.
13. PLANS ONLY ILLUSTRATE APPROXIMATE LOCATIONS OF MANHOLES AND PIPE SEGMENTS. REFER TO THE TABLES ON EACH SHEET FOR THE APPROXIMATE LENGTH OF EACH PIPE SEGMENT AND THE APPROXIMATE STATION NUMBER OF REHABILITATIONS. SEE TELEVISION INSPECTION LOGS, WHICH SHALL BE FURNISHED UPON REQUEST, FOR MORE INFORMATION. THE LOCATIONS OF MANHOLES AND PIPE SEGMENTS SHALL BE FIELD VERIFIED BY THE CONTRACTOR.
14. EXCAVATION SHALL BE COMPLETED IN ACCORDANCE WITH ALL APPLICABLE NEW HAMPSHIRE STANDARDS AND SPECIFICATIONS.
15. IN SITUATIONS WHERE WORK IS LOCATED OFF A PUBLIC STREET, THE 'STREET / LOCATION' FIELD OF THE TABLE INDICATES THE CLOSEST STREET.
16. MANHOLES AND LINE SEGMENTS WITH WORK TO BE PERFORMED ON ARE INDICATED ON PLANS ACCORDING TO LEGEND. WHERE THERE IS A DISCREPANCY BETWEEN THE PLANS AND THE WORK TABLES, THE WORK TABLES SHALL CONTROL.
17. WATER SERVICE CONNECTIONS AND GAS SERVICE CONNECTIONS HAVE NOT BEEN INCLUDED ON THE PLAN VIEWS. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE LOCATION OF WATER SERVICE CONNECTIONS, GAS SERVICE CONNECTIONS AND OTHER UTILITIES AS NECESSARY TO PERFORM THE WORK.
18. NO CONSTRUCTION WORK SHALL BE ALLOWED ON SATURDAYS, SUNDAYS, OR HOLIDAYS WITHOUT WRITTEN AUTHORIZATION FROM THE OWNER AND APPROVAL FROM THE ENGINEER.
19. ALL STREET EXCAVATIONS SHALL BE COMPLETELY CLOSED AT THE END OF EACH WORKING DAY BY BACKFILLING OR COVERING WITH STEEL PLATES.
20. WHENEVER A SEWER MUST CROSS UNDER A WATER MAIN, THE SEWER SHALL BE LAID AT SUCH AN ELEVATION THAT THE TOP OF THE SEWER IS AT LEAST 18 INCHES BELOW THE BOTTOM OF THE WATER MAIN.

ABBREVIATIONS

APPROX.	APPROXIMATE
AVE	AVENUE
BLDG.	BUILDING
C	CENTERLINE
CMP	CORRUGATED METAL PIPE
CP	CONCRETE PIPE (NON-REINFORCED)
CT	COURT
DIA.	DIAMETER
DPW	DEPARTMENT OF PUBLIC WORKS
EA	EACH
IN	INCH
L	LENGTH
LF	LINEAR FEET
LN	LANE
MH	MANHOLE
MIN.	MINIMUM
NA	NOT APPLICABLE
NO.	NUMBER
NTS	NOT TO SCALE
PKWY	PARKWAY
PS	PUMP STATION
PVC	POLYVINYL CHLORIDE
RCP	REINFORCED CONCRETE PIPE
RD	ROAD
REQ'D	REQUIRED
ST	STREET
STA	STATION
SVC	SERVICE CONNECTION
TEMP	TEMPORARY
TYP	TYPICAL
VF	VERTICAL FEET
VCP	VITRIFIED CLAY PIPE
W	WIDTH

Project:

CITY OF ROCHESTER, NH



EASTERN AVENUE SANITARY SEWER AND SURFACE DRAIN REHABILITATION PROJECT

31 WAKEFIELD STREET
ROCHESTER, NH 03868



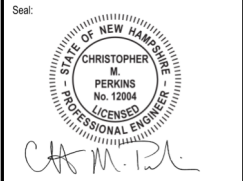
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100 International Drive, Suite 152
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 W&S Project No.: ENG23-0612
 W&S File No.:

Drawing Title:
ABBREVIATIONS, NOTES, AND LEGEND

Sheet Number:
G001

BASE BID - STRUCTURAL CURED-IN-PLACE PIPE

ASSET ID	MH	TO MH	STREET/LOCATION	PIPE DIA (IN)	MATERIAL	APPROXIMATE MH TO MH LENGTH (LF)	REINSTATE ACTIVE SVC. (APPROX. STA)	APPROX. NUMBER OF ACTIVE SVC
SP01267	SMH0052	SMH0051	SUMMER STREET	12	VCP	302	1+22, 1+65, 1+67, 1+89, 2+20, 2+24, 2+24, 2+44, 2+74, 2+76	10
SP01268	SMH0051	SMH1469	SUMMER STREET	12	VCP	237	0+06, 0+48, 0+63, 0+67, 0+91, 1+52, 1+79, 1+98	8
SP00585	SMH0362	SMH0360	WALNUT ST	8	VCP	346	0+07, 0+50, 1+14, 1+39, 1+67	5
SP01910	SMH0360	SMH1850	WALNUT ST	8	VCP	49	-	0

APPROX. 8-INCH TOTAL (LF)= 395
APPROX. 12-INCH TOTAL (LF)= 539

NOTE:
1. CONTRACTOR TO VERIFY ALL SERVICE CONNECTION LOCATIONS AND ACTIVITY PRIOR TO CIPP INSTALLATION.

