BIDDING DOCUMENTS, CONTRACT DOCUMENTS, AND TECHNICAL SPECIFICATIONS

CROSSINGS AT SLEEPY HOLLOW COOPERATIVE, INC.
ARPA PROJECT# CW-334424.01
SEWER SYSTEM IMPROVEMENT PROJECT
NEWMARKET, NEW HAMPSHIRE

June 2024

34 SCHOOL STREET • LITTLETON, NH 03561 • PHONE 603-444-4111 • FAX 603-444-1343 • www.horizonsengineering.com

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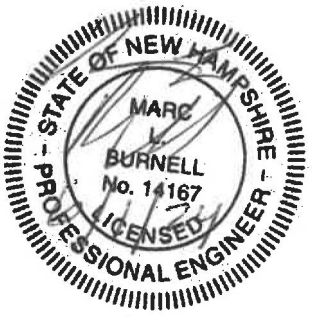

Project No. 230125

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2022

NHDES Front End Documents
Section A: Bidding Requirements

Rev 3/2022

Section A: Bidding Documents

Links to Other NHDES Front End Documents

NHDES Front End Documents: Section B Contract
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Advertisement for Bids

Owner Name: Crossings at Sleepy Hollow Cooperative, Inc.		Project Number: 230125		
Project Address:	83 Harvard Street Street # and name	Newmarket City/Town	NH State	03857 ZIP

Separate sealed BIDS for the construction of: Sewer System Improvement Project will be received by Marc Burnell of Horizons Engineering, Inc. at the office of 34 School Street, Littleton, NH 03561 until 2 p.m. Local Time on 07/15/2024 and then at said office publicly opened and read aloud.

1. Completion time for the project will be calculated as calendar days from the date specified in the "Notice to Proceed" as follows:
   90 calendar days for substantial completion.
   120 calendar days for final completion
   Liquidated damages will be in the amount of $1,000, for each calendar day of delay from the date established for substantial completion, and $1,000 for each calendar day of delay from the date established for final completion.
2. Each General Bid shall be accompanied by a Bid Security in the amount of 5% of the Total Bid Price.
3. The successful Bidder must furnish 100% Performance and Payment Bonds and will be required to execute the Contract Agreement within 10 days following notification of the acceptance of their Bid.
4. Any contract or contracts awarded under this Advertisement for Bids are expected to be funded in whole or in part by: **(Select all appropriate.)**
   - ☐ A loan from the NH Clean Water State Revolving Fund.
   - ☐ A loan from the NH Drinking Water State Revolving Fund.
   - ☐ A loan from the NH Drinking Water and Groundwater Trust Fund.
   - ☐ A grant from the NH Drinking Water and Groundwater Trust Fund.
   - ☐ A State Aid Grant from the NH Department of Environmental Services (SAG).
   - ☒ A grant from the American Rescue Plan Act from the NH Department of Environmental Services (ARPA).
   - ☐ A loan or grant from USDA Rural Development.
   - ☐ A Community Development Block Grant (CDBG) from the NH Community Development Finance Authority.

Include paragraphs 5-8 below if project is funded in whole or in part by a loan under the CWSRF and/or DWSRF programs

5. ~~The successful Bidder on this work is required to comply with the President's Executive Order No. 11246 entitled "Equal Employment Opportunity" as amended by Executive Order 11375, and amendments or supplements thereto, and as supplemented in Department of Labor Regulations (41 CFR Part 60). The requirements for bidders and contractors under this order are explained in the **Information For Bidders.**~~
6. ~~Utilization of Minority and Women's Business Enterprises (MBEs and WBEs). The successful Bidder on this work must demonstrate compliance with the U.S. Environmental Protection Agency's MBE/WBE rule in order to be deemed a responsible bidder. The requirements for bidders and contractors covered by this rule are explained in the Information for Bidders.~~
7. ~~The successful Bidder on this work is subject to U.S. Department of Labor's Davis Bacon wage provisions.~~
8. ~~The successful bidder on this work is subject to the **"American Iron and Steel (AIS)"** requirements of the CWSRF and DWSRF programs.~~
9. No Bidder may withdraw a Bid within 60 days after the actual date of opening thereof.
10. A non-mandatory pre-bid meeting will be held at 83 Harvard Street, Newmarket, NH 03857 on 06/26/2024 at 10:30 A.M.

