PROJECT MANUAL

CITY OF PORTSMOUTH
PORTSMOUTH, NEW HAMPSHIRE

FOR CONSTRUCTION

Bid #03-25

LITTLE BAY ROAD WATER IMPROVEMENTS

August 28, 2024

Underwood Engineers, Inc.
Portsmouth, New Hampshire
FILE NO. 3025

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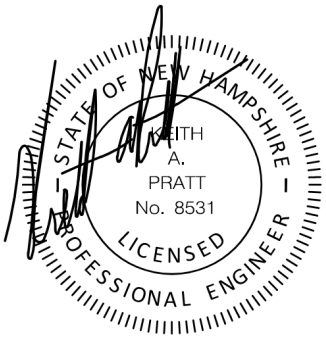
CITY OF PORTSMOUTH
PORTSMOUTH, NEW HAMPSHIRE

FOR CONSTRUCTION

LITTLE BAY ROAD WATER IMPROVEMENTS



August 28, 2024

Prepared and Copyrights by

Underwood Engineers, Inc.
25 Vaughan Mall
Portsmouth, New Hampshire 03801

FILE NO 3025

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A. BIDDING

ADVERTISEMENT FOR BIDS

City of Portsmouth
1 Junkins Avenue
Portsmouth, NH 03801

Separate sealed BIDS for the construction of: **Little Bay Road Water Improvements** will be received by **the City of Portsmouth** at the **Purchasing Department, City Hall, 1 Junkins Avenue, Portsmouth, NH 03801** until **2:00 PM** (Local Time) on **October 3, 2024.** Bids will be publicly opened and read aloud. The work includes:

- Furnish and install approximately 4,300 LF of new 8" ductile iron water main
- Replace 25 water services
- Replace four (4) hydrant assemblies
- Permanent trench repairs where roadway is impacted by pipe installations

1. Completion time for the project will be **75** days for substantial completion and **90** days for final completion from the date specified on the "Notice to Proceed". Liquidated damages shall be in the amount of **$1,000.00** for each calendar day beyond the date established for substantial completion and **$1,000.00** for each calendar day beyond the date established for final completion.
2. Bid security is to accompany bid proposals and shall be **10%** of the total bid price.
3. The successful bidder must furnish 100% Performance and Payment Bonds in the City's standard format (Section B-3 and B-4 respectively) and will be required to execute the Contract Agreement within 10 days following notification of the acceptance of the Bid.
4. The Owner reserves the right to reject any or all bids, to accept any bid, to waive any informality on bids received, and to take any action that it may deem to be in the best interest of the Owner.
5. No Bidder may withdraw a Bid within 30 days after the actual date of opening thereof.
6. There will be a mandatory pre-bid meeting for all prospective bidders held at the: Public Works Department Training Room at 680 Peverly Hill Road, Portsmouth, New Hampshire on **September 18, 2024, at 10:00 AM.**
7. Inquiries as to availability of Contract Documents and technical questions regarding the plans and specifications shall be directed to the City of Portsmouth Purchasing Department (603) 610-7227.

The CONTRACT DOCUMENTS may be examined at the following locations:

- Underwood Engineers, Inc. - 25 Vaughan Mall, Portsmouth, NH 03801-4012
- Underwood Engineers, Inc. – 99 North State Street, Concord, NH 03301
- Construction Summary of NH – 734 Chestnut St., Manchester, NH 03104
- Dodge Data & Analytics - 34 Crosby Drive, Suite 201, Bedford, MA 01730
- Associated General Contractors, 48 Grandview Road, Bow, NH 03304

Neither the Owner nor the Engineer will be responsible for full or partial sets of Contract Documents.

Electronic Contract Documents (Plans, Specifications, and Addenda) may only be obtained electronically at the City's website http://cityofportsmouth.com/finance/purchasing.htm. Paper copies of the documents are not available.

Addenda to this bid document, including response to questions submitted will not be provided directly to bidders, but will be posted on the City's website, under the project heading by 4:00 pm on September 25, 2024. It will be the bidder's responsibility to check the website for any addenda issued prior to submitting their bid. Bidders must acknowledge receipt of addendums with their Bid (page A-3.2).

INSTRUCTIONS TO BIDDERS

ARTICLE 1 – DEFINED TERMS

1.01 Terms used in these Instructions to Bidders have the meanings indicated in the General Conditions and Supplementary Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below:

A. *Issuing Office* – The office from which the Bidding Documents are to be issued and where the bidding procedures are to be administered.

Underwood Engineers, Inc.
25 Vaughan Mall
Portsmouth, New Hampshire 03801
(603) 436-6192

ARTICLE 2 – COPIES OF BIDDING DOCUMENTS

2.01 Complete sets of the Bidding Documents in the number and for the sum and appropriate postage fees, if any, stated in the Advertisement or Invitation to Bid may be obtained from the Issuing Office.

2.02 Complete sets of Bidding Documents shall be used in preparing Bids; neither Owner nor Engineer assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

2.03 Owner and Engineer, in making copies of Bidding Documents available on the above terms, do so only for the purpose of obtaining Bids for the Work and do not confer a license or grant for any other use.

ARTICLE 3 – QUALIFICATIONS OF BIDDERS

3.01 To demonstrate Bidder's qualifications to perform the Work, within five days of Owner's request, Bidder shall submit written evidence such as financial data, previous experience, present commitments, and such other data as may be called for below.

A. Current financial statement.
B. Current list of project currently under construction include contract value and estimated completion date.
C. List of available equipment,
D. List of key personnel.
E. List of similar projects.
F. List of contacts familiar with Bidders work.
G. Contractor is listed on the latest NHDOT Contractor List as pre-qualified to perform the specified work.

ARTICLE 4 – EXAMINATION OF BIDDING DOCUMENTS, OTHER RELATED DATA, AND SITE

4.01 *Subsurface and Physical Conditions*

Logs for borings performed by R.W. Gillespie & Associates are provided in Appendix A.

4.02 *Underground Facilities*

A. Information and data shown or indicated in the Bidding Documents with respect to existing Underground Facilities at or contiguous to the Site is based upon information and data furnished to Owner and Engineer by owners of such Underground Facilities, including Owner, or others.

4.03 Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to subsurface conditions, other physical conditions and Underground Facilities, and possible changes in the Bidding Documents due to differing or unanticipated conditions appear in Paragraphs 4.02, 4.03, and 4.04 of the General Conditions. Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to a Hazardous Environmental Condition at the Site, if any, and possible changes in the Contract Documents due to any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work appear in Paragraph 4.06 of the General Conditions.

4.04 On request, Owner will provide Bidder access to the Site to conduct such examinations, investigations, explorations, tests, and studies as Bidder deems necessary for submission of a Bid. Bidder shall fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies. Bidder shall comply with all applicable Laws and Regulations relative to excavation and utility locates.

4.05 It is the responsibility of each Bidder before submitting a Bid to:

A. examine and carefully study the Bidding Documents, the other related data identified in the Bidding Documents, and any Addenda;

B. visit the Site and become familiar with and satisfy Bidder as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work;

C. become familiar with and satisfy Bidder as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work;

D. carefully study all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in the Supplementary Conditions as provided in Paragraph 4.02 of the General Conditions, and (2) reports and drawings of Hazardous Environmental Conditions at the Site which have been identified in the Supplementary Conditions as provided in Paragraph 4.06 of the General Conditions;

E. obtain and carefully study (or accept consequences of not doing so) all additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents, and safety precautions and programs incident thereto;

F. agree at the time of submitting its Bid that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of its Bid for performance of the Work at the price(s) bid and within the times and in accordance with the other terms and conditions of the Bidding Documents;

G. become aware of the general nature of the work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents;

H. correlate the information known to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents;

I. promptly give Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder discovers in the Bidding Documents and confirm that the written resolution thereof by Engineer is acceptable to Bidder; and

J. determine that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work.

4.06 The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article 4, that without exception the Bid is premised upon performing and furnishing the Work required by the Bidding Documents and applying any specific means, methods, techniques, sequences, and procedures of construction that may be shown or indicated or expressly required by the Bidding Documents, that Bidder has given Engineer written notice of all conflicts, errors, ambiguities, and discrepancies that Bidder has discovered in the Bidding Documents and the written resolutions thereof by Engineer are acceptable to Bidder, and that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work.

ARTICLE 5 – PRE-BID CONFERENCE

5.01 A **mandatory** pre-Bid conference will be held at **10:00 AM** local time on **September 18, 2024** at the **Public Works Department Training Room at 680 Peverly Hill Road, Portsmouth, New Hampshire**. Representatives of Owner and Engineer will be present to discuss the Project. Bidders are required to attend and participate in the conference. Engineer will transmit to all prospective Bidders of record such Addenda as Engineer considers necessary in response to questions arising at the conference. Oral statements may not be relied upon and will not be binding or legally effective.

ARTICLE 6 – SITE AND OTHER AREAS

6.01 The Site is identified in the Bidding Documents. Easements for permanent structures or permanent changes in existing facilities are to be obtained and paid for by Owner unless otherwise provided in the Bidding Documents. All additional lands and access thereto required for temporary construction facilities, construction equipment, or storage of materials and equipment to be incorporated in the Work are to be obtained and paid for by Contractor.

ARTICLE 7 – INTERPRETATIONS AND ADDENDA

7.01 All questions about the meaning or intent of the Bidding Documents are to be submitted to Engineer in writing. Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda mailed or delivered to all parties recorded by Engineer as having received the Bidding Documents. Questions received less than ten days prior to the date for opening of Bids may not be answered. Only questions answered by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

7.02 Addenda may be issued to clarify, correct, or change the Bidding Documents as deemed advisable by Owner or Engineer.

ARTICLE 8 – BID SECURITY

8.01 A Bid must be accompanied by Bid security made payable to Owner in an amount of **TEN (10%)** percent of Bidder's maximum Bid price and in the form of a certified check or bank money order or a Bid bond (on the form attached) issued by a surety meeting the requirements of Paragraphs 5.01 and 5.02 of the General Conditions.

8.02 The Bid security of the Successful Bidder will be retained until such Bidder has executed the Contract Documents, furnished the required contract security and met the other conditions of the Notice of Award, whereupon the Bid security will be returned. If the Successful Bidder fails to execute and deliver the Contract Documents and furnish the required contract security within 15 days after the Notice of Award, Owner may annul the Notice of Award and the Bid security of that Bidder will be forfeited. The Bid security of other Bidders whom Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of seven days after the Effective Date of the Agreement or 61 days after the Bid opening, whereupon Bid security furnished by such Bidders will be returned.

8.03 Bid security of other Bidders whom Owner believes do not have a reasonable chance of receiving the award will be returned within seven days after the Bid opening.

ARTICLE 9 – CONTRACT TIMES

9.01 The number of days within which, or the dates by which, the Work is to be substantially completed and ready for final payment are set forth in the Agreement.

ARTICLE 10 – LIQUIDATED DAMAGES

10.01 Provisions for liquidated damages, if any, are set forth in the Agreement.

ARTICLE 11 – SUBSTITUTE AND "OR-EQUAL" ITEMS

11.01 The Contract, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents without consideration of possible substitute or "or-equal" items. Whenever it is specified or described in the Bidding Documents that a substitute or "or-equal" item of material or equipment may be furnished or used by Contractor if acceptable to Engineer, application for such acceptance will not be considered by Engineer until after the Effective Date of the Agreement.

ARTICLE 12 – SUBCONTRACTORS, SUPPLIERS AND OTHERS

12.01 If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, individuals, or entities to be submitted to Owner in advance of a specified date prior to the Effective Date of the Agreement, the apparent Successful Bidder, and any other Bidder so requested, shall within five days after Bid opening, submit to Owner a list of all such Subcontractors, Suppliers, individuals, or entities proposed for those portions of the Work for which such identification is required. Such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, individual, or entity if requested by Owner. If Owner or Engineer, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, individual, or entity, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit a substitute, without an increase in the Bid.

12.02 If apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next lowest Bidder that proposes to use acceptable Subcontractors, Suppliers, individuals, or entities. Declining to make requested substitutions will not constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor, Supplier, individual, or entity so listed and against which Owner or Engineer makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner and Engineer subject to revocation of such acceptance after the Effective Date of the Agreement as provided in Paragraph 6.06 of the General Conditions.

12.03 Contractor shall not be required to employ any Subcontractor, Supplier, individual, or entity against whom Contractor has reasonable objection.

ARTICLE 13 – PREPARATION OF BID

13.01 The Bid Form is included with the Bidding Documents. Additional copies may be obtained from Engineer.

13.02 All blanks on the Bid Form shall be completed by printing in ink or by typewriter and the Bid signed in ink. Erasures or alterations shall be initialed in ink by the person signing the Bid Form. A Bid price shall be indicated for each Bid item listed therein, or the words "No Bid," "No Change," or "Not Applicable" entered.

13.03 A Bid by a corporation shall be executed in the corporate name by the president or a vice-president or other corporate officer accompanied by evidence of authority to sign. The corporate seal shall be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporation shall be shown below the signature.

13.04 A Bid by a partnership shall be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The official address of the partnership shall be shown below the signature.

13.05 A Bid by a limited liability company shall be executed in the name of the firm by a member and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm shall be shown below the signature.

13.06 A Bid by an individual shall show the Bidder's name and official address.

13.07 A Bid by a joint venture shall be executed by each joint venturer in the manner indicated on the Bid Form. The official address of the joint venture shall be shown below the signature.

13.08 All names shall be typed or printed in ink below the signatures.

13.09 The Bid shall contain an acknowledgment of receipt of all Addenda, the numbers of which shall be filled in on the Bid Form.

13.10 The address and telephone number for communications regarding the Bid shall be shown.

13.11 The Bid shall contain evidence of Bidder's authority and qualification to do business in the state where the Project is located or covenant to obtain such qualification prior to award of the Contract. Bidder's state contractor license number, if any, shall also be shown on the Bid Form.

ARTICLE 14 – BASIS OF BID; COMPARISON OF BIDS

14.01 *Unit Price*

A. Bidders shall submit a Bid on a unit price basis for each item of Work listed in the Bid schedule.

B. The total of all estimated prices will be the sum of the products of the estimated quantity of each item and the corresponding unit price. The final quantities and Contract Price will be determined in accordance with Paragraph 11.03 of the General Conditions.

C. Discrepancies between the multiplication of units of Work and unit prices will be resolved in favor of the unit prices. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum. Discrepancies between words and figures will be resolved in favor of the words.

ARTICLE 15 – SUBMITTAL OF BID

15.01 With each copy of the Bidding Documents, a Bidder is furnished one separate unbound copy of the Bid Form, and, if required, the Bid Bond Form. The unbound copy of the Bid Form is to be completed and submitted with the Bid security and the data requested in the Bid Form:

15.02 A Bid shall be submitted no later than the date and time prescribed and at the place indicated in the Advertisement or Invitation to Bid and shall be enclosed in an opaque sealed envelope plainly marked with the Project title (and, if applicable, the designated portion of the Project for which the Bid is submitted), the name and address of Bidder, and shall be accompanied by the Bid security and other required documents. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate envelope plainly marked on the outside with the notation **"BID ENCLOSED – Little Bay Road Water Improvements."** A mailed Bid shall be addressed to:

City of Portsmouth
1 Junkins Avenue
Portsmouth, New Hampshire 03801

ARTICLE 16 – MODIFICATION AND WITHDRAWAL OF BID

16.01 A Bid may be modified or withdrawn by an appropriate document duly executed in the manner that a Bid must be executed and delivered to the place where Bids are to be submitted prior to the date and time for the opening of Bids.

16.02 If within 24 hours after Bids are opened, any Bidder files a duly signed written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of its Bid, that Bidder may withdraw its Bid, and the Bid security will be returned. Thereafter, if the Work is rebid, that Bidder will be disqualified from further bidding on the Work.

ARTICLE 17 – OPENING OF BIDS

17.01 Bids will be opened at the time and place indicated in the Advertisement or Invitation to Bid and, unless obviously non-responsive, read aloud publicly. An abstract of the amounts of the base Bids and major alternates, if any, will be made available to Bidders after the opening of Bids.

ARTICLE 18 – BIDS TO REMAIN SUBJECT TO ACCEPTANCE

18.01 All Bids will remain subject to acceptance for the period of time stated in the Bid Form, but Owner may, in its sole discretion, release any Bid and return the Bid security prior to the end of this period.

ARTICLE 19 – EVALUATION OF BIDS AND AWARD OF CONTRACT

19.01 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Owner further reserves the right to reject the Bid of any Bidder whom it finds, after reasonable inquiry and evaluation, to not be responsible. Owner may also reject the Bid of any Bidder if Owner believes that it would not be in the best interest of the Project to make an award to that Bidder. Owner also reserves the right to waive all informalities not involving price, time, or changes in the Work and to negotiate contract terms with the Successful Bidder. The Owner also reserves the right to advertise for new bids, if in the judgment of the City, the best interest of the City of Portsmouth will be promoted thereby. The Owner also reserves the right to request corporate and background information on the Bidder and to request references.

19.02 More than one Bid for the same Work from an individual or entity under the same or different names will not be considered. Reasonable grounds for believing that any Bidder has an interest in more than one Bid for the Work may be cause for disqualification of that Bidder and the rejection of all Bids in which that Bidder has an interest.

19.03 In evaluating Bids, Owner will consider whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices and other data, as may be requested in the Bid Form or prior to the Notice of Award.

19.04 In evaluating Bidders, Owner will consider the qualifications of Bidders and may consider the qualifications and experience of Subcontractors, Suppliers, and other individuals or entities proposed for those portions of the Work for which the identity of Subcontractors, Suppliers, and other individuals or entities must be submitted as provided in the Supplementary Conditions.

19.05 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications and financial ability of Bidders, proposed Subcontractors, Suppliers, individuals, or entities to perform the Work in accordance with the Contract Documents.

19.06 If the Contract is to be awarded, Owner will award the Contract to the Bidder whose Bid is in the best interests of the Project.

ARTICLE 20 – CONTRACT SECURITY AND INSURANCE

20.01 Article 5 of the General Conditions, as may be modified by the Supplementary Conditions, sets forth Owner's requirements as to performance and payment bonds and insurance. When the Successful Bidder delivers the executed Agreement to Owner, it shall be accompanied by such bonds.

ARTICLE 21 – SIGNING OF AGREEMENT

21.01 When Owner gives a Notice of Award to the Successful Bidder, it shall be accompanied by the required number of unsigned counterparts of the Agreement with the other Contract Documents which are identified in the Agreement as attached thereto. Within 15 days thereafter, Successful Bidder shall sign and deliver the required number of counterparts of the Agreement and attached documents to Owner. Within ten days thereafter, Owner shall deliver one fully signed counterpart to Successful Bidder with a complete set of the Drawings with appropriate identification.

ARTICLE 22 – EMPLOYMENT NONDISCRIMINATION POLICY

22.01 Bidder certifies that it has implemented an employment nondiscrimination policy prohibiting discrimination in hiring, discharging, promoting, or demoting, matters of compensation, or any other employment-related decision or benefit on account of actual or perceived race, ethnicity, color, religion, national origin, gender identity, gender expression, or marital or familial status. Bidder warrants that it shall not, in the performance of the Contract, discriminate on account of actual or perceived race, ethnicity, color, religion, national origin, gender, disability, age, military status, sexual orientation, gender identity, gender expression, or marital or familial status.

ARTICLE 1 – BID RECIPIENT

1.01 This Bid is submitted to:

The City of Portsmouth, New Hampshire for the Little Bay Road Water Improvements project.

1.02 The undersigned Bidder proposes and agrees, if this Bid is accepted, to enter into an Agreement with Owner in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.

ARTICLE 2 – BIDDER'S ACKNOWLEDGEMENTS

2.01 Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for 60 days after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of Owner.

ARTICLE 3 – BIDDER'S REPRESENTATIONS

3.01 In submitting this Bid, Bidder represents that:

A. Bidder has examined and carefully studied the Bidding Documents, the other related data identified in the Bidding Documents, and the following Addenda, receipt of which is hereby acknowledged.

Addendum No.	Addendum Date
_____	_____
_____	_____
_____	_____

B. Bidder has visited the Site and become familiar with and is satisfied as to the general, local and Site conditions that may affect cost, progress, and performance of the Work.

C. Bidder is familiar with and is satisfied as to all federal, state and local Laws and Regulations that may affect cost, progress and performance of the Work.

D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in SC-4.02, and (2) reports and drawings of Hazardous Environmental Conditions that have been identified in SC-4.06.

E. Bidder has obtained and carefully studied (or accepts the consequences for not doing so) all additional or supplementary examinations, investigations, explorations, tests, studies and data concerning conditions (surface, subsurface and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying the specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents to be employed by Bidder, and safety precautions and programs incident thereto.

F. Bidder does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price(s) bid and within the times and in accordance with the other terms and conditions of the Bidding Documents.

G. Bidder is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.

H. Bidder has correlated the information known to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents.

I. Bidder has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and the written resolution thereof by Engineer is acceptable to Bidder.

J. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work for which this Bid is submitted.

K. Bidder will submit written evidence of its authority to do business in the state where the Project is located not later than the date of its execution of the Agreement.

ARTICLE 4 – FURTHER REPRESENTATIONS

4.01 Bidder further represents that:

A. this Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation;

B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid;

C. Bidder has not solicited or induced any individual or entity to refrain from bidding; and

D. Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over Owner.

ARTICLE 5 – BASIS OF BID

5.01 Bidder will complete the Work in accordance with the Contract Documents for the following price(s):

Bidder acknowledges that estimated quantities are not guaranteed, and are solely for the purpose of comparison of Bids, and final payment for all Unit Price Bid items will be based on actual quantities, determined as provided in the Contract Documents.

ARTICLE 6 – TIME OF COMPLETION

6.01 Bidder agrees that the Work will be substantially complete within **75** calendar days after the date when the Contract Times commence to run as provided in paragraph 2.03 of the General Conditions, and will be completed and ready for final payment in accordance with Paragraph 14.07.B of the General Conditions within **90** calendar days after the date when Contract Times commence to run.

6.02 Bidder accepts the provisions of the Agreement as to liquidated damages in the event of failure to complete the Work within the Contract Times.

ARTICLE 7 – ATTACHMENTS TO THIS BID

7.01 The following documents are attached to and made a condition of this Bid:

A. Required Bid security in the form of Bid Bond

B. List of Proposed Subcontractors

C. List of Proposed Suppliers

D. List of Project References

E. Required Bidder Qualification Statement with Supporting Data

F. [List other documents as pertinent]

Contractor's Bid Schedule - Little Bay Road Water Main Improvements					
Item No.	**Est. Quant.**	**Units**	**Item Description (and Unit Price written in words)**	**Unit Price**	**Extended Total**
3.1.06	L.F.	90	Furnish and Install 6" Dia. D.I. CL 52 Water Main _____Dollars and _____Cents per L.F.		
3.1.08	L.F.	4400	Furnish and Install 8" Dia. D.I. CL 52 Water Main _____Dollars and _____Cents per L.F.		
3.3.1	L.F.	535	Furnish and Install 1" Dia. Copper Water Service Pipe _____Dollars and _____Cents per L.F.		
3.3.2	L.F.	40	Furnish and Install 2" Dia. Copper Water Service Pipe _____Dollars and _____Cents per L.F.		
3.4.1	Each	25	Furnish and Install 1" Water Service Connection _____Dollars and _____Cents per Each		

Contractor's Bid Schedule - Little Bay Road Water Main Improvements					
Item No.	**Est. Quant.**	**Units**	**Item Description (and Unit Price written in words)**	**Unit Price**	**Extended Total**
3.4.2	Each	2	Furnish and Install 2" Water Service Connection _____ Dollars and _____ Cents per Each		
3.5.08	Each	18	Furnish and Install 8" Gate Valve and Box (including all valve box adjustments) _____ Dollars and _____ Cents per Each		
3.6	EA	5	Furnish and Install Hydrant Assemblies _____ Dollars and _____ Cents per EA		
3.7	EA	4	Remove Existing Hydrant Assemblies _____ Dollars and _____ Cents per EA		
6.1	Allow	1	Construction Vibration Monitoring Five Thousand Dollars and Zero Cents per Allow	$5,000.00	$5,000.00

Contractor's Bid Schedule - Little Bay Road Water Main Improvements					
Item No.	**Est. Quant.**	**Units**	**Item Description (and Unit Price written in words)**	**Unit Price**	**Extended Total**
6.3	EA	2	Unknown Utility Crossing _____Dollars and _____Cents per EA		
6.4	EA	2	Repair of Unknown Utilities or Mismarked Utilities _____Dollars and _____Cents per EA		
6.5	CY*	50	Ledge Removal (Min $120/CY) _____Dollars and _____Cents per CY*		
6.6A	CY*	20	Additional Excavation (where requested) _____Dollars and _____Cents per CY*		
6.6B	CY*	20	Excavation of Unsuitable Materials _____Dollars and _____Cents per CY*		

Contractor's Bid Schedule - Little Bay Road Water Main Improvements					
Item No.	**Est. Quant.**	**Units**	**Item Description (and Unit Price written in words)**	**Unit Price**	**Extended Total**
6.7	CY*	40	Additional Screened Gravel _____ Dollars and _____ Cents per CY*		
6.8	EA	10	Exploratory Test Pit Excavation (where requested) _____ Dollars and _____ Cents per EA		
6.9	Allow	1	Geotechnical Field Testing Ten Thousand Dollars and Zero Cents per Allow	$10,000.00	$10,000.00
6.1	LF*	100	Furnish and Install 2"x24" Rigid Polystyrene Insulation _____ Dollars and _____ Cents per LF*		
6.11	LB	2000	Calcium Chloride for Dust Control _____ Dollars and _____ Cents per LB		

Contractor's Bid Schedule - Little Bay Road Water Main Improvements					
Item No.	**Est. Quant.**	**Units**	**Item Description (and Unit Price written in words)**	**Unit Price**	**Extended Total**
304.3	CY	940	Crushed Gravel (12" depth for trench repairs) _____Dollars and _____Cents per CY		
403.11	TON	1000	Machine Method Pavement (8' Wide Permanemt Trench Repair, 4" depth) _____Dollars and _____Cents per TON		
403.12	TON	50	Hand Method Pavement _____Dollars and _____Cents per TON		
417.1	SY	4000	Cold planing bituminous surfaces (4" depth, final trench pavement prep) _____Dollars and _____Cents per SY		
603.003	LF	50	12" Dia. Reinforced Concrete Drain Pipe _____Dollars and _____Cents per LF		

Contractor's Bid Schedule - Little Bay Road Water Main Improvements					
Item No.	**Est. Quant.**	**Units**	**Item Description (and Unit Price written in words)**	**Unit Price**	**Extended Total**
618.7	Hour	400	Uniformed Flaggers For Traffic Control _____ Dollars and _____ Cents per Hour		
618.61	Allow	1	Uniformed Officer For Traffic Control Fifty Five Thousand Dollars and Zero Cents per Allow	$55,000.00	$55,000.00
619.1	LS	1	Maintenance of Traffic (including temporary stabilization) _____ Dollars and _____ Cents per LS		
619.253	WK	20	Portable Changeable Message Boards _____ Dollars and _____ Cents per WK		
645.531	LF	5000	Silt Fence _____ Dollars and _____ Cents per LF		

Contractor's Bid Schedule - Little Bay Road Water Main Improvements					
Item No.	**Est. Quant.**	**Units**	**Item Description (and Unit Price written in words)**	**Unit Price**	**Extended Total**
645.7	LS	1	Storm Water Pollution Prevention Plan (SWPPP) _____Dollars and _____Cents per LS		
645.71	Hour	30	Monitoring SWPPP _____Dollars and _____Cents per Hour		
692	LS	1	Mobilization _____Dollars and _____Cents per LS		
				TOTAL	

Notes to Bidders:

1. The basis of the low bidder will be the lowest price provided based on the Engineer's Estimate of Quantities and Contractor's Bid.
2. * Means Indeterminate Quantity.
3. The Owner reserves the right to waive any informalities or minor defects or reject any and all bids and to take any other action that is in the best interest of the City.

4. Unit prices in words shall govern over unit prices in numbers in determination of bid.

ARTICLE 8 – BID SUBMITTAL

8.01 This Bid submitted by:

If Bidder is:

An Individual

Name (typed or printed): _____

By: _____ (SEAL)
(Individual's signature)

Doing business as: _____

A Partnership

Partnership Name: _____ (SEAL)

By: _____
(Signature of general partner – attach evidence of authority to sign)

Name (typed or printed): _____

A Corporation

Corporation Name: _____ (SEAL)

State of Incorporation: _____
Type (General Business, Professional, Service, Limited Liability): _____

By: _____
(Signature – attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____
(CORPORATE SEAL)

Attest: _____
(Signature of Corporate Secretary)

Date of Qualification to do business in _____ *[State Where Project is Located]* is ____________.

A Joint Venture

Name of Joint Venturer: _____

First Joint Venturer Name: _____ (SEAL)

By: _____

(Signature of first joint venture partner – attach evidence of authority to sign)
Name (typed or printed): _____

Title: _____

Second Joint Venturer Name: _____ (SEAL)

By: _____
(Signature of second joint venture partner – attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

(Each joint venturer must sign. The manner of signing for each individual, partnership, and corporation that is a party to the joint venture should be in the manner indicated above.)

Bidder's Business address: _____
_____

Phone: _____ Facsimile: _____

Submitted on _____, 20_____.

State Contractor License No. _____. (If applicable)

PENAL SUM FORM

BID BOND

Any singular reference to Bidder, Surety, Owner, or other party shall be considered plural where applicable.

BIDDER (Name and Address):

SURETY (Name and Address of Principal Place of Business):

OWNER (Name and Address):

BID
Bid Due Date:
Project (Brief Description Including Location):

BOND
Bond Number:
Date (Not later than Bid due date):
Penal sum _____ _____
(Words) (Figures)

Surety and Bidder, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each cause this Bid Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

BIDDER	SURETY
_____ (Seal)	_____ (Seal)
Bidder's Name and Corporate Seal	Surety's Name and Corporate Seal
By: _____	By: _____
Signature and Title	Signature and Title (Attach Power of Attorney)
Attest: _____	Attest: _____
Signature and Title	Signature and Title

Note: Above addresses are to be used for giving required notice.

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Surety's liability.

2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.

3. This obligation shall be null and void if:

3.1. Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or

3.2. All Bids are rejected by Owner, or

3.3. Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).

4. Payment under this Bond will be due and payable upon default by Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.

5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions shall not in the aggregate exceed 120 days from Bid due date without Surety's written consent.

6. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety and in no case later than one year after Bid due date.

7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.

8. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.

9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.

10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.

11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

B. CONTRACT DOCUMENTS

Notice of Award

Dated: _____

Project: Little Bay Road Water Improvements	**Owner: City of Portsmouth, New Hampshire**	Owner's Contract No.: **Bid 03-25**
Contract:		**UEI project No.: 3025**
Bidder:		
Bidder's Address: (send Certified Mail, Return Receipt Requested)		

You are notified that your Bid dated _____ for the above Contract has been considered. You are the Successful Bidder and are awarded a Unit Price Contract for Little Bay Road Water Improvements. The Contract Price of your Contract is_____Dollars ($_____) in accordance with the bid schedule.

Six (6) copies of each of the proposed Contract Documents (and Drawings) accompany this Notice of Award, or will otherwise be made available to you.

You must comply with the following conditions precedent within [15] days of the date you receive this Notice of Award.

1. Attend a pre-construction meeting on _____ in Portsmouth, NH at _____ AM/PM. Prior to or at the meeting, Contractor shall deliver four (4) executed sets of the contract
2. Deliver four (4) original copies of the Contract security [Bonds] by _____ (drafts by _____), as specified in the instructions to bidders (article 20), and the General Conditions (Paragraph 5.01)
3. Provide schedule

Failure to comply with these conditions within the time specified will entitle Owner to consider you in default, annul this Notice of Award and declare your Bid security forfeited.

Within ten days after you comply with the above conditions, Owner will return to you one fully executed counterpart of the Contract Documents.

_____
Owner

By:_____
Authorized Signature

_____
Title

Receipt Acknowledged

_____
Contractor

By:_____
Authorized Signature

_____
Title

Copy to Engineer, Underwood Engineers, Inc

CONTRACT FOR CONSTRUCTION

This Contract is by and between **The City of Portsmouth, New Hampshire** (Owner) and _____ (Contractor).

Owner and Contractor hereby agree as follows:

ARTICLE 1 - THE WORK

1.01 Work

A. Work includes all labor, materials, equipment, services, and documentation necessary to construct the Project defined herein. The Work may include related services such as testing, start-up, and commissioning, all as required by the Contract Documents.

B. The Contractor shall complete all Work as specified or indicated in the Contract Documents. The Project is generally described as follows:

1. Little Bay Road Water Improvements Include:

- Furnish and install approximately 4,300 LF of new 8" ductile iron water main
- Replace 25 water services
- Replace four (4) hydrant assemblies
- Permanent trench repairs where roadway is impacted by pipe installations

2. The Site of the Work includes property, easements, and designated work areas described in greater detail in the Contract Documents but generally located:

- Within the Town Right-of-Way along Little Bay Road, Newington, New Hampshire

ARTICLE 2 - CONTRACT DOCUMENTS

2.01 Intent of Contract Documents

A. It is the intent of the Contract Documents to describe a functionally complete project. The Contract Documents do not indicate or describe all of the Work required to complete the Project. Additional details required for the correct installation of selected products are to be provided by the Contractor and coordinated with the Owner and Engineer. This Contract supersedes prior negotiations, representations, and agreements, whether written or oral. The Contract Documents are complementary; what is required by one part of the Contract Documents is as binding as if required by other parts of the Contract Documents.

B. During the performance of the Work and until final payment, Contractor and Owner shall submit all matters in question concerning the requirements of the Contract Documents, or relating to the acceptability of the Work under the Contract Documents to the Engineer. Engineer will be the initial interpreter of the requirements of the Contract Documents, and judge of the acceptability of the Work thereunder.

C. Engineer will render a written clarification, interpretation, or decision on the issue submitted, or initiate a modification to the Contract Documents.

D. Contractor, and its subcontractors and suppliers, shall not have or acquire any title to or ownership rights to any of the Drawings, Specifications, or other documents (including copies or electronic media editions) prepared by Engineer or its consultants.

2.02 Contract Documents Defined

A. The Contract Documents consist of the following documents:

1. This Contract.
2. Performance bond.
3. Payment bond.
4. Specifications listed in the Table of Contents.
5. Drawings as listed on the Drawing Sheet Index.
6. Addenda.
7. Exhibits to this Contract (enumerated as follows):
    a. **Not Used**
8. The following which may be delivered or issued on or after the Effective Date of the Contract:
    a. Notice to Proceed (EJCDC C-550).
    b. Work Change Directives (EJCDC C-940).
    c. Change Orders (EJCDC C-941).
    d. Field Order (EJCDC C-942).
    e. Certificate of Substantial Completion (EJCDC-645).

ARTICLE 3 - ENGINEER

3.01 Engineer

A. The Engineer for this Project is:

Underwood Engineers, Inc.
25 Vaughan Mall
Portsmouth, New Hampshire

ARTICLE 4 - CONTRACT TIMES

4.01 Contract Times

A. The Work will be substantially completed within **75** calendar days after the Effective Date of the Notice to Proceed (B-5.1) and completed and ready for final payment within **90** calendar days after the Effective Date of the Notice to Proceed (B-5.1).

4.02 Liquidated Damages

A. Contractor and Owner recognize that time is of the essence in the performance of the Contract, and that Owner will incur damages if Contractor does not complete the Work according to the requirements of Paragraph 4.01. Because such damages for delay would be difficult and costly to determine, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty) Contractor shall pay Owner $**1,000.00** for each calendar day that expires after the Contract Time for substantial completion and $**1,000.00** for each calendar day that expires after the Contract Time for Substantial Completion.

4.03 Delays in Contractor's Progress

A. If Owner, Engineer, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Times and Contract Price. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

B. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delay, disruption, or interference caused by or within the control of Contractor or their subcontractors or suppliers.

C. If Contractor's performance or progress is delayed, disrupted, or interfered with by unanticipated causes not the fault of and beyond the control of Owner, Contractor, and those for which they are responsible, then Contractor shall be entitled to an equitable adjustment in Contract Times.

D. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for any delay, disruption, or interference if such delay is concurrent with a delay, disruption, or interference caused by or within the control of Contractor or Contractor's subcontractors or suppliers.