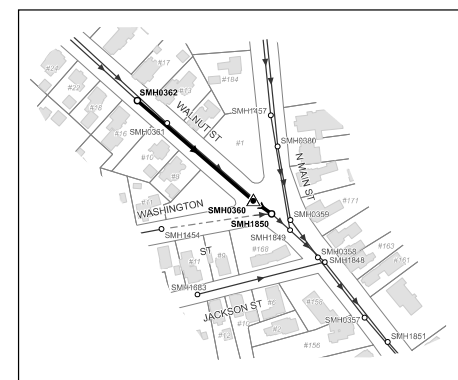
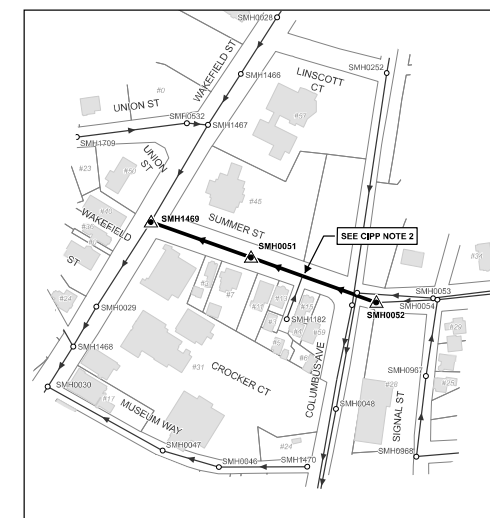
2. SP01269 FROM DANIEL COURT (6-INCH) TIES INTO ASSET ID SP02545 AS A SERVICE CONNECTION AT STA 1+67. CIPP INSTALLATION SHALL BE PERFORMED WHILE ASSET ID SP01269 IS UNDER BYPASS.

BASE BID - CEMENTITIOUS LINING AND EXTERIOR SEALING OF MANHOLES

MH	STREET/LOCATION	MATERIAL	APPROX. MH DEPTH (VF)
SMH0360	WALNUT STREET	BRICK	11
SMH0052	SUMMER STREET	BRICK	12
SMH0051	SUMMER STREET	BRICK	14
SMH1469	SUMMER STREET	BRICK	13

APPROX. TOTAL (VF)= 50

BASE BID - SANITARY SEWER



ALTERNATE BID NO. 1 - SURFACE DRAIN AND CULVERT

ALTERNATE BID #1 - STRUCTURAL ULTRAVIOLET LIGHT CURED-IN-PLACE PIPE

ASSET ID	MH	TO MH	STREET/LOCATION	PIPE DIA (IN)	MATERIAL	APPROXIMATE MH TO MH LENGTH (LF)	REINSTATE ACTIVE SVC. (APPROX. STA)	APPROX. NUMBER OF ACTIVE SVC
DP02983	CB1159	CB1157	TEN ROD ROAD	30	CMP	180	0+29, 1+19	2
DP02986	CB1157	CB1156	TEN ROD ROAD	30	CMP	260	0+48, 1+33	2
DP02989	CB1156	DMH0818	TEN ROD ROAD	36	CMP	125	1+08	1

APPROX. 30-INCH TOTAL (LF)= 440
APPROX. 36-INCH TOTAL (LF)= 125

NOTE:
1. CONTRACTOR TO VERIFY ALL SERVICE CONNECTION LOCATIONS AND ACTIVITY.

ALTERNATE BID #1 - PULL IN PLACE GLASS REINFORCED PLASTIC ULTRAVIOLET LIGHT CURED-IN-PLACE PIPE

ASSET ID	MH	TO MH	STREET/LOCATION	PIPE DIA (IN)	MATERIAL	APPROXIMATE MH TO MH LENGTH (LF)	REINSTATE ACTIVE SVC. (APPROX. STA)	APPROX. NUMBER OF ACTIVE SVC
DP07280	INTAKE	OUTFALL	CROSS ROAD ROW	36	CMP	45	-	0

APPROX. 36-INCH TOTAL (LF)= 45

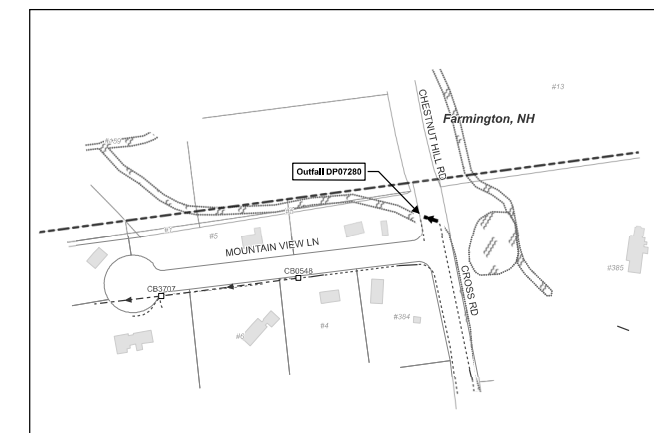
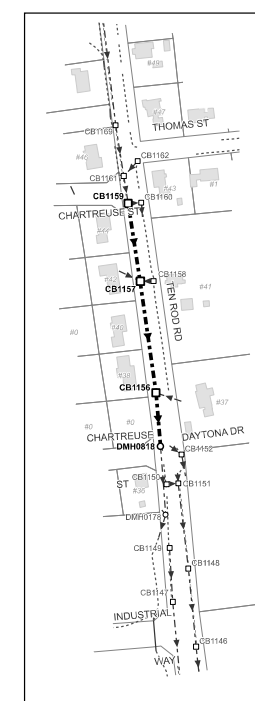
NOTE:
1. CONTRACTOR TO VERIFY ALL SERVICE CONNECTION LOCATIONS AND ACTIVITY.

ALTERNATE BID #1 - CUT PROTRUDING SERVICE CONNECTION

ASSET ID	MH	TO MH	STREET/LOCATION	PIPE DIA (IN)	MATERIAL	APPROXIMATE MH TO MH LENGTH (LF)	CUT PROTRUDING SVC. (APPROX. STA)
DP02983	CB1159	CB1157	TEN ROD ROAD	30	CMP	180	0+29
DP02983	CB1159	CB1157	TEN ROD ROAD	30	CMP	180	1+19
DP02986	CB1157	CB1156	TEN ROD ROAD	30	CMP	260	0+48
DP02986	CB1157	CB1156	TEN ROD ROAD	30	CMP	260	1+33
DP02989	CB1156	DMH0818	TEN ROD ROAD	36	CMP	125	1+08

APPROX. TOTAL (EA) = 5

NOTE:
1. CONTRACTOR TO VERIFY ALL SERVICE CONNECTION LOCATIONS AND ACTIVITY.