The Contract Documents may be examined at the following locations:

34 School Street, Littleton, NH 03561

83 Harvard Street, Newmarket, NH 03857

Digital copies of the Contract Documents may be obtained from Horizons Engineering, Inc. (HorizonsEngineering.com) upon payment of a fee of $0 per set, which will not be refunded. Partial sets will not be distributed. All requests for physical documents must be accompanied by a fee of $100 to cover the cost of postage and handling.

Information for Bidders

All Contracts

Bids will be received by: Crossings at Sleepy Hollow Cooperative, Inc. herein called the "OWNER" at:
Address: 83 Harvard Street Newmarket NH 03857
Each BID must be submitted in a sealed envelope, addressed to:

Horizons Engineering, Inc. at 34 School Street, Littleton, NH 03561

Each sealed envelope containing a BID must be plainly marked on the outside as BID for Crossings at Sleepy Hollow Cooperative, Inc. and the envelope should bear on the outside the BIDDER's name, address and license number if applicable and the name of the project for which the BID is submitted. If forwarded by mail, the sealed envelope containing the BID must be enclosed in another envelope addressed to the OWNER at 34 School Street, Littleton, NH 03561.

All BIDS must be made on the required BID form. All blank spaces for BID prices must be filled in, in ink or typewritten, and the BID form must be fully completed and executed when submitted. Only one copy of the BID form is required.

The OWNER may waive any informalities or minor defects or reject any and all BIDS. Any BID may be withdrawn prior to the above scheduled time for the opening of BIDS or authorized postponement thereof. Any BID received after the time and date specified shall not be considered. No BIDDER may withdraw a BID within 60 days after the actual date of the opening thereof. Should there be reasons why the contract cannot be awarded within the specified period, the time may be extended by mutual agreement between the OWNER and the BIDDER.

BIDDERS must satisfy themselves of the accuracy of the estimated quantities in the BID SCHEDULE by examination of the site and a review of the drawings and specifications including ADDENDA. After BIDS have been submitted, the BIDDER shall not assert that there was a misunderstanding concerning the quantities of WORK or of the nature of the WORK to be done.

The OWNER shall provide to BIDDERS prior to BIDDING, all information which is pertinent to, and delineates and describes, the land owned and rights-of-way acquired or to be acquired.

The CONTRACT DOCUMENTS contain the provisions required for the construction of the PROJECT. Information obtained from an officer, agent, or employee of the OWNER or any other person shall not affect the risks or obligations assumed by the CONTRACTOR or relieve them from fulfilling any of the conditions of the contract.

Each BID must be accompanied by a BID BOND payable to the OWNER in the amount of five percent (5%) of the total amount of the BID. As soon as the BID prices have been compared, the OWNER will return the BONDS of all except the three lowest responsive BIDDERS. When the AGREEMENT is executed, the bonds of the two remaining unsuccessful BIDDERS will be returned. The BID BOND of the successful BIDDER will be retained until the PAYMENT BOND and PERFORMANCE BOND have been executed and approved, after which it will be returned. A certified check may be used in lieu of a BID BOND.

A PERFORMANCE BOND and a PAYMENT BOND, each in the amount of 100 percent of the CONTRACT PRICE, with a corporate surety approved by the OWNER, will be required for the faithful performance of the contract.

Attorneys-in-fact who sign BID BONDS or PAYMENT BONDS and PERFORMANCE BONDS must file with each BOND a certified and effective dated copy of their power of attorney.

The party to whom the contract is awarded will be required to execute the AGREEMENT and obtain the PAYMENT BOND and PERFORMANCE BOND within ten (10) calendar days from the date when NOTICE OF AWARD is delivered to the BIDDER. The NOTICE OF AWARD shall be accompanied by the necessary AGREEMENT and BOND forms. In case of failure of the BIDDER to execute the AGREEMENT, the OWNER may at their option consider the BIDDER in default, in which case the BID BOND accompanying the proposal shall become the property of the OWNER.