4.04 Progress Schedules

A. Contractor shall develop a progress schedule and submit to the Engineer for review and comment before starting Work on the Site. The Contractor shall modify the schedule in accordance with the comments provided by the Engineer.

B. The Contractor shall update and submit the progress schedule to the Engineer each month. The Owner may withhold payment if the Contractor fails to submit the schedule.

ARTICLE 5 - CONTRACT PRICE

5.01 Payment

A. Owner shall pay Contractor in accordance with the Contract Documents at the agreed to unit prices as stipulated in the Contractor's Bid (section A-3) for work completed.

B. Payment will be the amount equal to the total of all extended prices for actual Work completed. The extended price is determined by multiplying the unit price times the actual quantity of that Work item completed. The Engineer will determine actual quantities installed and recommended for payment.

ARTICLE 6 - BONDS AND INSURANCE

6.01 Bonds

A. Before starting Work, Contractor shall furnish a performance bond and a payment bond from surety companies that are duly licensed or authorized to issue bonds in the required amounts in the jurisdiction in which the Project is located. Each bond shall be in an amount equal to the Contract Price, as security for the faithful performance and payment of all of Contractor's obligations under the Contract. These bonds shall remain in effect until the completion of the correction period specified in Paragraph 7.12 but, in any case, not less than one year after the date when final payment becomes due.

6.02 Insurance

A. Before starting Work, Contractor shall furnish evidence of insurance from companies that are duly licensed or authorized in the jurisdiction in which the Project is located with a minimum AM Best rating of A-VII or better. Contractor shall provide insurance in accordance with the following:

1. Contractor shall provide coverage for not less than the following amounts, or greater where required by Laws and Regulations:

a. Workers' Compensation:

State:	Statutory
Employer's Liability:	
Bodily Injury, each Accident	$ **100,000**
Bodily Injury By Disease, each Employee	$ **100,000**
Bodily Injury/Disease Aggregate	$ **500,000**

b. Commercial General Liability:

General Aggregate	$ **2,000,000**
Products - Completed Operations Aggregate	$ **2,000,000**
Personal and Advertising Injury	$ **2,000,000**
Each Occurrence (Bodily Injury and Property Damage)	$ **2,000,000**

c. Automobile Liability herein:

Bodily Injury:	
Each Person	$ **2,000,000**
Each Accident	$ **2,000,000**
Property Damage:	
Each Accident	$ **2,000,000**
Combined Single Limit of:	$ **2,000,000**

d. Excess or Umbrella Liability:

Per Occurrence	$

General Aggregate $ _____

e. Contractor's Pollution Liability:

Each Occurrence $ _____

General Aggregate $ **1,000,000**

B. All insurance policies required to be purchased and maintained will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 10 days prior written notice has been given to the insured and additional insured.

C. Automobile liability insurance provided by Contractor shall provide coverage against claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance, or use of any motor vehicle. The automobile liability policy shall be written on an occurrence basis.

D. Contractor's commercial general liability policy shall be written on a 1996 or later ISO commercial general liability occurrence form and include the following coverages and endorsements:

1. Products and completed operations coverage maintained for three years after final payment;
2. Blanket contractual liability coverage to the extent permitted by law;
3. Broad form property damage coverage; and
4. Severability of interest; underground, explosion, and collapse coverage; personal injury coverage.

E. The Contractor's commercial general liability and automobile liability, umbrella or excess, and pollution liability policies shall include and list City of Portsmouth (Owner), Town of Newington, and Underwood Engineers, Inc., and the respective officers, directors, members, partners, employees, agents, consultants, and subcontractors of each as additional insureds; and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby (including as applicable those arising from both ongoing and completed operations) on a non-contributory basis.

1. Additional insured endorsements will include both ongoing operations and products and completed operations coverage through ISO Endorsements CG 20 10 10 01 and CG 20 37 10 01 (together). If Contractor demonstrates to Owner that the specified ISO endorsements are not commercially available, then Contractor may satisfy this requirement by providing equivalent endorsements.
2. Contractor shall provide ISO Endorsement CG 20 32 07 04, "Additional Insured—Engineers, Architects or Surveyors Not Engaged by the Named Insured" or its equivalent for design professional additional insureds.

F. Umbrella or excess liability insurance shall be written over the underlying employer's liability, commercial general liability, and automobile liability insurance. Subject to industry-standard exclusions, the coverage afforded shall be procured on a "follow the form" basis as to each of the underlying policies. Contractor may demonstrate to Owner that Contractor has met the combined limits of insurance (underlying policy plus applicable umbrella) specified for employer's liability, commercial general liability, and automobile liability through the primary policies alone, or through combinations of the primary

insurance policies and an umbrella or excess liability policy.

G. The Contractor shall provide property insurance covering physical loss or damage during construction to structures, materials, fixtures, and equipment, including those materials, fixtures, or equipment in storage or transit.

H. If Contractor has failed to obtain and maintain required insurance, Owner may exclude the Contractor from the Site, impose an appropriate set-off against payment, and exercise Owner's termination rights under Article 15.

ARTICLE 7 - CONTRACTOR'S RESPONSIBILITIES

7.01 Supervision and Superintendence

A. Contractor shall supervise and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, safety, and procedures of construction.

B. Contractor shall assign a competent resident superintendent who is to be present at all times during the execution of the Work. This resident superintendent shall not be replaced without written notice to and approval by the Owner and Engineer except under extraordinary circumstances.

C. Contractor shall at all times maintain good discipline and order at the Site.

D. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours (Section 7.02).

7.02 Hours of Work

A. Regular hours of work shall be **Monday through Friday 7:00 AM to 5:00 PM**.

B. Work during overnight hours, weekends, or federally observed holidays (Memorial Day, Fourth of July, Labor Day, Columbus Day, Veterans Day, Thanksgiving, and Christmas) will not be permitted without prior approval from the Owner. The Contractor shall submit a request to work outside the regular working hours described to the Owner two (2) weeks in advance of the date requested for approval.

7.03 Other Work at the Site

A. In addition to and apart from the Work of the Contractor, other work may occur at or adjacent to the Site. Contractor shall take reasonable and customary measures to avoid damaging, delaying, disrupting, or interfering with the work of Owner, any other contractor, or any utility owner performing other work at or adjacent to the Site.

7.04 Services, Materials, and Equipment

A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start up, and completion of the Work, whether or not such items are specifically called for in the Contract Documents.

B. All materials and equipment incorporated into the Work shall be new, of good quality and shall be stored, applied, installed, connected, erected, protected, used, cleaned, and

conditioned in accordance with instructions of the applicable supplier, except as otherwise may be provided in the Contract Documents.

7.05 Subcontractors and Suppliers

A. Contractor may retain subcontractors and suppliers for the performance of parts of the Work. Such subcontractors and suppliers must be acceptable to Owner.

7.06 Quality Management

A. Contractor is fully responsible for the managing quality to ensure Work is completed in accordance with the Contract Documents.

7.07 Licenses, Fees and Permits

A. Contractor shall pay all license fees and royalties and assume all costs incident to performing the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others.

B. Contractor shall obtain and pay for all construction permits and licenses unless otherwise provided in the Contract Documents.

7.08 Laws and Regulations; Taxes

A. Contractor shall give all notices required by and shall comply with all local, state, and federal Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Engineer shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.

B. Contractor shall bear all resulting costs and losses, and shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages if Contractor performs any Work or takes any other action knowing or having reason to know that it is contrary to Laws or Regulations.

C. Contractor shall pay all applicable sales, consumer, use, and other similar taxes Contractor is required to pay in accordance with Laws and Regulations.

7.09 Record Documents

A. Contractor shall maintain one printed record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, written interpretations and clarifications, and approved shop drawings in a safe place at the Site. Contractor shall annotate them to show changes made during construction. Contractor shall deliver these record documents to Engineer upon completion of the Work.

7.10 Safety and Protection

A. Contractor shall be solely responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work.

B. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury, or loss to:

1. All persons on the Site or who may be affected by the Work;

2. All the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and

3. Other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks,

pavements, roadways, structures, other work in progress, utilities, and underground facilities not designated for removal, relocation, or replacement in the course of construction.

C. All damage, injury, or loss to any property caused, directly or indirectly, in whole or in part, by Contractor, or anyone for whose acts the Contractor may be liable, shall be remedied by Contractor at its expense (except damage or loss attributable to the fault of Contract Documents or to the acts or omissions of Owner or Engineer and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor).

D. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations.

E. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor shall act to prevent threatened damage, injury, or loss. Contractor shall give Engineer prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

7.11 Shop Drawings, Samples, and Other Submittals

A. Contractor shall review and coordinate the shop drawing and samples with the requirements of the Work and the Contract Documents and shall verify all related field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information.

B. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review of that submittal, and that Contractor approves the submittal.

C. With each submittal, Contractor shall give Engineer specific written notice, in a communication separate from the submittal, of any variations that the shop drawing or sample may have from the requirements of the Contract Documents.

D. Engineer will provide timely review of shop drawings and samples.

E. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction or to safety precautions or programs.

F. Engineer's review and approval of a separate item does not indicate approval of the assembly in which the item functions.

G. Contractor shall make corrections required by Engineer and shall return the required number of corrected copies of shop drawings and submit, as required, new samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by Engineer on previous submittals.

H. Shop drawings are not Contract Documents.

7.12 Warranties and Guarantees

A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its officers, directors, members, partners, employees, agents, consultants, and subcontractors shall be entitled to rely on Contractor's warranty and guarantee.

7.13 Correction Period

A. If within one year after the date of substantial completion, any Work is found to be defective, or if the repair of any damages to the Site, adjacent areas that Contractor has arranged to use through construction easements or otherwise, and other adjacent areas used by Contractor as permitted by Laws and Regulations, is found to be defective, then Contractor shall promptly and without cost to Owner, correct such defective Work.

7.14 Indemnification

A. To the fullest extent permitted by Laws and Regulations, and in addition to any other obligations of Contractor under the Contract or otherwise, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, members, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any subcontractor, any supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts they may be liable.

ARTICLE 8 - OWNER'S RESPONSIBILITIES

8.01 Owner's Responsibilities

A. Except as otherwise provided in the Contract Documents, Owner shall issue all communications to Contractor through Engineer.

B. Owner shall make payments to Contractor as provided in this Contract.

C. Owner shall provide Site and easements required to construct the Project.

D. If Owner intends to contract with others for the performance of other work at or adjacent to the Site, unless stated elsewhere in the Contract Documents, Owner shall have sole authority and responsibility for such coordination.

E. The Owner shall be responsible for performing inspections and tests required by applicable codes.

F. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

G. While at the Site, Owner's employees and representatives shall comply with the specific applicable requirements of Contractor's safety programs of which Owner has been informed.

H. Owner shall furnish copies of any applicable Owner safety programs to Contractor.

ARTICLE 9 - ENGINEER'S STATUS DURING CONSTRUCTION

9.01 Engineer's Status

A. Engineer will be Owner's representative during construction. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in this Contract.

B. Neither Engineer's authority or responsibility under this Article 9 or under any other provision of the Contract, nor any decision made by Engineer in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Engineer, shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Engineer to Contractor, any subcontractor, any supplier, any other individual or entity, or to any surety for or employee or agent of any of them.

C. Engineer will make visits to the Site at intervals appropriate to the various stages of construction. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work.

D. Engineer has the authority to reject Work if Contractor fails to perform Work in accordance with the Contract Documents.

E. Engineer will render decisions regarding the requirements of the Contract Documents, and judge the acceptability of the Work.

F. Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Engineer will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

ARTICLE 10 - CHANGES IN THE WORK

10.01 Authority to Change the Work

A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work.

10.02 Change Orders

A. Owner and Contractor shall execute appropriate Change Orders covering:

1. Changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive;

2. Changes in the Work which are: (a) ordered by Owner or (b) agreed to by the parties or (c) resulting from the Engineer's decision, subject to the need for Engineer's recommendation if the change in the Work involves the design (as set forth in the Drawings, Specifications, or otherwise), or other engineering or technical matters; and

3. Changes in the Contract Price or Contract Times or other changes which embody the substance of any final binding results under Article 12.

B. If the provisions of any bond require notice to be given to a surety of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times), the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

ARTICLE 11 - DIFFERING SUBSURFACE OR PHYSICAL CONDITIONS

11.01 Differing Conditions Process

A. If Contractor believes that any subsurface or physical condition including but not limited to utilities or other underground facilities that are uncovered or revealed at the Site either differs materially from that shown or indicated in the Contract Documents or is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in Work of the character provided for in the Contract Documents then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except with respect to an emergency) until receipt of a written statement permitting Contractor to do so.

B. After receipt of written notice, Engineer will promptly:

1. Review the subsurface or physical condition in question;
2. Determine necessity for Owner obtaining additional exploration or tests with respect to the condition;
3. Determine whether the condition falls within the differing site condition as stated herein;
4. Obtain any pertinent cost or schedule information from Contractor;
5. Prepare recommendations to Owner regarding the Contractor's resumption of Work in connection with the subsurface or physical condition in question and the need for any change in the Drawings or Specifications; and
6. Advise Owner in writing of Engineer's findings, conclusions, and recommendations.

C. After receipt of Engineer's written findings, conclusions, and recommendations, Owner shall issue a written statement to Contractor regarding the subsurface or physical condition in question, addressing the resumption of Work in connection with such condition, indicating whether any change in the Drawings or Specifications will be made, and adopting or rejecting Engineer's written findings, conclusions, and recommendations, in whole or in part.

ARTICLE 12 - CLAIMS AND DISPUTE RESOLUTION

12.01 Claims Process

A. The party submitting a claim shall deliver it directly to the other party to the Contract and the Engineer promptly (but in no event later than 10 days) after the start of the event giving rise thereto.

B. The party receiving a claim shall review it thoroughly, giving full consideration to its merits. The two parties shall seek to resolve the claim through the exchange of information and direct negotiations. All actions taken on a claim shall be stated in writing and submitted to the other party.

C. If efforts to resolve a claim are not successful, the party receiving the claim may deny it by giving written notice of denial to the other party. If the receiving party does not take action on the claim within 45 days, the claim is deemed denied.

D. If the dispute is not resolved to the satisfaction of the parties, Owner or Contractor shall give

written notice to the other party of the intent to submit the dispute to a court of competent jurisdiction unless the Owner and Contractor both agree to an alternative dispute resolution process.

ARTICLE 13 - TESTS AND INSPECTIONS; CORRECTION OF DEFECTIVE WORK

13.01 Tests and Inspections

A. Owner and Engineer will have access to the Site and the Work at reasonable times for their observation, inspection, and testing. Contractor shall provide them proper and safe conditions for such access.

B. Contractor shall give Engineer timely notice of readiness of the Work for all required inspections and tests, and shall cooperate with inspection and testing personnel to facilitate required inspections and tests.

C. If any Work that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, Contractor shall, if requested by Engineer, uncover such Work for observation. Such uncovering shall be at Contractor's expense.

13.02 Defective Work

A. Contractor shall ensure that the Work is not defective.

B. Engineer has the authority to determine whether Work is defective, and to reject defective Work.

C. Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor.

D. The Contractor shall promptly correct all such defective Work.

E. When correcting defective Work, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

F. If the Work is defective or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, then Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated.

ARTICLE 14 - PAYMENTS TO CONTRACTOR

14.01 Progress Payments

A. The Contractor shall prepare a schedule of values that will serve as the basis for progress payments. The schedule of values will be in a form of application for payment acceptable to Engineer. The unit price breakdown submitted with the bid will be used for unit price work. Break lump sum items into units that will allow for measurement of Work in progress.

14.02 Applications for Payments:

A. Contractor shall submit an application for payment in a form acceptable to the Engineer, no more frequently than monthly, to Engineer. Applications for payment will be prepared and signed by Contractor. Contractor shall provide supporting documentation required by the Contract Documents. Payment will be paid for Work completed as of the date of the application for payment.

B. Beginning with the second application for payment, each application shall include an

affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior applications for payment.

14.03 Retainage

A. The Owner shall retain **5**% of each progress payment until the Work is substantially complete.

B. Upon Substantial Completion, the Owner shall retain **2**% of the Contract Value for the duration of the Correction Period as defined in Paragraph 7.13.

14.04 Review of Applications

A. Within 10 days after receipt of each application for payment, the Engineer will either indicate in writing a recommendation for payment and present the application for payment to Owner or return the application for payment to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. The Contractor will make the necessary corrections and resubmit the application for payment.

B. Engineer will recommend reductions in payment (set-offs) which, in the opinion of the Engineer, are necessary to protect Owner from loss because the Work is defective and requires correction or replacement.

C. The Owner is entitled to impose set-offs against payment based on any claims that have been made against Owner on account of Contractor's conduct in the performance of the Work, incurred costs, losses, or damages on account of Contractor's conduct in the performance of the Work, or liquidated damages that have accrued as a result of Contractor's failure to complete the Work.

14.05 Contractor's Warranty of Title

A. Contractor warrants and guarantees that title to all Work, materials, and equipment furnished under the Contract will pass to Owner free and clear of (1) all liens and other title defects, and (2) all patent, licensing, copyright, or royalty obligations, no later than seven days after the time of payment by Owner.

14.06 Substantial Completion

A. The Contractor shall notify Owner and Engineer in writing that the Work is substantially complete and request the Engineer issue a certificate of substantial completion when Contractor considers the Work ready for its intended use. Contractor shall at the same time submit to Owner and Engineer an initial draft of punch list items to be completed or corrected before final payment.

B. Engineer will make an inspection of the Work with the Owner and Contractor to determine the status of completion. If Engineer does not consider the Work substantially complete, Engineer will notify Contractor and Owner in writing giving the reasons therefor.

C. If Engineer considers the Work substantially complete or upon resolution of all reasons for non-issuance of a certificate identified in 14.06.B, Engineer will deliver to Owner a certificate of substantial completion which shall fix the date of substantial completion and include a punch list of items to be completed or corrected before final payment.

14.07 Final Inspection

A. Upon written notice from Contractor that the entire Work is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in

writing of all particulars in which this inspection reveals that the Work, or agreed portion thereof, is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

14.08 Final Payment

A. Contractor may make application for final payment after Contractor has satisfactorily completed all Work defined in the Contract, including providing all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance, certificates of inspection, annotated record documents and other documents.

B. The final application for payment shall be accompanied (except as previously delivered) by:

1. All documentation called for in the Contract Documents;

2. Consent of the surety to final payment;

3. Satisfactory evidence that all title issues have been resolved such that title to all Work, materials, and equipment has passed to Owner free and clear of any liens or other title defects, or will so pass upon final payment;

4. A list of all disputes that Contractor believes are unsettled; and

5. Complete and legally effective releases or waivers (satisfactory to Owner) of all lien rights arising out of the Work, and of liens filed in connection with the Work.

C. The Work is complete (subject to surviving obligations) when it is ready for final payment as established by the Engineer's written recommendation of final payment.

D. Final payment to the Contractor shall be at the end of the correction period as defined in Paragraph 7.13 and will release all remaining retainage, minus the value of any defective work not corrected by the Contractor at the end of the Correction period.

14.09 Waiver of Claims

A. The making of final payment will not constitute a waiver by Owner of claims or rights against Contractor.

B. The acceptance of final payment by Contractor will constitute a waiver by Contractor of all claims and rights against Owner other than those pending matters that have been duly submitted.

ARTICLE 15 - SUSPENSION OF WORK AND TERMINATION

15.01 Owner May Suspend Work

A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 60 consecutive days by written notice to Contractor and Engineer. Such notice will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be entitled to an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension.

15.02 Owner May Terminate for Cause

A. Contractor's failure to perform the Work in accordance with the Contract Documents or other failure to comply with a material term of the Contract Documents will constitute a default by Contractor and justify termination for cause.

B. If Contractor defaults in its obligations, then after giving Contractor and any surety ten days written notice that Owner is considering a declaration that Contractor is in default and

termination of the Contract, Owner may proceed to:

1. Declare Contractor to be in default, and give Contractor and any surety notice that the Contract is terminated; and

2. Enforce the rights available to Owner under any applicable performance bond.

C. Owner may not proceed with termination of the Contract under Paragraph 15.02.B if Contractor within seven days of receipt of notice of intent to terminate begins to correct its failure to perform and proceeds diligently to cure such failure.

D. Subject to the terms and operation of any applicable performance bond, if Owner has terminated the Contract for cause, Owner may exclude Contractor from the Site, take possession of the Work, incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and complete the Work as Owner may deem expedient.

E. In the case of a termination for cause, if the cost to complete the Work, including related claims, costs, losses, and damages, exceeds the unpaid contract balance, Contractor shall pay the difference to Owner.

15.03 Owner May Terminate for Convenience

A. Upon seven days written notice to Contractor, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for, without duplication of any items:

1. Completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

2. Expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses; and

3. Other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.

B. Contractor shall not be paid on account of loss of anticipated overhead, profits, or revenue, or other economic loss arising out of or resulting from such termination.

15.04 Contractor May Stop Work or Terminate

A. If, through no act or fault of Contractor, (1) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (2) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner, and provided Owner does not remedy such suspension or failure within that time, either stop the Work until payment is received, or terminate the Contract and recover payment from the Owner.

ARTICLE 16 - CONTRACTOR'S REPRESENTATIONS

16.01 Contractor Representations

A. Contractor makes the following representations when entering into this Contract:

1. Contractor has examined and carefully studied the Contract Documents, and any data and reference items identified in the Contract Documents.

2. Contractor has visited the Site, conducted a thorough visual examination of the Site and adjacent areas, and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
3. Contractor is familiar with and is satisfied as to all Laws and Regulations that may affect cost, progress, and performance of the Work.
4. Contractor has considered the information known to Contractor itself; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; the Contract Documents; and the Site-related reports and drawings identified in the Contract Documents, with respect to the effect of such information, observations, and documents on:
    a. The cost, progress, and performance of the Work;
    b. The means, methods, techniques, sequences, and procedures of construction to be employed by Contractor; and
    c. Contractor's safety precautions and programs.
5. Based on the information and observations referred to in the preceding paragraph, Contractor agrees that no further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract.
6. Contractor is aware of the general nature of work to be performed by Owner and others at the Site that relates to the Work as indicated in the Contract Documents.
7. Contractor has given Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.
8. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.
9. Contractor's entry into this Contract constitutes an incontrovertible representation by Contractor that, without exception, all prices in the Contract are premised upon performing and furnishing the Work required by the Contract Documents.

ARTICLE 17 - MISCELLANEOUS

17.01 Cumulative Remedies

A. The duties and obligations imposed by this Contract and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract. The provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

17.02 Limitation of Damages

A. Neither Owner, Engineer, nor any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors, shall be liable to Contractor for any claims, costs, losses, or damages sustained by Contractor on or in connection with any other project or

anticipated project.

17.03 No Waiver

A. A party's non-enforcement of any provision shall not constitute a waiver of that provision, nor shall it affect the enforceability of that provision or of the remainder of this Contract.

17.04 Survival of Obligations

A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract, as well as all continuing obligations indicated in the Contract, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

17.05 Contractor's Certifications

A. Contractor certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract.

17.06 Controlling Law

A. This Contract is to be governed by the law of the state in which the Project is located.

IN WITNESS WHEREOF, Owner and Contractor have signed this Contract.

This Contract will be effective on _____ (which is the Effective Date of the Contract).

OWNER:	CONTRACTOR:
_____	_____
By: Karen Conard	By: _____
Title: City Manager	Title: _____
	(If Contractor is a corporation, a partnership, or a joint venture, attach evidence of authority to sign.)
Attest: _____	Attest: _____
Title: _____	Title: _____
Address for giving notices:	Address for giving notices:
1 Junkins Avenue	_____
Portsmouth, NH 03801	_____
_____	_____
	License No.: _____ (where applicable)

(If Owner is a corporation, attach evidence of authority to sign. If Owner is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of this Contract.)

B-3.1

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS: that

_____
(Name of Contractor)

_____
(Address of Contractor)

a_____, hereinafter called Principal,
(Corporation, Partnership or Individual)

and _____
(Name of Surety)

_____
(Address of Surety)

hereinafter called Surety, are held and firmly bound unto

City of Portsmouth, New Hampshire
(Name of Owner)

1 Junkins Avenue, Portsmouth, NH 03801
(Address of Owner)

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:

Little Bay Road Water Main Improvements

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 **4** (number) counterparts, each one of which shall be deemed an original, this_____day of_____, 20_____.

ATTEST:

_____
Principal

By: _____
(Principal) Secretary

(SEAL) **BY** _____

_____
(Address)

By: _____ _____
Witness as to Principal

_____
(Address)

_____
(Surety)

ATTEST: **BY** _____
Attorney - in - Fact

By _____ _____
Witness as to Surety (Address)

_____ _____

_____ _____
(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

_____
(Name of Contractor)

_____
(Address of Contractor)

a_____, hereinafter called Principal,
(Corporation, Partnership or Individual)

and _____
(Name of Surety)

_____
(Address of Surety)

hereinafter called Surety, are held and firmly bound unto

City of Portsmouth, New Hampshire
(Name of Owner)

Department of Public Works, 680 Peverly Hill Road, Portsmouth NH 03801
(Address of Owner)

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:

Little Bay Road Water Main Improvements

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 **4** (number) counterparts, each one of which shall be deemed an original, this _____ day of _____, 20 .

ATTEST:

_____
Principal

By: _____
(Principal) Secretary

(SEAL) **BY** _____

_____
(Address)

By: _____ _____
Witness as to Principal

_____
(Address)

_____

_____
(Surety)

ATTEST: **BY** _____
Attorney - in - Fact

By _____ _____
Witness as to Surety (Address)

_____ _____

_____ _____
(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: _____

Project: Little Bay Road Water Improvements	Owner: City of Portsmouth, New Hampshire	Owner's Contract No.:
Contract: Little Bay Road Water Improvements		UEI Project No.: **3025**
Contractor:		
Contractor's Address:		

You are notified that the Contract Times under the above contract will commence to run on _____. On or before that date, you are to start performing your obligations under the Contract Documents. The time for completion will be in accordance with Article 4 of the Agreement.

Before you may start any Work at the Site, Paragraph 2.01.B of the General Conditions provides that you and Owner must each deliver to the other (with copies to Engineer and other identified additional insureds) certificates of insurance which each is required to purchase and maintain in accordance with the Contract Documents.

The Contractor shall provide evidence of insurance renewal when any insurance policies are renewed.

	City of Portsmouth
Contractor	Owner
Received by:	Given by:
Authorized Signature	Authorized Signature
	Karen Conard, City Manager
Title	Title
Date	Date

Copy to Engineer, Underwood Engineers, Inc

B-6.1

CONTRACTOR'S AFFIDAVIT

STATE OF New Hampshire

COUNTY OF _____

Before me, the undersigned, a _____
(Notary Public, Justice of Peace, Alderman)

in and for said County and State personally appeared,_____

_____ who being duly sworn according to law
authorized representative of corporate contractor)

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

City of Portsmouth, NH
(Owner)

and _____ of _____
(Contractor)

dated _____ for the construction of the _____and necessary appurtenant installations have been paid in full.

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

Sworn to and subscribed before me

this _____ day of _____ ,20_____ .

_____
Notary Public

B-7.1

CONTRACTOR'S RELEASE

KNOW ALL MEN BY THESE PRESENTS that _____

_____
(Contractor)

of _____ , County of _____

and State of New Hampshire do _____ hereby acknowledge that

_____
(Contractor)

has _____ this day had, and received of and from _____

City of Portsmouth, NH
(Owner)

the sum of One Dollar and other valuable considerations in full and complete satisfaction and payment of all sums of money owed, payable and belonging to _____

_____
(Contractor)

by any means whatsoever, for on account of a Contract Agreement between

City of Portsmouth, NH
(Owner)

and _____
(Contractor)

dated _____for _____
(Project)

NOW, THEREFORE, the said _____
(Contractor)

(for myself, my heirs, executors and administrators) (for itself, its successors and assigns) do/does, by these presents remise, release, quit-claim and forever discharge

_____
(Owner)

of and from all claims and demands, arising from or in connection with the said contract dated _____,and of and from all, and all manner of action and actions, cause and causes of action and actions, suits, debts, dues, duties, sum and sums of money, accounts, reckonings, bonds, bills, specialties, covenants, contracts, agreements, promises, variances, damages, judgments, extents, executions, claims and demand, whatsoever in law or equity, or otherwise, against _____
(owner)

its successors and assigns, which (I, my heirs, executors, or administrators) (it, its successors and

assigns) ever had, now have or which (I, my heirs, executors, or administrators) (it, its successors and assigns) hereafter can, shall or may have, for, upon or by reason of any matter, cause, or thing whatsoever; from the beginning of recorded time to the date of these presents.

IN WITNESS WHEREOF, _____

_____
(Contractor)

has caused these presents to be duly executed this _____ day of _____ ,20 ___

Signed, Sealed and Delivered in the presence of:

_____ _____(seal)
(Individual - Contractor)

_____(seal)
(Partnership - Contractor)

_____ By _____
(seal) (Partner)

Attested:

_____
(Corporation)

_____ By _____
(Secretary) (President or Vice President)

(Corp. Seal)

Certificate of Substantial Completion

Project: **Little Bay Road Water Improvements**	Owner: **City of Portsmouth, New Hampshire**	Owner's Contract No.:
Contract: **Little Bay Road Water Improvements**		Date of Contract:
Contractor:		UEI No.: **3025**

This ~~[tentative]~~ [definitive] Certificate of Substantial Completion applies to:

☐ All Work under the Contract Documents: ☐ The following specified portions:

Date of Substantial Completion

The Work to which this Certificate applies has been inspected by authorized representatives of Owner, Contractor and Engineer, and found to be substantially complete. The Date of Substantial Completion of the Project or portion thereof designated above is hereby declared and is also the date of commencement of applicable warranties required by the Contract Documents, except as stated below.

A [tentative] [revised tentative] [definitive] list of items to be completed or corrected, is attached hereto. This list may not be all-inclusive, and the failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

The responsibilities between OWNER and CONTRACTOR for security, operation, safety, maintenance, heat, utilities, insurance and warranties shall be as provided in the Contract Documents except as amended as follows:

☐ Amended Responsibilities ☐ Not Amended

Owner's Amended Responsibilities:

Contractor's Amended Responsibilities:

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

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 Engineer	Date
Accepted by Contractor	Date
Accepted by Owner	Date

Change Order

No. _____

Date of Issuance: _____ Effective Date: _____

Project: Little Bay Road Water Improvements	Owner: City of Portsmouth, New Hampshire	Owner's Contract No.:
Contract:		Date of Contract:
Contractor:		Engineer's Project No.: 3025

The Contract Documents are modified as follows upon execution of this Change Order:

Description:

Attachments (list documents supporting change):

CHANGE IN CONTRACT PRICE:	**CHANGE IN CONTRACT TIMES:**
Original Contract Price:	Original Contract Times: ☐ Working days ☐ Calendar days
$_____	Substantial completion (days or date): _____
	Ready for final payment (days or date): _____
[Increase] [Decrease] from previously approved Change Orders No. _____ to No. _____:	[Increase] [Decrease] from previously approved Change Orders No. _____ to No. _____:
$_____	Substantial completion (days): _____
	Ready for final payment (days): _____
Contract Price prior to this Change Order:	Contract Times prior to this Change Order:
$_____	Substantial completion (days or date): _____
	Ready for final payment (days or date): _____
[Increase] [Decrease] of this Change Order:	[Increase] [Decrease] of this Change Order:
$_____	Substantial completion (days or date): _____
	Ready for final payment (days or date): _____
Contract Price incorporating this Change Order:	Contract Times with all approved Change Orders:
$_____	Substantial completion (days or date): _____
	Ready for final payment (days or date): _____

RECOMMENDED:	ACCEPTED:	ACCEPTED:
By: _____	By: _____	By: _____
Engineer (Authorized Signature)	Owner (Authorized Signature)	Contractor (Authorized Signature)
Date: _____	Date: _____	Date: _____
Approved by Funding Agency (if applicable): _____		Date: _____

Contractor's Application for Payment No. 1

Application Period:
From Contractor:
Contract: Little Bay Road Water Improvements

Application Date:
Via Engineer: **Underwood Engineers, Inc.**

Owner's Project No.
Funding Agency Project No.
Contractor's Project No.
Engineer's Project No.: **3025**

Application for Payment

Change Order Summary			Payment Summary	
Approved Change Orders			1. Orignal Contract Price	
Number	Additions	Deductions	2. Net Change by Change Order	
			3. Current Contract Price (Line 1±2)	
			4a. Total Completed	
			4b. Total Stored	
			4. Total completed and Stored	
			5a. ____% x Work Completed	
			5b. ____% x Stored Materials	
			5. Total Retainage (Line 5a. + 5b.)	
Totals	$0.00	$0.00	6. Amount Eligible for Payment (Line 4-5)	
Net Change by Change Order		$0.00	7. Less Previous Payments	
			8. Amount Due this Application	
			9. Balance to Finish plus Retainage	

Contractor's Certifications

The undersigned Contractor certifies that: (1) all previous progress payments received from Owner on account of Work done under the Contract have been applied on account to discharge Contractor's legitimate obligations incurred in connection with Work covered by prior Applications for Payment; (2) title of all Work, materials and equipment incorporated in said Work or otherwise listed in or covered by this Application for Payment will pass to Owner at time of payment free and clear of all Liens, security interests and encumbrances (except such as are covered by a Bond acceptable to Owner indemnifying Owner against any such Liens, security interest or encumbrances); and (3) all Work covered by this Application for Payment is in accordance with the Contract Documents and is not defective.

By: _____
(Contractor) (Date)

Payment of: _____
(Line 8 or other - attach explanation of other amount)

is recommended by: _____
(Engineer) (Date)

Payment of _____

_____
(Line 8 or other - attach explanation of other amount)

is approved by: _____
(Owner) (Date)

Approved by: _____
(Funding Agency) (Date)

Approved by: _____
(Funding Agency) (Date)

C. SPECIFICATIONS

DIVISION 1

Scope of Work

The scope of this Division covers the General Administrative Requirements and the general work-related provisions of the Construction Contract.

Contents of Division

Section No.	Section Title
POW	Prosecution of Work
01010	Summary of Work
01025	Measurement and Payment
01070	Abbreviations and Symbols
01090	Reference Standards
01200	Project Meetings
01201	Community Information
01310	Construction Schedules
01340	Submittals
01546	Use of Explosives
01548	Vibration Monitoring
01562	Dust Control
01570	Traffic Regulation
01580	Project Identification
01590	Temporary Field Office
01611	Owner's Right to Material
01630	Substitution and Product Options
01701	Project Closeout Procedures
01710	Project Cleaning
01720	Project Record Documents

PROSECUTION OF WORK

The Prosecution of Work is intended to provide the Contractor a summary of project requirements for easy reference. It is not intended to provide all requirements. Refer to Technical Specifications and Drawings for details.

1. DESCRIPTION OF WORK

Work includes replacement of 4,200 LF of existing watermain owned by the City of Portsmouth along Little Bay Road from Fox Point Road to Gundalow Landing in Newington, NH. Water improvement include but may not be limited to:

- Furnish and install 8" ductile iron (class 52) poly encased water pipe
- Replacement of water service laterals with 1" copper service piping including curb stops and required transition fittings
- Replacement of all branch connections to side streets
- Maintenance of water system without interruption to service to users. Use of temporary water not anticipated.
- Permanent Trench Patch pavement repairs
- Perform testing of new water and sewer systems prior to paving
- Coordination of water shutdowns with Portsmouth Water Department.
- Coordination of any roadway impacts and traffic management with Newington Police Department.
- Maintenance of access to all properties during the course of the work.
- Contractor is required to conduct roadway restoration to Town of Newington Standard.

Work also includes replacement of an existing 12" culvert at the intersection of Fox Point Road is new 12" RCP drain pipe and mortar rubble masonry headwalls. A portion of the work will impact jurisdictional wetlands. A wetlands permit has been secured for the work and is provided in Appendix B.

2. SPECIAL SEQUENCING OF WORK

Prior to the start of any work, the Contractor shall submit for approval a proposed work schedule and sequence of work. The Contractor shall sequence the work to accomplish final paving and property restoration. Schedule updates or alterations should be presented at regular progress meetings. The Contractor will need to consider the following items pertaining to general sequencing of the work:

2.1 Utility Installation

It will be necessary to maintain all existing water systems throughout the duration of the Project. The Contractor shall review water sequencing with the Owner and Engineer.