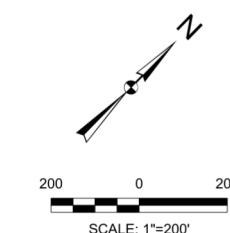
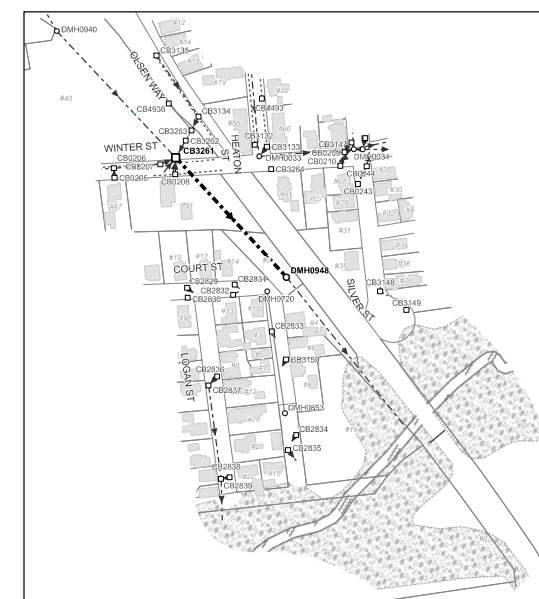
ALTERNATE BID NO. 2 - SURFACE DRAIN

ALTERNATE BID #2 - STRUCTURAL ULTRAVIOLET LIGHT CURED-IN-PLACE PIPE

ASSET ID	MH	TO MH	STREET/LOCATION	PIPE DIA (IN)	MATERIAL	APPROXIMATE MH TO MH LENGTH (LF)	REINSTATE ACTIVE SVC. (APPROX. STA)	APPROX. NUMBER OF ACTIVE SVC
DP00818	CB3261	DMH0948	WINTER STREET ROW	18	VCP	370	-	0

APPROX. 18-INCH TOTAL (LF)= 370

NOTE:
1. CONTRACTOR TO VERIFY ALL SERVICE CONNECTION LOCATIONS AND ACTIVITY.



- NOTES:
- CONTRACTOR SHALL VERIFY ALL ACTIVE SERVICE CONNECTION LOCATIONS DURING INITIAL TELEVISION INSPECTION WITH DYE TESTING. SERVICE CONNECTION LOCATIONS WERE OBTAINED FROM AVAILABLE TELEVISION INSPECTIONS AND MAY NOT BE ACCURATE.
 - STREETS WITH RIGHT OF WAY (ROW) DESIGNATION INDICATE THAT WORK IS LOCATED IN AN EASEMENT.
 - UPON COMPLETION OF WORK IN EASEMENTS, CONTRACTOR SHALL RESTORE THE AREA TO ITS ORIGINAL CONDITION, AT NO ADDITIONAL COST TO THE OWNER.
 - MANHOLE DEPTHS WERE OBTAINED FROM AVAILABLE RECORD INFORMATION. CONTRACTOR SHALL CONFIRM IN FIELD PRIOR TO BIDDING.

Project: CITY OF ROCHESTER, NH

EASTERN AVENUE SANITARY SEWER AND SURFACE DRAIN REHABILITATION PROJECT

31 WAKEFIELD STREET
ROCHESTER, NH 03868

Weston & Sampson
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No.	Date	Description

Revisions:

No.	Date	Description

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Date: 02/29/2024
Drawn By: ZSO
Reviewed By: JMS
Approved By: CMP

W&S Project No.: ENG23-0512
W&S File No.: SEE PATH

Drawing Title:

BASE BID AND ALTERNATE BIDS 1 & 2 PLANS AND TABLES

Sheet Number:

C101

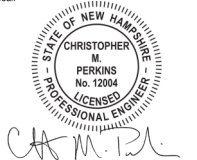
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Drawing Title:
CONSTRUCTION DETAILS

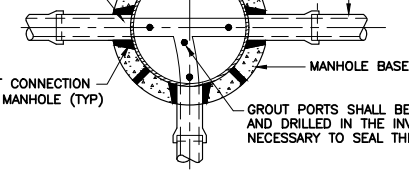
Sheet Number:
C501

PRECAST:
 GROUT PORT (TYP) FOR EXTERIOR CHEMICAL SEALING OF MANHOLES. GROUT PORTS SHALL BE LOCATED EVERY 2 FEET (MAXIMUM) AROUND THE CIRCUMFERENCE OF THE MANHOLE, APPROXIMATELY ONE FOOT BELOW AND ONE FOOT ABOVE EACH JOINT TO SEAL ALL JOINTS. ADDITIONAL GROUT PORTS SHALL BE LOCATED SO AS TO SEAL ANY OTHER DEFECTS NOT OCCURRING AT A JOINT.

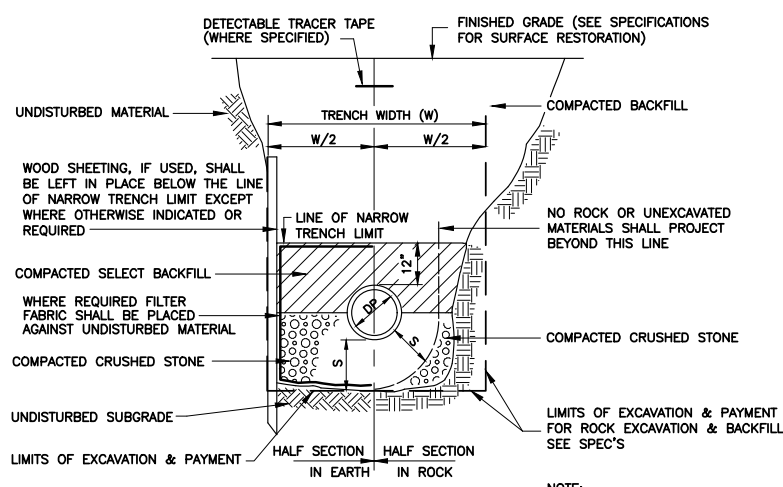
FOR BRICK/BLOCK MHS:
 GROUT PORT (TYP) FOR EXTERIOR CHEMICAL SEALING OF MANHOLES. GROUT PORTS SHALL BE LOCATED AND DRILLED AROUND THE CIRCUMFERENCE OF THE MANHOLE TO ENSURE PROPER GROUTING OF THE SOIL OUTSIDE OF MANHOLE.

INTERIOR CEMENTITIOUS LINING SHALL BE APPLIED TO THE MANHOLE BENCH, WALLS AND CORBEL/CONE (TYP). A UNIFORM MONOLITHIC LINING OF 1/2 INCH MINIMUM SHALL BE APPLIED.