The OWNER within ten (10) days of receipt of acceptable PAYMENT BOND, PEERFORMANCE BOND and AGREEMENT signed by the party to whom the AGREEMENT was awarded shall sign the AGREEMENT and return to such party an executed duplicate of the AGREEMENT. Should the OWNER not execute the AGREEMENT within such period, the BIDDER may by WRITTEN NOTICE withdraw their signed AGREEMENT. Such notice of withdrawal shall be effective upon receipt of the notice by the OWNER.

The NOTICE TO PROCEED shall be issued within ten (10) days of the execution of the Agreement by the OWNER. Should there be reasons why the NOTICE TO PROCEED cannot be issued within such period, the time may be extended by mutual agreement between the OWNER and CONTRACTOR. If the NOTICE TO PROCEED has not been issued within the ten (10) day period or within the period mutually agreed upon, the CONTRACTOR may terminate the AGREEMENT without further liability on the part of either party.

The OWNER may make such investigations as Owner deems necessary to determine the ability of the BIDDER to perform the WORK, and the BIDDER shall furnish to the OWNER all such information and data for this purpose as the OWNER may request. The OWNER reserves the right to reject any BID if the evidence submitted by, or investigation of, such BIDDER fails to satisfy the OWNER that such BIDDER is properly qualified to carry out the obligations of the AGREEMENT and to complete the WORK contemplated therein.

A conditional or qualified BID will **not** be accepted.

Award will be made to the lowest responsive and responsible BIDDER, based on Base Bid amount. Bid alternates will be considered in the order they are presented, 1 first, 2 second, 3 third .

All applicable laws, ordinances, and the rules and regulations of all authorities having jurisdiction over construction of the PROJECT shall apply to the contract throughout.

Each BIDDER is responsible for inspecting the site and for reading and being thoroughly familiar with the CONTRACT DOCUMENTS. The failure or omission of any BIDDER to complete any of the foregoing shall in no way relieve any BIDDER from any obligation in respect to their BID.

The low BIDDER shall supply the names and addresses of major material SUPPLIERS and SUBCONTRACTORS when requested to do so by the OWNER.

MANUFACTURER'S EXPERIENCE

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

PROJECT SIGN

The Contractor shall construct a sign in accordance with the Standard Detail included in these specifications. The sign shall be erected in a location selected by the Engineer or Owner in coordination with NHDES. The Contractor shall maintain the sign throughout the duration of the contract.

SAFETY AND HEALTH REGULATIONS

This project is subject to all the Safety and Health Regulations (CFR 29 Part 1926 and all subsequent amendments) as promulgated by the U.S. Department of Labor on June 24, 1974. Contractors shall comply with the requirements of these regulations.

NONDISCRIMINATION IN EMPLOYMENT

Contracts for work under this proposal will obligate the contractors and sub-contractors not to discriminate in employment practices.

STATE INSPECTION

Work performed on this project shall be subject to inspection by representatives of the New Hampshire Department of Environmental Services (NHDES). Such inspection shall in no sense make the State Government a party to this contract, unless said Government is also the Owner, and will in no way interfere with the rights of either party hereunder.

Representatives of NHDES shall be given Right of Access to all portions of the proposed work, including but not limited to actual work site, storage yards, offsite manufacturing and fabricating location and job records.

COPIES OF THE CONTRACT

There shall be at least five (5) executed copies of the Contract to be distributed as follows:

a) One (1) copy each to the Owner, Engineer and Contractor.
b) One electronic copy in PDF format to NHDES.
c) Additional copies as required for other federal or state agencies contributing to or participating in project costs.

NON-RESIDENT CONTRACTORS

The successful bidder, if a corporation established under laws other than the State of New Hampshire, shall file, at the time of the execution of the contract, with the Owner, notice of the name of its resident attorney, appointed as required by the laws of the State of New Hampshire.

The successful bidder, if not a resident of New Hampshire, and not a corporation, shall file, at the time of execution of the contract, with the Owner a written appointment of a resident of the state of New Hampshire, having an office or place of business therein, to be their true and lawful attorney upon whom all lawful processes in any actions or proceedings against them may be served; and in such writing, which shall set forth said attorney's place of residence, shall agree that any lawful process against them which is served on said attorney shall be of the same legal force and validity as if served on them and that the authority shall continue in force so long as any liability remains outstanding against them in New Hampshire.