Existing water will be maintained and/or protected from damage while new utilities are installed. No temporary water systems are intended for this project.

2.2 Testing
Coordinate all testing and acceptance of new utilities with Engineer and Owner. All new water mains shall be tested and accepted prior to completion of final pavement repairs

2.3 Road Maintenance
Trenches will be backfilled, and roads shall be re-opened to provide safe two way vehicular and pedestrian traffic at the end of each working day.

2.4 Property Restoration
Loam, seed & mulch and complete property restorations as work progresses.

3. TRAFFIC CONTROL PLAN

A Traffic Control Plan (TCP) shall be submitted to the Engineer for review and will require approval by the City of Portsmouth and the Town of Newington Police Department. Construction warning signs must conform to MUTCD standards, as applicable. Once approved, any changes or modifications to the TCP will have to be reviewed for approval. The Engineer, the City of Portsmouth, and the Town of Newington reserve the right to request modifications to the approved TCP at any time based on Contractor's operations and conditions observed.

EQUIPMENT
Provide necessary barricades, signs and traffic control devices in accordance with approved TCP, NHDOT Section 619, and MUTCD (latest edition). All barrels used will be required to have blinking yellow light for additional visibility at night.

PORTABLE MESSAGE BOARDS
Upon request, The Contractor shall provide two (2) portable message boards for this project when requested and will be responsible for siting and/or locating message boards as designated, and for maintenance of the messages throughout construction (Item 619.253).

POLICE DETAILS AND CERTIFIED FLAGGERS
Police details shall be used as required by the Town of Newington. It is anticipated that one (1) police detail per day will be adequate to cover the work zone. A unit item for flagging is provided in the event a police detail cannot be filled on a given day. Contractors shall be responsible for the coordination of flaggers when needed. The Engineer, the City of Portsmouth, and the Town of Newington reserves the right to request more or fewer police details and/or flaggers as work progresses and conditions change.

BUSINESS, RESIDENCE, AND PARKING ACCESS
The Contractor will be required to maintain access to abutting properties at all times.

Contractor shall notify owners and abutters of any impacts to driveway access due to trenching operations 1 day prior to the work. One know business (a hair salon at 66 Little Bay Road) is located within the project area, As work approaches the business location, the Contractor shall work with the business owner to complete work that will impact access at a time that least impacts hours of operation.

4. CONSTRUCTION LAYOUT

Work is to be generally constructed as shown on the drawings. The Contractor will be responsible for all construction layouts. Upon request, a list of available horizontal control points (and coordinates) and TBM's will be provided by the Engineer and confirmed by the Contractor, for reference throughout the project. The Engineer and/or Owner's Representative, together with the Project Superintendent will review utility corridors, considering dig-safe markings and Contractor's work plan. The Contractor will advise the Engineer, in advance, of potential conflicts concerning execution of his work. It will be the responsibility of the Contractor to protect and maintain TBM's, layout and control points provided by the Engineer. The Engineer will provide an electronic copy of plans and coordinates to the Contractor upon request to facilitate the Contractor's layout, providing the Contractor executes a release concerning the information transmitted.

5. CONFLICTS AND COORDINATION WITH EXISTING UTILTIES

It will be the Contractor's responsibility to coordinate with the utility companies for identification and re-location, if necessary, of any utilities that are interfering or conflicting with the work shown on the drawings. Loss of production or crew downtime relating to utility work by others will not be considered for additional payment.

6. OTHER BURIED UTILITIES AND SERVICE PIPES

Utilities shown on the drawings are based on information on file and should be considered approximate. All services for gas and water utilities may not be shown on the drawings but one (1) of each are to be expected for each building unit where the utility exists in the street. Where buildings have multiple units, multiple services can be expected. Additional or unknown utility crossings will be measured for payment as described in Item 6.3.

The Contractor is expected to coordinate utility markings through Dig Safe, Unitil and the City of Portsmouth, Water and Sewer Department before proceeding with this work. Repairs to unknown, unmarked or mismarked utilities will be measured for payment as described in item 6.4. Repairs to damaged utilities either shown on the plans or through markings on the ground will not be measured for payment. Direct conflicts with utilities resulting in the need for relocation of utilities will be measured for payment, utilizing contract unit items, as deemed appropriate by the Engineer. Additional compensation beyond unit items for loss of production, delays or downtime will not be considered.

7. MEETINGS

Public Information Meetings:

The Contractor, together with City/Town Officials and the Engineer, shall schedule and attend one public information meeting with residents and business owners prior to the start of

construction and at the beginning of construction following any temporary disruptions of the work (i.e., winter shutdown).

Project Meetings:

It is anticipated that regularly scheduled meetings with Owner's Representatives, Contractor, sub-contractors and regulatory representatives will be held monthly, unless increased frequency is meetings is considered necessary by the Contractor, Owner or Engineer.

Coordination Meetings

Informal weekly meetings are anticipated between the Contractor's Superintendent, Owner, and Resident Project Representative to review progress/schedule, sequence and other day to day issues.

8. TEMPORARY EROSION CONTROL

The Contractor's attention is directed to the provisions of NHDOT Section 645 of the Project Manual. The Contractor shall exercise caution to minimize the intrusion of any spillage, sediment, turbidity, or pollution into the waterways or adjacent properties around the project area, as this watershed drains to waters of the state, including Little Bay and the Piscataqua River. Sediment and erosion controls shall be operational prior to commencing trench de-watering operations.

A Storm Water Pollution Prevention Plan (SWPPP) will be required and must be kept on site at all times. The SWPPP shall be submitted to the Engineer for review and approval prior to implementation. The Contractor will be responsible for filing the NOI and maintaining the SWPPP onsite at all times. The NOI must be submitted to the EPA at least seven (7) days prior to the start of construction. The SWPPP must be in place prior to submittal of the NOI.

The SWPPP may be amended as necessary to provide continued erosion and sediment control throughout the project. Appropriate measures shall be implemented to prevent sedimentation migration resulting from the Contractor's construction operations.

9. CONSTRUCTION DEWATERING (Also, refer to Section 02402)

Trench dewatering may be required to complete the work. The Contractor shall comply with the Environmental Protection Agency's (EPA) National Pollutant Discharge Elimination System (NPDES) General Permit for Construction Dewatering before proceeding with the work. It is anticipated that well point dewatering (pre draining soils) is not anticipated to be required to complete the work.

This NPDES general permit covers construction dewatering discharges defined as pumped or drained discharges of groundwater and/or storm water from excavations or other points of accumulation associated with a construction activity. Qualified dischargers must submit a Construction Dewatering NOI to EPA-NE to be covered and will receive a written notification from EPA-NE of permit coverage. The EPA-NE contact for NOI forms is Shelley Puleo at (617) 918-1545. The DES contact for this permit is Stergios Spanos at (603) 271-6637.

Appropriate sediment and erosion controls shall be operational prior to commencing trench dewatering operations. Construction dewatering is incidental. See specification Sections 02402 and 02650 for additional information.

10. GEOTECHNICAL INFORMATION

To assist the Contractor in preparing a bid, borings logs, groundwater readings, and a geotechnical report are included in Appendix A of the Project Manual. Fluctuations in groundwater may exist.

11. HEALTH & SAFETY PLAN

Site safety shall be the Contractor's responsibility. The Contractor shall prepare a Health and Safety Plan (HASP) and maintain a copy of it onsite at all times. The HASP shall be located in an area easily accessible to all site personnel. Refer to Section 13710 of the Project Manual for HASP requirements

12. DUST CONTROL (refer to Section 01562)

Due to the proximity of homes to the work zone, the Contractor is required to actively work to mitigate dust and the Owner will enforce a strict dust control policy for this project as described in the above referenced section. Water and/or Calcium Chloride are required on unpaved surfaces to control dust. On paved surfaces sweeping will be required and the use of a mechanically enclosed street sweeper will be required at the end of each work week.

13. PEDESTRIAN TRAFFIC

The work area is in a residential neighborhood and the Contractor will need to accommodate the safe passage of pedestrian traffic as necessary.

14. STAGING AREA

The Contractor is required to locate and secure all staging and material storage areas. All staging areas to be secured by the Contractor must be approved in advance by the City of Portsmouth and Town of Newington. Contractor shall provide a Hold Harmless Release to both the City of Portsmouth and the Town of Newington to start of use of the staging area. At the completion of work, the Contractor shall receive a release from the property owners of the staging area(s) and a copy of each release shall be provided to the Owner prior to final acceptance of the project.

With Owner approval, the Contractor may use the side of the roadway for staging of pipe providing the following conditions are met (unless approved otherwise by the City/Town).

A. Pipe is placed no sooner than two (2) days preceding installation.
    a. No pipe shall be left strung out along the road way during weekends
B. Driveways are unimpeded and a minimum of 20 feet of roadway is maintained as a smooth traveling surface for vehicular traffic.

15. WINTER MAINTENANCE SEASON (If Required)

Prior to the winter shutdown season, the Contractor shall meet with the Owner and the Engineer relative to the condition of the project site that is to remain for the winter shutdown

period. This is to ensure that the roadways and sidewalks are in a condition which is satisfactory from a maintenance, safety and functionality standpoint for the winter season.

16. SALVAGE OF MATERIALS (Refer to Section 01611)

Existing hydrants identified to be removed shall be delivered to the City of Portsmouth Public Works Department at 680 Peverly Hill Road, Portsmouth, NH 03801.

17. ABANDONMENT OF EXISTING PIPE

All water pipe to be abandoned shall be cut and capped, unless shown otherwise on the Drawings. Existing gate valves to be abandoned are to be left in the closed position and the gate valve box removed.

18. VIBRATION MONITORING

Vibration Monitoring in addition to the vibration monitoring for blasting, required by state and local ordinances, will be provided by the Contractor upon request, if deemed necessary to monitor vibration resulting from the Contractor's equipment, compaction efforts or operations. Vibration monitoring for blasting operations is provided at the Contractors own expense.

19. TREE REMOVAL

No trees shall be removed without prior approval from the Owner/or abutting property owner.

20. TRIMMING OF TREES

Tree trimming, if required to accommodate the work, shall be reviewed with the Engineering and the Town of Newington the City. Prior to the start of the project, the Contractor shall walk the site and mark all the limbs that will require trimming to complete the work and minimize further damage to the tree. Upon approval by the Engineer and the Owner for all the limbs to be cut, the Contractor shall then trimming of limbs to be completed. This work shall be incidental and shall not be measured for payment.

END OF SECTION

SECTION 01010

SUMMARY OF WORK

PART 1 - GENERAL

1.1 WORK UNDER THIS CONTRACT

A. The work to be completed under this Contract includes but is not limited to:

1. Work shown on the Drawings included in the Bid Schedule or included within the Project Specifications.
2. Work described in the Prosecution of Work, Section POW.
3. Continuous maintenance of water system to provide uninterrupted water service and fire flows wherever possible.
4. Maintenance of stormwater flows during culvert replacements.
5. Piping modifications necessary to tie into existing systems.
6. Complete restoration of all properties both public and private.
7. All other work required for completion of the work as shown on the Drawings and as specified.

1.2 CONTRACTORS RESPONSIBILITIES

A. The General Contractor shall have the following responsibilities:

1. Prosecution of Work – The Contactor will perform work in accordance with the Prosecution of Work Section of these specifications.
2. Traffic Control – Coordinate with the City of Portsmouth and Town of Newington and provide all necessary barricades, signs and traffic control devices in accordance with Specification Section 01570 – Traffic Regulation.
3. Furnish all labor, materials, equipment and incidentals required to complete all work in accordance with the Contract Documents within the allotted time schedule and maintain required warranties.
4. Protect against vandalism. All losses incurred through vandalism are to be reimbursed by the Contractor or Contractor's insurance company.
5. Coordinate with the Department of Public Works, including securing any required permits, on all work accomplished within Town of Newington roadway rights-of-way.
6. Perform all work within Town of Newington right-of-way or limits of easements as shown on the Drawings unless written authorization is provided for further occupation of private properties.
7. Coordinate activities involving other utilities with the respective utility companies.
8. Obtain all necessary environmental and other permits required by federal, state and local authorities.
9. The work also includes but is not limited to furnishing all materials, labor and equipment to perform the following activities:
    a. Preparation and submittal of Contract specified submittals.
    b. Testing of materials as specified herein.
10. NPDES Permit Requirements – The Contractor shall prepare a Stormwater Pollution Prevention Plan (SWPPP) and submit a Notice of Intent (NOI) to the USEPA in accordance with the EPA Stormwater requirements associated

with Construction Activities prior to construction. See specification section 02540 – Temporary Erosion Control.

11. Contractor shall maintain storm flow during construction.

1.3 ENUMERATION OF DRAWINGS

A. The following drawings which form a part of this contract are:
   1. Sheet No's 1 – 10, entitled "Little Bay Road Water Improvements"

1.4 ENUMERATION OF SPECIFICATIONS

The following specifications which form a part of this Contract are:

A. Bid Requirements
B. Contract
C. General Conditions
D. Technical Specifications
E. Appendix A – Geotechnical Information
F. Appendix B – Permits
G. All addendum issued during the bidding process also form a part of this contract

PART 2 - PRODUCTS

(NOT PART OF THIS SECTION)

PART 3 - EXECUTION

3.1 WORK SEQUENCE

A. No work may commence until the following plans have been submitted and approved by the Owner and the Engineer:
   1. Traffic Control Plan
   2. Water Tie-In Plan
   3. Stormwater Pollution Prevention Plan (SWPPP) including the submission of the "Notice of Intent" to the US EPA

B. It is the intention that the work required to be completed under this Contract be performed in an organized and workmanlike manner. Water work shall proceed in accordance with approved scheduling to ensure that the new water system is tied into the existing water system as intended in the Contract and as shown on the Drawings. Construction areas shall be restored as soon as practical in an effort to minimize disturbance to private and public property. The Contractor is responsible for scheduling work to meet these objectives.

C. Proposed test pits, as shown on the Drawings or as directed by the Engineer, shall be excavated in the presence of the Engineer. Test pits shall be excavated prior to the start of work so that adequate time is allowed to address any required field changes and to allow for sufficient material lead time.

3.2 SPECIAL REQUIREMENTS

A. Contractor shall maintain existing utilities to all existing users at all times.
B. The Contractor shall maintain access to all properties during construction to the greatest extent practical.

C. Temporary trench pavement repairs shall be required at the end of each week unless approved otherwise.

D. Contractor shall maintain repair parts on-site for emergency repair of water system, drain lines, etc.

E. Contractor to receive approval from the Town of Newington prior to initiating any traffic restrictions and detours, if any.

3.3 WORK RESTRICTIONS

A. Work on the project will only be allowed as outlined in the Agreement (Section B-2)

END OF SECTION

SECTION 01025

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.1 DESCRIPTION

A. For all items other than those to be paid for by lump sum amounts, after the work is completed and before final payment is made therefore, the Owner's Representative shall make final measurements to determine the quantities of various items of work accepted as the basis for final settlement. The Contractor, in the case of unit price items, will be paid for the actual amount of work accepted and for the actual amount of materials in place, as shown by the final measurements.

B. All units of measurement shall be standard United States convention as applied to the specific items of work by tradition and as interpreted by the Engineer.

C. At the end of each day's work, the Contractor's Superintendent or other authorized representative of the Contractor shall meet with the Owner's Representative and determine and agree upon the quantities of unit price work accomplished and/or completed during the work day.

D. The Representative will then prepare a "Field Report" which shall be signed by both the Representative and Contractor's Representative indicating complete agreement and approval of the quantities listed.

E. Once each month the Representative will prepare a "Monthly Progress Summation" form from the month's accumulation of "Field Report" which shall also be signed by both the Representative and Contractor's Representative indicating complete agreement and approval of quantities listed.

F. These completed forms will provide the basis of the Engineer's monthly quantity estimate upon which payment will be made. Items not appearing on both the Field Report and Monthly Progress Summation may not be included for payment. Items appearing on forms not properly signed by the Contractor may not be included for payment.

G. The Contractor will prepare and submit the Pay Application for approved work completed in the payment period to the Engineer. The Engineer will provide a recommendation for payment to the Contractor. Upon recommendation from the Engineer, the Owner will complete a final review and approve the Pay Application for payment.

H. Samples of the above referenced forms are included at the end of this section of the Specifications.

I. The Contractor shall submit a cost breakdown of all lump sum items for payment purposes. This cost breakdown shall be submitted prior to Contract signing and shall be approved by the Engineer.

J. Payment Application will only be prepared in a form acceptable to the Owner and approved by the Engineer. The form shall be in a computer spreadsheet format and exportable to MS EXCEL. (Sample Forms attached).

1.2 SCOPE OF PAYMENT

A. Payments to the Contractor will be made for the actual quantities of Contract items performed and accepted in accordance with the plans and specifications. Upon completion of the construction, if these actual quantities show either an increase or decrease from the quantities given in the Bid (form), the Contract unit prices will still prevail, except as provided hereinafter.

B. The Contractor shall accept compensation, as herein provided, in full payment for furnishing all materials, labor, tools, equipment and incidentals necessary to complete the work and for performing all work included in the Contract; for all loss or damage arising from the nature of the work, or from the action of the elements; or from any unforeseen difficulties which may be encountered during the prosecution of the work and until its final acceptance by the Engineer; and for all risks of every description connected with the prosecution of the work, except as provided herein, also for all expenses incurred in consequence of the suspension of the work as herein authorized.

C. The payment of any partial estimate or of any retained percentage except by and under the approved final invoice, in no way shall affect the obligation of the Contractor to repair or replace any defective parts of the construction or to be responsible for damage due to such defects.

1.3 PAYMENT FOR INCREASED OR DECREASED QUANTITIES

A. When alterations in the quantities of work not requiring supplemental agreements are ordered and performed, the Contractor shall accept payment in full at the Contract price for the actual quantities of work done. No allowance will be made for anticipated profits. Increased or decreased work involving supplemental agreements will be paid for as stipulated in such agreements.

1.4 ELIMINATED ITEMS

A. Should any items contained in the Bid (form) be found unnecessary for the proper completion of the work contracted, the Engineer may eliminate such items from the Contract, and such action shall in no way invalidate the Contract, and no allowance will be made for items so eliminated in making final payment to the Contractor.

1.5 PARTIAL PAYMENTS

A. Partial payments shall be made monthly as the work progresses. All partial payments shall be subject to correction in the final quantity invoice and payment.

B. No monthly payment shall be required to be made when, in the judgment of the Engineer, the work is not proceeding in accordance with the provisions of the Contract, or when, in his judgment, the total value of the work done since the last payment amounts to less than $1,000.00.

C. The partial payments will be based upon invoices prepared by the Engineer of the value of the work performed, and materials complete in place in accordance with the Contract. Retainage shall be as specified in Paragraph 24.2 of the General Conditions as modified by the Supplemental General Conditions. The Owner shall pay the Contractor within 45 days of receipt of the Engineer approved invoiced amount.

1.6 PAYMENT FOR MATERIAL DELIVERED ON LUMP-SUM PROJECTS

A. At the discretion of the Owner, the Engineer may act upon the request of the Contractor, prepare an invoice, accompanied by receipted bills for payment of all or part of the value of acceptable, nonperishable materials and equipment which are to be incorporated into lump sum type contracts, and which have been delivered to the site of the work or in acceptable storage places, and not used at the time of such invoice. Materials, when so paid for by the Owner, shall become the property of the Owner, and in the event of default on the part of the Contractor, the Owner may use, or cause to be used, these materials in the construction of the work provided for in the Contract. The Contractor shall be responsible for any damage to, or loss of, these materials in accordance with Contract insurance requirements. The amount thus paid by the Owner shall go to reduce estimated amounts due the Contractor as the material is used in the work.

B. No partial payment shall be made upon fuels, supplies, lumber, false work, or other materials, or on temporary structures of any kind which are not a permanent part of this Contract.

1.7 FINAL PAYMENT

A. The Engineer shall make, as soon as practicable after the completion of the project, a final quantity invoice of the amount of work performed under the Contract and establish the value of such work.

B. The Owner shall retain a sum determined in accordance with the General Conditions and Supplemental Provisions of the final Contract cost for an one-year warranty period commencing on the date of substantial completion.

C. The Owner shall then pay the entire sum found to be due, after deducting there from all previous payments and the aforementioned retainage. In addition, any amounts to be retained or deducted under the provisions of the Contract may be held by the Owner for a period of sixty (60) days after the completion of the final quantity invoice, or until such time as the Contractor submits satisfactory evidence that all bills for labor and materials used under this Contract have been paid and all required documents submitted to the Engineer.

1.8 INCIDENTAL OR SUBSIDIARY WORK

A. Incidental work items for which separate payment is not measured includes the following items:

1. Clearing, Grubbing and Stripping.
2. Clean Up.
3. Sod or Loam and Seeding unless paid for under other items.
4. Restoration of property or repairs to any facilities that are impacted from construction performed by the Contractor unless otherwise paid for.
5. Cooperation with utility companies, Owner’s representatives, or other Contractors employed by the Owner.
6. Utility crossings, unless otherwise paid for.
7. Utility relocation unless otherwise paid for.
8. Minor items - Such as replacement/relocation of mailboxes, guard rails, signs, rock walls, etc. where separate items are not provided.

9. Dewatering, unless otherwise paid for.
10. Steel and/or wood sheeting utilized by the Contractor other than sheeting left in place or removed when directed by the Engineer and paid for under a separate item.
11. Repair to utilities damaged as a result of Contractor operations
12. Temporary water systems necessary for the Contactor to perform the work without disruption to the existing facilities, will not be measured for payment.
13. Temporary roadway stabilization materials (crushed gravel, pavement millings or reclaimed asphalt product).
14. Prosecution of Work in accordance with project specifications.
15. Dust control is included in Item 6.11 and is required on a daily basis.
16. Any work shown or described on the drawings or in the Contract Documents, for which no pay item exists, shall be considered subsidiary to the project and will not constitute additional payment.

1.9 DESCRIPTION OF PAY ITEMS

A. The following sections describe the measurement of and payment for the work to be done under the respective items listed in the Bid (form).

B. Each unit or lump sum price stated in the Bid (form) shall constitute full compensation, as herein specified, for each item of the work completed.

C. Refer to Division E NHDOT Technical Specifications, and Amendments for Measurement and Payment of unit items not described in this Section.

D. Measurement and Payment of unit items that are not included in the NHDOT Standard Specifications or Amended Sections and Special Provisions of Division E are described, as follows:

ITEM NO. 3.X.YY: FURNISH AND INSTALL DUCTILE IRON WATER PIPE (ALL SIZES)

A. Method of Measurement:
1. Ductile iron pipe shall be measured per linear foot.
2. Pipe shall be measured along the horizontal centerline of the pipe as laid.
3. No deduction shall be made for the space occupied by fittings.
4. Note: X=1 DI
X=2 C-900
YY=pipe diameter in inches
5. Six inch (6") branch pipe for hydrants is included in Item 3.6A and will not be measured under this item

B. Basis of Payment:
1. Pipe shall be paid for at the Contract price per linear foot.
2. Said unit price shall constitute full compensation for furnishing and installing all materials (including polyethylene encasement), labor, equipment and tools necessary for hauling, handling, laying, jointing and testing pipe.
3. Said unit price shall include all necessary earth excavation, bedding, sheeting, backfill, compaction, rigid insulation, cleaning and testing and

other incidental work including removal, stockpiling and replacement of select reclaimed pavement and roadway gravels.

4. Said unit price shall include full compensation for installing and maintaining trench dewatering systems, where necessary, to install the pipe in the dry, unless otherwise paid under a separate item.
5. Said price shall include any fittings, tees, wyes, adapters, couplings, thrust restraint fittings and thrust blocks, etc. not covered under separate bid items which are required to connect existing pipe to the proposed water main.
6. Said unit price shall include full compensation for the relocation of utilities (including but not limited to gas, electric and telephone) which interfere with the proposed water main as shown on the Drawings, and for the repair of utilities damaged by the Contractor not paid for under a separate item
7. Said unit price shall include temporary piping, temporary facilities, and temporary services, not included or paid for under separate items, as necessary to maintain water service during construction.
8. Said unit price shall include removal and proper disposal of (non-asbestos) existing water main, in-line valves, and other items that are abandoned and are required to be removed. Unit price shall include caps for pipes abandoned in place.
9. Said unit price shall include restoration to existing conditions including, but not limited to driveways (paved and gravel), lawns, curbs, drainage, etc., unless specifically paid under a separate pay item.
10. Said unit price shall include sheeting and bracing (if necessary).
11. Said unit price shall include disinfection, de-chlorination, bacteriological, and pressure testing.
12. Said unit price shall include installation and removal of temporary blowoffs, including any corporations, pipes and shut-offs needed to flush lines and chlorinate the system when this cannot be accomplished through an existing hydrant.
13. Said unit price shall include management and disposal of surplus soils not used as trench backfill.
14. Actual payment for this item shall be broken down in accordance with the following percentages:
    a. Water pipe in place and backfilled - 90%
    b. Water pipe successfully cleaned and tested, and cleanup and/or corrections completed - 10%
15. Unit item will include compensation for sequencing required to connect new water systems into the existing systems not paid for under separate items.

ITEM NO. 3.3.X: FURNISH AND INSTALL COPPER SERVICE PIPE (ALL SIZES)

A. Method of Measurement:
   1. Copper service pipe shall be measured per linear foot.
   2. Measurement shall be along the centerline of the pipe including the tapping saddle (if necessary), corporation stop, through the curb stop to the connection to the existing service line.
   3. Note: X=pipe diameter in inches

B. Basis of Payment:
   1. Pipe shall be paid for at the Contract price per linear foot.
   2. Said unit price shall constitute full compensation for furnishing and installing all materials, labor, equipment and tools necessary for hauling, handling, laying, jointing and testing pipe.
   3. Said unit price shall also include all necessary earth excavation, dewatering, bedding, backfill, sheeting/bracing, compaction, cleaning and testing, and other incidental work.
   4. Said unit price shall also constitute full compensation for the removal and replacement of curbs, drives (paved and gravel), bushes, plantings, sod, and all necessary grading and reseeding of grassed areas disturbed by the Contractor's operations, not paid for under separate items.
   5. Said unit price shall also constitute full payment for copper service pipes previously installed by contractor which require relocation or replacement because of proposed sewer or drain interferences.

ITEM NO. 3.4.X: FURNISH AND INSTALL WATER SERVICE CONNECTIONS

A. Method of Measurement:
   1. Measurement for these items shall be for each service connection completed.
   2 Note: X=size in inches

B. Basis of Payment:
   1. Water service connections complete in place shall be paid at the Contract price for each.
   2. Said unit price shall constitute payment for tapping water main wet or dry; furnishing and installing corporation, curb stop, curb box; cleaning, testing and connection to the existing service as shown on the Drawings and as specified herein.
   3. Said price shall be considered compensation for furnishing any service saddles, fittings, tees, wyes, adapters, couplings, etc. not covered under separate bid items which are required to connect the proposed water main to the existing house service, where indicated on the Drawings.
   4. Said unit price shall also constitute full compensation for all necessary excavation, dewatering, backfill, compaction, sheeting, bracing, cleaning and other incidental work not specifically included for payment under other items.
   5. Said unit price shall also include removal and proper disposal of existing curb stops and boxes except for salvage quantity identified in Section 01611.
   6. Said unit price shall also constitute full compensation for the removal and replacement of curbs, drives (paved and gravel), bushes, plantings, sod, and all necessary grading and reseeding of grassed areas disturbed by the Contractor's operations not paid for under separate items.

ITEM NO. 3.5.XX: FURNISH AND INSTALL VALVE ASSEMBLIES (ALL SIZES) AND TYPES

A. Method of Measurement:
   1. Valves shall be measured per each valve and valve box assembly installed.
   2. Note: XX=diameter in inches

B. Basis of Payment:
   1. Valves shall be paid at the Contract unit price per each valve and valve box assembly installed.
   2. Said unit price shall be full compensation for furnishing all materials, labor, equipment, and tools; for installing, setting, joining; for restraining joints and/or thrust blocks; for testing all valves; and for all other incidental work and expenses.
   3. Said unit price shall also include adjustments of valve boxes to final pavement elevation.

ITEM NO. 3.6: FURNISH AND INSTALL HYDRANT ASSEMBLIES

A. Method of Measurement:
   1. Hydrant assemblies shall be measured each assembly installed in the field as indicated on the Drawings or in a location as directed by the Engineer.

B. Basis of Payment:
   1. Fire Hydrant assemblies shall be paid at the Contract price per each assembly, including tee at main, 6" ductile iron branch piping from the main gate valve, valve box, mechanical joint fittings, and thrust restraint as specified.
   2. Said unit price shall also constitute payment for tools, labor, materials, and equipment necessary to furnish and install hydrant, branch piping from the main line regardless of the length of branch piping installed, anchoring tee, gate valve, mechanical joint retainer glands, valve box, thrust block, cleaning, testing, and painting as shown on the Drawings and as specified herein.
   3. Said unit price shall also constitute full compensation for tools, materials, labor and equipment necessary for excavation, dewatering, backfill, compaction, sheeting, bracing, cleaning and other incidental work not specifically included for payment under other items.
   4. Said unit price shall also constitute full compensation for the removal and replacement of curbs, drives (paved and gravel), bushes, plantings, sod, and all necessary grading and reseeding of grassed areas disturbed by the Contractor's operations, not paid for under separate unit items.
   5. Said unit price shall also constitute payment for removal and disposal of existing hydrant as indicated on the Drawings. Existing hydrant assemblies including valves shall remain the property of the Owner and be delivered to the Owner, when requested.
   6. Actual payment for this item shall be broken down in accordance with the following percentages:
      a. Hydrant assembly in place and backfilled - 70%

b. Hydrant assembly successfully cleaned and tested, and cleanup and/or corrections completed - 30%

ITEM NO. 3.7: REMOVE EXISTING HYDRANT ASSEMBLIES

A. Method of Measurement:
1. Existing fire hydrants removed shall be measured per each.
2. Existing hydrants removed for replacement with new hydrants within normal excavation limits (payable trench width plus 1' either side) will not be measured for payment under this item.

B. Basis of Payment:
1. Hydrant removal shall be paid for at the Contract unit price per each.
2. Said unit price shall also constitute payment for removal and disposal of existing hydrant as indicated on the Drawings. Existing hydrant assemblies including the valves shall remain the property of the Owner and be delivered to the Owner, when requested.
3. The said unit price for hydrant assemblies removed shall include furnishing and installing caps or plugs necessary to facilitate abandonment in place of existing main.
4. Said unit price shall also constitute full compensation for all necessary excavation, dewatering, backfill, compaction, sheeting, bracing, cleaning and other incidental work not specifically included for payment under other items.
5. Said unit price shall also constitute full compensation for the removal and replacement of curbs, drives (paved and gravel), bushes, plantings, sod, and all necessary grading and reseeding of grassed areas disturbed by the Contractor's operations not paid for under separate Items.

ITEM NO. 6.1X: CONSTRUCTION VIBRATION MONITORING

A. Method of Measurement:
1. Construction vibration monitoring for this item will be measured for any additional monitoring that is beyond what is required by state and local ordinances, for blasting.
2. Vibration monitoring for blasting will not be measured for payment under his item.
3. Engineer must approve use of vibration monitoring prior to installation of monitoring devices. Vibration monitoring initialized prior to Engineer's approval will not be eligible for payment.

B. Basis of Payment:
1. Payment for vibration monitoring shall be based on actual invoices from the subcontractor and submitted to the Engineer. Payment shall be without markup.
2. Said allowance shall constitute full compensation for the furnishing of all labor, equipment and materials associated with providing vibration monitoring services in accordance with the Contract Drawings and Specifications.

3. Said unit price shall include, but not be limited to; coordinating, scheduling, and paying for all services; providing support services for the vibration monitoring firm; and all other work required for or incidental to the satisfactory completion of this item.

ITEM NO. 6.3: UNKNOWN UTILITY CROSSING

A. Method of Measurement:
   1. Unknown utility crossing will be measured as a single unit for each utility pipe crossing that exceeds what normally can be anticipated, defined as follows:
      a. The Contractor can anticipate that each unit or building has one service lateral each for gas and water unless additional crossings are shown on the drawings. Additional utility crossings (more than one of each) will be measured for payment under this item.
   2. Unmarked or mismarked utility crossings will not be measured for payment under this item unless they exceed what normally can be anticipated as defined in line 1.a above
   3. Utility crossings, delineated or otherwise, indicated on the drawings will not be measured for payment under this item.
   4. Repair of unknown/unmarked or mismarked utility crossings will be measured and paid under Item 6.4.

B. Basis of Payment:
   1. Unknown utility crossing will be paid for at the contract unit price per each crossing as measured in A, above.
   2. Said unit price will be considered full compensation for the Contractor's crew, labor and equipment, and any lost time or production that is associated with the unknown utility crossing as identified in A, above.
   3. Repair of unknown utility will be paid for in accordance with Item 6.4 and is not included in the payment of this item.
   4. An unknown or mismarked utility will only be considered once for payment.

ITEM 6.4: REPAIR OF UNKNOWN UTILITIES OR MISMARKED UTILITIES

A. Method of Measurement:
   1. Repair of unknown utilities or mismarked utilities will be measured as a single unit for each utility pipe that requires repair, regardless of the size or material of the utility conduit.
   2. To be eligible for measurement under this item, the Contractor shall review the utility discovered with the Owner's Representative to determine that the utility repairs are required.
   3. Repair of utilities that are marked by Dig-Safe or indicated on the drawings will not be measured for payment, unless they are 6-feet beyond the locations indicated as determined and measured by the Engineer.

B. Basis of Payment:
   1. Repair of unknown utilities or mismarked utilities will be paid for at the contract unit price for each utility repaired as measured in A, above.

2. To be eligible for payment under this item, the Contractor shall review the utility discovered with the Owner's Representative to determine that the utility repairs are required. Any utility repaired without approval from the Owner's Representative will not be considered for payment.
3. Said unit price will be considered full compensation for all materials, equipment and labor, necessary to repair unknown or unmarked utilities to original or better condition using similar or compatible materials, as approved by the Engineer or Owner's representatives.
4. Repairs using dissimilar sizes or materials, or utility repairs that are not properly aligned as determined by the Engineer will not be considered for payment.
5. An unknown or mismarked utility will only be considered once for payment.

ITEM NO. 6.5: TRENCH LEDGE REMOVAL AND DISPOSAL

A. Method of Measurement:
   1. Ledge removal and disposal shall be measured per cubic yard of ledge removed within payment limits indicated on the Drawings or as directed by the Engineer.
   2. Measurement beyond the limits indicated on the plans will only be considered if such limits have been authorized in writing by the Engineer, in which case measurement shall be made to the authorized limits.
   3. The field representative shall make field measurements for ledge removal either in place before excavation or by measuring the length and average depth of ledge removed.
   4. Payment width (w) for ledge excavation shall be as follows:
      a. For pipes 15 inches nominal diameter or less, W shall be no more than 36 inches.
      b. For pipes greater than 15 inches in nominal diameter, W shall be 24 inches plus pipe outside diameter (O.D.).
   5. Logs for borings taken along the project are recorded in the Appendix of this Contract.
   6. Boulders measuring less than two cubic yards will not be measured for payment.
   7. Ledge that breaks apart using standard excavating methods (i.e. excavator bucket) without significant additional effort or "wear and tear" as described in paragraph 1.1A.2 of Section 02224 will not be measured for payment.

B. Basis of Payment:
   1. Ledge excavation shall be paid for at the Contract unit price per cubic yard.
   2. Said unit price shall constitute full compensation for the furnishing all labor, equipment, and materials associated with ledge excavation and disposal.
   3. Said unit price shall include full payment of the furnishing and installation of suitable backfill for trench.
   4. Said unit price shall also include full compensation for all permits, insurances, pre-blast surveys, blast monitoring etc. if the use of explosives is the selected method of ledge demolition.

5. Boulders removed from the trench shall be removed from the work area immediately after measurement.
6. Rock removal shall be consistent with current City Blasting Ordinance.