INTERIOR LINING SHALL BE APPLIED 3 INCHES INTO EACH SERVICE CONNECTION.



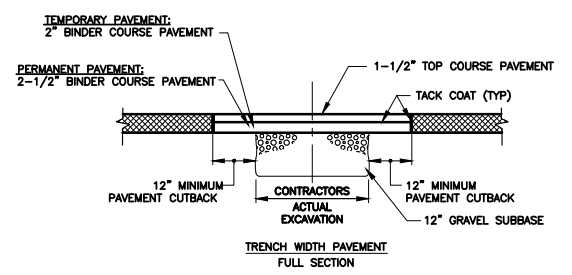
MANHOLE REHABILITATION PLAN
 N.T.S.



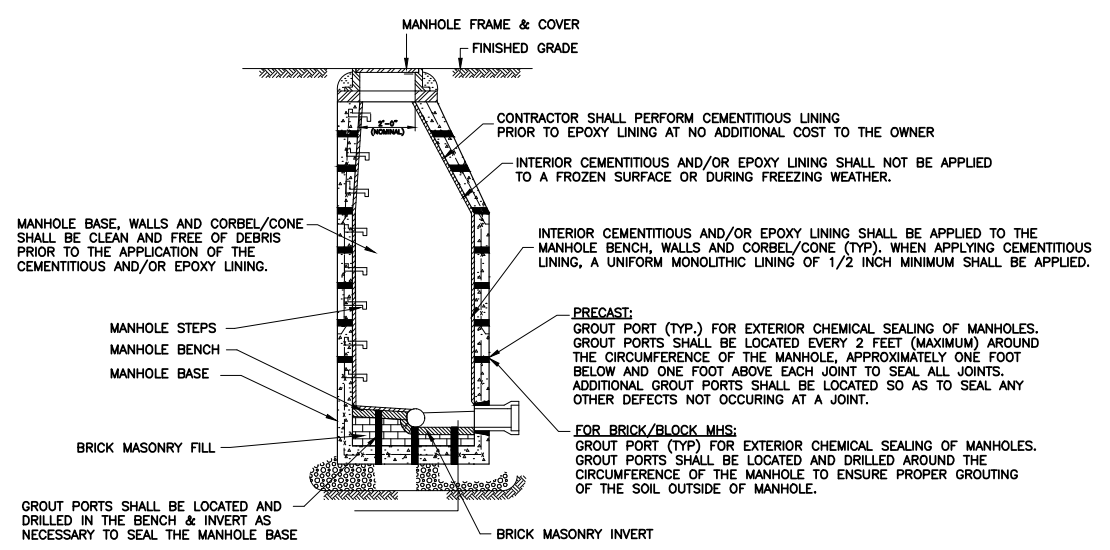
TRENCH DETAIL
 (SEWER, FORCE MAIN, STORM DRAIN)
 N.T.S.

DEPTH TO INVERT	DIAMETER OF PIPE (DP)	MAXIMUM TRENCH WIDTH BELOW LINE OF NARROW TRENCH LIMIT (SHEETED OR UNSHEETED) (W)	MINIMUM CLEARANCE (S)
0-12'	TO 18"	5'	6"
0-12'	21"-24"	5'	7-1/2"
OVER 12'	TO 18"	7'	6"
OVER 12'	21"-24"	7'	7-1/2"

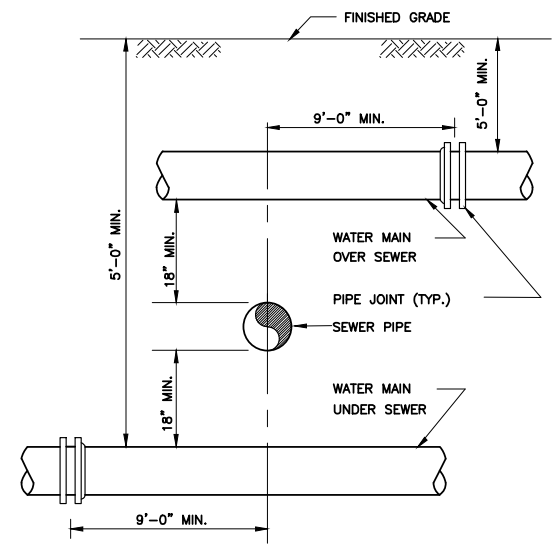
TABLE A



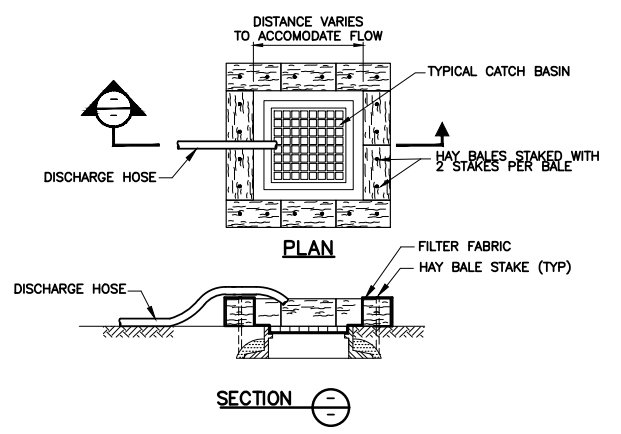
PAVEMENT REPLACEMENT DETAILS
 N.T.S.



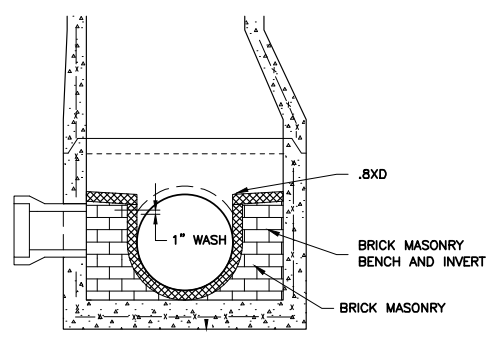
MANHOLE REHABILITATION DETAIL
 N.T.S.



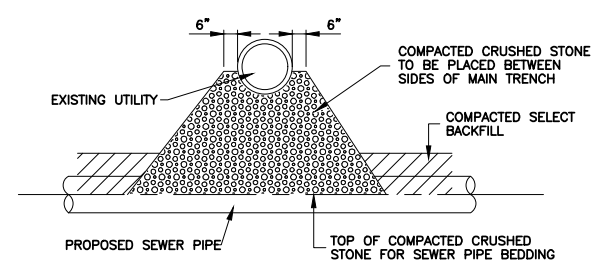
SEWER CROSSING DETAIL
 N.T.S.