The power of attorney shall be filed in the office of the Secretary of State if required, and copies certified by the Secretary shall be sufficient evidence thereof. Such appointment shall continue in force until revoked by an instrument in writing, designating in a like manner some other person upon whom such processes may be served, which instrument shall be filed in the manner provided herein for the original appointment.

A Non-resident Contractor shall be deemed to be:

a) A person who is not a resident of the State of New Hampshire.
b) Any partnership that has no member thereof resident of the State of New Hampshire.
c) Any corporation established under laws other than those of the State of New Hampshire.

BIDDERS' QUALIFICATIONS

No award will be made to any Bidder who cannot meet all of the following requirements:

A. He shall not have defaulted nor turned the work over to the bonding company on any contract within three years prior to the bid date.
B. He shall maintain a permanent place of business.
C. He shall have adequate personnel and equipment to perform the work expeditiously.
D. He shall have suitable financial status to meet obligations incidental to the work.
E. He shall have appropriate technical experience satisfactory to the Engineer and the Division in the class of work involved.
F. He shall be registered with the Secretary of State to do business in New Hampshire.
G. He shall have performed to the satisfaction of the Engineer and the Division on previous contracts of a similar nature.
H. He shall not have failed to complete previous contracts on time, including approved time extensions.

WITHDRAWAL OF BIDS

Prior to Bid Opening, bids may be withdrawn upon written or telegraphic request of the Bidder provided confirmation of any telegraphic withdrawal over the signature of the Bidder is placed in the mail and postmarked prior to the time set for Bid Opening. Bid documents and security of any Bidder withdrawing their bid in accordance with the foregoing conditions will be returned

ARPA Only Contracts (non-SRF)

DAVIS-BACON WAGE RATES (Does not apply to ARPA only contracts less than $10M)

This project is funded in whole or in part by an American Rescue Plan Act grant through NHDES for a contract over $10M and hence is subject to federal Davis-Bacon wage provisions.

All laborers and mechanics employed by contractors or subcontractors on this project shall be paid wages at rates not less than those prevailing on projects of a character similar in the locality as determined by the U.S.

Department of Labor (DOL) in accordance with Subchapter IV of Chapter 31 of Title 40, United States Code.

A copy of the applicable DOL wage determination(s) is included in Attachment B in PART D- FEDERAL PROVISIONS, RULES, REGULATIONS AND FORMS in these project documents.

If the applicable wage determination does not provide a rate for a classification of work to be performed, the Contractor must request additional classifications and wage rates to be added in conformance to the contract wage determination after contract award. You can find additional information on DBA Conformances in the US Department of Labor Learning Center.

DOMESTIC PREFERENCES FOR PROCUREMENTS (2 C.F.R. § 200.322)

As appropriate and to the extent consistent with law, to the greatest extent practicable, there is a preference for the purchase, acquisition, or use of goods, products, or materials produced in the United States (including but not limited to iron, aluminum, steel, cement, and other manufactured products). The requirements of this section must be included in all subawards including all contracts and purchase orders for work or products under this award.

For purposes of this section:

(1) "Produced in the United States" means, for iron and steel products, that all manufacturing processes, from the initial melting stage through the application of coatings, occurred in the United States.

(2) "Manufactured products" means items and construction materials composed in whole or in part of non-ferrous metals such as aluminum; plastics and polymer-based products such as polyvinyl chloride pipe; aggregates such as concrete; glass, including optical fiber; and lumber.

RESTRICTIONS ON LOBBYING

The Contractor shall comply with the terms of 15 CFR part 28 and 2 CFR Part 200 Subpart E which prohibit the use of federal Contract funds to influence (or attempt to influence) a federal employee, and requires the submission of Standard Form LLL ("Disclosure of Lobbying Activities") if *non*federal funds have been used to influence (or attempt to influence) a federal employee.

DRUG-FREE WORKPLACE

The Contractor shall comply with the terms of 2 CFR part 1329 which require that as a condition of the Agreement, certification that they maintain a drug-free workplace. By signing and submitting the Agreement, the Contractor certifies that they will not engage in the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance in conducting any activity associated with the Agreement.