ITEM NO. 6.6X: ADDITIONAL EXCAVATION AND EXCAVATION OF UNSUITABLE MATERIALS

A. Method of Measurement:
   1. Additional excavation below normal depth or excavation of unsuitable material below normal depth shall be measured per cubic yard, as ordered by the Engineer. Unsuitable materials may include but not be limited to: peat, muck, stumps, wood debris, etc.
   2. The volume shall be determined by multiplying the average pay width by the average length by the average depth as measured by the Engineer.
   3. The quantities of additional excavation shall be cumulative; that is an increase on any part of the work shall offset a decrease on any other part of the work, and the final adjustment shall be based on the net increase or decrease for these items.
   4. For changes in line or grade of the sewers or drain as directed by the Engineer, the first 1 foot depth of additional excavation shall be incidental to the pipe installation item. Additional depth exceeding 1 foot shall be measured for payment under this item.
   5. Note: X shall be:
      A – Additional trench excavation (where directed)
      B – Excavation and disposal of unsuitable materials (un-regulated)
   6. Additional excavation for roadway work shall be paid for under Item 6.6A.

B. Basis of Payment:
   1. Additional excavation and excavation of unsuitable materials shall be paid for at the Contract unit price per cubic yard.
   2. Said unit price shall constitute full compensation for the furnishing of all material, labor, equipment and tools necessary for additional excavation and disposal of all unsuitable materials.
   3. Said unit price shall be considered full compensation for proper disposal of unsuitable materials.

ITEM NO. 6.7: FURNISH AND INSTALL ADDITIONAL SCREENED GRAVEL (CRUSHED STONE) (WHERE ORDERED BY THE ENGINEER)

A. Method of Measurement:
   1. Additional screened gravel shall be measured per cubic yard measured in place after compaction, used as backfill below normal depth.
   2. Measurement shall be by multiplying the ordered width by the ordered length by the depth after compaction.
   3. Measured quantity shall be the same as that number of cubic yards of additional earth excavation required below normal depth which said gravel replaces.
   4. Screened gravel used for bedding pipe backfill unauthorized excavations, backfill rock excavations, replacing unsuitable trench material, or as

indicated on the Drawings, for which appropriate payment items have been provided, shall not be included for payment under this item.

B. Basis of Payment:
   1. Additional screened gravel shall be paid for at the Contract unit price per cubic yard.
   2. Said unit price shall constitute full compensation for the furnishing of all materials, labor, equipment, and tools necessary for furnishing, placing and compacting screened gravel as specified.

ITEM NO. 6.8: EXPLORATORY TEST PIT EXCAVATION

A. Method of Measurement:
   1. Test pits shall be measured per each individual test pit completed.
   2. Test pits will only be measured for payment if shown on the drawings or at locations approved by the Engineer. Test pits or exploratory excavation completed in the absence of the Engineer will not be considered for payment.
   3. Locations shown on the drawings are approximated and installation at these locations shall be coordinated with the Engineer.

B. Basis of Payment:
   1. Test pits shall be paid at the Contract unit price per each.
   2. Payment under this item shall be full compensation for furnishing all equipment, labor, and materials for excavation, location of existing utilities, backfill, property restoration and all else incidental for which separate payment is not provided for under other items.
   3. Payment for individual test pits exceeding 10 CY will constitute additional payment based on the proportional increase of the test pit excavation.
   4. Said unit price shall constitute full compensation for any repairs to existing utilities that result from exploratory test pit excavation.

ITEM NO. 6.9: GEOTECHNICAL FIELD TESTING

A. Method of Measurement:
   1. Field testing of subgrade and fill or backfill layers shall be measured for payment when directed by the Engineer and performed with satisfactory results.
   2. Tests for which results do not meet specified requirements shall not be considered for payment.

B. Basis of Payment:
   1. Payment for field testing shall be based on actual invoices from the testing agency and submitted to the Engineer. Payment shall be without markup.
   2. Work by the Contractor to coordinate and support testing shall be incidental.
   3. Gradation analysis and Proctor tests (i.e., laboratory work) for select aggregates shall be incidental to other items. Engineer may order additional Proctors/Gradations when sampling/test results vary (also incidental).

ITEM NO. 6.10 – 2" INCH THICK x 24" WIDE RIGID POLYSTYRENE INSULATION

A. Method of Measurement:
   1. Rigid insulation installed as directed by the Engineer shall be measured by

the linear foot along the centerline of the pipe to the nearest foot.

2. Rigid insulation installed in areas other than that shown on the drawings or not previously approved by the Engineer will not be measured for payment.

B. Basis of Payment:

1. Rigid polystyrene insulation shall be paid at the contract price per linear foot.
2. Said unit price shall constitute full compensation for furnishing and installing all materials, labor, equipment, and tools necessary for installation of insulation.

ITEM NO. 6.11 – CALCIUM CHLORIDE FOR DUST CONTROL

A. Method of Measurement:

1. The quantity of calcium chloride to be measured for payment shall be on a per pound basis as ordered and approved by the engineer.
2. Water applications and street sweeping for dust control are included in Item and will not be measured under this Item.

1. B. Basis of Payment Dust control shall be paid for at the Contract per unit price.

2. Said unit price shall constitute full compensation for the furnishing of all labor, equipment and materials associated with providing dust control in accordance with the Contract Drawings and Specifications.
3. Said unit price shall include, but not be limited to; furnishing and placing calcium chloride and all other work required for or incidental to the satisfactory completion of this item.

PART 2 - PRODUCTS

(NOT PART OF THIS SECTION)

PART 3 - EXECUTION

(NOT PART OF THIS SECTION)

END OF SECTION

SECTION 01070

ABBREVIATIONS & SYMBOLS

PART 1 - GENERAL

1.1 DESCRIPTION

a. Where any of the following abbreviations are used in these Specifications, they shall have the meaning set forth opposite each.

AASHTO	American Association of State Highway and Transportation Officials
AC	Alternating Current
ACI	American Concrete Institute
ACP	Asbestos Cement Pipe
AGA	American Gas Association
AIC	Ampere Interrupting Capacity
AGMA	American Gear Manufacturers Association
AIEE (IEEE)	American Institute of Electrical Engineers (Institute of Electrical and Electronics Engineers, Inc.)
AISC	American Institute of Steel Construction
amp	Ampere
125-16 Amer. Std.	American Standard for Cast Iron Pipe Flanges and Flanged Fittings, Class 125 (ASA B16 11960)
ANSI	American National Standards Institute
API	American Petroleum Institute
ASA	American Standards Association
ASCE	American Society of Civil Engineers
ASH & AE	American Society of Heating and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society of Testing and Materials
AWG	American or Brown and Sharpe Wire Gage
AWWA	American Water Works Association
BOD	Biochemical Oxygen Demand
c.f.	Cubic Foot
c.f.m	Cubic Foot Per Minute
c.f.s	Cubic Foot Per Second
CI	Cast Iron
CIPRA	Cast Iron Pipe Research Association
CSI	Construction Specifications Institute
c.y.	Cubic Yards
DC	Direct Current
DEP	Department of Environmental Protection

DES	Department of Environmental Services
DI	Ductile Iron
DOT	Department of Transportation
EDR	Equivalent Directional Radiation
EPA	U.S. Environmental Protection Agency
FmHA	Farmers Home Administration (RD)
fps	Feet Per Second
ft.	Feet
gal.	Gallons
gpd	Gallons Per Day
gpm	Gallons Per Minute
HDPE	High Density Polyethylene
HP	Horsepower
IBR	Institute of Boiler and Radiator Manufacturers
in.	Inches
inter.	Interlock
ISA	Instrument Society of America
kva	Kilovolt-ampere
kw	Kilowatt
lb.	Pound
max.	Maximum
MCB	Master Circuit Board
MGD	Million Gallons Per Day
Min.	Minimum
NBS	National Bureau of Standards
NEC	National Electrical Code, Latest Edition
NEMA	National Electrical Manufacturers Association
NEWWA	New England Water Works Association
NPT	National Pipe Thread
OS&Y	Outside Screw and Yoke
PCA	Portland Cement Association
PE	Polyethylene
ppm	Parts Per Million
%	Percent
psi	Pounds Per Square Inch
psig	Pounds Per Square Inch Gage
PVC	Polyvinyl Chloride
R.D.	Rural Development (Formerly FmHA)
rpm	Revolutions Per Minute
s.f.	Square Foot
STL.W.G.	U.S. Steel Wire, Washburn and Moen, American Steel and Wire Cos., or Roebling Gage
s.y.	Square Yard
TDH	Total Dynamic Head

USAS	Standards of the United States of America Standards Institute (formerly American Standards Association)
USS GAGE	United States Standard Gage
VC	Vitrified Clay
WSP	Working Steam Pressure
Fed. Spec.	Federal Specifications issued by the Federal Supply Service of the General Service Administration, Washington, D.C.

PART 2 - PRODUCTS

(Not part of this Section)

PART 3 - EXECUTION

(Not part of this Section

END OF SECTION

SECTION 01090

REFERENCE STANDARDS

PART 1 - GENERAL

1.1 QUALITY ASSURANCE

A. For products or workmanship specified by association, trade, or Federal Standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard by date of issue current on the date of Contract Documents.

C. Should specified reference standards conflict with Contract Documents, request clarification from Engineer before proceeding.

D. The contractual relationship of the parties to the Contract shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.2 SCHEDULE OF REFERENCES

AA	Aluminum Association
AABC	Associated Air Balance Council
AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
ADC	Air Diffusion Council
AGC	Associated General Contractors of America
AI	Asphalt Institute
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
AMCA	Air Movement and Control Association
ANSI	American National Standards Institute
APA	American Plywood Association
ARI	Air-Conditioning and Refrigeration Institute
ASHRAE	American Society of Heating, Refrigerating,
ASME	American Society of Mechanical Engineers
ASPA	American Sod Producers Association
ASTM	American Society for Testing and Materials
AWI	Architectural Woodwork Institute
AWPA	American Wood-Preservers' Association
AWS	American Welding Society
AWWA	American Water Works Association
BIA	Brick Institute of America

BOCA	Building Officials and Code Administrators
CDA	Copper Development Association
CLFMI	Chain Link Fence Manufacturers Institute
CRSI	Concrete Reinforcing Steel Institute
DHI	Door and Hardware Institute
EJCDC	Engineers' Joint Contract Documents Committee
EJMA	Expansion Joint Manufacturers Association
FGMA	Flat Glass Marketing Association
FM	Factory Mutual System
FS	Federal Specification
GA	Gypsum Association
ICBO	International Conference of Building Officials
IEEE	Institute of Electrical and Electronics Engineers
IMIAC	International Masonry Industry All-Weather Council
MBMA	Metal Building Manufacturer's Association
MFMA	Maple Flooring Manufacturers Association
MIL	Military Specification
ML/SFA	Metal Lath/Steel Framing Association
NAAMM	National Association of Architectural Metal
NCMA	National Concrete Masonry Association
NEBB	National Environmental Balancing Bureau
NEMA	National Electrical Manufacturer's Association
NFPA	National Fire Protection Association
NFPA	National Forest Products Association
NSWMA	National Solid Wastes Management Association
NTMA	National Terrazzo and Mosaic Association
NWMA	National Woodwork Manufacturers Association
PCA	Portland Cement Association
PCI	Prestressed Concrete Institute
PS	Product Standard
RIS	Redwood Inspection Service
RCSHSB	Red Cedar Shingle and Handsplit Shake Bureau
SDI	Steel Deck Institute
SDI	Steel Door Institute
SIGMA	Sealed Insulating Glass Manufacturers Association
SJI	Steel Joist Institute
SMACNA	Sheet Metal and Air Conditioning Contractors'
SSPC	Steel Structures Painting Council
TCA	Tile Council of America, Inc.
UL	Underwriters' Laboratories, Inc.
WCLIB	West Coast Lumber Inspection Bureau
WWPA	Western Wood Products Association

PART 2 - PRODUCTS

(NOT PART OF THIS SECTION)

PART 3 - EXECUTION

(NOT PART OF THIS SECTION)

END OF SECTION

SECTION 01200

PROJECT MEETINGS

PART 1 - GENERAL

1.1 INTRODUCTION

A. Project meeting requirements

1.2 PROJECT MEETINGS (FORMAL)

A. The Contractor shall attend project meetings throughout the progress of the work.
B. Meetings shall be held at a frequency no greater than twice per month.
C. The following representatives of the Contractor shall attend:
    1. Superintendent or authorized representative
    2. Representative of major subcontractors (when requested)
    3. Representatives of major suppliers (when requested)
    4. Other representatives as appropriate to agenda topics
D. The Engineer shall prepare and distribute project meeting notes.
E. Sample Agenda
    1. Work progress
    2. Progress schedule
    3. Delivery schedules
    4. Submittals
    5. Payment applications
    6. Change Orders and Field Orders
    7. Other items

1.3 WEEKLY COORDINATION MEETINGS (INFORMAL)

A. The contractor's superintendent, the owner, and the resident engineer shall meet weekly to informally discuss the project progress/schedule, sequence, and other issues.

PART 2 - PRODUCTS

(NOT PART OF THIS SECTION)

PART 3 - EXECUTION

(NOT PART OF THIS SECTION)

END OF SECTION

SECTION 01201

COMMUNITY INFORMATION

PART 1 - GENERAL

1.1 INTRODUCTION

A. Community information requirements of the Contractor.

1.2 COMMUNITY INFORMATION REQUIREMENTS

A. The Contractor shall be responsible for keeping the Public (both the City of Portsmouth and the Town of Newington) informed of the progress of the work on a weekly basis. On Thursday of each week, the Contractor will provide a summary update on the work planned for the following week including:
   1. Work zones
   2. Work tasks and disciplines
   3. Traffic conditions, planned interruptions to water service or any other impacts to the public.

B. The Contractor shall provide a twenty-four (24) hour contact person for emergencies.

1.3 PUBLIC INFORMATION MEETINGS

A. The Contractor shall make themselves available to attend a public informational meeting prior to the commencement of each construction season. This meeting is expected to be held during the Town of Newington's Board of Selectmen meeting.

B. The meetings shall be scheduled during the evening hours.

C. There shall be at least a two week advance notice regarding the meetings.

D. The Owner shall post and advertise for the meetings.

E. The Owner will provide the site for the meeting.

1.4 RESIDENT COMPLAINTS

A. The Contractor is responsible for resolution of resident complains that may arise as a result of his work operations.

B. Verbal complaints should be addressed promptly as they occur. If immediate resolution is not possible, the complaint should be recorded in writing for further follow up and action by the Contractor (sample form attached)

PART 2 - PRODUCTS

(NOT PART OF THIS SECTION)

PART 3 - EXECUTION

(NOT PART OF THIS SECTION)

END OF SECTION

Underwood Engineers, Inc.
25 Vaughan Mall
Portsmouth, New Hampshire 03801

Complaint No._____
(*Assigned by Engineer)*

COMPLAINT FORM

Name_____Date:_____

Address:_____

Tel:_____

Location of Problem:_____

Nature of Complaint:_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

(Signature)

Attach additional pages if required. Attach <u>copies</u> of receipts or estimates if applicable. Retain copies of all correspondence.

Remit form to Contractor:
(Insert Contractor's Name
Address, Telephone & Fax Number)

Carbon Copy Engineer:
Underwood Engineers, Inc.
25 Vaughan Mall
Portsmouth, New Hampshire 03801

SECTION 01310

CONSTRUCTION SCHEDULES

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included: Within ten days after the effective date of the Agreement between Owner and Contractor, submit to the Engineer an estimated progress schedule.

B. Form of Schedules:
   1. Narrative: Completely describe the construction methods to be employed.
   2. Horizontal Bar Chart (i.e., Gantt chart):
      a. Provide a separate horizontal bar column for each trade or operation.
      b. Order: Chronological, for each trade and/or operation.
      c. Horizontal scale: Identify first work day of each week, allow space for updating and revision.

C. Content of Schedules:
   1. Provide complete sequence of construction by activity:
      a. Shop Drawings, Project Data and Samples:
         (1) Submittal Dates
         (2) Dates reviewed copies will be required.
      b. Decision dates for:
         (1) Products specified by allowances.
         (2) Selection of finishes (when applicable).
      c. Product procurement and delivery dates.
      d. Dates for beginning and completion of each element of construction.
   2. Identify work of separate phases and logically grouped activities.
   3. Show the projected percentage of completion for each item of work as of the first day of each month.
   4. Provide separate sub-schedules, if requested by the Engineer, showing submittals, review times, procurement schedules, and delivery dates.

D. Updating:
   1. The schedules shall be updated at least every month and for each project meeting.
   2. Show all changes occurring since previous submission.
   3. Indicate progress of each activity, show completion dates.
   3. Include:
      a. Major changes in scope.
      b. Activities modified since previous updating.
      c. Revised projections due to changes.
      d. Other identifiable changes.
   4. Provide narrative report, including:
      a. Discussion of problem areas, including current and anticipated delay factors.
      b. Corrective action taken, or proposed.

c. Description of revisions that may affect schedules.

E. Standard Holidays – Holidays observed by the City include:

- New Year's Day
- Memorial Day
- Fourth of July
- Labor Day
- Columbus Day
- Veterans Day
- Thanksgiving
- Day after Thanksgiving
- Christmas

Project work will not be permitted on these dates unless approved by advance (72 hours) written request to the Owner.

1.2 SUBMITTALS

A. Submit periodically updated schedules when requested by the Engineer.
B. Submit 4 copies of initial and updated schedules to the Engineer.

PART 2 - PRODUCTS

(NOT PART OF THIS SECTION)

PART 3 - EXECUTION

(NOT PART OF THIS SECTION)

END OF SECTION

SECTION 01340

SUBMITTALS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:
   1. Submit to the Engineer, Shop Drawings, Operation and Maintenance Manuals, Manufacturers' Certificates, Project Data, and Samples required by the Specification Sections.

B. Alternates
   1. If the Contractor elects to submit an Alternate that is equivalent, the Contractor will be responsible to make all modifications to the Work resulting from the use of the Alternate at no additional cost to the Owner.

1.2 SHOP DRAWINGS

A. Shop Drawings are required for each and every element of the work. Each shop drawing shall be assigned a sequential number for purposes of easy identification, and shall retain its assigned number, with appropriate subscript, on required resubmission.

B. Shop Drawings are generally defined as all fabrication and erection drawings, diagrams, brochures, schedules, bills of material, manufacturers data, spare parts lists, and other data prepared by the Contractor, his subcontractors, suppliers, or manufacturers which illustrate the manufacturer, fabrication, construction, and installation of the work, or a portion thereof.

C. Shop drawings may be submitted in electronic format (PDF) with prior approval by the engineer. Electronic submission does not completely waive the Contractor’s responsibility to provide hard copies and hard copies shall be provided when requested by the engineer.

D. The Contractor shall provide a copy of a completed submittal certification form which shall be attached to every copy of each shop drawing. Shop Drawings shall show the principal dimensions, weight, structural and operating features, space required, clearances, type and/or brand of finish or shop coat, grease fittings, etc., depending on the subject of the drawing. 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 the work.

E. The Contractor shall be responsible for the prompt and timely submittal of all shop and working drawings so that there shall be no delay to the work due to the absence of such drawings.

F. No material or equipment shall be purchased or fabricated especially for the Contract until the required shop and working drawings have been submitted as hereinabove provided and reviewed for conformance to the Contract requirements. All such materials and equipment and the work involved in their installation or incorporation into the Work shall then be as shown in and represented by said drawings.

G. Until the necessary review has been made, the Contractor shall not proceed with any portion of the work (such as the construction of foundations), the design or details of which are dependent upon the design or details of work, materials, equipment or other features for which review is required.

H. 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 his subcontractors and returning reviewed drawings to them. Shop drawings shall be of standardized sizes to enable the Owner to maintain a permanent record of the submissions. Approved standard sizes shall be: (a) 24 inches by 36 inches; (b) 11 inches by 17 inches, and (c) 11 inches by 8-1/2 inches. Provision shall be made in preparing the shop drawings to provide a binding margin on the left hand side of the sheet. Shop drawings submitted other than as specified herein may be returned for re-submittal without being reviewed.

I. Only drawings, which have been checked and corrected by the fabricator, should be submitted to the Contractor by his 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 Drawings and Specifications in all respects. All drawings which are correct shall be marked with the date, checker's name, and indication of the Contractor's approval, and then shall be submitted to the Engineer.

J. If a shop drawing shows any deviation from the Contract requirements, the Contractor shall make specific mention of the deviations in his letter of transmittal.

K. Should the Contractor submit equipment that requires modifications to the structures, piping, electrical conduit, wires and appurtenances, layout, etc., detailed on the Drawings, he shall also submit details of the proposed modifications. If such equipment and modifications are accepted, the Contractor, at no additional cost to the Owner, shall do all work necessary to make such modifications.

L. A maximum of two submissions of each Shop Drawing will be reviewed, checked, and commented upon without charge to the Contractor. Any additional submissions which are ordered by the Engineer to fulfill the stipulations of the Drawings and Specifications, and which are required by virtue of the Contractor's neglect or failure to comply with the requirements of the Drawings and Specifications, or to make those modifications and/or corrections ordered by the Engineer in the review of the first two submissions of each Shop Drawing, will be reviewed and checked as deemed necessary by the Engineer, and the cost of such review and checking, as determined by the Owner, and based upon Engineer's documentation of time and rates established for additional services in the Owner-Engineer Agreement for this Project, may be deducted from the Contractor to make all modifications and/or corrections as may be required by the Engineer in an accurate, complete, and timely fashion.

1.3 SAMPLES

A. The Contractor shall submit samples when requested by the Engineer to establish conformance with the specifications, and as necessary to define color selections available.

1.4 OPERATION AND MAINTENANCE MANUALS

A. The Contractor shall furnish the Engineer six (6) copies of a complete instruction manual for installation, operation, maintenance, and lubrication of each item specified. At least 3 months prior to the expected substantial completion date, the Contractor shall submit to the Engineer all manuals in accordance with the requirements specified herein.

B. Manuals shall include operating and maintenance information on all systems and items of equipment. The data shall consist of catalogs, brochures, bulletins, charts, schedules, equipment numbers, shop drawings corrected to as-built conditions, wiring diagrams, and assembly drawings which shall describe location, operation, maintenance, lubrication, operating weight, lubrication charts showing manufacturer recommended lubricants for each rotating or reciprocating unit, and other necessary information for the Engineer to establish a complete maintenance program.

C. The submittal shall also include details of all replacement parts; "Nameplate" data for all equipment; detailed instructions for start-up, normal operation, shutdown procedures, and control techniques; and a guide to troubleshooting the system.

1.5 MANUFACTURER'S CERTIFICATES

A. Prior to accepting the installation, the Contractor shall submit manufacturer's certificates for each item specified.

B. Such manufacturer's certificates shall state that the equipment has been installed under either the continuous or periodic supervision of the manufacturer's authorized representative, that it has been adjusted and initially operated in the presence of the manufacturer's authorized representative, and that it is operating in accordance with the specified requirements, to the manufacturer's satisfaction. All costs for meeting this requirement shall be included in the Contractor's bid price.

C. Certified performance test data will also be submitted to the Engineer as required by the specifications.

1.6 SUBMISSION REQUIREMENTS

A. Accompany submittals with transmittal letter, containing:
   1. Date.
   2. Project title and number.
   3. Contractor's name and address.
   4. The number of each Shop Drawing, Project Data and Sample submitted.
   5. Notification of deviations from Contract Documents.
   6. Other pertinent data.

B. Submittals shall include:
   1. Date and revision dates.
   2. Project title and number.
   3. The names of:
      a. Engineer.
      b. Contractor.
      c. Subcontractor.
      d. Supplier.
      e. Manufacturer.
      f. Separate detailer when pertinent.
   4. Identification of product or material.
   5. Relation to adjacent structure or materials.
   6. Field dimensions, clearly identified as such.
   7. Specification section number.
   8. Applicable standards, such as ASTM number or Federal Specification.
   9. A blank space, 4" x 4", for the Engineer's stamp.
   10. Identification of deviations from Contract Documents.
   11. Contractor's stamp, initialed or signed, certifying to review of submittal, verification of field measurements and compliance with Contract Documents.
   12. Where specified or when requested by the Engineer, manufacturer's certification that equipment, accessories and shop painting meet or exceed the Specification requirements.
   13. Where specified, manufacturer's guarantee.

1.7 RESUBMISSION REQUIREMENTS

A. Revise initial drawings as required and resubmit as specified for initial submittal.
B. Indicate on drawings any changes which have been made other than those required by Engineer.

1.8 ENGINEER'S REVIEW

A. The review of shop and working drawings hereunder will be general only, and nothing contained in this specification shall relieve, diminish or alter in any respect the responsibilities of the Contractor under the Contract Documents and in particular, the specific responsibility of the Contractor for details of design and dimensions necessary for proper fitting and construction of the work as required by the Contract and for achieving the result and performance specified thereunder.

SUBMITTAL CERTIFICATION FORM

PROJECT: _____ CONTRACTOR'S PROJ. NO: _____

CONTRACTOR: _____ ENGINEER'S PROJ. NO: _____

ENGINEER: _____

TRANSMITTAL NUMBER: _____ SHOPDRAWING NUMBER:_____

SPECIFICATION SECTION OR DRAWING NO: _____

DESCRIPTION: _____

MANUFACTURER: _____

The above referenced submittal has been reviewed by the undersigned and I/we certify that the material and/or equipment meets or exceeds the project specification requirements with

___
___ NO DEVIATIONS

or

___
___ A COMPLETE LIST OF DEVIATIONS AS FOLLOWS[a]:

_____
_____
_____
_____
_____
_____

By:_____ By:_____
Contractor[b] Manufacturer[c]

Date: _____ Date: _____

[a] Any deviations not brought to the attention of the Engineer for review and concurrence shall be the responsibility of the Contractor to correct, if so directed.
[b] Required on all submittals
[c] When required by specifications

END OF SECTION

SECTION 01546

USE OF EXPLOSIVES

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:
   1. Provide all materials and perform all work necessary to insure safe use and storage of explosives.
   2. Contractor shall be responsible for any and all damage resulting from use of explosives.
   3. Complete all blasting in accordance with the City of Portsmouth Blasting Rules and Procedures amended December 2020. The rules are provided at the end of this section for reference.

1.2 QUALITY ASSURANCE

A. Requirements of regulatory agencies: Conduct all blasting in accordance with all applicable local and state laws, ordinances and code requirements (see City of Portsmouth Blasting Rules and Procedures, attached).

PART 2 - PRODUCTS

2.1 MATERIALS

A. Explosive charges and detonation devices shall be of a type suitable for the intended use.
B. Store all explosives in a secure manner, in compliance with all State and local laws and ordinances, and legibly mark all such storage places. Storage shall be limited to such quantity as may be needed for the work underway.

PART 3 - EXECUTION

3.1 PERFORMANCE

A. Preparation:
   1. Blasting, if required, shall be performed only after approval has been given by the Owner for such operation.
   2. Do not bring explosives to the site or use any explosives without obtaining all necessary permits and the written consent of authorities having jurisdiction. Such written consent will not relieve the Contractor of total responsibility for any injury to persons or for any damage to property due to blasting operations.
   3. Designate as a BLASTING AREA all sites where electric blasting caps are located and where explosive charges are being placed.

4. Mark all blasting areas with signs as required by law.
5. Place signs, as required by law, at 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.
6. The Contractor shall conduct a Pre-blast Survey of all structures within the blasting area and provide the Engineer a written report of the Pre-blast Survey.
7. Notify each property owner and public utility company having structures in proximity to the site of the work sufficiently in advance to enable them 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.
8. 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.

B. Blasting:
   1. All blasting shall be performed in accordance with all pertinent provisions of the "Manual of Accident Prevention in Construction" issued by the Associated General Contractors of America, Inc..
   2. Provide watchmen during the loading period and until charges have been exploded.
   3. Provide adequate protective covering over all charges before being exploded.
   4. Blasting Log:
      1. The Contractor shall provide the Engineer with a blasting log for the work. The blasting log shall contain the following information:
         a. Location.
         b. Time and date.
         c. Location of explosives.
         d. Amount of type of explosives used at each location.
         e. The names of persons, companies, corporations or public utilities that own, lease or occupy property or structures in proximity to the site of the work and were contacted about the Contractor's intention to use explosives.

END OF SECTION

SECTION 01548

VIBRATION MONITORING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:

1. Provide all materials and equipment to perform all work necessary to protect and prevent damage of existing structures due to vibrations generated from construction activities.
2. Employ a professional vibration consultant to monitor construction related vibrations and set vibration limits to avoid damaging nearby structures, properties and utilities located on or near the project.
3. Sources of construction related vibrations include compaction equipment, hoe ram, sheeting and other construction activities resulting in vibrations to adjacent properties and/or structures.
4. Contractor shall secure the services of a qualified Vibration Consultant who shall consult with the Contractor, to mitigate effects from vibration related to construction activities.
5. Provide a preconstruction survey including photographic documentation of all existing structures. The preconstruction survey shall include both external and internal, foundations, plaster, masonry and other internal surfaces adjacent to work areas, similar to pre-blast survey requirements.
6. Contractor shall be responsible for any and all damage resulting from construction activity vibrations.

PART 2 - PRODUCTS

2.1 MATERIALS

A. All and any equipment necessary for monitoring seismic activity as part of vibration monitoring activities.

PART 3 - EXECUTION

3.1 PERFORMANCE

A. Preparation:

1. Prior to initiating any activity, which in the opinion of the Vibration Consultant requires vibration monitoring, a Vibration Monitoring Plan shall be prepared by the Vibration Consultant and submitted to Contractor to support their methods of construction. The plan may be modified as work progresses based on monitoring results.

2. The Vibration Monitoring Plan shall identify:

a. Proposed construction activity
b. The anticipated vibration limits for the construction activity
c. Historic or significant structures of concern including structures in poor condition, structures supported by vibration sensitive materials which could cause settlement or loss
d. Procedures, techniques and equipment to be employed by the Contractor to guard against damage to structures in the vicinity of the work area.

3. Vibration monitoring equipment shall meet the requirements of 203.3.2.5.6 of the NHDOT Standard Specifications (included by reference).
4. The Contractor shall conduct a Pre Construction Condition Survey of existing structures adjacent to the work including interior and exterior building foundations, walls and surfaces, plaster, brick and masonry structures, stone retaining walls and other sensitive areas. Further observation may be required at the discretion of the Contractor's Vibration Consultant. The completed Survey shall be provided to the Engineer as a written report in advance of the work.
5. The frequency and duration of vibration monitoring for construction activities shall be identified in the Vibration Monitoring Plan.
6. Vibration Monitoring Reports shall be furnished to the Engineer upon request and shall include the following information:
   a. The name of the Contractor and/or Subcontractors responsible for the particular construction activity.
   b. The name of the approved Vibration Consultant.
   c. The name of the operator of the vibration monitoring equipment.
   d. A sketch indicating the location of the vibration monitors and the particular construction activity.
   e. Results of monitored vibrations for the particular construction activity. This information should include the frequencies of the measured peak particle velocities.
   f. Identification of any activity that caused the vibration limits to be exceeded and the time of day that the limits were exceeded.
   g. A summary of vibration related complaints received.
7. If the monitoring data indicates that the ground vibration limits for any of the three mutually perpendicular components have been exceeded, alternate construction methods will need to be considered by the Contractor to safeguard against damage to adjacent structures. It will be the Contractor's responsibility to implement construction methods and techniques in a manner which will mitigate the effects of construction. Damage to existing structures or properties as a result of the Contractor's operations shall be resolved by the Contractor at no additional cost to the Owner.
8. The Engineer and/or Owner will notify the Contractor of any complaints concerning vibrations resulting from construction activities.

END OF SECTION

SECTION 01562

DUST CONTROL

PART 1 - GENERAL

1.1 DESCRIPTIONS

A. This project is in a residential area and daily dust control utilizing a water truck and mechanical street sweeper is required.

B. Work Included: Furnish water truck and apply water to the road surfaces on a daily basis, unless rain is imminent. Use mechanical street sweeper on paved surfaces or sweep paved surfaces on a daily basis.

C. The Contractor shall have a water truck on site at all times.

D. Dust control operations will be required multiple times daily and on weekends when needed.

E. Dust control work shall be incidental to the appropriate items of the Contract unless a separate unit item is provided

PART 2 - PRODUCTS

2.1 MATERIALS

A. Water for Sprinkling: Clean, free of salt, oil, and other injurious matter.

B. Calcium Chloride: Meet the requirements of AASHTO M144.

C. A mechanical broom attachment with a watering device for daily clean-up activities.

D. Street Sweeper: Mechanical enclosed street sweeper with watering device able to pick up and haul away debris for weekly street sweeping.

PART 3 - EXECUTION

3.1 APPLICATION

A. Water: Use suitable equipment including a tank with gauge equipped pump or spray bar. Apply water 2-3 times a day and on weekends as needed.

B. Calcium Chloride: Apply at a rate sufficient to maintain a damp surface but low enough to assure non-contamination of water courses.

3.2 PROTECTION

A. Perform all Dust Control Work in a manner that will prevent damage to public and private property from dust and the materials used.

B. Repair, replace or make payment for all damage caused by Dust Control Work at no additional cost to the Owner.

C. Street sweeping: Minimum of once per week and as needed or requested by the Engineer.

END OF SECTION

SECTION 01570

TRAFFIC REGULATION

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:
   1. Contractor shall provide a Traffic Control Plan for approval by the Engineer and the Owner. A schematic of project areas is provided at the end of this section for the Contractor's benefit.
   2. Provide all materials and perform all work necessary to completely regulate traffic in the area of Work.
   3. Provide Dust Control in accordance with Section 01562.
   4. Perform all work in such a manner as to provide safe passage at all times for the public and with a minimum of obstruction to traffic.
   5. Do not close roads or streets to passage of the public without the permission of the Newington Police Department or Public Works Department.

B. The City/Town DPW and Police Department will decide if adequate Traffic Control is being maintained and shall have the authority to require the Contractor to take any additional steps necessary to maintain safe passage. If the State furnishes an inspector on the job as a result of poor traffic control by the Contractor, the Contractor shall be responsible for all costs assessed by the State.

1.2 SCHEDULING WORK

A. Schedule all work so that two adjacent parallel streets are not closed to passage by the public at any one time, if possible.
B. Revise the plan of work if it will create a traffic hazard or an unreasonably long detour.
C. Do not start work in any new location without the permission of the Engineer.
D. Notify all police and fire departments of all scheduled detours and when streets are reopened.

PART 2 - PRODUCTS

2.1 WARNING SIGNS AND BARRICADES

A. Do not perform work without providing adequate warning signs, barricades, signal lights, watchmen and take other necessary precautions for the safety of the public.
B. Provide and illuminate suitable warning signs to show where construction, barricades or detours exist.
C. Provide barricades of substantial construction and painted with a finish that increases visibility at night.
D. Keep signal lights illuminated at all barricades and obstructions from sunset to sunrise.
E. Maintain all necessary signs, barricades, lights, watchmen and other safety precautions during authorized suspension of the Work, weekends, holidays or other times when the Work is not in progress.

F. Traffic control signs for construction work shall be located and of the size and type as outlined in Manual on Uniform Traffic Control Devices for Streets and Highways (latest edition) as published by U.S. Department of Transportation.

PART 3 - EXECUTION

3.1 DETOURS

A. Provide, identify and maintain suitable detours when the project, or any part thereof, is closed to public travel.

B. When the closed part of the project is reopened, restore the detour area and any other disturbed areas to the original condition.

3.2 INCONVENIENCE TO RESIDENTS OF VICINITY

A. Whenever a traveled way is closed, perform the Work in such a manner that local travel and residents in the vicinity of the Work will be inconvenienced as little as possible.

B. Allow access to residents and abutting landowners along the project to driveways and other normal outlets from their property.

3.3 UNIFORMED POLICE OFFICERS

A. The Contractor shall only use uniformed police officers in locations required by the Owner.

B. Arrange police detail with the local Chief of Police.

C. Any police officers, whether regular, reserve, special or otherwise, shall be employed by the Contractor.

3.4 PEDESTRIANS

A. Maintain safe pedestrian corridors throughout project area.

B. Protect and/or barricade uneven or irregular surfaces impacted by construction.

END OF SECTION

SECTION 01590

TEMPORARY FIELD OFFICE

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included: Provide and maintain a field office for the exclusive use of the Engineer during the entire life of the Contract.