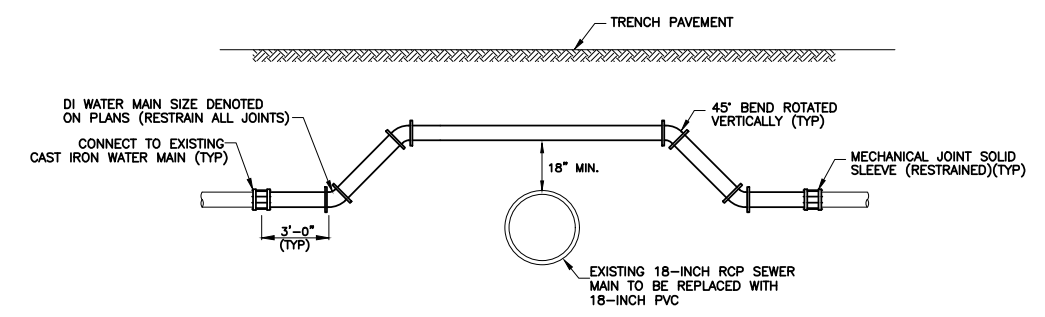
DEWATERING DISCHARGE DISPOSAL TO CATCH BASIN DETAIL
 N.T.S.



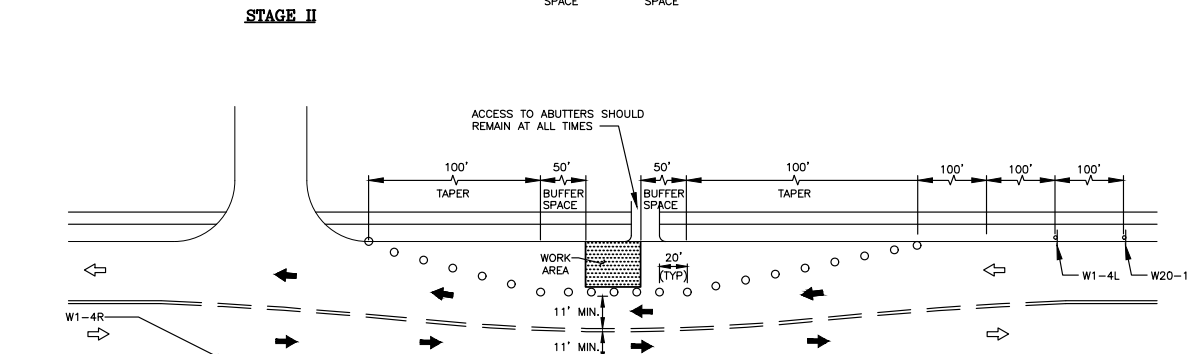
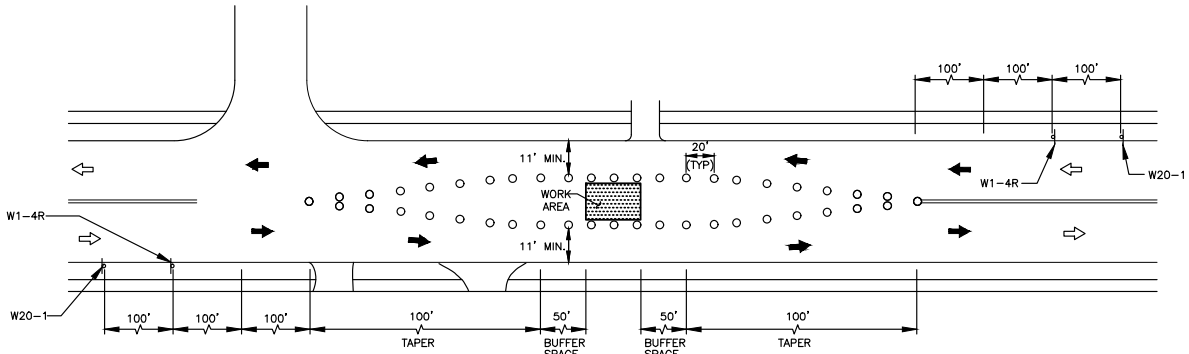
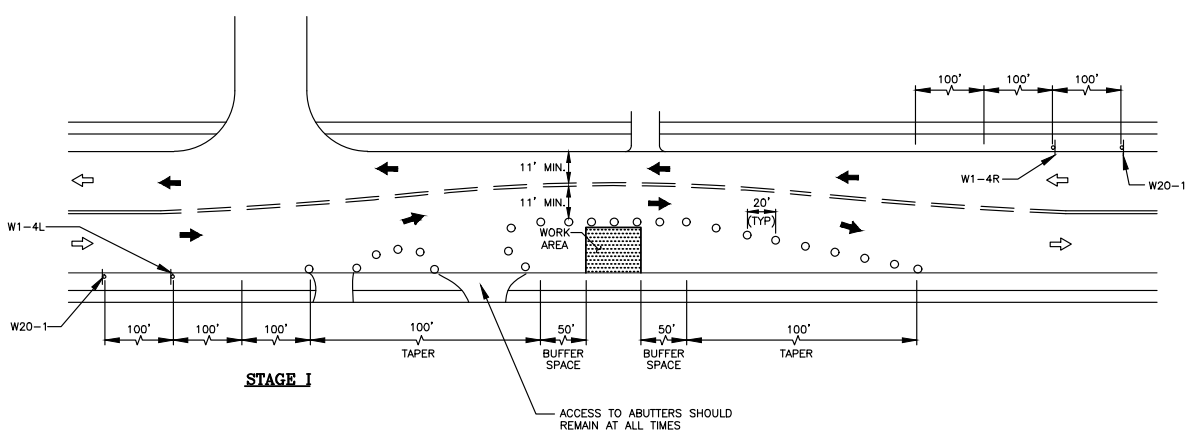
SEWER MANHOLE BENCH AND INVERT DETAIL
 N.T.S.