PROTECTION FOR WHISTLEBLOWERS

The Contractor shall comply with the terms of 41 U.S.C. §471 regarding Whistleblower protections. As described in 41 USC §471 "an employee of a contractor, subcontractor, grantee, or subgrantee or personal services contractor may not be discharged, demoted, or otherwise discriminated against as a reprisal for disclosing to a person or body described in paragraph (2) information that the employee reasonably believes is evidence of gross mismanagement of a Federal contract or grant, a gross waste of Federal funds, an abuse of authority relating to a Federal contract or grant, a substantial and specific danger to public health or safety, or a violation of law, rule, or regulation related to a Federal contract (including the competition for or negotiation of a contract) or grant."

Bid

Proposal of _____ [company](hereinafter called the "BIDDER", organized and existing under the laws of the State of NH doing business as Corporation, Partnership, Individual to the Crossings at Sleepy Hollow Cooperative, LLC [ownername](herein after called "OWNER").

In compliance with your Advertisement for Bids, BIDDER hereby proposes to perform all WORK For the construction of _____ [project name]in strict accordance with the CONTRACT DOCUMENTS, within the time set forth therein, and at the prices stated below.

By submission of this BID, each BIDDER certifies, and in the case of a joint BID each party thereto certifies as to their own organization, that this BID has been arrived at independently, without consultation, communication, or agreement as to any matter relating to the BID with any other BIDDER or with any competitor.

BIDDER hereby agrees to commence WORK under this contract on or before a date to be specified in the NOTICE TO PROCEED and to complete the PROJECT within:

90	calendar days for substantial completion.
120	calendar days for final completion

Liquidated damages will be in the amount of $ 500 for each calendar day of delay from the date established for substantial completion and $500 for each calendar day of delay from the date established for final completion, as provided in Section 18 of the General Conditions.

BIDDER acknowledges receipt of the following ADDENDUM:

1 _____

2 _____

3 _____

4 _____

5 _____

The Bidder shall state below what works of a similar character to that of the proposed contract they have performed and provide such references as will enable the Owner to judge their experience, skill, and business standing.

All questions must be answered, and the data given must be clear and comprehensive. This statement must be notarized. If necessary, add separate sheets.

Bidder Name:				
Permanent Main Office Address:	Street # and name		City/Town	State ZIP
When was it organized?			Where incorporated?	
☐ Yes	☐ No	Is the bidder registered with the Secretary of State to do business in NH?		
For how many years has your firm engaged in the contracting business under its present name? Please list previous firm names and dates if applicable.				
Years		Previous Name		
Contracts on hand, attach a schedule or list showing gross amount of each contract and the approximate anticipated dates of completion.				
Describe the general character of work performed by your company.				
☐ Yes	☐ No	Have you ever failed to complete any work awarded you in the scheduled contract time, including approved time extensions? If so where and why?		
☐ Yes	☐ No	Have you ever defaulted on a contract? If so where and why?		
☐ Yes	☐ No	Have you ever had liquidated damages assessed on a contract? If so where and why?		
List the more important contracts recently executed by your company:				
Recent Contract Name			Approximate Cost	Month/Year Completed
List your major equipment **available for this contract**: (Attach additional sheets as necessary.)				
List your key personnel **available for this contract**: (Attach additional sheets as necessary.)				
Staff Name			Role (i.e. Project Superintendent, Foreman)	

List any subcontractors whom you would expect to use for the following (unless this work is to be done by your own organization)		
Civil Engineering Utility Installation Other please describe:		
Please list banks with whom you conduct business.		
☐ Yes	☐ No	Do you grant the Engineer permission to contact this (these) institutions?
NOTE: Bidders may be required to furnish their latest financial statement as part of the award process.		

Respectfully Submitted:

Signature: _____ Date:

Printed Name: Title:

Street # and name City/Town State ZIP

[Signed Name] Being duly sworn, deposes and says that they are [Position Title] of [Organization] and all the answers to the foregoing questions and all statement contained therein are true and correct.

Sworn to before me this day of , 20

, Notary Public

My Commission Expires

Seal

Attest:

BIDDER agrees to perform all the work described in the CONTRACT DOCUMENTS for the following unit prices or lump sum:

NOTE: BIDS shall include sales tax and all other applicable taxes and fees.