PART 2 - PRODUCTS

2.1 PRODUCTS

A. Provide a separate structure, such as a mobile field office trailer:
   1. Size: Equivalent to 10 feet by 30 feet in area.
   2. A minimum of two windows arranged for cross ventilation with screens.
   3. Door with closer and secure lock.
   4. Adequate lights over all work areas and convenient electrical outlets on each wall.
   5. Adequate heating and air conditioning system with thermostat control.
   6. Sanitary conveniences meeting the requirements of all local and state health codes (portable facilities acceptable).
   7. Provide telephone line service for the exclusive use of the Engineer. A Project cell phone provided by the Contractor is acceptable
   8. Provide internet access (high speed wireless is acceptable) for the exclusive use of the Engineer.
      a. If wireless internet provided results in connection problems or slow internet speeds that prevent video conferencing, the Engineer reserves the right to request “hard line” connection.
   9. Potable water supply (bottled water acceptable).

B. Provide furnishings:
   1. One (1) flat top desk, 30 inches by 60 inches, with drawers at each side.
   2. One (1) plywood drawing table with suitable drawing surface, 3 feet by 6 feet.
   3. One (1) desk or table suitable for supporting the copy machine, fax machine and computer.
   4. Eight (8) straight chairs plus one (1) suitable for use with drawing table.
   5. One (1) four-drawer steel filing cabinet with lock and key.
   6. One (1) large wastebasket.
   7. One (1) rack suitable for storing drawings.
   8. One (1) wall mounted fire extinguisher.

C. Provide equipment:
   1. One (1) combination copier/scanner/printer (color) capable of 11” x 17” faxes and copies. Model shall be subject to the approval of the Engineer. Acceptable manufacturers include:
      a. HP (Hewlett Packard)
      b. Brother.
      c. or approved equal.

2. Provide one (1) new personal laptop computer with Microsoft Office. Model shall be subject to the approval of the Engineer.
3. Provide one (1) phone with answering service (either land line or cellular phone service is acceptable).
4. A microwave oven and refrigerator shall be made available for the Engineer to use as needed.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install in a location approved by the Owner and properly set up for all anticipated weather conditions.
B. Provide electric power and heat during the duration of the Work.
C. The Contractor shall pay all utility charges relating to this Contract.

3.2 CLEANING

A. Upon completion of the project, remove the Field Office from the site and thoroughly clean the area.
B. The Field Office and furnishings shall remain the property of the Contractor.

END OF SECTION

SECTION 01611

OWNER'S RIGHT TO MATERIAL

PART 1 -- GENERAL

1.1 DESCRIPTION

A. Work Included:

1. The Owner retains the right to claim all suitable and unsuitable material including equipment listed below:
   a. Hydrant assemblies removed as part of the work.
2. Contractor shall deliver all material claimed by the Owner to 680 Peverly Hill Road, Portsmouth, New Hampshire unless otherwise directed by the Engineer.

B. Work Specified Elsewhere. The following is a list of Sections that note work related to this Section. The list is provided for the Contractor's convenience and is not intended to relieve the Contractor of requirements noted in Sections that are not listed below.

1. Division 2
2. Division 11
3. Division 15
4. Division 16

PART 2 -- PRODUCTS

(NOT PART OF THIS SECTION)

PART 3 -- EXECUTION

(NOT PART OF THIS SECTION)

END OF SECTION

SECTION 01630

SUBSTITUTIONS & PRODUCT OPTIONS

PART 1 - DESCRIPTION

1.1 DESCRIPTION

A. If stated in these Specifications that a substitute that is equal to any material or equipment specified may be furnished, and if the Contractor wishes to furnish or use a substitute, submit a written request to the Engineer for approval of the substitute.

B. The Engineer shall be the judge of equality.

1.2 SUBMITTALS

A. Submit approval request promptly after the award of the Contract.

B. Completely describe the proposed substitution including, as applicable:

1. Manufacturer's catalog data,
2. Illustrations,
3. Specifications,
4. Samples,
5. Copies of previous approvals,
6. Other data that may be requested by the Engineer to determine equality.

PART 2 - PRODUCTS

2.1 CRITERIA

A. The following criteria will be used by the Engineer in determining the equality of the proposed substitutions:

1. Adaptability to the design,
2. Functional performance,
3. Appearance (when applicable)
4. Quality of materials,
5. Strength of materials,
6. Complexity, frequency and cost of maintenance.

PART 3 - EXECUTION

3.1 ORDERING AND INSTALLING

A. Do not order and do not install any substituted material or equipment without the written approval of the Engineer.

3.2 RESULTING CHANGES

A. If proposed substitutions are judged as being acceptable, make all changes to structures, buildings, piping, electrical, and other items necessary to accommodate substitutions, at no additional cost to the Owner.

B Whenever it may be written that a manufacturer must have a specified period of experience with his product, a product which does not meet the specified experience period can be considered if the manufacturer is willing to provide a bond or cash deposit for the duration of the specified time period which will guarantee replacement of that product in the event of failure.

3.3 ENGINEERING SERVICES

A. If the Contractor requests substitutions which require design or other engineering services, the services will be provided only by a Professional Engineer registered in the state in which the project is located.

B. All engineering services for substitutions shall be performed at the expense of the Contractor.

END OF SECTION

SECTION 01701

PROJECT CLOSE-OUT PROCEDURES

PART 1 - GENERAL

1.1 INTRODUCTION

A. Contractor's requirements of the Contract to closeout the project.

1.2 PROJECT CLOSE-OUT REQUIREMENTS

A. Prior to final payment the Contractor shall submit the following to the Engineer:
   1. Contractor's Affidavit
   2. Consent of Surety to final payment.
   3. Certificate of Inspections
   4. Evidence of payment and release of liens
   5. Project Record Documents (Section 01720)
   6. Operation and Maintenance data (Section 01730)
   7. Submission of warrantees

PART 2 - PRODUCTS

(NOT PART OF THIS SECTION)

PART 3 - EXECUTION

(NOT PART OF THIS SECTION)

END OF SECTION

SECTION 01710

PROJECT CLEANING

PART 1 -- GENERAL

1.1 DESCRIPTION

A. Work Included:
   1. Maintain premises and public properties free from accumulations of waste, debris, and rubbish, caused by operations.
   2. At completion of Work, remove waste materials, tools, equipment, machinery, and surplus materials, and clean all sight-exposed surfaces. Leave project clean and ready for use.

1.2 QUALITY ASSURANCE

A. Conduct cleaning and disposal operations in accordance with all applicable local and state laws, ordinances, and code requirements.

PART 2 -- PRODUCTS

A. Use only cleaning materials recommended by manufacturer of surfaces to be cleaned.

PART 3 -- EXECUTION

3.1 PERFORMANCE

A. Cleaning During Construction (where applicable):
   1. Execute cleaning operations to ensure that buildings, grounds, and public properties are maintained free from accumulations of waste materials and rubbish.
   2. Entirely remove and dispose of material or debris during the progress of the Work that has washed into or has been placed in watercourses, ditches, gutters, drains, catch basins, or elsewhere as a result of the Contractor's operations.
   3. Wet down dry materials and rubbish to lay dust and prevent blowing dust.
   4. At reasonable intervals during the progress of work, clean the site and dispose of waste materials, debris, and rubbish.
   5. Clean interiors of buildings, when applicable, prior to finish painting, and continue on an as-needed basis until buildings are ready for occupancy.
   6. Handle materials in a controlled manner with as few handlings as possible. Do not drop or throw materials from heights.
   7. Where applicable, schedule cleaning operations so that dust and other contaminants resulting from the cleaning process will not fall on wet, newly painted surfaces.

B. Sweep all roads where work had been completed on a daily basis.

C. Control of Hazards:

1. Store volatile wastes in covered metal containers, and remove from premises daily.
2. Prevent accumulation of wastes which may create hazardous conditions.
3. Provide adequate ventilation during use of volatile or noxious substances.

D. Disposal:
1. Dispose of all material at an approved disposal area.
2. Do not burn or bury rubbish and waste material on project site.
3. Do not dispose of hazardous wastes, such as mineral spirits, oil, or paint thinner, in storm or sanitary drains.
4. Do not dispose of wastes into streams or waterways.
5. Do not dispose of waste material in excavations.

E. Final Cleaning (where applicable):
1. Employ experienced and/or professional cleaners for final cleaning.
2. Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials, from all sight-exposed interior and exterior finished surfaces.
3. Repair, patch and touch up marred surfaces to specified finishes.
4. Broom clean paved surfaces.
5. Rake clean non-paved surfaces on the project site.
6. Restore to their original condition those portions of the site not designated for alterations by the Contract Documents.

END OF SECTION

SECTION 01720

PROJECT RECORD DOCUMENTS

PART 1 -- GENERAL

1.1 DESCRIPTION

A. Work Included: Keep accurate files containing original contract as well as copies of all submittals and record all additions, substitutions of material, variations in work, and any other additions or revisions to the Contract, including up-to-date marked up construction drawings and specifications reflecting changes in work and field ties to installed buried/submerged utilities, and as further described in Section 2.1 below.

B. Provide field survey of the completed work including GPS coordinates and elevations of pipe, fittings, changes in slope and other utilities encountered. Pipe locations shall be recorded on a daily basis. The following information shall be recorded by the Contractor and provided to the Engineer.

- GPS coordinates of the installed pipe locations
- Elevation of pipelines as installed
- GPS coordinates and elevations of changes in pipe slope and/or alignment
- Elevation and designation of utilities at crossings
- Final centerline and gutter lines of road reconstruction areas and where grading has changed from existing
- Paving repairs or pavement restoration limits
- Field ties to pipe fittings, bends, structures, gate valves, etc.
- Field ties to any changes in materials

PART 2 -- PRODUCTS

2.1 RECORD DOCUMENTS

A. Maintain at the job site, one copy each of:

1. Contract Drawings.
2. Specifications.
3. Addenda.
4. Reviewed and approved Shop Drawings.
5. Change Orders, Field Orders and Engineering Supplemental Information (ESI's).
6. Any other modifications to the Contract.
7. Field Test Reports.
8. Inspection certificates
9. Manufacturer's certificates
10. Manufacturer's operation and maintenance manuals
11. Red-line record drawings

PART 3 -- EXECUTION

3.1 FIELD ENGINEERING

A. The contractor shall designate personnel who will be responsible for layout, measurements, and as-built survey for the entire project. The contractor shall submit copies of Field Engineering Survey to the Engineer for review on a monthly basis. Plan information provided shall be the same scale and datum as the design drawings.

3.2 STORAGE AND MAINTENANCE

A. Store Record Documents in approved files and racks apart from documents used for construction.
B. File Record Documents in accordance with Project Filing Format of Uniform Construction Index.
C. Maintain Record Documents in clean, dry, legible condition.
D. Do not use Record Documents for construction purposes.
E. Make Record Documents available at all times for inspection by the Engineer and Owner.

3.3 RECORDING

A. Label each document "PROJECT RECORD" in large printed letters.
B. Keep Record Documents current and do not permanently conceal any work until required information has been recorded. **Report on the status of red-line record drawings at each monthly meeting.**
C. Contract Drawings: Legibly mark to record actual construction (when applicable)
    1. Method of locations and recording shall have prior approval of the Engineer.
    2. Depths of various elements of foundations in relation to survey datum.
    3. Horizontal and vertical locations of underground utilities and appurtenances referenced to permanent surface improvements.
        a. Include all water, sewer, steam, air, instrumentation and fuel piping systems and all electrical and communications circuits including all direct burial cables.
        b. Whenever any existing utility line is uncovered in the course of excavation for new utility installation, record the location dimensions of such lines.
    4. Location of service connection points with any utility (water, sewer, electrical, telephone, etc.) and the location of capped or plugged ends of these same house service lines.
        a. Locations shall be recorded by accurate "swing ties" or other methods approved by the Engineer.
    5. Location of internal utilities and appurtenances concealed in construction referenced to visible and accessible features of structure.
        a. Electrical equipment such as conduits, piping, instrumentation located in slabs, walls and ceilings and to include approximate locations and routing.
        b. Schematic diagram of actual electric conduit or instrument tubing routing between equipment and supply.

6. Field changes of dimension and detail and changes made by Change Order or Field Order.
7. Details not on original Contract Drawings.

D. Specifications and Addenda: Legibly mark up each Section to record:
   1. Manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually installed.
   2. Changes made by Change Order or Field Order.

E. Electrical and Instrumentation and Control Record Drawings
   1. The contractor will be responsible for preparing CADD drawing record drawings for all electrical and Instrumentation and Control work for review by the Engineer.
   2. Electronic CADD files will be provided to the Contractor for his use to prepare record drawings.

3.4 SUBMITTALS

A. At Substantial Completion of the project, deliver Record Documents to the Engineer.
   1. Record Drawings shall be submitted in electronic (PDF) format in addition to full size 22'' x 34'' hard copy.

B. Accompany submittal with transmittal letter, in duplicate, containing:
   1. Date, project title and number.
   2. Contractor's name and address.
   3. Title and number of each Record Document with certification that each document is completed and accurate.
   4. Signature of Contractor, or his authorized representative.

C. Failure to record these locations on the Project Record Drawings shall result in non-approval of the final payment to the Contractor and/or if contract time (as specified in the Contract and/or modified in accordance with the Standard General Conditions of the Construction Contract) has elapsed, this shall be grounds for the assessment of the liquidated damages as specified.

END OF SECTION

DIVISION 2

Scope of Work

Furnish, install and test all site work and appurtenant work in complete accordance with the Drawings and Specifications.

Contractor's Duties

Except as specifically noted, provide and pay for all labor, materials, equipment, tools, machinery, water, heat, other facilities and services necessary for proper execution and completion of the work.

Contents of Division

Section No.	Section Title
02223	Trench Excavation - Earth
02224	Trench Excavation - Ledge
02229	Backfilling, Compaction Control & Testing
02275	Construction Fabrics
02369	Sheeting
02402	Site Dewatering
02610	Pipe & Pipe Fittings – General
02611	Ductile Iron Pipe and Fittings
02612	Reinforced Concrete Pipe
02626	Copper Service Pipe
02630	Couplings, Connectors, Caps & Plugs
02641	Resilient Seated Gate Valves
02642	Corporation Stops
02643	Curb Stops
02644	Hydrant Assemblies
02646	Valve Boxes
02649	Service Saddles
02650	Excavation Dewatering

SECTION 02223

TRENCH EXCAVATION - EARTH

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:

1. Trench excavation work in earth includes the removal of sand, gravel, existing utilities, ashes, loam, clay, swamp muck, trolley tracks, soft or disintegrated rock or hard pan which can be removed with a backhoe, or a combination of such materials, and boulders measuring less than two cubic yards for the installation of pipes and appurtenant structures.
2. All trench excavation shall be classed as earth or ledge.
3. Submit details of proposed temporary lateral support for all excavations exceeding 12-feet in depth.

1.2 JOB CONDITIONS

A. Utilities:

1. The locations of known buried water lines, sewer lines, telephone cables, storm drains, culverts, gas mains, electrical conduits, and other utilities are shown on the Drawings. No guarantee is made as to the correctness of the locations shown and to the completeness of the information given.
2. Discontinue excavation by machinery when the excavation approaches pipes, conduits, or other underground structures of which the approximate locations are known. Use manual excavation methods to locate the obstructions.

B. Existing Structures:

1. Perform excavation in such a manner that will prevent any possibility of undermining and disturbing the foundations of any existing structures and any work previously completed under this Contract.
2. Where existing buildings and other structures are in close proximity to the proposed construction, exercise extreme caution and utilize sheeting, bracing, and whatever other precautionary measures, that may be required.

C. Repairing Damage:

1. Repair, or have repaired, all damage to existing utilities, structures, lawns, other public and private property which results from construction operations, at no additional cost to the Owner, to the complete satisfaction of the Owner, the Engineer, the utility company and the property owner.

D. Backfill of Trenches:

1. Do not leave any trenches open overnight. Unless otherwise approved by the Owner, all trenches shall be completely backfilled at the end of each day

PART 2 – PRODUCTS

A. Unsuitable Material:
   1. If, in the opinion of the Engineer, the material encountered above the indicated grade, shown on the Drawings, for excavation, is unsuitable, remove the material to the widths and depths as directed by the Engineer. Replace this material as specified in the "Backfilling, Compaction, Control & Testing" Section of this Division.
   2. If, in the opinion of the Engineer, the material encountered at or below the indicated invert grade shown on the Drawings, for excavation is unstable, remove the material. Replace this material with thoroughly compacted bank-run gravel, screened gravel or stone bedding material as shown on the drawings, or as directed by the Engineer.

B. Disposal of Material:
   1. All surplus and unsuitable material shall become the property of the Contractor unless specified otherwise.
   2. Disposal of surplus and unsuitable material is the Contractor's responsibility.
   3. The Contractor shall obtain and provide to the Owner a "Hold Harmless Release" from the owner of the property where of any surplus or unsuitable material will be disposed of.
   4. The Contractor is responsible for complying with all appropriate local, state and federal regulation governing the placement of fill.

C. Embankment Material: Obtain prior approval and instructions from the Engineer prior to undertaking the excavation for pipe placement of any fill material that has been in an embankment for less than one year.

PART 3 - EXECUTION

3.1 PERFORMANCE

A. General:
   1. Unless otherwise specifically directed or permitted by the Engineer, begin excavation at the low end sewer lines and proceed upgrade.
   2. Perform trench excavation for utilities and structures in a logical sequence, to minimize re-work and prevent damage to surrounding utilities and structures.

B. Amount of Excavation:
   1. Trench width: As shown on the Drawings.
   2. Trench depth: As shown on the Drawings.
   3. Open Excavation:
      a. The extent of open excavation shall be controlled by prevailing conditions.
      b. Open excavation shall, at all times, be confined to the limits acceptable to the Owner.
   4. Unauthorized Excavation:
      a. Backfill to the specified grade, any excavation beyond the limits stated above and as shown on the Drawings (unless specifically

ordered otherwise by the Engineer) with thoroughly compacted crushed stone or screened gravel.

b. Backfill unauthorized excavation at no additional cost to the Owner.

C. Excavation Protection:

1. The Contractor shall be responsible for selecting and implementing Excavation Protection Systems required by OSHA and State requirements..
2. Trench width on drawings do not apply to excavation necessary for installation of trench shoring and bracing systems.

D. Trench Preparation

1. The Contractor shall take all necessary steps to minimize impacts to surrounding property owners.
2. The Contractor shall segregate gravels and select aggregates for reuse. Contractor shall return select aggregates to existing depths or to the limits shown on the drawings.
3. Contractor shall take all necessary steps to minimize the impact of both surface water and ground water within the trench excavation area.
4. When the Contractor approaches the lower limits of the excavations, the Contractor shall take necessary steps to maintain a smooth undisturbed dry bottom. This may include using a smooth excavator bucket and dewatering the excavation in accordance with Section 02650.
5. Over-excavation below limits indicated on the drawings, shall be filled with crushed stone at the Contractors own expense, unless directed otherwise.

END OF SECTION

SECTION 02224

TRENCH EXCAVATION - LEDGE

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:

1. Trench excavation work in ledge includes the removal of ledge and rock required for the installation of pipes and/or structures.
2. "Ledge" and "rock" includes any natural compound, natural mixture, and chemical element required to be excavated that, in the opinion of the Engineer, can be removed from its existing position and state only by blasting, drilling and blasting, wedging, drilling and wedging, wedging and breaking with power hand tools, or by extending the use of an approved excavating machine beyond normal and design wear and tear. No boulder, ledge, slab, or other single piece of excavated material less than two cubic yards in total volume shall be considered to be rock unless, in the opinion of the Engineer, it must be removed from its existing position by one of the methods mentioned above.
3. All trench excavation shall be classed as earth or ledge.

1.2 JOB CONDITIONS

A. Utilities:

1. The locations of known buried water lines, sewer lines, telephone cables, storm drains, culverts, gas mains, electric conduits and other utilities are shown on the Drawings. No guarantee is made as to the correctness of the locations shown and to the completeness of the information given.
2. Use manual excavation methods to locate existing utilities.

B. Existing Structures:

1. Perform excavation in such a manner that will prevent any possibility of undermining and disturbing the foundations of any existing structures and any work previously completed under this Contract.
2. Where existing buildings and other structures are in close proximity to the proposed construction, exercise extreme caution and utilize whatever precautionary measure that may be required.

C. Repairing Damage:

1. Repair, or have repaired, all damage to existing utilities, structures, lawns, other public and private property which results from construction operations, at no additional cost to the Owner, to the complete satisfaction of the Owner, the Engineer, the utility company and the property owner.

D. Backfill of Trenches:

1. Do not leave any trenches open overnight. Unless otherwise approved by the Owner, all trenches shall be completely backfilled at the end of each day

PART 2 - PRODUCTS

2.1 MATERIALS

A. Disposal of Suitable Material:
   1. All material that is, in the opinion of the Engineer, suitable shall remain the property of the Owner.
   2. Stockpile all suitable material in locations approved or designated by the Owner.

B. Disposal of Unsuitable Material:
   1. All unsuitable material shall become the property of the Contractor unless specified otherwise in Division 1.
   2. Dispose of unsuitable material at the locations acceptable to or designated by the Owner.

PART 3 - EXECUTION

3.1 PERFORMANCE

A. General:
   1. Unless otherwise specifically directed or permitted by the Engineer, begin excavation at the low end of sewer lines and proceed upgrade.
   2. Perform excavation for force mains and/or water mains in a logical sequence.

B. Amount of Excavation:
   1. Trench width: As shown on the Drawings.
   2. Trench depth: As shown on the Drawings.
   3. Open Excavation:
      a. The extent of open excavation shall be controlled by prevailing conditions.
      b. Open excavation shall, at all times be confined to the limits acceptable to the Owner.
   4. Unauthorized Excavation:
      a. Backfill to the specified grade, any excavation beyond the limits stated above and as shown on the Drawings (unless specifically ordered otherwise by the Engineer) with thoroughly compacted crushed stone or screened gravel.
      b. Backfill unauthorized excavation at no additional cost to the Owner.

C. Shoring and Bracing:
   1. As the excavation progresses, install such shoring and bracing (i.e., trench box) necessary to prevent caving and sliding and to meet the requirements of the State and OSHA safety standards.

END OF SECTION

SECTION 02229

BACKFILL AND COMPACTION

PART 1 -- GENERAL

1.1 DESCRIPTION

A. Work Included:
   1. Work includes backfilling trenches and/or excavation around structures with suitable material removed in the course of excavating and other suitable materials.
   2. Testing soils.

B. Work Specified Elsewhere. This Section is not a stand-alone Section. Other requirements which relate to this Section are noted elsewhere in these documents. The Contractor and all Subcontractors are required to review this entire document along with the Drawings in an effort to identify all requirements.

1.2 REFERENCE STANDARDS

A. Sieve Analysis of Fine and Coarse Aggregates: ASTM C136
B. Sampling Aggregates: ASTM D75
C. Moisture Density Relations of Soils (Modified Proctor): ASTM D1557
D. Density of Soil In-Place by Nuclear Methods: ASTM D2922
E. State of New Hampshire Department of Transportation (NHDOT) Standard Specifications for Road and Bridge Construction (latest edition)

1.3 QUALITY ASSURANCE

A. The Contractor shall obtain and pay for all services of a geotechnical testing firm to perform the necessary soil and compaction tests. The independent soils laboratory shall be approved by the Engineer prior to testing.
B. The Contractor shall make necessary arrangements to allow compaction testing to be performed at a time, place and elevation determined by the Engineer.
C. Pre-placement testing.
   1. The Contractor shall take one sample of each material proposed to be used on the project. The samples shall be taken in the presence of the Engineer and in accordance with ASTM D75.
   2. Subgrade Material: Proctor density tests shall be performed on the existing subgrade in accordance with the following schedule and in accordance with ASTM D1557:
      a. At the bottom of excavations where structures or slabs will be placed.
      b. One after every 5,000 cubic yards has been relocated on the site.
      c. Whenever the material has changed in the opinion of the Engineer.
   3. Select and Borrow Materials: Sieve and modified proctor density tests shall be performed on all select and borrow material in accordance with the following schedule and in accordance with ASTM C136 and ASTM D1557:
      a. Before any materials are brought to the site.

b. One after every 5,000 cubic yards has been brought to the site.
c. Whenever the source changes.

4. The result shall be submitted to the Engineer for approval prior to placement.
5. The Contractor shall obtain representative samples for ongoing trench backfill operations.
   a. Samples may be obtained in-situ at time of testing provided they are, in the Engineers opinion, representative of ongoing operations.
   b. Samples may be obtained from stockpiles provide the stockpiled material is thoroughly mixed to represent ongoing operations..
   c. Samples shall also be obtained for select materials such as reclaimed asphalt or gravels previously excavated from the trench.

D. Post-placement testing:
1. The trench and/or excavation shall be prepared using the normal backfill technique employed by the Contractor. No special or additional preparation will be allowed.
2. Determine in-place density in accordance with ASTM D2922 or by other methods as approved by the Engineer.
3. Compaction tests shall be made in accordance with the following table:

	Material	**Testing Frequency**	**Percent Compaction**
Under Slabs or Structures:			
	Native material or borrow material	One for every 500 s.f. of surface area of the slab for every 2 lifts of material placed.	95% 12” lifts
	Structural fill or crushed gravel	One for every 500 s.f. of surface area of the slab for every lift of material placed	95% 6” lifts
Around Structures:			
	Borrow material or other material noted on the drawings	One for every 500 l.f. of wall for every 2 lifts of material placed.	95% 12” lifts
In Trenches:			
	Native material or borrow material	From the blanket material to the underside of the gravel or loam. See Note #1 Below	95% 12” lifts
	Gravels or loam	See requirements for Under paved Areas and Grassed Areas for requirements below	See below
Under Paved Areas:			
	Native material or borrow material	One for every 10,000 s.f. of surface area for every 2 lifts of material placed.	95% 12” lifts
	Gravel	One for every 10,000 s.f. of surface area for every lift of	95% 6” lifts

		material placed.	
	Crushed Gravel	One for every 10,000 s.f. of surface area for every lift of material placed.	95% 6" lifts

Under Grassed or Landscaped Areas			
	Native material or borrow material	One for every 20,000 s.f. of surface area for every 2 lifts of material placed.	90% 12" lifts

Notes:

1. *The Contractor shall propose a method for backfill on the first day of work. This proposed method will be tested and modified as required to meet the compaction requirements noted in the above table. The first day of testing shall include testing of a minimum of 4 lifts. This compaction method shall be used until the soil characteristics have changed in the opinion of the Engineer. At that point new compaction tests shall be performed to determine if the requirements are still being met. If they are, the method shall continue, if they are not, the method shall be modified until the requirements are met. Even if the soil characteristics have not changed, confirmatory compaction tests shall be taken every 3 weeks. Confirmatory testing shall include testing of a minimum of 2 lifts. The Engineer shall determine the location of all tests.*

4. Should compaction tests fail to meet the specified densities, the Contractor shall modify backfill methods as necessary to obtain passing results. The modified method shall be used from that point on.

1.4 SUBMITTALS

A. The Contractor shall submit at the preconstruction meeting his proposed compaction technique which shall include compaction around field structures (i.e manholes, catch basins, etc.) and valve boxes.

B. The Contractor shall submit sieve and proctor curves to the Engineer for approval 7 days before any material is brought to the site.

C. The Contractor shall submit compaction test result sheets to the Engineer no later than 7 days after the test were performed.

PART 2 -- PRODUCTS

2.1 MATERIALS

A. Excavated Material Suitable for Reuse:
   1. Material shall be friable natural material comprised of gravels, sand, silts, or clayey gravel and sands.
   2. Material shall be free from peat, muck, other organic matter, frozen material, ice, and/or snow.
   3. Material shall be free from stones, ledge/rock fragments, and asphalt over 8” in the largest dimension.
   4. The material shall not have a moisture content over 2% of its optimum moisture content.

B. Select and Borrow Materials:
   1. Crushed Stone (Bedding Material):
      a. Crushed stone shall be well graded in size from 1/4 inch to 3/4 inch and conform to ASTM C33 stone size No. 67.
      b. Clean, hard, and durable particles or fragments.
      c. Sieve Analysis:

Sieve Designation	% Passing by Weight Square Opening
1"	100
3/4"	90 - 100
3/8"	20 - 55
No. 4	0 - 10
No. 8	0 - 5
No. 200	1% Max.

   2. Sand (Sand Blanket or Bedding):
      a. Clean, hard and durable particles or fragments.
      b. Sieve Analysis:

Sieve Designation	% Passing by Weight Square Opening
3/8"	100
No. 4	95 - 100
No. 16	50 - 85
No. 50	10 - 30
No. 100	2 - 10

3. Crushed Gravel or Structural Fill (Crushed Gravel Base Course):
   a. Well graded granular crushed gravel material for use as a crushed gravel base.
   b. Material shall be hard and durable, free from frost, organic material, loam, debris and other unsuitable material.
   c. At least 50% of material retained on the 1 inch sieve shall have a fractured face.
   d. Sieve Analysis:

Sieve Designation	% Passing by Weight Square Opening	
3"	100	
2"	95 - 100	
1"	55 - 85	
No. 4	27 - 52	
No. 200	0 – 12	(of the sand portion)

4. Bank Run Gravel or Granular Gravel Borrow (Gravel Subbase Course):
   a. Well graded granular bank-run gravel material for use as gravel subbase.
   b. Material shall be hard and durable, free from frost, organic material, loam, debris and other unsuitable material. Shall not have excess amounts of clay or silt and shall be so sized that the material can be laid out and graded in smooth uniform 8" lifts.
   c. Sieve Analysis:

Sieve Designation	% Passing by Weight Square Opening	
6"	100	
No. 4	25 - 70	
No. 200	0 - 12	(of the sand portion)

5. Common Borrow (i.e. Sand):
   a. Consist of earth suitable for embankment construction; free from frozen material, perishable rubbish, peat and other unsuitable material.
   b. The moisture content shall be sufficient to provide the required compaction and stable embankment. In no case shall the moisture content exceed 4 percent above optimum.
   c. The optimum moisture content shall be determined in accordance with AASHTO T 180, Method C or D.
   d. 100% shall pass the 3” sieve and 70-100% shall pass the No. 4 sieve.
6. Gravel Borrow (i.e. Gravel):
   a. Well graded granular material suitable for placement in authorized excavations below the bottom of the bedding layer to replace deficient

excavated material, for road construction, pipeline construction, and other designate uses.

b. 95-100% shall pass the 3" sieve and 25-70% shall pass the No. 4 sieve.

PART 3 -- EXECUTION

3.1 PERFORMANCE

A. General:

1. Provide and place all necessary backfill material.
2. Do not allow large masses of backfill to be dropped into the excavation, as from a grab bucket, in such a manner that may endanger pipes and structures.
3. Place material in a manner that will prevent stones and lumps from becoming nested.
4. Completely fill all voids between stones with fine material.
5. Do not place backfill on or against new concrete until it has attained sufficient strength to support loads without distortion, cracking, and other damage.
6. Deposit backfill material evenly on all sides of structures to avoid unequal soil pressures.
7. Place backfill material evenly in the trench in an effort to maximize compaction.
8. Do not backfill with, or on, frozen materials.
9. Remove, or otherwise treat as necessary, previously placed material that has frozen prior to placing backfill.
10. Do not mechanically or hand compact material that is, in the opinion of the Engineer, too wet. Fill material that is too wet to be properly placed back in the trench it its current state shall be dried (disced, harrowed, etc.) to within 2% of optimum moisture content. This material shall not be classified as unsuitable material and ineligible for payment as such.
11. Material made unsuitable by the Contractor's construction methods shall be replace with Gravel Borrow at no additional cost to the Owner.
12. Fill that is too dry shall be uniformly watered. The water shall be placed over a loose lift to allow for the water to migrate through the entire lift before compaction.
13. Do not continue backfilling until the previously placed and/or new materials have dried sufficiently to permit proper compaction.
14. When original excavated material is, in the opinion of the Engineer, unsuitable, use only approved gravel borrow for backfilling.
15. Backfill excavation/trench as early as possible to allow for the maximum time for natural settlement.
16. Slope grade away from structures at a minimum slope of 1.5%.
17. The Contractor shall remove excess fill material from the site.

B. Sheeting:
   1. Leave sheeting in place when damage is likely to result from its withdrawal. This shall only be allowed with written approval of the Engineer.
   2. Completely fill with suitable material and thoroughly compact all voids left by the removal of sheeting.
   3. Sheet shall be left in-place and incrementally moved up to allow for a safe work environment in which to properly compact the excavation/trench.
   4. See Section 02369 – Sheeting.

C. Backfilling Around Trench Obstacles
   1. Material must be properly compacted around trench obstacles (i.e. manholes, catch basin, valve boxes, etc.). Uncompacted fill will not be allowed to be placed around these obstacles.
   2. The Contractor shall provide adequate excavation supports to allow for a safe work environment in which to properly compact the excavation/trench.
   3. The Contractor shall use methods that compensate for the space limitations in the immediate area around these obstacles.

D. Backfilling in Paved Areas:
   1. Backfill trenches in streets and other paved areas by maintaining a moisture content within 2% of optimum.
   2. In an effort to allow the road to heave uniformly, backfill material that was removed from the top portion of the trench shall be replaced back into the top of the trench. Similarly, the material removed from the middle of the trench shall be replaced back into the middle of the trench. Existing material removed from the bottom of the trench (i.e. where the pipe box is located) shall be stockpiled for later use.
   3. Backfill in such a manner as to permit the rolling and compaction of the filled trench with the adjoining material to provide the required bearing value for paving immediately after backfilling is completed.
   4. Where required, place excavated material, that is acceptable to the Engineer for surfacing or pavement subbase, at the top of the backfill to the depths as needed to adequately support pavement.

E. Backfilling Trenches in Nonpaved Areas:
   1. Grade the ground to a reasonable uniformity.
   2. Leave the mounding over the trenches in a uniform and neat condition, satisfactory to the Engineer.

F. Bedding & Backfilling of Pipelines:
   1. Install pipe bedding and cushion and primary backfill in accordance with the requirements noted herein, in the specific pipe Specification Section, and on the Drawings.
   2. Deposit and thoroughly compact the remainder of the backfill as noted herin.

G. Placing and Compacting Backfill:
   1. Water Jetting: Shall not be allowed without the approval of the Engineer.
      a.
   2. Puddling: Shall not be allowed without the approval of the Engineer.
   3. Tamping:

a. Deposit and spread the backfill material in uniform parallel layers not exceeding the lift thicknesses noted herein.
b. Tamp each layer as required to obtain a thoroughly compacted mass.
c. If necessary, furnish and use an adequate number of power driven tampers, each weighing at least 150 lbs.

4. Rolling:
   a. Compact material by rolling only when the width and depth of the excavation are sufficient to accommodate the rollers, dozers, mechanical tampers, or other similar powered equipment, as may prove to be acceptable, and when it can be performed without causing damage to pipes and structures installed in the excavation.
   b. Deposit and spread the backfill material in uniform parallel layers not exceeding the lift thicknesses noted herein.
   c. Roll each layer as required to obtain a thoroughly compacted mass.
5. Other placing and compacting methods may be employed only when approved by the Engineer.

H. Improper Backfill
1. When, in the opinion of the Engineer, excavation and trenches have been improperly backfilled, and when settlement occurs, reopen the excavation to the depth required, as directed by the Engineer.
2. Refill and compact the excavation or trench with suitable material and restore the surface to the required grade and condition.
3. Excavation, backfilling, compacting work and testing performed to correct improper backfilling shall be performed at no additional cost to the Owner.

END OF SECTION

SECTION 02275

CONSTRUCTION FABRICS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included: Furnish and install the appropriate construction fabric at locations shown on the Drawings.

B. Related Work Specified Elsewhere:
   1. Temporary Erosion Control - Section 02540.
   2. Pipe and Pipe Fittings - General - Section 02610
   3. Earthwork - Section 02200

1.2 SUBMITTALS

A. Shop drawings for each type of fabric to be used on the project shall be submitted to the Engineer for approval prior to installation. The Contractor will demonstrate that the strength of the chosen fabrics, while meeting the physical characteristics given below, shall withstand without failure the stresses which will be applied by his equipment and activity using his proposed construction techniques.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Construction fabrics shall be divided into four categories:
   1. Soil Stabilization - Geogrid (TRIAX)
   2. Erosion Control
   3. Sediment Control
   4. Drainage/Soil Separation (trench)

2.2 SOIL STABILIZATION (GEOGRID)

A. The geogrid material shall be manufactured from a polypropylene sheet, oriented in three (3) equilateral directions.

B. The fabric shall be inert to commonly encountered chemicals, liquids and other material, and shall be resistant to ultraviolet light, mildew, rot or other deterioration.