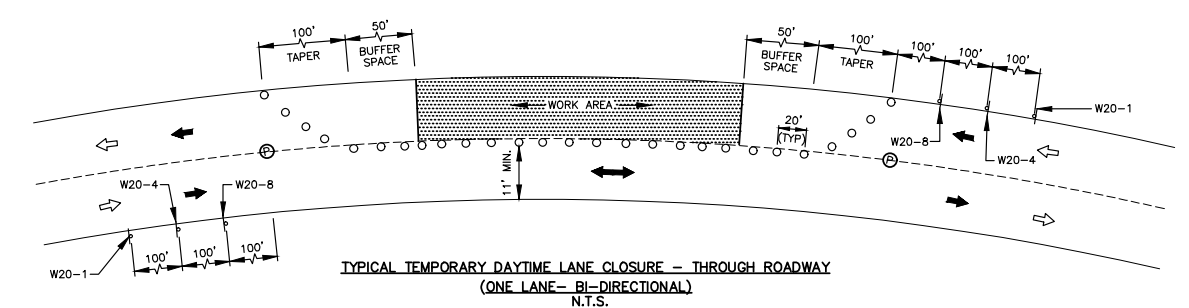
UTILITY CROSSING DETAIL
 N.T.S.



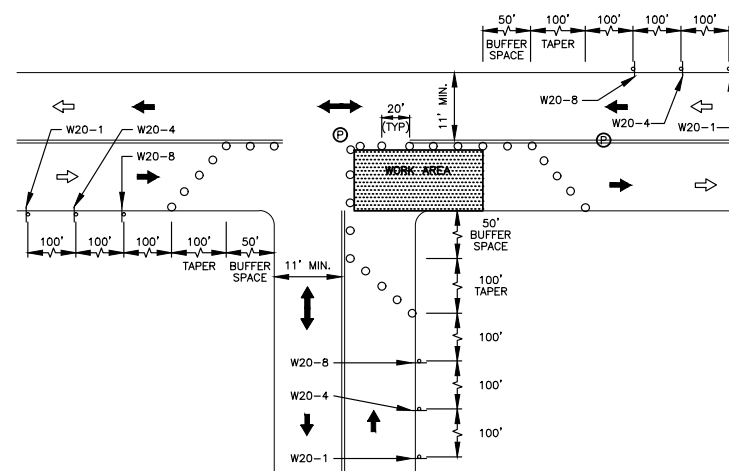
WATER CROSSING RELOCATION DETAIL
 N.T.S.



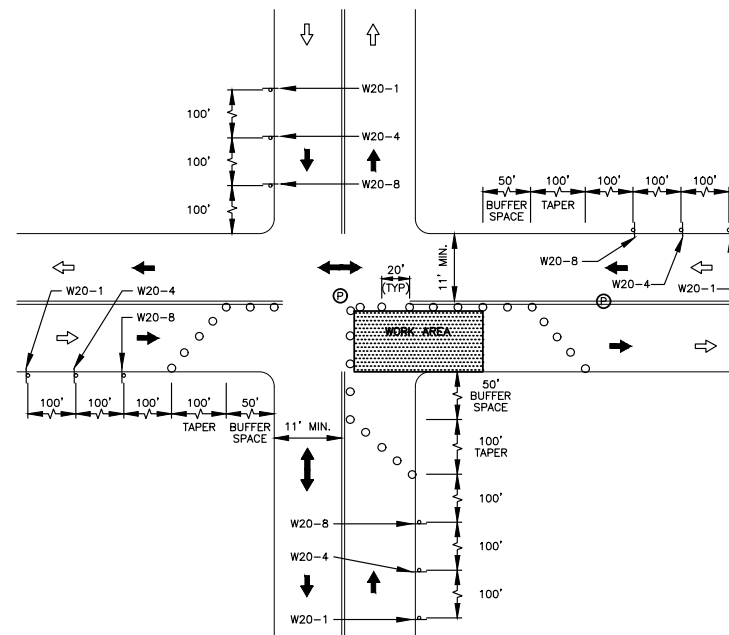
TRAFFIC OPERATION STAGES
N.T.S.



TYPICAL TEMPORARY DAYTIME LANE CLOSURE -- THROUGH ROADWAY
(ONE LANE - BI-DIRECTIONAL)
N.T.S.



"T" INTERSECTION LANE CLOSURE
N.T.S.



CLOSURE AT SIDE OF INTERSECTION
N.T.S.

TEMPORARY TRAFFIC SIGN SUMMARY

MUTCD CODE	SIZE OF SIGN		SIGN
	WIDTH	HEIGHT	
W1-4L	30"	30"	
W1-4R	30"	30"	
W20-1	36"	36"	
W20-4	36"	36"	
W20-8	36"	36"	
G20-2	36"	18"	

NOTE:

- FOR THE LATEST SPECIFICATION ON TEXT DIMENSIONS AND COLOR, CONTRACTOR SHALL REFER TO THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (CURRENT EDITION).

LEGEND:

- REFLECTORIZED DRUM
- TRAFFIC FLOW DURING CONSTRUCTION
- NORMAL TRAFFIC FLOW
- POLICE DETAIL OFFICER
- CONSTRUCTION SIGN
- WORK AREA

GENERAL NOTES:

- PLACEMENT OF ALL CONSTRUCTION SIGNS, DRUMS, BARRICADES, TRAFFIC DEVICES AND THE SHAPE, SIZE & COLOR OF ALL TEMPORARY TRAFFIC SIGNS SHALL CONFORM WITH THE LATEST EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
- ADVANCE WARNING SIGN PLACEMENT AND TAPER LENGTH TO BE ADJUSTED ACCORDING TO STREET CONDITIONS AND DRIVEWAY OPENINGS.
- ALL DRUMS SHALL BE APPROXIMATELY PLACED AND MOVED AS NECESSARY TO MAINTAIN ADEQUATE ABUTTER ACCESS AT ALL TIMES.
- THE CONTRACTOR SHALL NOTIFY EACH ABUTTER AT LEAST 24 HOURS IN ADVANCE OF THE START OF ANY WORK THAT WILL REQUIRE THE TEMPORARY CLOSURE OF ACCESS, SUCH AS EXISTING PAVEMENT EXCAVATION, TEMPORARY DRIVEWAY PAVEMENT PLACEMENT AND SIMILAR OPERATIONS.
- NONESSENTIAL TRAFFIC CONTROL DEVICES SHALL BE COVERED OR REMOVED DURING NON-WORKING HOURS.
- PEDESTRIANS SHALL BE PROVIDED WITH ACCESS AND SAFE PASSAGE THROUGH THE TEMPORARY TRAFFIC CONTROL ZONE AT ALL TIMES.
- W20-8 SHALL BE TAKEN DOWN OR COVERED AFTER EACH WORKING DAY OR WHEN OTHERWISE NOT APPLICABLE, OR WHEN POLICE OFFICERS ARE NOT PRESENT TO DIRECT TRAFFIC.
- ADVISORY SPEED PLATES (W13-1 - SEE CURRENT EDITION OF MUTCD) SHALL BE USED IF APPLICABLE AND AS REQUIRED BY THE ENGINEER.
- NO DIFFERENCE IN ROADWAY LANE ELEVATION WILL BE ALLOWED AT THE END OF THE WORK DAY.
- SAMPLE TRAFFIC PLANS INCLUDED ON THIS PLAN SHEET ARE BASED ON AN URBAN (LOW SPEED) ROAD TYPE FROM THE LATEST EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.
- DASHED LINES SHOW LANE DESIGNATIONS TO BE USED DURING CONSTRUCTION.
- THE CONTRACTOR SHALL SUBMIT ANY REVISIONS TO THE CONSTRUCTION ZONE SAFETY PLAN TO THE ENGINEER FOR APPROVAL.
- THIS CONSTRUCTION ZONE SAFETY PLAN SHALL NOT RELIEVE THE CONTRACTOR OF HIS SOLE RESPONSIBILITY FOR CONSTRUCTION SITE SAFETY.

Project: CITY OF ROCHESTER, NH



EASTERN AVENUE SANITARY SEWER AND SURFACE DRAIN REHABILITATION PROJECT

31 WAKEFIELD STREET
ROCHESTER, NH 03888



Weston & Sampson Engineers, Inc.
100 International Drive, Suite 152
Portsmouth, NH 03801
978.532.1900 800.SAMPSON

www.westonandsampson.com

Consultants:

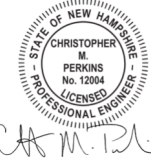
Revisions:

No.	Date	Description

COA:

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Seal:



Issued For:

BIDDING

Scale: NO SCALE

Date: 02 / 29 / 2024

Drawn By: TEL

Reviewed By: JMS

Approved By: CMP

W&S Project No.: ENG23-0612

W&S File No.:

Drawing Title:

CONSTRUCTION ZONE SAFETY PLAN

Sheet Number:

C502

BID PROPOSAL FORM
Bid # 24-27

Record total bid lump sum below (Base Bid + Alternate Bid #1 + Alternate Bid #2).

\$ _____
(cost in numbers)

\$ _____
(cost in words)

Legal Business Name: _____

Address: _____

City: _____ State: _____ Zip: _____

Primary Phone: _____ E-mail: _____

Mobile: _____ Fax: _____

Prices Good through date: _____

Authorization:

Print Name and Title _____

Signature: _____ **Date:** _____

Bid results will be posted after 48 hours on the City of Rochester's web site:
www.rochesternh.gov or will be available by request via e-mail at the following address:
purchasing@rochesternh.gov

Bid Schedule

ITEM NUMBER	DESCRIPTION	ESTIMATE OF QUANTITIES	COMPUTED TOTALS
----------------	-------------	------------------------------	--------------------

THE BIDDER MUST FILL IN THESE UNIT OR LUMP SUM PRICES. The BIDDER should also carry out all extensions and fill in "Computed Totals" (In case of error or discrepancies, UNIT OR LUMP SUM PRICES govern and written words take precedence

**BASE BID
(ITEMS 1 THROUGH 9)**

TRENCH WORK

Item 1a.	Relocation of existing 8-inch water main, and replacement of a section of existing 18-inch sewer, lump sum	Dollars		
	and	Cents	1 LS	\$
	(\$)		

STRUCTURAL CURED-IN-PLACE PIPE

Item 2a.	Structural Cured-in-Place Pipe for 8-inch Sanitary Sewers, per linear foot	Dollars		
	and	Cents	395 LF	\$
	(\$)		

Item 2b.	Structural Cured-in-Place Pipe for 12-inch Sanitary, Sewers, per linear foot	Dollars		
	and	Cents	539 LF	\$
	(\$)		

Item 2c.	Structural Cured-in-Place Pipe for 18-inch Sanitary, Sewers, per linear foot	Dollars		
	and	Cents	7,595 LF	\$
	(\$)		

SERVICE CONNECTION REHABILITATION

Item 3a. Cut Protruding Service Connection, per service

	Dollars		
and	Cents	8 EA	\$
(\$)		

MANHOLE REHABILITATION

Item 4a. Cementitious Lining and Exterior Sealing of Sanitary, Sewer Manholes, per vertical foot

	Dollars		
and	Cents	145 VF	\$
(\$)		

Item 4b. Epoxy Lining and Exterior Sealing of Sanitary Sewer Manholes, per vertical foot

	Dollars		
and	Cents	160 VF	\$
(\$)		

Item 4c. Build Manhole Bench and Invert, each

	Dollars		
and	Cents	1 EA	\$
(\$)		

CHEMICAL ROOT TREATMENT

Item 5a. Chemical Root Treatment of Sewer Manholes, per manhole

	Dollars		
and	Cents	8 EA	\$
(\$)		

PORTABLE CHANGEABLE MESSAGE SIGNS

Item 6a. Portable Changeable Message Signs, lump sum

	Dollars		
and	Cents	1 LS	\$
(\$)		

TRAFFIC CONTROL - ALLOWANCES FOR FLAGGER OR UNIFORMED OFFICERS SERVICES

Item 7a. Use of Flaggers or Uniformed Officers for Traffic Control, Allowance

	Dollars		
One Hundred Three Thousand	Cents	Allowance	\$ 103,000
and Zero	Cents		
(\$ 103,000)		

ALLOWANCES FOR TEMPORARY BYPASS PUMPING USING SEPTIC TRUCKS FOR HIGHLAND STREET CONSTRUCTION

Item 8a. Handling of Existing Flows (Temporary Bypass Pumping) using Septic Trucks, Allowance

	Dollars		
Forty-Five Thousand	Cents	Allowance	\$ 45,000
and Zero	Cents		
(\$)		