Bid Schedule

BID SCHEDULE

BASE BID FOR THE CROSSINGS AT SLEEPY HOLLOW SEWER MAIN AND SERVICE LINE CONSTRUCTION, HARVARD STREET, ITHACA LANE, COLBY ROAD, AND DARTMOUTH CIRCLE. CONNECTION TO THE EXISTING SEWER SYSTEM ON AMHERST STREET AND DARTMOUTH CIRCLE.

****

Item No.	**Brief Description; Unit or Lump Sum Price (both words and numbers)**	**Quantity and Units**	**Item Price**
1.	General Conditions, Mobilization and Miscellaneous Work, Per Lump Sum: _____Dollars And _____Cents ($_____)	1 LS	$_____
2.	Eight Inch PVC SDR 35 Pipe, Per Linear Foot: _____Dollars And _____Cents ($_____)	1,567 LF	$_____
3.	Six Inch PVC SDR 35 Pipe, Per Linear Foot: _____Dollars And _____Cents ($_____)	45 LF	$_____
4.	Four Inch PVC SDR 35 Pipe, Per Linear Foot: _____Dollars And _____Cents ($_____)	1,916 LF	$_____
5.	Manhole Frame and Cover, Per Each: _____Dollars And _____Cents ($_____)	13 EA	$_____
6.	Manhole Structures (4' Diameter), Per Vertical Foot: _____Dollars And _____Cents ($_____)	100 VF	$_____
7.	Manhole Structures (5' Diameter), Per Vertical Foot: _____Dollars And _____Cents ($_____)	23 VF	$_____
8.	Three Inch Bituminous Pavement, Per Ton: _____Dollars And _____Cents ($_____)	256 TON	$_____
9.	Crushed Gravel, Per Cubic Yard: _____Dollars And _____Cents ($_____)	250 CY	$_____
10.	Bank Run Gravel, Per Cubic Yard: _____Dollars And _____Cents ($_____)	500 CY	$_____

11. Two Inch Blue Board Insulation, Per Square Foot:
_____Dollars
And _____Cents ($_____) 96 SF $_____

12. Ledge Excavation, Per Cubic Yard:
_____Dollars
And _____Cents ($_____) 215 CY $_____

13. Unsuitable Material, Per Cubic Yard:
_____Dollars
And _____Cents ($_____) 20 CY $_____

14. Fifteen Inch HDPE Culvert Pipe, Per Linear Foot:
_____Dollars
And _____Cents ($_____) 100 LF $_____

15. Restoration of Surfaces, Per Lump Sum:
_____Dollars
And _____Cents ($_____) 1 LS $_____

16. Exploratory Excavation, Per Cubic Yard:
_____Dollars
And _____Cents ($_____) 100 CY $_____

17. Manhole Grading Repair, Per Lump Sum:
_____Dollars
And _____Cents ($_____) 1 LS $_____

18. Traffic Control, Per Lump Sum:
_____Dollars
And _____Cents ($_____) 1 LS $_____

19. Erosion Control Practices, Per Lump Sum:
_____Dollars
And _____Cents ($_____) 1 LS $_____

Total Base Bid Price in Words

ADDITIVE ALTERNATE #1 – COLGATE ROAD

ALTERNATE BID FOR SEWER MAIN AND SERVICE LINE CONSTRUCTION ON COLGATE ROAD TO CONNECT TO PREVIOUSLY BUILT COLBY ROAD.

****

AA1-1. General Conditions, Mobilization and Miscellaneous Work, Per Lump Sum:
_____Dollars
And _____Cents ($_____) 1 LS $_____

AA1-2. Eight Inch PVC SDR 35 Pipe, Per Linear Foot:
_____Dollars
And _____Cents ($_____) 202 LF $_____

AA1-3. Six Inch PVC SDR 35 Pipe, Per Linear Foot:
_____Dollars
And _____Cents ($_____) 167 LF $_____

AA1-4. Four Inch PVC SDR 35 Pipe, Per Linear Foot:
_____Dollars
And _____Cents ($_____) 285 LF $_____

AA1-5. Manhole Frame and Cover, Per Each:
_____Dollars
And _____Cents ($_____) 3 EA $_____

AA1-6. Manhole Structures (4' Diameter), Per Vertical Foot:
_____Dollars
And _____Cents ($_____) 18 VF $_____