C. The fabric shall have the following physical characteristics:

1.	Rib pitch	1.6 inches (nominal)	
2.	Radial stiffenings (at low strain)	20,000 lb/ft at 0.5% strain	ASTM D 6637-01

D. Acceptable manufacturers:
   1. Tensar International
   2. or equivalent

2.3 PERMANENT EROSION CONTROL

A. The fabric specified herein is suitable for medium duty applications beneath riprap or revetments.

B. Material shall be a woven or non-woven fabric made of polypropylene or polyester fabric.

C. The fabric shall be inert to commonly encountered chemicals, liquids and other material, and shall be resistant to ultraviolet light, mildew, rot or other deterioration.

D. The fabric shall have the following physical characteristics:

1.	Grab Tensile Strength	lbs.	150	ASTM D 4632
2.	Apparent Opening Size	US Standard Sieve	100	ASTM D 4751
3.	Water Flow Rate	gal/min/SF	100	ASTM D 4491
4.	Grab Elongation	%	40	ASTM D 4632
5.	Trap Tear Strength	lbs.	90	ASTM D 4533
6.	Mullen Burst Strength	psi	300	ASTM D 3786
7.	Permittivity	$sec.^{-1}$	1.5	ASTM D 4491
8.	Weight	oz./sy	7.0	

E. Acceptable manufacturers:

1. Amoco
2. Mirafi
3. or equivalent

2.4 SEDIMENT CONTROL

A. The fabric specified herein is suitable for general purpose siltation fencing.

B. Material shall be a woven fabric made of polypropylene or polyester mono-filaments.

C. The fabric shall be inert to commonly encountered chemicals, liquids and other material, and shall be resistant to ultraviolet light, mildew, rot or other deterioration.

D. The fabric shall have the following physical characteristics:

1.	Grab Tensile Strength	lbs.	100	ASTM D 4632
2.	Water Flow Rate	gal/min/SF	35	ASTM D 4491
3.	Grab Elongation	%	30	ASTM D 4632
4.	Trap Tear Strength	lbs.	70	ASTM D 4533
5.	Mullen Burst Strength	psi	300	ASTM D 3786
6.	Permittivity	$sec.^{-1}$	1	ASTM D 4491

E. The fabric shall be supported on a 1 1/2 inch hardwood stake spaced a 6 foot (max) intervals.

F. Fabric may be stapled or fastened to the stake with loops designed to adequately support the weight of the fabric and siltation load.

G. Acceptable manufacturers:

1. Amoco
2. Mirafi
3. or equivalent

2.5 DRAINAGE AND SOIL SEPARATION (TRENCH)

A. The fabric specified herein is suitable for medium duty applications to sequester drainage stone or retain bedding stone around a pipe.
B. Material shall be a non-woven fabric made of polypropylene or polyester fabric.
C. The fabric shall be inert to commonly encountered chemicals, liquids and other material, and shall be resistant to ultraviolet light, mildew, rot or other deterioration.
D. The fabric shall have the following physical characteristics:

1.	Grab Tensile Strength	lbs.	160	ASTM D 4632
2.	Apparent Opening Size	US Standard Sieve	70	ASTM D 4751
3.	Water Flow Rate	gal/min/SF	130	ASTM D 4491
4.	Grab Elongation	%	50	ASTM D 4632
5.	Trap Tear Strength	lbs.	80	ASTM D 4533
6.	Mullen Burst Strength	psi	350	ASTM D 3786
7.	Permittivity	$sec.^{-1}$	2	ASTM D 4491
8.	Weight	oz./sy	6.0	

E. Acceptable manufacturers:
1. Amoco
2. Mirafi
3. or equivalent

PART 3 - EXECUTION

3.1 STORAGE AND HANDLING

A. The fabric shall be stored and handled in such a way as to prevent any damage and according to manufacturer's recommendations.

3.2 INSTALLATION

A. The fabric shall be installed to in strict accordance with the manufacturer’s recommendations.
B. The fabric shall be staked, stapled, joined or overlapped, as may be appropriate for the application according to the manufacturer’s recommendation or as shown on the drawings.

END OF SECTION

SECTION 02369

SHEETING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included: Furnish, install and maintain sheeting and bracing in the location(s) shown on the Drawings and as required to comply with all applicable State and Federal Regulations including the Occupational Safety and Health Act.

B. Design: Insure that the sheeting is properly designed and installed to sustain all existing and expected loads to prevent all movement of earth which could in any way cause injury to workmen, delay the work or endanger adjacent structures. Submit details of proposed temporary lateral support systems to the Engineer for review before excavation.

1.2 JOB CONDITIONS

A. Utilize dewatering devices to facilitate excavation within the sheeted area.

B. Dewatering shall be considered incidental to excavation and no separate payment for dewatering will be made, unless specified elsewhere.

PART 2 - PRODUCTS

2.1 MATERIALS

A. All materials shall conform to all applicable State and Federal regulations including the Occupational Safety and Health Act.

B. Sheeting shall consist of driving timber or steel uprights ahead of open excavation to be held rigidly opposite each other forming the walls of the trench and to be held rigidly by horizontal cross members (braces) and longitudinal members (walers).

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install sheeting in accordance with all applicable State and Federal regulations including the Occupational Safety and Health Act.

B. Backfill as specified in these Specifications. When the level of compacted backfill reaches the location of bracing and wales, remove these items from the trench or other excavation.

C. Cut the sheeting as shown on the Drawings.

D. Complete backfilling as specified in these Specifications.

END OF SECTION

SECTION 02402

DEWATERING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:

1. The Contractor shall provide all materials, equipment, and labor necessary for the removal of surface water and as required to provide silt and erosion control devices.
2. The Contractor shall build all drains and do all ditching, pumping, bailing, and all other work necessary to keep the excavation clear of ground water, sewage, or storm water during the progress of the work and until the finished work is safe from damage.

1.2 Recommended Guides

A. AASHTO Highway Drainage Guidelines, Volume III, Guidelines for Erosion and Sediment Control in Highway Construction, American Association of State Highway and Transportation Officials, Inc., 444 North Capital St. N.W., Suite 249, Washington, D.C. 20001.

B. Stormwater Management and Erosion and Sediment Control Handbook for Urban and Developing Areas in New Hampshire, New Hampshire Department of Environmental Services, Public Information Office, P.O. Box 95, 6 Hazen Drive, Concord, New Hampshire.

C. Storm Water Phase II Compliance Assistance Guide, Section 5 Small Construction Activity, United State Environmental Protection Agency, Publication No. 833-R-00-003.

1.3 SUBMITTALS

A. The Contractor shall furnish to the Engineer and the USEPA, in writing, the Erosion and Sediment Control and Stormwater Management Plan (ESCSMP) plan for dewatering and diverting surface water before beginning the construction work for which the diversion is required. Acceptance of this plan will not relieve the Contractor of responsibility for completing the work as specified.

B. The Contractor shall provide the appropriate National Pollutions Discharge Elimination System (NPDES) permit number prior to the start of construction.

PART 2- PRODUCTS

(NOT PART OF THIS SECTION)

PART 3 – EXECUTION

3.1 REMOVAL OF WATER

A. Water pumped from excavations shall be piped to points discharging into approved treatment facilities prior to discharging into water courses

3.2 DIVERTING SURFACE WATER

A. The Contractor shall build, maintain, and operate all cofferdams, channels, flumes, sumps, and other temporary diversion and protection works needed to divert streamflow and other surface water through or around the construction site and away from the construction work while construction is in progress. Unless otherwise specified, stream diversion must discharge into the same natural drainageway in which its headworks are located. Storm runoff from disturbed areas must discharge into a sedimentation pond prior to discharge into a natural drainageway.

3.4 EROSION CONTROL PROVISIONS

A. The discharge from pumping operations during dewatering operations shall be contained by a device so constructed as to prevent silt from spreading off-site.

B. Prior to removal of all sediment control devices all retained silt or other materials shall be removed at no additional cost to the Owner.

3.5 REMOVAL OF TEMPORARY WORKS

A. After the temporary works have served their purpose, the Contractor shall remove them or level and grade them to the extend required to present a sightly appearance and to prevent any obstruction of the flow of water or any other interference with the operation of or access to the permanent works.

3.6 ENVIRONMENTAL PERMITS (IF APPLICABLE)

A. All work under this section shall be done in accordance with all federal, state, and local regulations, laws, and rules which may apply and any individual permits that have been obtained for the project.

END OF SECTION

SECTION 02610

PIPE & PIPE FITTINGS - GENERAL

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section includes general specifications for pipe appurtenances and specialty items typical to a wide range of pipe types and application. It also provides general information on pipe inspection, installation, cleaning and testing. This section is not all inclusive and may be supplemented by the Engineer as needed.

1.2 SUBMITTALS TO THE ENGINEER

A. Submit shop drawings in accordance with the General Conditions of the Construction Contract.

B. If requested by the Engineer, submit manufacturer's "Certification of Conformance" that pipe and pipe fittings meet or exceed the requirements of these Specifications.

C. Submit other documents as specified in the appropriate Sections of this Division.

1.3 DELIVERY, STORAGE AND HANDLING

A. Exercise care during loading, transporting, unloading, and handling to prevent damage of any nature to interior and exterior surfaces of pipe, fittings and appurtenances.

B. Do not drop pipe and fittings.

C. Store materials on the project site in enclosures or under protective coverings in accordance with manufacturer's recommendations and as directed by the Engineer.

D. Assure that materials are kept clean and dry. If appropriate protect from freezing.

E. Do not store materials directly on the ground.

F. Follow manufacturer's specific instructions, recommendations and requirements.

PART 2 - PRODUCTS

2.1 MATERIALS

A. See appropriate specification section for detailed pipe specification.

B Ductile Iron Pipe & Fittings

1. Conform to the latest AWWA Standard
   a. Cement lined class 52 unless otherwise noted
   b. Mechanical restrained joint
   c. Standard gaskets

C. PVC Sewer Pipe

1. Shall conform to the following ASTM as appropriate for the pipe size.

Pipe Size	Generic Material	ASTM
4”-15”	PVC Solid Wall	D3034
18”-60”	PVC Solid Wall	F679
4”-48”	PVC, dual wall Corrugated	F794
All Sizes	PVC Recycled	F1780
All Sizes	PVC Pressure Pipe	D2241 and D1784

D. High Density Polyethylene

1. Pipe shall be high density polyethylene (PE) conforming to the following standard referenced specifications:
    a. ASTM: D3035 Polyethylene Pipe SDR-PR design
    b. ASTM: D1248 Polyethylene Molding & Extrusion materials.
    c. CSA: 41-GP-25 Standard for polyethylene pipe.

E. Corrugate Polyethylene Drain Pipe
    a. Pipe shall be high density polyethylene (HDPE) conforming to the following standard referenced specifications:
    b. AASHTO M294
    c. ASTM: D1248 Polyethylene Molding & Extrusion materials.
    d. ASTM D3350 Polyethylene Plastic Pipes and Fittings.

F. Copper Service Pipe
    a. Seamless copper water tube, ASTM B88.
    b. Type K, soft annealed 3/4" (minimum) through 1".
    c. Type K, hard tempered, 1-1/4 inches and larger.

G. Marking Tape
    1. Shall be coded in accordance with the NPWA Standards.
    2. Shall be indelibly marked indicating the type of utility it is placed over.
    3. Shall be six (6) inches wide Terra Tape Sentry Line 1350 (Detectable) by Reef Industries, Houston, TX, or approved equal.
    4. Marking tape is required even in cases when tracer wire is installed.

H. Pipe Lubricant or glue
    1. Use only lubricants or glues suitable for the type of pipe and application.
    2. For potable water pipe use only lubricants or glues clearly marked “NSF 61 approved For Use with Potable Water.

I. Geotextile
    1. Unless specified elsewhere, geotextile fabric used to encase pipe and bedding material in the trench shall be Application 2 – Separation, Class 3 – Low Strength, Nonwoven fabric.
    2. Acceptable Manufactures shall be listed in the The National Transportation Product Evaluation Program (NTPEP) for Application, Strength Class and Structure

J. Tracer Wire:
    1. Tracer Wire shall be No. 10 AWG copper clad steel wire with HDPE insulation.
        a. Insulation shall be blue for drinking water lines.
        b. Insulation shall be green for sewers, forcemains and low pressure sewers.
    2. Tracer wire connections will be made with DryConn® by King Innovation waterproof connectors for direct bury, for #22 to #8 AWG wire, part #31556 or approved equal.
    3. Install marking tape even when tracer wire is installed. (See Section G.)

K. Pipe Insulation:
    1. Where shown on the plans for shallow depth, for separation between pipes or as directed, extruded polystyrene shall be installed.
    2. Insulation shall be Dow® Styrofoam™ Highload 100 or equivalent. Insulation shall be appropriate for direct bury.

3. Thickness shall be as shown on the drawings but in no case less than 2 inches. Insulation thickness shall be appropriate for the actual depth of bury for the pipe.
4. Width and length shall be as shown or as directed but in no case less than 2 feet wide.

L. Thrust Restraint is required for all pressure pipe.
1. Mechanical Joint Restrainer fittings with the appropriate retainer rings shall be installed at all mechanical joints.
a. Additional restraint at pipe bells on either side of the mechanical joint fitting may be required based on thrust restraint calculation available online. Programs are available from Ductile Iron Pipe Association, PVC Pipe Association, Romac Industries, Ebba Iron, etc.
2. Thrust Blocks of appropriate size and dimensions.
a. Thrust blocks shall be cast in place.
b. Precast thrust blocks may only be used with the written permission of the Owner and upon approval of supporting calculations relative to size.

PART 3 - EXECUTION

3.1 INSPECTION

A. Provide all labor and equipment necessary to assist the Engineer to inspect pipe, fittings, gaskets, and other materials.
1. This shall include all air quality testing equipment, harnesses and manlifts necessary to comply with the appropriate OSHA regulation.
2. The Engineer shall comply with the Contractors regulations and policies regarding below grade or confined space entry.

B. Carefully inspect all materials at the time of delivery and just prior to installation.

C. Carefully inspect all pipe and fittings for:
1. Defects and damage.
2. Deviations beyond allowable tolerances for joint dimensions.
3. Removal of debris and foreign matter.

D. Examine areas and structures to receive piping for:
1. Defects, such as weak structural components, which adversely affect the execution and quality of work.
2. Deviations beyond allowable tolerances for pipe clearances.

E. All materials and methods not meeting the requirements of these Specifications shall be rejected.

F. Immediately remove all rejected materials from the project site.

G. Start work only when conditions are corrected to the satisfaction of the Engineer.

3.2 INSTALLATION

A. General:
1. Install all pipe and fittings in strict accordance with the manufacturer's instructions and recommendations and as instructed by the Engineer.
2. Install all pipes and fittings in accordance with the lines and grades shown on the Drawings and as required for a complete installation.
3. Install adapters, approved by the Engineer, when connecting pipes constructed from different materials.

4. When applicable, support all piping not being installed in trenches in accordance with the "Pipe Hangers & Supports" Section of these Specifications.

B. Installation and Trenches:
1. Firmly support the pipe and fittings on bedding material as shown on the Drawings and as specified in the appropriate Sections of these Specifications.
   a. Where, in the opinion of the Engineers, the subgrade material is unsuitable to support the pipe, over-excavate the unsuitable material and replace the same with suitable gravel or granular borrow.
   b. If the subgrade material encountered consists of saturated clays or silts, the Engineer may direct the installation of the bedding material and pipe inside a construction fabric wrap as shown on the Drawings.
2. Do not permanently support the pipe or fittings on saddles, blocking stones, or any material which does not provide firm and uniform bearing along the outside length of the pipe.
3. Thoroughly compact the material under the pipe to obtain a substantial unyielding bed shaped to fully support the pipe.
4. Excavate suitable holes for the joints so that only the barrel of the pipe receives bearing pressure from the supporting material after placement.
5. Lay each pipe length so it forms a close joint with the adjoining length and bring inverts to the required grade.
6. Set the pipe true to line and grade. Use a transit for line. Use a laser beam aligner for grade.
7. Do not drive the pipe down to grade by striking it with a shovel handle, timber, rammer or any other unyielding object.
8. Make all pipe joints watertight with no sand, silt, clay or soil of any description entering the pipeline at the joints.
9. Immediately after making a joint, fill the holes for the joint with bedding material, and compact.
10. When each pipe length has been properly set, place and compact enough of the bedding material between the pipe and the sides of the trench to hold the pipe in correct alignment.
11. After filling the sides of the trench, place and lightly tamp bedding material to complete the bedding as shown on the Drawings.
12. Take all necessary precautions to prevent flotation of the pipe in the trench.
13. Where there is evidence of water or soil entering the pipeline, repair the defects to the satisfaction of the Engineer.
14. Tracer wire shall be positively attached at 3:00 or 9:00 to the non-metallic buried utilities by plastic wire ties every ten (10) feet.
15. Ends of the tracer wire shall be exposed either in a manhole, above grade at a curb box or valve box or bonded to the curb box or valve box.
16. Trace wire shall be continuous between access points and shall be tested for continuity in the presence of the RPR or Owner.

C. Temporary Plugs:
1. When pipe installation work in trenches is not in progress, close open ends of the pipe with temporary watertight plugs.
2. If water is in the trench when work is resumed, do not remove plugs until all danger of water entering the pipe is eliminated.
3. Do not use the pipe lines as conductors for trench drainage during construction.

D. Protection of Water Supplies:
1. There shall be no physical connection between a public or private potable water supply system and a sewer.
2. Sewer shall be a minimum of ten feet horizontally unless shown otherwise on the drawings.
3. Whenever sewers must cross water mains, the sewer shall be constructed as follows (unless shown otherwise on the Drawings):
a. Sewer pipe shall be class 52 ductile iron or PVC pressure rated pipe (DR-25 min. or SDR-32.5 min.) for a minimum distance of 9 feet each side of the crossing.
b. Joints shall be mechanical type water pressure rated with zero leakage when tested at 25 pounds per square inch for gravity sewers and 1-1/2 times working pressure for force mains and joints shall not be located within 9 feet of the crossing.
c. Vertical separation of sewer and water main shall not be less than 18".

3.3 CLEANING AND TESTING
A. Cleaning and Testing Piping - General:
1. Thoroughly clean all piping prior to testing. Remove all dirt, dust, oil, grease and other foreign material. Exercise care while cleaning to avoid damage to linings and coatings.
2. When the installation is complete, test all pipelines, including service laterals, in the presence of the Engineer and the plumbing or building inspector in accordance with the requirements of the local and state plumbing codes and the appropriate Sections of these Specifications, at no additional cost to the Owner.
3. Equipment: Supply all labor, equipment, materials, gages, and pumps required to conduct the tests.
4. Retesting: Perform all retesting required due to failure at no additional cost to the Owner and to the complete satisfaction of the Engineer.
B. Outside Potable Water Piping (When Applicable)
1. Pressure Test:
a. Perform testing in accordance with Section 5 of AWWA Standard C600.
b. Hydrostatic testing is required.
2. Chlorination of Pipelines:
a. Prior to chlorination thoroughly flush the lines at sufficient volume to remove any debris and contamination from the pipe.
b. Chlorinate all new potable water lines in accordance with the procedure outlined in AWWA C651 Disinfecting Water Mains, latest revision.
c. Locate chlorination and sampling points as approved by the Engineer.
d. Use a dosage which will produce not less that 10.0 ppm chlorine residual after a contact period of not less than 24 hours.
e. During the chlorination period, exercise care to prevent the contamination of water in existing water mains.
f. After chlorination, flush the piping with clean potable water until there is only background chlorine residual.
g. Chlorinated effluent shall be dechlorinated prior to release to surface waters.

3. Bacteriological Testing:
    a. Test all new potable water lines for total Coliform bacteria in accordance with AWWA C651 Disinfecting Water Mains (latest edition) at no additional cost to the Owner.
    b. Bacteriological samples shall be taken after the chlorinated main has been flushed and allowed to rest for 16 hours minimum prior to sampling.
    c. The length of pipe to be tested and the time of the test shall be as approved by the Engineer.
    d. The Engineer will observe the taking of samples.
    e. Have all samples tested by a laboratory approved by the State and submit test results to the Engineer.
    f. Any segment of a potable water line shall be considered unsuitable for service if a Coliform bacteria count is obtained from that sample.
    g. Re-disinfect all segments of piping considered unsuitable and retest. Continue to disinfect and test until no Coliform bacteria are present.
    h. Place piping into service when it has been successfully tested for pressure, leakage and total Coliform bacteria.

C. Building Interior Potable Water Lines (When Applicable):
1. Clean and test in accordance with the "Plumbing General" Section in these Specifications.
2. Test in accordance with local building codes as applicable.

D. Sewer Lines:
1. Outside Sewer Lines: Test with a low pressure air test, a visual inspection, and for PVC or other flexible piping, test with a deflectometer after suitable settling time has elapsed.
2. Pressure sewers shall be tested in accordance with Section 5 of AWWA C-600 latest edition to 1.5 time maximum operating pressure or 100 psi, whichever is greater.
3. Building Interior Sewer System: Clean and test in accordance with the "Plumbing General" Section in these Specifications.
4. Test in accordance with local building codes as applicable.

E. All Other Piping Systems:
1. Pressure Test:
    a. Perform a pressure test for all other piping systems at 1-1/2 times maximum system pressure, or at the maximum working pressure of the piping system, or at a pressure indicated in the appropriate Sections of this Specification.
    b. Tests shall be hydrostatic water, or air pressure as specified or as approved by the Engineer.
2. Cleaning: Perform all specialized cleaning as specified or required by system.

END OF SECTION

SECTION 02611

DUCTILE IRON PIPE & FITTINGS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included: Furnish and install ductile iron pipe and ductile iron fittings of the type(s) and size(s) in the location(s) shown on the Drawings and as specified herein.

1.2 QUALITY ASSURANCE

A. Standards:
   1. Cement-mortar lining for water: ANSI A21.4/AWWA C104.
   2. Rubber gasket joints: ANSI A21.11/AWWA C111.
   3. Ductile iron pipe thickness: ANSI A21.50/AWWA C150.
   4. Ductile iron pipe, centrifugally cast: ANSI A21.51/AWWA C151.
   5. Threaded flanges: ANSI A21.15/AWWA C115.
   6. Ductile iron fittings: ANSI 21.53/AWWA C153.
   7. Pipe flanges and fittings: ANSI B16-1, ANSI A-21.12.
   8. Bolts: COR-TEN ASTM A588.
   9. Polyethylene encasement: ANSI/A21.5/AWWA C105

1.3 SUBMITTALS TO THE ENGINEER

A. Submit shop drawings in accordance with the General Conditions of the Construction Contract.

B. If requested by the Engineer, submit manufacturer's "Certification of Conformance" that pipe and fittings meet or exceed the requirements of these Specifications.

C. If joint restraints are to be used in place of thrust blocks, submit restraint calculations for review by the Engineer. Restraint calculation shall be in accordance with DIPRA and AWWA standards.

1.4 DELIVERY, STORAGE AND HANDLING

A. Exercise extra care when handling pipe and fittings.

B. Exercise extra care when handling cement lined pipe and fittings because damage to the lining will render it unfit for use.

C. Protect the spherical spigot ends and the plain ends of all pipe during shipment by wood lagging securely fastened in place.

1.5 INSPECTION

A. Provide all labor necessary for the Engineer to inspect pipe, fittings, gaskets, and other materials.

B. Carefully inspect all materials at the time of delivery and just prior to installation.

C. Carefully inspect all pipe and fittings for:
   1. Defects and damage.
   2. Deviations beyond allowable tolerances for joint dimensions.

3. Removal of debris and foreign matter.

D. Examine areas and structures to receive piping for:
   1. Defects, such as weak structural components that adversely affect the execution and quality of work.
   2. Deviations beyond allowable tolerances for pipe clearances.

E. All materials and methods not meeting the requirements of the Contract Documents will be rejected.

F. Immediately remove all rejected materials from the project site.

G. Start work only when conditions are corrected to the satisfaction of the Engineer.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Pipe:
   1. All pipes shall conform to the latest AWWA specification C151. Unless otherwise shown on the Drawings, the minimum thickness of ductile iron pipe shall be:
      a. All ductile iron pipe shall be Class 52, double cement lined.
      b. Pipe with flanges: Class 53 (formerly Class 3).
      c. All ductile iron pipe shall have cement lining of double thickness.
   2. Pipe for use with sleeve type couplings shall have plain ends (without bells or beads) cast or machined at right angles to the axis.
   3. Pipe for use with split type couplings shall have ends with cast or machined shoulders or grooves that meet the requirements of the manufacturer of the couplings.
   4. Factory applied bituminous coatings, as approved by the Engineer, shall be furnished for all underground piping.
   5. Each ductile iron pipe shall have conspicuously marked on the exterior the pressure, class, and weight of the pipe.
   6. All ductile iron pipe furnished to the project shall be one uniform length, either 18 feet or 20 feet.

B. Joints (as shown on the Drawings, specified and applicable):
   1. General: All joints shall be the same pressure class as the pipe unless otherwise shown on the Drawings.
   2. Flanged:
      a. Provide specially drilled flanges when required for connection to existing piping or special equipment.
      b. Flanges shall be long-hub screwed tightly on pipe by machine at the foundry prior to facing and drilling.
      c. Gaskets:
         (1) Ring type of rubber with cloth insertion.
         (2) Thickness of gaskets 12 inches in diameter and smaller: 1/16 inch.
         (3) Thickness of gaskets larger than 12 inches in diameter: 3/32 inch.

d. Fasteners:
   (1) Make joints with bolt, stubs with a nut on each end, or one tapped flanged with a stud and nut.
   (2) The number and size of bolts shall meet the requirements of the same American National Standard as the flanges.
   (3) Nuts, bolts and studs shall be Grade B meeting the requirements of ASTM A307.
   (4) After jointing, coat entire joint with bituminous material compatible with pipe coating.

e. When applicable, provide and install flange clamps as shown on the Drawings.

f. Uniflange type connection shall be positively restrained by use of threaded rods (2) or other approved restraint device.

3. Push-on and Mechanical Joint:
   a. The plain ends of push-on pipes shall be factory machined to a true circle and chamfered to facilitate fitting the gasket.
   b. Provide gaskets manufactured from a composition material suitable for exposure to the liquid to be contained within the pipe.

4. Grooved split ring couplings, sleeve couplings, flexible joints and couplings: As specified and shown on the Drawings.

5. Joint Restraint:
   a. Provide both Mega-lug type joint restraint and thrust blocks as indicated on drawings details.
   b. Types of joint restraint:
      (1) Mechanical joint ductile iron pipe shall have “Mega-lug Type” restrained ductile iron glands and thrust blocks of sufficient size in accordance with DIPRA and AWWA standards for thrust restraint.
      (2) Pipe and fittings with approved lugs or hooks cast integrally for use with socket pipe clamps, tie rods, or bridles. Bridles and tie rods shall be a minimum of 3/4 inch diameter except where they replace flange bolts of a smaller size, in which case they shall be fitted with a nut on each side of the pair of flanges. The clamps, tie rods, and bridles shall be coated with an approved bituminous paint after assembly or, if necessary, prior to assembly.
      (3) Other types of bracing as shown on the Drawings.

C. Standard Fittings:
   1. All joints shall conform to the latest AWWA specification C-153.
   2. Class 350, Ductile Iron, Cement Lined except as shown on the Drawings or as specified.
   3. Joints the same as the pipe with which they are used or as shown on the Drawings.
   4. Provide fittings with standard bases where shown on the Drawings.
   5. Provide retainer glands on all fittings.
   6. Outside surface coated to specifications applicable to pipe.

D. Non-Standard Fittings:
   1. Fittings having non-standard dimensions shall be subject to the Engineer's approval.
   2. Non-standard fittings shall have the same diameter and thickness as standard fittings and shall meet the specification requirements for standard fittings.
   3. The laying lengths and types of joints shall be determined by the particular piping to which they connect.
   4. Flanged fittings not meeting the requirements of ANSI A21.10 (i.e., laterals or reducing elbows) shall meet the requirements of ANSI B16.1 in Class 125.

E. Polyethylene encasement shall be 8 mil thick.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:
   1. Install all pipe and fittings in strict accordance with the manufacturer's instructions and recommendations.
   2. Install all pipes and fittings in accordance with the lines and grades shown on the Drawings and as required for a complete installation.
   3. Install adapters, approved by the Engineer, when connecting pipes constructed from different materials.

B. Installation in Trenches:
   1. Firmly support the pipe and fittings on bedding material as shown on the Drawings and as specified in the appropriate Sections of these Specifications.
   2. Do not permanently support the pipe or fittings on saddles, blocking stones, or any material which does not provide firm and uniform bearing along the outside length of the pipe.
   3. Thoroughly compact the material under the pipe to obtain a substantial unyielding bed shaped to fully support the pipe.
   4. Excavate suitable holes for the joints so that only the barrel of the pipe receives bearing pressure from the supporting material after placement.
   5. Lay each pipe length so it forms a close joint with the adjoining length and bring the inverts up to the required grade.
   6. Set the pipe true to line and grade. Use a transit and level or a laser beam aligner as appropriate to the pipe application.

7. Do not drive the pipe down to grade by striking it with a shovel handle, timber, rammer, or any other unyielding object.
8. Make all pipe joints watertight with no visible leakage and no sand, silt, clay or soil of any description entering the pipeline at the joints.
9. Immediately after making a joint, fill the holes for the joints with bedding material and compact.
10. When each pipe length has been properly set, place and compact enough of the bedding material between the pipe and the sides of the trench to hold the pipe in correct alignment.
11. After filling the sides of the trench, place and lightly tamp bedding material to complete the bedding as shown on the Drawings.
12. Take all necessary precautions to prevent flotation of the pipe in the trench.
13. Where there is evidence of water or soil entering the pipeline, repair the defects.

C. Temporary Plugs:
1. When pipe installation work in trenches is not in progress, close the open ends of the pipe with temporary watertight plugs.
2. If water is in the trench when work is resumed, do not remove plugs until all danger of water entering the pipe is eliminated.
3. Do not use the pipelines as conductors for trench drainage during construction.

D. Assembling Joints:
1. Push-on Joints:
   a. Insert the gasket into the groove of the bell.
   b. Uniformly apply a thin film of special lubricant over the inner surface of the gasket that will contact the spigot end of the pipe.
   c. Insert the chamfered end of the plain pipe into the gasket and push until it seats against the bottom of the socket.
   d. Where electromagnetic type pipe locators are used or as directed, insert serrated brass wedges at all joints to assure continuity. Use two wedges per joint for 2" through 12" diameter pipe and four wedges for pipes greater than 12" diameter. Each wedge shall be driven into the opening between the plain end and the bell end. Wedges may be omitted with use of Field Lok 350 ™ gaskets.
2. Bolted Joints:
   a. Remove rust preventive coatings from machined surfaces prior to assembly.
   b. Thoroughly clean and carefully smooth all burrs and other defects from pipe ends, sockets, sleeves, housings and gaskets.
3. Flanged Joints:
   a. Insert the nuts and bolts (or studs), finger tighten, and progressively tighten diametrically opposite bolts uniformly around the flange to the proper tension.
   b. Execute care when tightening joints to prevent undue strain upon valves, pumps, and other equipment.

4. Mechanical Joints:
    a. Thoroughly clean, with a wire brush, surfaces that will be in contact with the gaskets.
    b. Lubricate the gasket, bell, and spigot.
    c. Slip the gland and gasket, in that order, over the spigot and insert the spigot into the bell until properly seated.
    d. Evenly seat the gasket in the bell at all points, center the spigot, and firmly press the gland against the gasket.
    e. Insert the bolts, install the nuts finger tight, and progressively tighten diametrically opposite nuts uniformly around the joint to the proper tension with a torque wrench.
    f. The correct range of torque (as indicated by a torque wrench) and the length of wrench (if not a torque wrench) shall not exceed:
        (1) Range of Torque: 60-90 Ft.-lbs.
        (2) Length of Wrench: 10 inches.
    g. If effective joint sealing is not attained at the maximum torque specified above, disassemble, thoroughly clean, and reassemble the joint. Do not overstress the bolts to tighten a leaking joint.
5. Bell and Spigot Joints:
    a. Thoroughly clean the bell and spigots and remove excess tar and other obstructions.
    b. Apply a liberal coat of manufacturer supplied lubricant to both the gasket and the spigot end. Lubricant shall be appropriate for the pipe application.
    c. Insert the spigot firmly into place and hold securely until the joint has been properly completed.

E. Fabrication:
1. Tapped Connections:
    a. Make all tapped connections where shown on the Drawings or where directed by the Engineer.
    b. Make all connections watertight and of adequate strength to prevent pullout.
    c. Drill and tap normal to the longitudinal axis of the pipe.
    d. The maximum sizes of taps in pipes and fittings without busses shall not exceed the sizes listed in the appendix of ANSI A21.51 based on 3 full threads for cast iron and 2 full threads for ductile iron.
2. Cutting:
    a. Perform all cutting with machines having rolling wheel cutters or knives designed to cut cast or ductile iron. Do not use a hammer and chisel to cut pipe.
    b. After cutting, examine all cut ends for possible cracks.
    c. Carefully chamfer all cut ends to be used with push-on joints to prevent damage to gaskets when pipe is installed.

F. Polyethylene encasement shall be installed in agreement with ANSI/AWWA C105/A21.5 and per manufacturers recommendations. Tube end shall be overlapped

and secured with adhesive tape or plastic string. Repair any rips or deflects prior to backfilling.

G. Pipe Deflection:

1. Push-on and Mechanical Joints:

a. The maximum permissible deflection of alignment at joints, in inches for 18 foot lengths:

Size of Pipe	Push-On	Mechanical
6	19	27
8	19	20
10	19	20
12	11	20
14	11	13.5
16	11	13.5
18	11	11
20	11	11
24	11	9

b. The maximum permissible deflection for other lengths shall be in proportion of such lengths to 18 feet.

2. Flexible Joints: The maximum deflection in any direction shall not exceed the manufacturer's instructions and recommendations.

H. Testing to be performed in accordance with the appropriate section of Section 02610 – Pipe and Pipe Fittings – General.

END OF SECTION

SECTION 02612

REINFORCED CONCRETE PIPE & FITTINGS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included: Furnish, install and test reinforced concrete pipe (RCP) of the size(s), type(s) and in the location(s) shown in the Drawings or specified herein.

1.2 QUALITY ASSURANCE

A. Manufacturer shall have a minimum of five (5) years experience in the manufacture of RCP sewer pipe.

B. The Engineer shall be granted the authority to visit the manufacturer and take core samples of the pipe.

1.3 SUBMITTALS TO THE ENGINEER

A. Submit manufacturer's literature, test reports and certificates of compliance in accordance with the General Conditions of the Construction Contract.

1.4 DELIVERY, STORAGE & HANDLING

A. Deliver as job progress requires and store on a smooth bed to prevent point loading.

B. Stack pipe in accordance with manufacturer's instructions.

C. Pipes will be removed from the delivery vehicle by forklift or with a sling and lifting equipment. Any pipe dropped from the bed of the delivery vehicle will be immediately rejected and removed from the site.

1.5 INSPECTION

A. Provide all labor necessary to assist the Engineer to inspect pipe, fittings, gaskets and other materials.

B. Carefully inspect all materials at the time of delivery and just prior to installation.

C. Carefully inspect all pipe and fittings for:

1. Defects and damage.
2. Deviations beyond allowable tolerances for joint dimensions.
3. Removal of debris and foreign matter.

D. Examine areas and structures to receive piping for:

1. Defects, such as weak structural components, that adversely affect the execution and quality of work.
2. Deviations beyond allowable tolerances for pipe clearances.
3. Any pipe which has damage extending beyond the compressive area of the innermost rubber o-ring shall be rejected.

E. All materials and methods not meeting the requirements of the Contract Documents will be rejected.
F. Start work only when conditions are corrected to the satisfaction of the Engineer.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Pipe and Fittings:
   1. Type shall conform to ASTM C-76, latest edition.
   2. Cement shall be Type II. The concrete shall have a 28-day compressive strength as listed in ASTM C-76 for the size and class noted on the Drawings.
   3. Class or strength: as designated on the Drawings.
   4. Furnish straight pipe in standard laying lengths.
   5. Furnish fittings of approved equal to the pipe with identical joint configuration.
   6. Reinforcing steel shall not be stressed.
   7. Absorption shall not exceed 6 percent of the dry weight as determined by ASTM Test C497.
   8. The date of pipe casting shall be marked on each pipe and the pipe shall not be shipped until 85 percent of the compressive strength has been reached, or 5 days, whichever is greater.
B. Joints: Flexible, oil resistant compression rings of elastomeric material conforming to ASTM C-443.
C. Service Connections:
   1. All service connections shall be the Kor-N-Tee style, with a minimum 6-inch PVC service connection or as shown on the Drawings.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install in accordance with the manufacturer's written instructions and as shown on the Drawings.