BASE BID - MOBILIZATION

Item 9a. Mobilization, lump sum (not more than 5% of total of 1 through 6, excluding 7 and 8)

	Dollars		
and	Cents	1 LS	\$
(\$)		

ALTERNATE NO. 1 BID SCHEDULE ON NEXT PAGE

**ALTERNATE NO.1
(ITEMS 10 THROUGH 15)**

STRUCTURAL ULTRAVIOLET LIGHT CURED-IN-PLACE PIPE

Item 10a. Structural Ultraviolet Light Cured-in-Place Pipe for 30-in Surface Drain, per linear foot

	Dollars		
and	Cents	440 LF	\$ _____
(\$ _____)			

Item 10b. Structural Ultraviolet Light Cured-in-Place Pipe for 36-in Surface Drain, per linear foot

	Dollars		
and	Cents	125 LF	\$ _____
(\$ _____)			

PULL IN PLACE GLASS REINFORCED PLASTIC ULTRAVIOLET LIGHT STRUCTURAL CURED-IN-PLACE PIPE

Item 11a. Pull in Place Glass Reinforced Plastic Ultraviolet Light Structural Cured-in-Place Pipe for 36-inch Culvert, lump sum

	Dollars		
and	Cents	1 LS	\$ _____
(\$ _____)			

SERVICE CONNECTION REHABILITATION

Item 12a. Cut Protruding Service Connection, per service

	Dollars		
and	Cents	5 EA	\$ _____
(\$ _____)			

PORTABLE CHANGEABLE MESSAGE SIGNS

Item 13a. Portable Changeable Message Signs, lump sum

	Dollars		
and	Cents	1 LS	\$ _____
(\$ _____)			

**TRAFFIC CONTROL - ALLOWANCES FOR
FLAGGER SERVICES OR UNIFORMED OFFICERS**

Use of Flaggers or Uniformed Officers for Traffic
Control, Allowance

Item
14a.

Eleven Thousand	Dollars		
<hr/>			
and Zero	Cents		
<hr/>			
(\$ 11,000)	Allowance	<u>\$ 11,000</u>

ALTERNATE NO.1 - MOBILIZATION

Mobilization, lump sum (not more than 5% of total of
10 through 13, excluding 14)

Item
15a.

	Dollars		
<hr/>			
and	Cents		
<hr/>			
(\$)	1 LS	<u>\$</u>

ALTERNATE NO. 2 BID SCHEDULE ON NEXT PAGE

**ALTERNATE NO.2
(ITEMS 16 THROUGH 19)**

STRUCTURAL ULTRAVIOLET LIGHT CURED-IN-PLACE PIPE

Structural Ultraviolet Light Cured-in-Place Pipe for 18-in Surface Drain, per linear foot

Item
16a.

Dollars			
and	Cents		
(\$)	370 LF	\$

PORTABLE CHANGEABLE MESSAGE SIGNS

Portable Changeable Message Signs, lump sum

Item
17a.

	Dollars		
and	Cents		
(\$)	1 LS	\$

**TRAFFIC CONTROL - ALLOWANCES FOR
FLAGGER SERVICES OR UNIFORMED OFFICERS**

Use of Flaggers or Uniformed Officers for Traffic Control, Allowance

Item
18a.

	Six Thousand	Dollars	
and	Zero	Cents	
(\$	6,000)	1 Allowance \$ 6,000

ALTERNATE NO.2 - MOBILIZATION

Mobilization, lump sum (not more than 5% of total of 16 through 17, excluding 18)

Item
19a.

	Dollars		
and	Cents		
(\$)	1 LS	\$

BID PRICE FOR WORK

TOTAL OF BASE BID

The computed contract price for BASE BID (Items 1 through 9) inclusive is:

_____ DOLLARS
(AMOUNT IN WORDS)

AND _____ CENTS \$ _____
(AMOUNT IN FIGURES)

TOTAL OF ALTERNATE NO.1 BID

The computed contract price for ALTERNATE NO.1 (Items 10 through 15) inclusive is:

_____ DOLLARS
(AMOUNT IN WORDS)

AND _____ CENTS \$ _____
(AMOUNT IN FIGURES)

TOTAL OF ALTERNATE NO.2 BID

The computed contract price for ALTERNATE NO.2 (Items 16 through 19) inclusive is:

_____ DOLLARS
(AMOUNT IN WORDS)

AND _____ CENTS \$ _____
(AMOUNT IN FIGURES)

TOTAL OF BASE BID PLUS ALTERNATE NO.1 BID

The computed contract price for ALTERNATE NO.2 (Items 1 through 9 plus items 10 through 15) inclusive is:

_____ DOLLARS
(AMOUNT IN WORDS)

AND _____ CENTS \$ _____
(AMOUNT IN FIGURES)

TOTAL OF BASE BID PLUS ALTERNATE NO.2 BID

The computed contract price for BASE BID PLUS ALTERNATE NO.1 PLUS ALTERNATE NO.2 (Items 1 through 19) inclusive is:

_____ DOLLARS
(AMOUNT IN WORDS)

AND _____ CENTS \$ _____
(AMOUNT IN FIGURES)

TOTAL OF BASE BID PLUS ALTERNATE NO.1 PLUS ALTERNATE NO.2

The computed contract price for BASE BID PLUS ALTERNATE NO.1 PLUS ALTERNATE NO.2 (Items 1 through 19) inclusive is:

_____ DOLLARS
(AMOUNT IN WORDS)

AND _____ CENTS \$ _____
(AMOUNT IN FIGURES)

<u>NUMBER OF CALENDAR DAYS TO COMPLETE BASE PROJECT</u>	<u>90</u>
<u>NUMBER OF CALENDAR DAYS TO COMPLETE BASE PROJECT PLUS ALTERNATE NO.1</u>	<u>110</u>
<u>NUMBER OF CALENDAR DAYS TO COMPLETE BASE PROJECT PLUS ALTERNATE NO.2</u>	<u>110</u>
<u>NUMBER OF CALENDAR DAYS TO COMPLETE BASE PROJECT PLUS ALTERNATE NO.1 AND ALTERNATE NO.2</u>	<u>120</u>

THIS PROPOSAL IS BASED ON PROVISIONS OF THE FOLLOWING ADDENDA:

No. _____ No. _____
No. _____ No. _____