3.2 CLEANING AND TESTING

A. Refer to section 02651 Final Pipe Testing.

END OF SECTION

SECTION 02622

PVC PIPE & FITTINGS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included: Furnish, install and test PVC pipe of the size(s), type(s) and in the location(s) shown on the Drawings and or specified herein.

B. Related work Specified Elsewhere (When Applicable):
   1. Site work is specified in this Division.
   2. Concrete is specified in Division 3.

1.2 QUALITY ASSURANCE

A. Manufacturer shall have a minimum of five (5) years experience in the manufacture of PVC sewer pipe.

1.3 SUBMITTALS TO THE ENGINEER

A. Submit manufacturer's literature, test reports, and certificates in accordance with the General Conditions of the Construction Contract.

1.4 DELIVERY, STORAGE & HANDLING

A. Deliver as job progress requires and store on a smooth bed to prevent point loading.

B. Stack pipe in accordance with manufacturer's instructions.

C. Exercise extra care when handling.

1.5 INSPECTION

A. Provide all labor necessary to assist the Engineer to inspect pipe, fittings, gaskets, and other materials.

B. Carefully inspect all materials at the time of delivery and just prior to installation.

C. Carefully inspect all pipe and fittings for:
   1. Defects and damage.
   2. Deviations beyond allowable tolerances for joint dimensions.
   3. Removal of debris and foreign matter.

D. Examine areas and structures to receive piping for:
   1. Defects, such as weak structural components, that adversely affect the execution and quality of work.
   2. Deviations beyond allowable tolerances for pipe clearances.

E. All materials and methods not meeting the requirements of the Contract Documents will be rejected.

F. Immediately remove all rejected materials from the project site.

G. Start work only when conditions are corrected to the satisfaction of the Engineer.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Pipe & Fittings:

1. Type - Polyvinylchloride (PVC) plastic pipe with integral bell and spigot joints. Polymer compounding and classification shall be in accordance with ASTM D1784 (Class 12454-B).
2. Gravity Sewers:
   a. 4" - 15" nominal diameter sizes shall conform to ASTM D3034 and SDR=35.
   b. 18" - 36" nominal diameter sizes shall conform to ASTM F679 (wall thickness T-1).
   c. 42” – 48” nominal diameters shall conform to ASTM 794.
3. Pressure Sewers shall conform to ASTM D2241 and D1784, Class 12454-B, with maximum SDR=26. A safety factor of 2.5 shall be used for pressure rating determination.
4. Furnish straight pipe in standard laying lengths, 12.5 and 20 feet for 18" diameter and less, 12 and 19.5 feet for 21", 24" and 27" diameter.
5. Furnish fittings of approved equal to the pipe and having bell and spigot configuration identical to that of the pipe.

B. Joints:

1. Type - Flexible elastomeric seal conforming to ASTM D3212 with push-on bell and spigot.
2. Gaskets shall conform to ASTM F477.
3. Rubber rings for pressure sewer shall conform to ASTM D1869 and ASTM F477.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install in accordance with the manufacturer's written instructions and as shown on the Drawings.

B. Exercise extra care during winter construction as pipes impact strength is lower.

C. Prior to backfilling, exercise extra care to maintain water level in open excavation below the pipe invert to avoid flotation of pipe already set to line and grade.

3.2 CLEANING AND TESTING

A. Clean and test PVC pipes: Refer to Final Sewer Testing section in these specifications.

END OF SECTION

SECTION 02626

COPPER SERVICE PIPE

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included: Furnish and install copper service pipe of the type and size and in the locations shown on the Drawings and as specified herein.

1.2 QUALITY ASSURANCE

A. Seamless copper water tube, ASTM B88.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Type K, soft annealed, 3/4" (minimum) through 1".
B. Type K, hard tempered, 1-1/4 inches and larger.

PART 3 - EXECUTION

A. Jointing:
   1. Compression Joints
      a. Ream or file the pipe to remove burrs.
      b. Slip compression nut over pipe and slide pipe into corporation.
      c. Tighten compression nut.
      d. Inspect for cracks, splits or other damages and replace if necessary.
   2. Adapters: Use as required to connect to existing services.

B. Bending Pipe:
   1. Bend pipe with suitable tools and provide smooth bend free of any cracks or buckles.

END OF SECTION

SECTION 02630

COUPLINGS, CONNECTORS, CAPS & PLUGS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included: Furnish and install couplings and connectors of the type(s) and size(s) in the location(s) shown on the Drawings and as specified herein.

B. Related Work Specified Elsewhere: "Pipe & Pipe Fittings - General" is specified in this Division.

1.2 QUALITY ASSURANCE

A. Minimum pressure rating equal to that of the pipeline in which they are to be installed.

B. Couplings and connectors, other than those specified herein, are subject to the Engineer's approval.

C. Cap and plug shop drawing submissions must be accompanied by a manufacturer's written certification that the cap or plug will effectively and permanently seal the inactivated or abandoned utility.

PART 2 - PRODUCTS

2.1 MATERIALS

A. All couplings and Connectors:

1. Gasket Materials: Composition suitable for exposure to the liquids to be contained within the pipes.
2. Diameters to properly fit the specific types of pipes on which couplings and connectors are to be installed.

B. Sleeve Type Couplings (When Applicable):

1. Exposed Couplings (When Applicable):
   a. Steel middle ring,
   b. Two steel follower rings,
   c. Two wedge-section gaskets,
   d. Sufficient steel bolts to properly compress the gaskets,
   e. Acceptable Manufacturers:
      (1) Dresser Manufacturing Co. - Style 38,
      (2) Smith-Blair Inc. - Style 411,
      (3) Or approved equal.
2. Buried Couplings (When Applicable):
   a. Cast or ductile iron middle rings with pipe stops removed,
   b. Two malleable iron follower rings with ribbed construction,
   c. Two wedge-section gaskets,
   d. Sufficient galvanized steel bolts to properly compress the gaskets,
   e. Acceptable Manufacturers:
      (1) Dresser Manufacturing Co.

(2) Smith-Blair Inc. - Style 411,
(3) Or approved equal.

C. Split Type Couplings (When Applicable):
1. Constructed from malleable or ductile iron.
2. For use with grooved or shouldered end pipe with minimum wall thickness as required so as not to weaken pipe.
3. Cast in two sections for 3/4 inch through 14 inch pipe sizes, four segments for 15 inch through 24 inch pipe sizes, and six segments for pipe sizes over 24 inch.
4. Coating: Enamel.
5. Bolts: Carbon steel.
6. Acceptable Manufacturers:
a. Victaulic Company of America, Style 77,
b. Gustin-Bacon Co.,
c. Or approved equal.

D. Flanged Adapters (When Applicable):
1. For joining plain end or grooved end pipe to flanged pipes and fittings.
2. Adapters shall conform in size and bolt hole placement to ANSI standards for steel and/or cast iron flanges 125 or 150 pound standard unless otherwise required for connections.
3. Exposed Sleeve Type:
a. Constructed from steel.
b. Coating: Enamel.
c. Bolts: Carbon steel.
d. Acceptable Manufacturers:
(1) Dresser Manufacturing Co. - Style 128 for cast iron, ductile iron and steel pipes with diameters of 2 inches through 96 inches.
(2) Or approved equal.
4. Buried Sleeve Type:
a. Constructed from cast iron.
b. Bolts: Galvanized steel.
c. Acceptable Manufacturers:
(1) Dresser Manufacturing Co. - Style 127 locking type for cast iron, ductile iron, asbestos cement and steel pipes with diameters of 3 inches through 12 inches.
(2) Or approved equal.
5. Split Type:
a. Constructed from malleable or ductile iron.
b. For use with grooved or shouldered end pipe.
c. Coating: Enamel.
d. Acceptable Manufacturers:
(1) Victaulic Company of America - Style 741 for pipe diameters of 2 inches through 12 inches,
(2) Victaulic Company of America - Style 742 for pipe diameters of 14 inches through 16 inches,
(3) Or approved equal.

E. Flexible Joints:
   1. Expansion Joints:
      a. Materials shall be capable of withstanding the temperature, pressure and type of material in the pipeline.
      b. Shall be the filled arch type that will prevent sediment build up for all sludge, sewage, and other lines with similar service.
      c. Supplied with control rods to restrict elongation and compression.
      d. Metal retaining rings shall be split and beveled galvanized steel for placement against the flange of the expansion joint.
   2. Deflection Joints:
      a. Joints designed to permit a nominal maximum deflection of 15 degrees in all directions from the axis of the adjacent pipe length, will prevent pulling apart, and will remain watertight at any angle of deflection under 15 degrees.
      b. Material to be manufactured from a composition material suitable for exposure to the liquid, pressure and temperature to be contained within the pipe.
      c. Supplied with control rods as required.
F. Caps and Plugs
   1. Cap and plug material shall be as indicated on the Drawings and shall be adaptable to the inactive or abandoned utility to be capped or plugged.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Sleeve Type Couplings (When Applicable):
   1. Thoroughly clean pipe ends for a distance of 8 inches from the ends prior to installing couplings, and use soapy water as a gasket lubricant.
   2. Slip a follower ring and gasket (in that order) over each pipe and place the middle ring centered over the joint.
   3. Insert the other pipe length into the middle ring the proper distance.
   4. Press the gaskets and followers evenly and firmly into the middle ring flares.
   5. Insert the bolts, finger tighten and progressively tighten diametrically opposite bolts uniformly around the flange to the torque recommended by the manufacturer.

B. Split Type Flange Adapters (When Applicable): Install in the same manner as Split Type Couplings.

C. Buried Couplings, Adapters and Connectors (When Applicable): Thoroughly coat all exterior surfaces, including nuts and bolts, after assembly and inspection by the Engineer with a heavy-bodied bituminous mastic as approved by the Engineer.

D. Install thrust rods, supports and other provisions to properly support pipe weight and axial equipment loads.

E. Install caps and plugs in accordance with manufacturer's recommendations to ensure a permanent seal of the inactive or abandoned utility.

END OF SECTION

SECTION 02641

RESILIENT-SEATED GATE VALVES

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included: Furnish and install gate valves of the type(s) and size(s) and in the location(s) shown on the Drawings and as specified herein.

1.2 QUALITY ASSURANCE

A. All gate valves of the same type and style shall be manufactured by one manufacturer.

B. Meet or exceed AWWA 509 Resilient-Seated Gate Valves for Water and Sewerage Systems or AWWA C515 Reduced Wall Resilient Seated Gate Valves for Water Supply Service.

C. Acceptable Manufacturers shall be specified by the local authority in their standards. If local standards do not exist, the following manufacturers shall be acceptable:

1. Mueller
2. Dresser
3. Darling
4. Clow
5. Smith
6. Or Equivalent

1.3 VALVE LOCATION AND USE

A. As shown on the Drawings.

B. Accessories: As shown and required for proper operation.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Waterworks type NRS valves (AWWA C509 or AWWA C515), with mechanical joints and all accessories including retainer gland.

1. Iron body bronze mounted (IBBM), coated inside and out with fusion bonded epoxy (AWWA C550).
2. Non rising stem (NRS).
3. Resilient seat gate.
4. End Connections: As shown on the Drawings and as required for pipe.
5. Working pressure:
   a. All sizes: 200 psi water.
   b. Unless otherwise shown on the Drawings.
6. Stem Sealing:
   a. Rust-proofed bolting.
   b. "O" ring design.
   c. Capable of replacing under pressure with valve open.
7. Buried Valves:

a. Gate box required.
b. Sufficient quantity of tee-handle valve wrenches for operating valves of various depths.
c. 2 inch square operating nut, securely fastened to shaft.

8. Valve operation: Open by turning right-clockwise.
9. Arrow showing direction of opening plainly cast on valve bonnet.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Buried Valves:
1. Stem vertical
2. Box vertical and centered over operating nut.
3. Thrust blocks installed as shown on the Drawings.
4. Gate box supported during backfilling and maintained.
5. Gate box shall not transmit shock load or stress to valve.

END OF SECTION

SECTION 02642

CORPORATION STOPS

PART 1 -- GENERAL

1.1 DESCRIPTION

A. Work Included: Furnish and install corporation stops of the type(s) and size(s) and in the location(s) shown on the Drawings and as specified herein.

B. Work Specified Elsewhere. This Section is not a stand-alone Section. Other requirements which relate to this Section are noted elsewhere in these documents. The Contractor and all Subcontractors are required to review this entire document along with the Drawings in an effort to identify all requirements.

1.2 REFERENCE STANDARDS

A. ANSI/AWWA C800.

1.3 SUBMITTALS

A. Submit manufacturer's literature, test reports, and certificates in accordance with the General Conditions and Section 01340 - Submittals.

1.4 DELIVERY, STORAGE & HANDLING

A. Store to prevent damage and in accordance with manufacturer's instructions.

PART 2 -- PRODUCTS

2.1 MATERIALS

A. Ball valve-type corporation with 300 psi rating.

B. Shall conform to ANSI/AWWA C800, latest revision.

C. Constructed of brass. Brass alloys not listed in ANSI/AWWA C800 Paragraph 4.1.2 are not approved.

D. Shall be “lead free” as defined in the Safe Drinking Water Act, amended January 4, 2011. Specifically, fittings shall contain not more than a weighted average of 0.25% lead when used with respect to their wetted surfaces.

E. Outlet shall have a compression pack joint (CPPJ) for Copper Tubing Size (CTS) O.D.

F. Stainless steel insert stiffeners shall be used where CTS plastic tubing is specified

G. Inlet shall have AWWA (cc) Tapered Pipe Threads.

H. Acceptable Manufacturers:

1. Mueller
2. A. Y. McDonald
3. Or equivalent

2.2 SUBSTITUTIONS

A. Products of equal or better quality, function and performance may be proposed for substitution by following the procedures in Section 01630 – Substitution and Product Options.

PART 3 -- EXECUTION

3.1 INSTALLATION

A. Install at locations shown on the Drawings and as specified in accordance with manufacturer's instructions.

B. Service saddles shall be required as noted on the drawings, on all PVC and AC mains, as required below, and as specified by the pipe and saddle manufacturers.

Pipe Size	Class 50 Ductile Iron Pipe	Class 51 Ductile Iron Pipe	Class 52 Ductile Iron Pipe
6”	All Taps	All Taps	Taps > 3/4”
8”	All Taps	Taps > 3/4”	Taps > 3/4”
10”	Taps > 3/4”	Taps > 3/4”	Taps > 1”
12”	Taps > 3/4”	Taps > 1”	Taps > 1-1/4”
16”	Taps > 1-1/4”	Taps > 1-1/2”	Taps > 2”

C. Spiral-wrap completely the thread area with Teflon tape prior to insertion.

D. Install corporation stops at the 2 and 10 o’clock positions on the pipe.

E. A minimum of one and a maximum of three threads of the installed corporation stop must be showing outside the water main. Care shall be taken not to over-tighten the stops.

F. Check and adjust all corporation stops for smooth operation.

3.2 TESTING

A. All corporation stops must be installed prior to leakage testing of the water main.

END OF SECTION

SECTION 02643

CURB STOPS ASSEMBLY

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included: Furnish and install curb stops of the type(s) and size(s) and in the location(s) shown on the Drawings and as specified herein.

1.2 QUALITY ASSURANCE

A. All curb stops shall be manufactured by one manufacturer.
B. All curb boxes shall be from one manufacturer.
C. Qualifications of Manufacturer: Products shall have proven reliable in similar installations over a reasonable number of years.
D. Meet or exceed ANSI/AWWA C800.
E. Acceptable Curb Stop Manufacturers:
   1. A.Y. McDonald Mfg. Co.
   2. Mueller Co.
   3. or equivalent.

PART 2 - PRODUCTS

A. Curb Stop
   1. Curb ball valve, quarter turn check.
   2. Construction shall be in accordance with AWWA C800 latest revision.
   3. Shall be “lead free” as defined in the Safe Drinking Water Act, amended January 4, 2011. Specifically, fittings shall contain not more than a weighted average of 0.25% lead when used with respect to their wetted surfaces.
   4. Inlet and outlet shall have compression type connections (CPPJ).
   5. Working pressure shall be 300 psi.
   6. Stainless steel insert stiffeners shall be used where plastic tubing (CTS) is specified.
   7. Inverted key and plug type curb stops are not acceptable.

B. Service Boxes
   1. Erie style
   2. 5½’ - 6½’ bury (unless shown otherwise)
   3. Plug cover with rope thread
   4. 36” x ½” stainless steel Box Rod
   5. For services over 1”, provide heavy duty foot piece.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install at locations shown on the Drawings and in accordance with manufacturer's instructions.

B. Install 2” x 8” x 8” concrete tile under curb stop.

3.2 ADJUSTMENTS

A. Check and adjust all curb stops for smooth operation.

B. The curb box shall be adjusted to final grade.

1. In paved areas or in sidewalks, the adjustment shall be approximately 1/8” below finish grade.
2. In lawn or grass area, the adjustment shall be approximately ½” below finish grade or at such a level as not to interfere with lawn maintenance.

END OF SECTION

SECTION 02644

HYDRANT ASSEMBLIES

PART 1 - GENERAL

1.1. DESCRIPTION

A. Work Included: Furnish and install hydrant assemblies of the type(s) and size(s) and in the location(s) shown on the Drawings and as specified herein.

B. Fire Hydrant Assemblies consist of:
   1. Hydrant tee.
   2. 6 inch gate valve and valve box.
   3. 6 inch hydrant branch piping.
   4. Fire Hydrant.
   5. Thrust blocking and retainer glands.

C. Flushing Hydrant consist of:
   1. Threaded DI cap.
   2. 2" copper branch tubing and fittings.
   3. 2' curb stop and box.
   4. Yard Hydrant.

1.2 QUALITY ASSURANCE

A. Hydrants shall conform to AWWA C502 and all hydrants shall be from one manufacturer.

B. Hydrants shall comply with Factory Mutual Research Corporation and Underwriters' Laboratories UL246 Standard.

C. Gate valves shall conform to AWWA C500.

D. Acceptable Manufacturer for Fire Hydrants:
   1. Kennedy Model K-81A or as approved by the City of Portsmouth Water Department.

E. Acceptable Manufacturers for Flushing Hydrants:
   1. Mainguard #77 by the Kupferle Foundry Company

PART 2 - PRODUCTS

2.1 MATERIALS

A. Fire Hydrants:
   1. Dry barrel type with a 5-1/4 inch minimum valve opening.
   2. Two (2) 2-1/2 inch hose connections and one (1) 4-1/2 inch pumper connection.
      a. 2-1/2 inch outlets: 60 degree V threads, 7-1/2 threads to the inch, external threads 3-1/16 inches, O.D. National Standard threads.
      b. 4-1/2 inch outlet: 4 threads to the inch, external threads 5-3/4 inches, O.D. National Standard threads.
   3. 200 pounds working pressure and 400 pounds hydrostatic test pressure.
   4. Working parts shall be bronze and open RIGHT (clockwise). Operating nut shall open by turning to the RIGHT and be five-sided, 1 1/2 inch point to flat.

5. Designed with standpipe breaking ring or breakable sections.
6. Supply one (1) collision repair kit for every twenty-five (25) hydrants installed.
7. Caps shall be attached to hydrant body by chains.

B. Flushing Hydrants:
1. Barrel shall be 2" diameter and self-draining.
2. Outlet shall be 2.5" NST thread with cap.
3. All working parts shall be brass.
4. Hydrant shall be operated by non-rising type stem and plunger.
5. Slotted operating nut shall be provided with locked access cover.
6. Inlet shall be 2" FIP thread.
7. Barrel shall include traffic breakaway coupling.

C. Gate Valves: As specified in Section 02641 - Resilient Seated Gate Valves.

D. Valve Boxes:
1. Cast or ductile iron, with the word "WATER" cast in covers.
2. Be of such length as required without full extensions. Minimum lap 12 inches.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install hydrants as shown in the details and using manufacturer's written instructions.
B. No hydrant assembly shall be backfilled until approved by the Engineer.
C. Provide thrust blocks as shown.
D. Provide barrel extensions as required for hydrant to be installed at proper grade at no additional cost to the Owner.
E. Plug all drain openings with brass plugs.
F. Provide finish paint on all exposed surfaces. Color must meet Owner's requirements.

3.2. CLEANING

A. Clean all hydrants of concrete, etc. and repaint as necessary to the satisfaction of the Engineer and Owner.

END OF SECTION

SECTION 02646

VALVE BOXES

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included: Furnish and install valve boxes of the type(s) and size(s) and in the location(s) shown on the Drawings and as specified herein.

1.2 QUALITY ASSURANCE

A. All valve boxes shall be manufactured by one manufacturer.

B. Qualifications of Manufacturer: Products to have been proven reliable in similar installations over a reasonable number of years.

PART 2 - PRODUCTS

2.1 MATERIALS

A. For valves 10 inches and smaller the valve box shall be cast iron, slip type two-piece integral base, with a top flange, 5-1/4 inch shaft.

B. For valves 12 inches and larger the valve box shall be cast iron, slip type, three piece (separate base), with a top flange, 5-1/4 inch shaft.

C. Cast or ductile iron, with the word "WATER" cast in covers.

D. Acceptable Manufacturers:

1. Mueller Co.
2. Central Foundry Co.
3. Clow.
4. Or equivalent.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Installation as shown on the Drawings and/or as specified herein:

1. When installation is complete, no pressure shall be exerted by valve box on the water main or on the valve.
2. Be of such length as required without full extension. Minimum lap 12 inches.
3. Install so cover is exactly level to 1/4 inch lower than pavement.

END OF SECTION

SECTION 02649

SERVICE SADDLES

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included: Furnish and install service saddles of the type(s) and size(s) and in the location(s) shown on the Drawings and as specified herein.

1.2 QUALITY ASSURANCE

A. All service saddles shall be manufactured by one manufacturer.

B. Qualifications of Manufacturer: Products to have been proven reliable in similar installations over a reasonable number of years.

1.3 SUBMITTALS TO THE ENGINEER

A. Submit shop drawings in accordance with the General Conditions.

PART 2 - PRODUCTS

2.1 MATERIALS WATER

A. For cast iron, ductile iron, and C900 PVC pipe
   1. Body -.
      a. Ductile iron - Fusion bonded epoxy coated (10 mils min.)
      b. Stainless Steel wrap around.
   2. Gasket - NBR compound.
   3. Bolts, Washers and nuts - heavy hex constructed of type 304 (18-8) stainless steel.
   4. Threads-American Tapered Pipe Threads.

B. Straps:
   1. 304 Stainless Steel single or double strap for 6" or smaller.
   2. 304 Stainless Steel double strap for 8" and larger.

C. Acceptable Manufacturers:
   1. Smith-Blair
   2. Dresser
   3. Romac
   4. Or equivalent

2.2 MATERIALS SEWER

A. For ductile iron, AC, VC, DR and SDR PVC pipe
   1. Body -.Ductile iron – painted body
   2. Gasket - SBR compound.
   3. Bolts, Washers and nuts - heavy hex constructed of type 304 (18-8) stainless steel.

B. Straps - 304 Stainless Steel.

C. Acceptable Manufacturers:
   1. Romac

2. Or equivalent

PART 3 - EXECUTION

3.1 INSTALLATION

A. Water

1. As shown on the Drawings and/or as specified herein.
2. Install at locations with 1 1/2 inch or larger services on ductile iron pipe, or at any size service on PVC or A.C. pipe, or as specified by the pipe and saddle manufacturers.
3. Check for leaks prior to backfilling as appropriate.
4. Tap pipe with tools and methods specifically furnished by pipe manufacturer.
5. For new main construction

B. Sewer

1. As shown on the Drawings and/or as specified herein.
2. For new main construction, install only with the written approval of the Engineer. Saddle to be tested in accordance with Section 02651 - Final Sewer Testing.

END OF SECTION

SECTION 02650
EXCAVATION DEWATERING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Design, furnish, install, operate, maintain and remove temporary dewatering systems as necessary to lower and control water levels below the excavated depth.

B. Determination of need to pre-drain soils using a well point system shall be by concurrence of the Engineer and Superintendant in advance of the work based on the following:

1. Observed water table >2’ above the proposed invert of the pipe.
2. Sufficient hydrostatic groundwater pressure to cause blowup of the trench bottom or sufficient to cause disturbance of the soil in the trench.
3. Perched water table above the invert of the pipe that can be addressed by conventional trench dewatering methods, such as by sump or trench pumps will not require a well point system.

1.2 DESIGN AND PERFORMANCE RESPONSIBILITY

A. The Contractor shall be solely responsible for the proper design and execution of methods for controlling surface water and pre-draining groundwater.

B. Damage to properties, buildings or structures, sewers and other utility installations, pavements, sidewalks, and work resulting from the Contractor’s dewatering operations will be the responsibility of the Contractor.

C. Design review and field monitoring activities by the Engineer shall not relieve the Contractor from their responsibility for the Work.

1.3 SUBMITTALS TO THE ENGINEER

A. Plan of proposed dewatering method including, the number, type, size, power supply and location of proposed dewatering units; schedule of operation; and method of disposal of water.

B. Water level readings in observation wells, the well locations, well point tip elevation and elevation of water in the wells.

C. Include provisions for the dewatering system in the Erosion and Sediment Control and Storm water Management Plan described in Section 02540 – Temporary Erosion Control.

1.4 SUBSURFACE CONDITIONS

A. When available, locations of test borings and pits are shown on the Drawings. The boring logs are included in the Appendix of these Specifications.

B. Variations in subsurface conditions should be anticipated by the Contractor when planning and estimating the work. Water levels can be expected to vary with season, precipitation and stages of nearby brooks and, therefore, water levels encountered at the time of construction may differ from any that are shown on the boring and test pit logs.

PART 2 - PRODUCTS

(NOT PART OF THIS SECTION)

PART 3 - EXECUTION

3.1 GENERAL

A. Control surface water and pre-drain groundwater such that excavation to final grade is made in-the-dry, maintain undisturbed bearing soils and insure that softening and/or disturbance due to the presence of seepage of water does not occur.

B. Perform all construction and backfilling in-the-dry. Flotation of completed portions of the Work is prohibited.

3.2 SURFACE WATER CONTROL

A. Construct surface water control measures, including dikes, ditches, sumps and other methods to prevent, as necessary, flow of surface water into excavations.

3.3 EXCAVATION DEWATERING

A. Construct all pipelines, concrete work, pipe bedding, and backfill in-the-dry. Excavate in-the-dry and not until the water level, as indicated by groundwater observation wells, is a minimum of six inches below the proposed bottom of final excavation within the trench limits.

B. Provide and maintain, at all times during construction, proper equipment and facilities to promptly and adequately remove and dispose of all water entering excavations. Keep undisturbed subgrade foundation conditions until the fill, structure or pipes to be built thereon have been completed to such an extent that they will not be floated or otherwise damaged by allowing water levels to return to natural elevations.

C. Conduct dewatering, at all times, in such a manner to preserve the natural undisturbed capacity of the subgrade soils at the bottom of excavations.

D. Evaluate the impact of the anticipated subsurface soil/water conditions on the proposed method of excavation and removal of water.

E. Where groundwater level is above the bottom of the proposed excavation level, install and operate a pumped dewatering system, including well points or closely spaced wells. Pre-drain the soils prior to final excavation, and maintain the lowered groundwater level until construction has been completed to such an extent that the structure, pipeline or fill will not be floated or otherwise damaged. The type of system, spacing of dewatering units and other details of the work will vary depending on soil/water conditions at particular locations.

F. At least two weeks prior to the start of construction in any areas of anticipated dewatering, submit a proposed initial plan for removal of water, method of excavation and support of the excavation to the Engineer for review. Do not proceed with construction in any of these areas until the initial plan has been reviewed and commented upon by the Engineer. Concurrence by the Engineer with the Contractor's initial plan shall be the Engineer's agreement that the plan is satisfactory for initial trial. It is expected that the initial plan may need modifications to suit the variable soil/water conditions to be encountered along the route.

G. Dewater and excavate in a manner which does not cause loss of ground or disturbance to the pipe bearing soil or soil supporting overlying or adjacent structures.

H. Surround well points and other dewatering units with suitable filter sand to prevent fines from being removed by pumping.

I. Pump the dewatering system continuously until pipe or structure is adequately backfilled and provide stand-by pumps.

J. Collect water entering the excavation from precipitation or surface runoff in shallow ditches around the perimeter of the excavation, drain to sump and pump from the excavation to maintain a bottom free from standing water.

K. Dispose of drainage in an approved area so that backflow, pollution, or public nuisance will not occur.

3.4 TEMPORARY GROUNDWATER OBSERVATION WELLS

A. Prior to commencing excavation and at locations designated by the Engineer, install temporary groundwater observation wells on the alignment of the pipe centerline.

B. The required spacing of the wells will be determined by the Engineer based on the methods and sequence of excavation and dewatering and the soil and water conditions encountered. It is anticipated that temporary well spacing will generally vary within the range of 100 feet to 300 feet.

C. Evaluate water level readings in the wells to confirm that the groundwater level has been lowered as specified such that excavation to final grade can be made in-the-dry.

D. Make water level readings and submit to the Engineer, to confirm effectiveness of dewatering prior to final excavation. Permit the Engineer to make independent readings of water levels in wells.

E. Temporary groundwater observation wells shall consist of a screened or slotted well point and riser pipe. The well point tip shall be placed at least two feet below the proposed bottom of excavation level.

F. Leave temporary groundwater observation wells in place until immediately prior to final excavation at the well locations.

END OF SECTION

DIVISION 13

DIVISION 13
SPECIAL CONSTRUCTION REQUIREMENTS

Scope of Work

Provide Health and Safety Documents and conduct environmental testing to safeguard workers at project site and dispose of contaminated soils and groundwater in accordance with NHDES guidelines.

Contractor's Duties

Except as specifically noted, provide and pay for all labor, materials, equipment, tools, machinery, water, heat, other facilities and services necessary for proper execution and completion of the work.

Contents of Division

Section No.	Section Title
13100	Contaminated Soils and Groundwater
13710	Health & Safety Plan Requirements

SECTION 13100

MANAGEMENT & DISPOSAL OF SOILS AND GROUNDWATER

PART 1 - GENERAL

1.1 DESCRIPTION

A. This work shall include the management, transport, treatment and/or disposal of soils and groundwater transported and disposed of at an offsite facility.

B. This work shall also include documentation and tracking excavated materials (regulated and non-regulated) in accordance with applicable local, state and federal regulations. Documentation of material disposal shall be provided to the Owner upon request.

1.2 REQUIREMENTS

A. Unless specified or indicated, monitoring, testing, treatment (or disposal) of regulated soils and groundwater, or other materials, including sampling protocols and testing shall conform to applicable regulations, including but not limited to:

1. New Hampshire Hazardous Waste Rules He-P 1905
2. RSA 146-A, RSA 146-C, and RSA 146-D, (Administered by the NHDES Water Supply and Pollution Control Division).
3. RSA 147-A, and RSA 147-B, (Administered by the NHDES Waste Management Division).
4. RSA 125-C (Administered by the NHDES Air Resources Division).
5. US Laws 29 Code of General Regulations (CRF) 1910 OSHA (Hazardous Materials Training).

PART 2 - PRODUCTS

2.1 MATERIALS

A. Available information pertaining to groundwater and remediation sites is included in Appendix C.

B. Contractor shall prepare and implement a Health and Safety Plan (HASP) for open excavations. (Section 13710)

PART 3 – EXECUTION

SURPLUS MATERIAL -

3.1 CONSTRUCTION REQUIREMENTS

A. Notify Owner immediately upon encountering soils regulated for disposal (or soils that are suspected to be regulated for disposal).

B. Segregate regulated soils from non-regulated materials

C. Incorporate all regulated soils into project backfill wherever possible, and as soon as possible.
D. The Engineer and the Owner reserve the right (utilizing an environmental consultant) to field screen surplus excavated material and claim material to be incorporated into the project as backfill, whether regulated or un-regulated.
E. Regulated soils that represent a threat to the environment or groundwater shall be appropriately secured and covered during stockpiling to prevent emissions or leaching of contaminates into groundwater. Covers shall be secured to prevent displacement or damage from wind, rain or other adverse weather conditions.

3.2 REGULATED SOIL DISPOSAL

A. The method of disposal of soils shall be approved by the Engineer and the Owner's representatives.

3.3 REGULATED GROUNDWATER DISPOSAL

A. In order to facilitate the treatment of potential contaminated groundwater, the Contractor shall obtain a Temporary Ground Water Discharge Permit from NHDES or authorization to discharge groundwater to the Owner's sanitary sewer system. A Temporary Surface Water Discharge Permit will require obtaining a NPDES permit exclusion from the United States Environmental Protection Agency for this activity.
B. Review trench dewatering methods and groundwater disposal with the Owner. Obtain owner approval for any special handling of groundwater.
C. Health and Safety precautions shall conform to the approved Project Health and Safety Plan.

END OF SECTION

SECTION 13710

HEALTH AND SAFETY PLAN REQUIREMENTS

PART 1 - GENERAL

1.1 DESCRIPTION

A. This work shall consist of preparing and implementing a Health and Safety Plan (HASP) to establish protocols necessary for protecting workers and the general public from potential hazards during excavation, backfill and pipe installations. Excavated soils encountered in urban development areas often include petroleum contaminants from leaking underground storage tanks (UST's), ash and VOC's as well as other naturally occurring or man-made compounds that may be regulated such as arsenic. The HASP is meant for all personnel associated with excavation, pipe laying, backfill and/or trenching operations and other personnel observing the work who could come in contact with regulated soils, compounds, materials and groundwater. The HASP shall be prepared in accordance with 29 CFR 1910.120.

1.2 REQUIREMENTS

A. The Contractor shall develop a HASP using these requirements as a baseline and incorporating additional requirements where necessary. The HASP must establish in detail the protocols necessary for protecting workers and potential off-site receptors from any potential hazards encountered during construction.

B. The HASP shall address the safe work practices and engineering safeguards to be employed for the work performed by the Contractor. These shall include but not be limited to the following:

1. Descriptions of personal protective equipment and clothing used as part of the different levels of protection. Respiratory protection shall also be addressed. The Contractor shall maintain an air quality monitor (for VOC detection) and explosimeter, to aid in the quick detection of methane or other potentially explosive gasses.

1.3 SUBMITTALS

A. The HASP shall be submitted to the Engineer a minimum of fourteen (14) days prior to earthwork.

B. A Closeout Safety Report shall be submitted by the contractor to the Engineer on completion of the work. This report shall summarize the weekly safety reports and provide an overview of the contractor's performance with regard to the HASP requirements.

C. Accident Reports.

1.4 LEVELS OF PROTECTION

A. The Contractor shall include in the HASP a list of tasks and specific levels of protection for each task. Levels of protection may be upgraded or downgraded

during site activities, based upon air monitoring results, meteorological conditions and the professional judgment of the SSHO.

1.5 PERSONAL SAFETY EQUIPMENT AND PROTECTIVE CLOTHING

A. The Contractor shall provide on-site personnel with appropriate safety equipment and protective clothing, when required by the HASP and shall ensure that all safety equipment and protective clothing is kept clean and well maintained. Specific levels of respiratory, and clothing protection shall be established in the HASP.

1.6 AIR MONITORING

A. General Requirements

1. The Contractor shall develop and implement an Air Monitoring Program to detect and quantify any volatilization of soil contaminants or release of soil particles associated with the work and the surrounding air. The program shall be consistent with the requirements of this section and submitted as part of HASP for review by the Engineer.
2. Information gathered during the air-monitoring program shall be logged and included in the project records and safety and health record file.

PART 2 - PRODUCTS

(NOT PART OF THIS SECTION)

PART 3 - EXECUTION

(NOT PART OF THIS SECTION)

END OF SECTION

D. NHDOT SPECIFICATIONS

NHDOT TECHNICAL SPECIFICATIONS

All work shall be in accordance with current edition of the State of New Hampshire, Department of Transportation (NHDOT) Standard Specifications for Road and Bridge Construction, (Standard Specifications) and as amended herein. Although not included within the Project Manual, the Standard Specifications are part of the Contract Documents titled "Little Bay Road Water Main Improvements – Portsmouth, New Hampshire" hereinafter referred to as the "Contract Documents." The following sections from the Standard Specification apply to this project:

Section Number	Title
403	Hot Bituminous Pavement
417	Cold Planing Bituminous Surfaces
603	Culverts and Storm Drains
618	Uniformed Officers and Flaggers
619	Maintenance of Traffic
645	Erosion Control
692	Mobilization

This list is not all inclusive and does not relieve the Contractor from complying with any or all NHDOT specifications referred to by the Contract Documents or referenced to by NHDOT specification sections that identified through unit items. It is the Contractor's responsibility to review NHDOT specifications and the additional specifications that are provided herein.

A complete set of NHDOT Standard Specifications for Road and Bridge Construction may be purchased from: NHDOT, Records Section, 1 Hazen Drive, P.O. Box 483, Concord, NH 03302-0483, Phone No.: 603-271-3514, or viewed on line. Amendments to selected sections of NHDOT specifications, to be incorporated into this project, are included herein.

Note: Provisions included in the Contract Documents shall take precedent over conflicts with the NHDOT specifications.

AMENDMENTS TO NHDOT SPECIFICATIONS

The NHDOT specifications are hereby amended as follows:

General:
Reference made to the "Department" or "Bureau" or "State" or "District Engineer" shall mean "City of Portsmouth, Town of Newington, their Agents or Engineer".

Section 100
Delete: Division 100-General Provisions in its entirety with the exception of:

- Section 101-Definitions and Terms
- Section 105-Control of the Work (subsections 105.01 through 105.07, and 105.12,
- Section 106-Control of the Material
- Section 109.01-Measurement of Quantities.
- Section 109.02-Scope of Payment

Section 109 – Measurement and Payment

Add Paragraph 109.12 – Incidental Construction and Subsidiary Work as follows:

Incidental work items for which separate payment is not measured is as summarized in Section 01025 – Measurement and Payment

Section 618 – Uniformed Officers and Flaggers

Basis of Payment

Paragraph 5.1: **Replace** "5%" with "0%"

E. APPENDICES

APPENDIX A

R.W. Gillespie & Associates, Inc.
Geotechnical Engineering • Environmental Consulting • Materials Testing Services

09 April 2024

Andrew Blair, Project Engineer
Underwood Engineers, Inc.
25 Vaughan Mall
Portsmouth, New Hampshire 03801

Via Email: ablair@underwoodengineers.com

Subject: Subsurface Exploration Services
Little Bay Road Water Main
Newington, New Hampshire
RWG&A Project No. 0515-243

Dear Mr. Blair:

R.W. Gillespie & Associates, Inc., (RWG&A) is pleased to provide the results of the explorations performed for the Little Bay Road Water Main project in Newington, New Hampshire. These services were performed in general accordance with RWG&A Proposal No. P-11577, dated 14 December 2023. The purpose of the services was to perform explorations along the proposed sewer alignment and provide the subsurface information to Underwood Engineers, Inc. The subsurface information is provided for informational purposes only. Users of the information provided herein accept responsibility for their interpretation and use.

The exploration program consisted of 18 auger probes and three test borings drilled along the proposed water main alignment. The explorations were performed on 28 March 2024 by Northern Test Boring, Inc., of Gorham, Maine using a track-mounted drill rig. The test borings were advanced with hollow stem augers and the probes were advanced with solid stem augers. Figure 1, *Exploration Location Plan*, shows the approximate exploration locations.

Exploration activities were coordinated and observed by an RWG&A engineer who prepared the exploration logs. The soils were described in general accordance with *ASTM D2488, Standard Practice for Description and Identification of Soils (Visual-Manual Procedure).* The logs of the explorations are included in the Appendix. Stratification lines shown on the exploration logs represent the estimated boundaries between the different soil types encountered and approximate refusal depths; the actual transitions will be more gradual and vary over short distances. Subsurface information should only be considered representative of subsurface conditions encountered within the vertical reach of the explorations on the date they were made. Please refer to the exploration logs for a detailed description of observed subsurface conditions.

The soils encountered in the explorations generally consisted of fill underlain by naturally deposited silty sand over clayey silt and silty clay. Refusal surfaces were not encountered to the depths drilled.

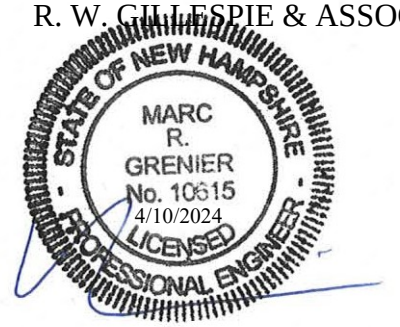
Free water was not observed in the explorations at the time of drilling. The United States Department of Agriculture's medium-intensity soil survey indicates that seasonal high groundwater for the soil type mapped along the alignment is about 2 feet to more than 6.5 feet below ground surface. The absence of free water data on the exploration log does not mean free water was not present or will not be encountered in the future within the vertical reach of the exploration. The apparent absence of free water might have been influenced by the drilling methods used and slow free water response. Groundwater levels at the site will fluctuate due to season, temperature, rainfall, nearby underground utilities, and construction activity in the area.

Closure

This report has been prepared for the exclusive use of Underwood Engineers, Inc. This work has been completed in accordance with generally accepted soil and foundation engineering practices. No other warranty, expressed or implied, is made.

We have enjoyed working with Underwood Engineers, Inc., on this project. If you have any questions, or if we may be of further service, please contact us.

Sincerely,
R. W. GILLESPIE & ASSOCIATES, INC.



Marc R. Grenier, P.E.
Senior Geotechnical Engineer

MRG:fg

Attachments:
Figure 1, Exploration Location Plan
Appendix, Exploration Logs with Soil Description Sheet

LEGEND:

B-1 APPROXIMATE LOCATION OF SOIL BORING DRILLED 28 MARCH 2024.

P-2 APPROXIMATE LOCATION OF SOIL PROBE DRILLED 28 MARCH 2024.

SOURCE:
© GOOGLE EARTH 2020 IMAGE.

N

0 500 750 1000
SCALE, FEET

FIGURE 1
EXPLORATION LOCATION PLAN
SUBSURFACE EXPLORATION SERVICES
LITTLE BAY ROAD WATER MAIN
NEWINGTON, NEW HAMPSHIRE

APRIL 2024 PROJECT NO. 0515-243

R.W. Gillespie & Associates
Geotechnical Engineering ● Materials Testing Services
Environmental Consulting ● www.rwgillespie.com

APPENDIX

EXPLORATION LOGS WITH SOIL DESCRIPTION SHEET

Subsurface Exploration Services
Little Bay Road Water Main
Newington, New Hampshire

RWG&A, Inc. soil descriptions are based on the following criteria. Descriptive terminology is used to denote the grain size and percentage of each component. The soil descriptions are based on visual-manual classification procedures, Standard Penetration Test results, and the results of laboratory testing on selected soil samples, where available. The Unified Soil Classification Group Symbol will be indicated in capital letters.

COMPONENT DEFINITIONS BY GRADATION SIEVE LIMITS

Materials	Definitions	Fractions	Upper	Lower
Boulders	Material too large to pass through an opening 12 in. square.			
Cobbles	Material passing through a 12 in. opening and retained on the 3 in. sieve.			
Gravel	Material passing the 3 in. sieve and retained on 1/4" (No. 4 sieve).	Coarse Fine	3 in. 3/4 in.	3/4 in. 1/4 in.
Sand	Material passing the No. 4 sieve and retained on the No. 200 sieve.	Coarse Medium Fine	No. 4 (1/4") No. 10 (1/8") No. 40 (1/32")	No. 10 (1/8") No. 40 (1/32") No. 200
Silt	Material passing the No. 200 sieve which is usually non-plastic in character and exhibits little or no strength when air dried.		No. 200	
Clay	Material passing the No. 200 sieve which can also be made to exhibit plasticity within a certain range of moisture contents and which exhibits considerable strength when air dried.		No. 200	

SOIL DESCRIPTION

General

Soils are described as to the Unified Soil Classification Systems Group Symbol, density or consistency, color, grain size distribution and other pertinent properties such as plasticity and dry strength. The RWG&A order of descriptors is as follows:

1. USCS Group Name and Symbol, or Fill
2. Density or Consistency
3. Moisture
4. Grain Size & Constituent percentages
5. Other pertinent descriptors
6. Color

DESCRIPTIVE TERMINOLOGY DENOTING COMPONENT PROPORTIONS

Descriptive Terms	Range of Proportions
Noun (major component)	∃50%
Adjective (secondary component)	20 - 50%
Some (third component)	25 - 45%
Little (second or third component)	15 - 25%
Few (second or third component)	5 - 15%
Trace	0 - 5%
With	Amount of component not determined. Used as a conjunction only. Does not indicate component percentile

OTHER DESCRIPTIVE TERMS

Where appropriate, geological classifications are also used (Glacial Till, etc.)

TYPICAL DESCRIPTIONS

SAND WITH SILT (SP-SM): Medium dense, moist, coarse to medium sand, few silt, brown.
FILL; Loose, dry, fine sand, some gravel and silt, with brick and concrete fragments, dark brown.
SILTY CLAY (CL); Very stiff, moist, silty clay, olive-brown.

DENSITY OR CONSISTENCY OF SOILS

COHESIVE SOILS

Consistency of Cohesive Soils	Standard Penetration Test (Blows Per Foot) (N)	Undrained Shear Strength (TSF)
Very Soft	0 - 2	Below 0.13 (250 psf)
Soft	2 - 4	0.13 to 0.25 (to 500 psf)
Medium	4 - 8	0.25 to 0.5 (to 1,000 psf)
Stiff	8 - 15	0.5 to 1.0 (to 2,000 psf)
Very Stiff	15 - 30	1.0 to 2.0 (to 4,000 psf)
Hard	Over 30	over 2.0 (over 4,000 psf)

Consistency of cohesive soils is based upon field vane shear, torvane, or pocket penetrometer, or laboratory vane shear or Unconsolidated-Undrained Triaxial Compression tests. Consistency of cohesive soils is based upon the Standard Penetration test when no other data is available.

COHESIONLESS SOILS

Density of Cohesionless Soils	Standard Penetration Test (Blows per Foot) (in)
Very Loose	0 - 4
Loose	4 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	over 50

PENETRATION RESISTANCE

STANDARD PENETRATION TEST (ASTM D1586) - a 2.0-inch diameter, 1-3/8 inch inside diameter split barrel sample is driven into soil by means of a 140-pound weight falling freely through a vertical distance of 30 inches. The total number of blows required for penetration from 6 to 18 inches is the Standard Penetration Resistance (N).

COBBLES AND BOULDERS

The percentage of cobbles and boulders is estimated visually where possible.

Descriptive Term	Estimated Percentage
Very Few	0 - 10%
Few	10 - 25%
Common	25 - 40%
Numerous	40 - 50%

If the percentage cannot be determined, as in a typical test boring, then use “with” to indicate the presence of cobbles and/or boulders. (i.e., gravelly sand with cobbles and boulders).

FILLS

The following terminology is used to denote size range of man-made materials within fill deposits:

Size Range	Comparative Soil Terms
<No. 200 Sieve	Silt - size
No. 200 to 1/4 in.	Sand - size
1/4 in. to 3 in.	Gravel - size
3 in. to 12 in.	Cobble - size
>12 in.	Boulder - size

SUPPLEMENTAL SOIL DESCRIPTION TERMINOLOGY

Term	Example	
Seam	Typically 1/16 to 1/2 inch thick	1/4 inch sand seams
Layer	Greater than 1/2 inch thick	2-inch sand layers
Occasional	One or less per foot of thickness	
Frequent	More than one per foot of thickness	
Interbedded	Alternating soil layers of different composition	
Varved	Alternating thin seams of silt and clay	
Mottled	Variations in color	

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Boring Log: B-1
Total Depth (ft): 12
Sheet 1 of 1

Project Name: Little Bay Road Water Improvements
RWG&A Project No. 0515-243-24
Location: Newington, New Hampshire
Client: Underwood Engineers, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings
Observed Water Depth: Not Obs.

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50 Rubber Track
Driller Rep.: Mike Nadeau
Date Started: 03/28/24
Date Completed: 03/28/24
Surface Elevation:
Drilling Method: SSA/Open Hole
Casing Type:

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0			S-1	FILL; Subbase, coarse to fine sand, few silt, little gravel, tan.	16	4 4 4 4	8		
				SILTY SAND WITH GRAVEL (SM); Medium dense, moist, coarse to fine sand, little silt, gray.					
5			S-2	Pushed gravel in SPT, no recovery.	0	7 10 7 9	17		
10			S-3	CLAYEY SILT (ML); Very stiff, dry to moist, silt, trace sand, few clay, mottled, orange and gray.	18	7 9 11 12	20		
				Bottom of exploration at 12.0'; Not refusal.					
15									
20									
25									
30									

Notes:

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Boring Log: P-2

Total Depth (ft): 10

Sheet 1 of 1

Project Name: Little Bay Road Water Improvements
RWG&A Project No. 0515-243-24
Location: Newington, New Hampshire
Client: Underwood Engineers, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings
Observed Water Depth: Not Obs.

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50 Rubber Track
Driller Rep.: Mike Nadeau
Date Started: 03/28/24
Date Completed: 03/28/24
Surface Elevation:
Drilling Method: SSA/Open Hole
Casing Type:

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0				FILL; Subbase, coarse to fine sand, few silt, little gravel, tan.					
				SILTY SAND WITH GRAVEL (SM); Medium dense, moist, coarse to fine sand, little silt, gray.					
5				CLAYEY SILT (ML); Very stiff, dry to moist, silt, trace sand, few clay, mottled, orange and gray.					
10				Bottom of exploration at 10.0'; Not refusal.					
15									
20									
25									
30									

Notes: Subsurface materials inferred from auger cuttings. Subsurface material composition and stratigraphy might vary from description provided.

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- Environmental Consulting
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Boring Log: P-3

Total Depth (ft): 10

Sheet 1 of 1

Project Name: Little Bay Road Water Improvements
RWG&A Project No. 0515-243-24
Location: Newington, New Hampshire
Client: Underwood Engineers, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings
Observed Water Depth: Not Obs.

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50 Rubber Track
Driller Rep.: Mike Nadeau
Date Started: 03/28/24
Date Completed: 03/28/24
Surface Elevation:
Drilling Method: SSA/Open Hole
Casing Type:

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0				FILL; Subbase, coarse to fine sand, few silt, little gravel, tan.					
				SILTY SAND WITH GRAVEL (SM); Medium dense, moist, coarse to fine sand, little silt, gray.					
5				CLAYEY SILT (ML); Very stiff, dry to moist, silt, trace sand, few clay, mottled, orange and gray.					
10				Bottom of exploration at 10.0'; Not refusal.					
15									
20									
25									
30									

Notes: Subsurface materials inferred from auger cuttings. Subsurface material composition and stratigraphy might vary from description provided.

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Boring Log: P-4

Total Depth (ft): 10

Sheet 1 of 1

Project Name: Little Bay Road Water Improvements
RWG&A Project No. 0515-243-24
Location: Newington, New Hampshire
Client: Underwood Engineers, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings
Observed Water Depth: Not Obs.

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50 Rubber Track
Driller Rep.: Mike Nadeau
Date Started: 03/28/24
Date Completed: 03/28/24
Surface Elevation:
Drilling Method: SSA/Open Hole
Casing Type:

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0				FILL; Subbase, coarse to fine sand, few silt, little gravel, tan.					
				SILTY SAND WITH GRAVEL (SM); Medium dense, moist, coarse to fine sand, little silt, gray.					
5				CLAYEY SILT (ML); Very stiff, dry to moist, silt, trace sand, few clay, mottled, orange and gray.					
10				Bottom of exploration at 10.0'; Not refusal.					
15									
20									
25									
30									

Notes: Subsurface materials inferred from auger cuttings. Subsurface material composition and stratigraphy might vary from description provided.

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Boring Log: P-5
Total Depth (ft): 10
Sheet 1 of 1

Project Name: Little Bay Road Water Improvements
RWG&A Project No. 0515-243-24
Location: Newington, New Hampshire
Client: Underwood Engineers, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings
Observed Water Depth: Not Obs.

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50 Rubber Track
Driller Rep.: Mike Nadeau
Date Started: 03/28/24
Date Completed: 03/28/24
Surface Elevation:
Drilling Method: SSA/Open Hole
Casing Type:

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0				FILL; Subbase, coarse to fine sand, few silt, little gravel, tan.					
				SILTY SAND (SM); Medium dense, moist, coarse to fine sand, little silt, trace gravel, gray.					
5				CLAYEY SILT (ML); Very stiff, dry to moist, silt, trace sand, few clay, mottled, orange and gray.					
				Denser.					
10				Bottom of exploration at 10.0'; Not refusal.					
15									
20									
25									
30									

Notes: Subsurface materials inferred from auger cuttings. Subsurface material composition and stratigraphy might vary from description provided.

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Boring Log: P-6
Total Depth (ft): 10
Sheet 1 of 1

Project Name: Little Bay Road Water Improvements
RWG&A Project No. 0515-243-24
Location: Newington, New Hampshire
Client: Underwood Engineers, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings
Observed Water Depth: Not Obs.

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50 Rubber Track
Driller Rep.: Mike Nadeau
Date Started: 03/28/24
Date Completed: 03/28/24
Surface Elevation:
Drilling Method: SSA/Open Hole
Casing Type:

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0				FILL; Subbase, coarse to fine sand, few silt, little gravel, tan.					
				SILTY SAND (SM); Medium dense, moist, coarse to fine sand, little silt, trace gravel, gray.					
5				CLAYEY SILT (ML); Very stiff, dry to moist, silt, trace sand, few clay, mottled, orange and gray.					
				SILTY CLAY (CL); Wet, clay, some silt, gray.					
10				Bottom of exploration at 10.0'; Not refusal.					
15									
20									
25									
30									

Notes: Subsurface materials inferred from auger cuttings. Subsurface material composition and stratigraphy might vary from description provided.

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Boring Log: P-7
Total Depth (ft): 10
Sheet 1 of 1

Project Name: Little Bay Road Water Improvements
RWG&A Project No. 0515-243-24
Location: Newington, New Hampshire
Client: Underwood Engineers, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings
Observed Water Depth: Not Obs.

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50 Rubber Track
Driller Rep.: Mike Nadeau
Date Started: 03/28/24
Date Completed: 03/28/24
Surface Elevation:
Drilling Method: SSA/Open Hole
Casing Type:

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0				FILL; Subbase, coarse to fine sand, few silt, little gravel, tan.					
				SILTY SAND (SM); Medium dense, moist, coarse to fine sand, little silt, trace gravel, gray.					
5				Denser.					
10				Bottom of exploration at 10.0'; Not refusal.					
15									
20									
25									
30									

Notes: Subsurface materials inferred from auger cuttings. Subsurface material composition and stratigraphy might vary from description provided.

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Boring Log: P-8

Total Depth (ft): 10

Sheet 1 of 1

Project Name: Little Bay Road Water Improvements
RWG&A Project No. 0515-243-24
Location: Newington, New Hampshire
Client: Underwood Engineers, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings
Observed Water Depth: Not Obs.

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50 Rubber Track
Driller Rep.: Mike Nadeau
Date Started: 03/28/24
Date Completed: 03/28/24
Surface Elevation:
Drilling Method: SSA/Open Hole
Casing Type:

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0				FILL; Subbase, coarse to fine sand, few silt, little gravel, tan.					
				SILTY SAND (SM); Medium dense, moist, coarse to fine sand, little silt, trace gravel, gray.					
10				Bottom of exploration at 10.0'; Not refusal.					
15									
20									
25									
30									

Notes: Subsurface materials inferred from auger cuttings. Subsurface material composition and stratigraphy might vary from description provided.

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Boring Log: P-9
Total Depth (ft): 10
Sheet 1 of 1

Project Name: Little Bay Road Water Improvements
RWG&A Project No. 0515-243-24
Location: Newington, New Hampshire
Client: Underwood Engineers, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings
Observed Water Depth: Not Obs.

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50 Rubber Track
Driller Rep.: Mike Nadeau
Date Started: 03/28/24
Date Completed: 03/28/24
Surface Elevation:
Drilling Method: SSA/Open Hole
Casing Type:

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0				FILL; Subbase, coarse to fine sand, few silt, little gravel, tan.					
				SILTY SAND (SM); Medium dense, moist, coarse to fine sand, little silt, trace gravel, gray.					
10				Bottom of exploration at 10.0'; Not refusal.					
15									
20									
25									
30									

Notes: Subsurface materials inferred from auger cuttings. Subsurface material composition and stratigraphy might vary from description provided.

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Boring Log: P-10

Total Depth (ft): 10

Sheet 1 of 1

Project Name: Little Bay Road Water Improvements
RWG&A Project No. 0515-243-24
Location: Newington, New Hampshire
Client: Underwood Engineers, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings
Observed Water Depth: Not Obs.

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50 Rubber Track
Driller Rep.: Mike Nadeau
Date Started: 03/28/24
Date Completed: 03/28/24
Surface Elevation:
Drilling Method: SSA/Open Hole
Casing Type:

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0				FILL; Subbase, coarse to fine sand, few silt, little gravel, tan.					
				SILTY SAND (SM); Medium dense, moist, coarse to fine sand, little silt, trace gravel, gray.					
10				Bottom of exploration at 10.0'; Not refusal.					
15									
20									
25									
30									

Notes: Subsurface materials inferred from auger cuttings. Subsurface material composition and stratigraphy might vary from description provided.

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Boring Log: P-11
Total Depth (ft): 10
Sheet 1 of 1

Project Name: Little Bay Road Water Improvements
RWG&A Project No. 0515-243-24
Location: Newington, New Hampshire
Client: Underwood Engineers, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings
Observed Water Depth: Not Obs.

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50 Rubber Track
Driller Rep.: Mike Nadeau
Date Started: 03/28/24
Date Completed: 03/28/24
Surface Elevation:
Drilling Method: SSA/Open Hole
Casing Type:

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0				FILL; Subbase, coarse to fine sand, few silt, little gravel, tan.					
				SILTY SAND (SM); Medium dense, moist, coarse to fine sand, little silt, trace gravel, gray.					
5									
				CLAYEY SILT (ML); Very stiff, dry to moist, silt, trace sand, few clay, mottled, orange and gray.					
10				Bottom of exploration at 10.0'; Not refusal.					
15									
20									
25									
30									

Notes: Subsurface materials inferred from auger cuttings. Subsurface material composition and stratigraphy might vary from description provided.

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Boring Log: P-12

Total Depth (ft): 10

Sheet 1 of 1

Project Name: Little Bay Road Water Improvements
RWG&A Project No. 0515-243-24
Location: Newington, New Hampshire
Client: Underwood Engineers, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings
Observed Water Depth: Not Obs.

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50 Rubber Track
Driller Rep.: Mike Nadeau
Date Started: 03/28/24
Date Completed: 03/28/24
Surface Elevation:
Drilling Method: SSA/Open Hole
Casing Type:

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0				FILL; Subbase, coarse to fine sand, few silt, little gravel, tan.					
				SILTY SAND (SM); Medium dense, moist, coarse to fine sand, little silt, trace gravel, gray.					
5									
				CLAYEY SILT (ML); Very stiff, dry to moist, silt, trace sand, few clay, mottled, orange and gray.					
10				Bottom of exploration at 10.0'; Not refusal.					
15									
20									
25									
30									

Notes: Subsurface materials inferred from auger cuttings. Subsurface material composition and stratigraphy might vary from description provided.

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- Environmental Consulting
- Materials Testing Services

Boring Log: B-13
Total Depth (ft): 12
Sheet 1 of 1

Project Name: Little Bay Road Water Improvements
RWG&A Project No. 0515-243-24
Location: Newington, New Hampshire
Client: Underwood Engineers, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings
Observed Water Depth: Not Obs.

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50 Rubber Track
Driller Rep.: Mike Nadeau
Date Started: 03/28/24
Date Completed: 03/28/24
Surface Elevation:
Drilling Method: SSA/Open Hole
Casing Type:

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0			S-1	FILL; Subbase, coarse to fine sand, few silt, little gravel, tan.	18	3 4 4 3	8		
				SILTY SAND WITH GRAVEL (SM); Medium dense, moist, coarse to fine sand, little silt, gray.					
5			S-2		15	2 2 3 3	5		
				CLAYEY SILT (ML); Very stiff, dry to moist, silt, trace sand, few clay, mottled, orange and gray.					
10			S-3		16	4 5 4 5	9		
				Bottom of exploration at 12.0'; Not refusal.					
15									
20									
25									
30									

Notes:

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- Environmental Consulting
- Materials Testing Services

Boring Log: P-15

Total Depth (ft): 10

Sheet 1 of 1

Project Name: Little Bay Road Water Improvements
RWG&A Project No. 0515-243-24
Location: Newington, New Hampshire
Client: Underwood Engineers, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings
Observed Water Depth: Not Obs.

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50 Rubber Track
Driller Rep.: Mike Nadeau
Date Started: 03/28/24
Date Completed: 03/28/24
Surface Elevation:
Drilling Method: SSA/Open Hole
Casing Type:

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0				FILL; Subbase, coarse to fine sand, few silt, little gravel, tan.					
				SILTY SAND (SM); Medium dense, moist, coarse to fine sand, little silt, trace gravel, gray.					
5									
				CLAYEY SILT (ML); Very stiff, dry to moist, silt, trace sand, few clay, mottled, orange and gray.					
10				Bottom of exploration at 10.0'; Not refusal.					
15									
20									
25									
30									

Notes: Subsurface materials inferred from auger cuttings. Subsurface material composition and stratigraphy might vary from description provided.

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- Materials Testing Services

Boring Log: P-16
Total Depth (ft): 15
Sheet 1 of 1

Project Name: Little Bay Road Water Improvements
RWG&A Project No. 0515-243-24
Location: Newington, New Hampshire
Client: Underwood Engineers, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings
Observed Water Depth: Not Obs.

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50 Rubber Track
Driller Rep.: Mike Nadeau
Date Started: 03/28/24
Date Completed: 03/28/24
Surface Elevation:
Drilling Method: SSA/Open Hole
Casing Type:

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0				ASPHALT PAVEMENT (3 inches).					
				FILL; Subbase, sand and gravel, coarse to fine sand, few silt, little gravel, tan.					
				SILTY SAND (SM); Medium dense, moist, coarse to fine sand, little silt, trace gravel, gray.					
5				Cobble/boulder.					
				CLAYEY SILT (ML); Very stiff, dry to moist, silt, trace sand, few clay, mottled, orange and gray.					
10									
15				Bottom of exploration at 15.0'; Not refusal.					
20									
25									
30									

Notes: Subsurface materials inferred from auger cuttings. Subsurface material composition and stratigraphy might vary from description provided.

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- Materials Testing Services

Boring Log: P-17
Total Depth (ft): 15
Sheet 1 of 1

Project Name: Little Bay Road Water Improvements
RWG&A Project No. 0515-243-24
Location: Newington, New Hampshire
Client: Underwood Engineers, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings
Observed Water Depth: Not Obs.

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50 Rubber Track
Driller Rep.: Mike Nadeau
Date Started: 03/28/24
Date Completed: 03/28/24
Surface Elevation:
Drilling Method: SSA/Open Hole
Casing Type:

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0				FILL; Subbase, coarse to fine sand, few silt, little gravel, tan.					
5				SILTY SAND (SM); Medium dense, moist, coarse to fine sand, little silt, trace gravel, gray.					
10				SILTY CLAY (CL); Soft.					
15				Bottom of exploration at 15.0'; Not refusal.					
20									
25									
30									

Notes: Subsurface materials inferred from auger cuttings. Subsurface material composition and stratigraphy might vary from description provided.

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Boring Log: P-18

Total Depth (ft): 10

Sheet 1 of 1

Project Name: Little Bay Road Water Improvements
RWG&A Project No. 0515-243-24
Location: Newington, New Hampshire
Client: Underwood Engineers, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings
Observed Water Depth: Not Obs.

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50 Rubber Track
Driller Rep.: Mike Nadeau
Date Started: 03/28/24
Date Completed: 03/28/24
Surface Elevation:
Drilling Method: SSA/Open Hole
Casing Type:

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0				FILL; Subbase, coarse to fine sand, few silt, little gravel, tan.					
				SILTY SAND (SM); Medium dense, moist, coarse to fine sand, little silt, trace gravel, gray.					
5				CLAYEY SILT (ML); Very stiff, dry to moist, silt, trace sand, few clay, mottled, orange and gray.					
10				Bottom of exploration at 10.0'; Not refusal.					
15									
20									
25									
30									

Notes: Subsurface materials inferred from auger cuttings. Subsurface material composition and stratigraphy might vary from description provided.

R.W. Gillespie & Associates

- Geotechnical Engineering
- Environmental Consulting
- Materials Testing Services

Boring Log: P-19

Total Depth (ft): 10

Sheet 1 of 1

Project Name: Little Bay Road Water Improvements
RWG&A Project No. 0515-243-24
Location: Newington, New Hampshire
Client: Underwood Engineers, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings
Observed Water Depth: Not Obs.

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50 Rubber Track
Driller Rep.: Mike Nadeau
Date Started: 03/28/24
Date Completed: 03/28/24
Surface Elevation:
Drilling Method: SSA/Open Hole
Casing Type:

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0				FILL; Subbase, coarse to fine sand, few silt, little gravel, tan.					
				SILTY SAND (SM); Medium dense, moist, coarse to fine sand, little silt, trace gravel, gray.					
5									
				CLAYEY SILT (ML); Very stiff, dry to moist, silt, trace sand, few clay, mottled, orange and gray.					
10				Bottom of exploration at 10.0'; Not refusal.					
15									
20									
25									
30									

Notes: Subsurface materials inferred from auger cuttings. Subsurface material composition and stratigraphy might vary from description provided.

R.W. Gillespie & Associates

- Geotechnical Engineering
- Environmental Consulting
- Materials Testing Services

Boring Log: P-20

Total Depth (ft): 10

Sheet 1 of 1

Project Name: Little Bay Road Water Improvements
RWG&A Project No. 0515-243-24
Location: Newington, New Hampshire
Client: Underwood Engineers, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings
Observed Water Depth: Not Obs.

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50 Rubber Track
Driller Rep.: Mike Nadeau
Date Started: 03/28/24
Date Completed: 03/28/24
Surface Elevation:
Drilling Method: SSA/Open Hole
Casing Type:

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0				FILL; Subbase, coarse to fine sand, few silt, little gravel, tan.					
				SILTY SAND (SM); Medium dense, moist, coarse to fine sand, little silt, trace gravel, gray.					
5				Little gravel.					
10				Bottom of exploration at 10.0'; Not refusal.					
15									
20									
25									
30									

Notes: Subsurface materials inferred from auger cuttings. Subsurface material composition and stratigraphy might vary from description provided.

R.W. Gillespie & Associates

- Geotechnical Engineering
- Environmental Consulting
- Materials Testing Services

Boring Log: P-21

Total Depth (ft): 10

Sheet 1 of 1

Project Name: Little Bay Road Water Improvements
RWG&A Project No. 0515-243-24
Location: Newington, New Hampshire
Client: Underwood Engineers, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings
Observed Water Depth: Not Obs.

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50 Rubber Track
Driller Rep.: Mike Nadeau
Date Started: 03/28/24
Date Completed: 03/28/24
Surface Elevation:
Drilling Method: SSA/Open Hole
Casing Type:

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0				FILL; Subbase, coarse to fine sand, few silt, little gravel, tan.					
				SILTY SAND (SM); Medium dense, moist, coarse to fine sand, little silt, trace gravel, gray.					
5				CLAYEY SILT (ML); Very stiff, dry to moist, silt, trace sand, few clay, mottled, orange and gray.					
10				Bottom of exploration at 10.0'; Not refusal.					
15									
20									
25									
30									

Notes: Subsurface materials inferred from auger cuttings. Subsurface material composition and stratigraphy might vary from description provided.

R.W. Gillespie & Associates
- Geotechnical Engineering
- Environmental Consulting
- Materials Testing Services

Boring Log: B-22
Total Depth (ft): 12
Sheet 1 of 1

Project Name: Little Bay Road Water Improvements
RWG&A Project No. 0515-243-24
Location: Newington, New Hampshire
Client: Underwood Engineers, Inc.
RWG&A Representative: Tom Snow
Boring Location: See Exploration Location Plan
Boring Abandonment Method: Backfill with cuttings
Observed Water Depth: Not Obs.

Drilling Co.: Northern Test Boring
Drill Rig: Diedrich D-50 Rubber Track
Driller Rep.: Mike Nadeau
Date Started: 03/28/24
Date Completed: 03/28/24
Surface Elevation:
Drilling Method: SSA/Open Hole
Casing Type:

DEPTH, FT.	SYMBOL	SAMPLES	SAMPLE NUMBER	DESCRIPTION OF MATERIAL	SAMPLE RECOVERY, IN.	BLOWS PER 6"	SPT-N VALUE	MOISTURE CONTENT %	LAB TESTS
0			S-1	ASPHALT PAVEMENT (2.5 inches).	12	5 7 7 5	14		
				FILL; Subbase, coarse to fine sand, few silt, little gravel, tan.					
				SAND WITH SILT (SP-SM); Loose to medium dense, dry, coarse to fine sand, trace to some silt, stratified, tan.					
5			S-2		16	2 2 5 8	7		
10			S-3		15	6 7 10 10	17		
				Bottom of exploration at 12.0'; Not refusal.					
15									
20									
25									
30									

Notes:

APPENDIX B

The State of New Hampshire
Department of Environmental Services

Robert R. Scott, Commissioner

August 05, 2024

CITY OF PORTSMOUTH
680 PEVERLY HILL RD
PORTSMOUTH NH 03801

Re: Culvert Repair-Replacement Statutory Permit-by-Notification (RSA 482-A)
NHDES File Number: 2024-02241
Project Location: Newington, Tax Map #10, Lot #9-9, 10-20

Dear Applicant:

On July 30, 2024, the New Hampshire Department of Environmental Services (NHDES) Wetlands Bureau received the above-referenced Culvert Repair-Replacement Statutory Permit-by-Notification (Culvert SPN). On August 05, 2024, the NHDES determined that the Culvert SPN was administratively complete and that the project, as described, met the criteria for a Culvert SPN. Pursuant to RSA 482-A:3, XVI and Rules Env-Wt 100-900, work may commence in accordance with the conditions listed below:

1. All work shall be done to protect water quality in accordance with Env-Wt 307.03, to minimize erosion, minimize sediment transfer to surface waters or wetlands, and minimize turbidity in surface water and wetlands using the techniques in the "Best Management Practices for Routine Roadway Maintenance in New Hampshire" published by the Department of Transportation (Routine Roadway BMPs).
2. The project shall be carried out in accordance with the Routine Roadway BMPs (Env-Wt 308.08(c)).
3. The work shall be done in compliance with all applicable conditions in Env-Wt 307 (refer to Protection of Fishery and Breeding Areas (Env-Wt 307.04); Protection Against Invasive Species (Env-Wt 307.05); Protection of Rare, Threatened, or Endangered Species and Critical Habitat (Env-Wt 307.06)).
4. The project shall meet the minimum impact criteria outlined in Env-Wt 903.01.
5. Any work done in shoreland covered by RSA 483-B, the shoreland water quality protection act, shall comply with all applicable conditions established therein (Env-Wt 308.08(b)).
6. The project shall meet the criteria established in RSA 482-A:3, XVI(a).
7. Prior to commencing the work covered by the SPN, the person responsible for the project shall post at the site a copy of this letter (Env-Wt 308.07(a)).
8. Within 10 days following completion of the work covered by the SPN, the person responsible for the project shall submit to the department confirmation of completion of the project, either by paper copy or electronically (Env-Wt 308.07(b)).

This Culvert SPN is valid through August 05, 2029.

If you have any questions, please contact the Wetlands Bureau at (603) 271-2147.

Sincerely,

Dale Keirstead

Dale R. Keirstead
Public Works Specialist, Wetlands Bureau
Land Resources Management, Water Division

cc: Agent; Underwood Engineers, Inc.; Daniel Rochette
Municipal Clerk/Conservation Commission