AA1-7. Three Inch Bituminous Pavement, Per Ton:
_____Dollars
And _____Cents ($_____) 31 TON $_____

AA1-8. Crushed Gravel, Per Cubic Yard:
_____Dollars
And _____Cents ($_____) 31 CY $_____

AA1-9. Bank Run Gravel, Per Cubic Yard:
_____Dollars
And _____Cents ($_____) 61 CY $_____

AA1-10. Two Inch Blue Board Insulation, Per Square Foot:
_____Dollars
And _____Cents ($_____) 96 SF $_____

AA1-11. Rock/Ledge Excavation, Per Cubic Yard:

_____Dollars
And _____Cents ($_____) 20 CY $_____

AA1-12. Unsuitable Material, Per Cubic Yard:

_____Dollars
And _____Cents ($_____) 10 CY $_____

AA1-13. Restoration of Surfaces, Per Lump Sum:

_____Dollars
And _____Cents ($_____) 1 LS $_____

AA1-14. Exploratory Excavation, Per Cubic Yard:

_____Dollars
And _____Cents ($_____) 10 CY $_____

AA1-15. Erosion Control Practices, Per Lump Sum:

_____Dollars
And _____Cents ($_____) 1 LS $_____

_____

Total Alternate Bid Price in Words

ADDITIVE ALTERNATE #2 – COLGATE ROAD EXTENSION

ALTERNATE BID FOR SEWER MAIN AND SERVICE LINE CONSTRUCTION ON COLGATE ROAD, EXTENSION OF PRINCETON STREET, TO CONNECT TO PREVIOUSLY BUILT HARVARD STREET.

****

AA2-1. General Conditions, Mobilization and Miscellaneous Work, Per Lump Sum:
_____Dollars
And _____Cents ($_____) 1 LS $_____

AA2-2. Six Inch PVC SDR 35 Pipe, Per Linear Foot:
_____Dollars
And _____Cents ($_____) 154 LF $_____

AA2-3. Four Inch PVC SDR 35 Pipe, Per Linear Foot:
_____Dollars
And _____Cents ($_____) 150 LF $_____

AA2-4. Manhole Frame and Cover, Per Each:
_____Dollars
And _____Cents ($_____) 1 EA $_____

AA2-5. Manhole Structures (4' Diameter), Per Vertical Foot:
_____Dollars
And _____Cents ($_____) 7 VF $_____

AA2-6. Three Inch Bituminous Pavement, Per Ton:
_____Dollars
And _____Cents ($_____) 13 TON $_____

AA2-7. Crushed Gravel, Per Cubic Yard:
_____Dollars
And _____Cents ($_____) 13 CY $_____

AA2-8. Bank Run Gravel, Per Cubic Yard:
_____Dollars
And _____Cents ($_____) 25 CY $_____

AA2-9. Two Inch Blue Board Insulation, Per Square Foot:
_____Dollars
And _____Cents ($_____) 32 SF $_____

AA2-10. Rock/Ledge Excavation, Per Cubic Yard:
_____Dollars
And _____Cents ($_____) 5 CY $_____

AA2-11. Unsuitable Material, Per Cubic Yard:

_____Dollars
And _____Cents ($_____) 10 CY $_____

AA2-12. Restoration of Surfaces, Per Lump Sum:

_____Dollars
And _____Cents ($_____) 1 LS $_____

AA2-13. Exploratory Excavation, Per Cubic Yard:

_____Dollars
And _____Cents ($_____) 10 CY $_____

AA2-14. Erosion Control Practices, Per Lump Sum:

_____Dollars
And _____Cents ($_____) 1 LS $_____

Total Alternate Bid Price in Words

ADDITIVE ALTERNATE #3 – PRINCETON, TUFTS-YALE, YALE EXTENSION

ALTERNATE BID FOR SEWER MAIN AND SERVICE LINE CONSTRUCTION ON PRINCETON STREET, TUFTS STREET, AND YALE STREET, TO CONNECT TO PREVIOUSLY BUILT HARVARD STREET.

****

AA3-1. General Conditions, Mobilization and Miscellaneous Work, Per Lump Sum:
_____Dollars
And _____Cents ($_____) 1 LS $_____

AA3-2. Eight Inch PVC SDR 35 Pipe, Per Linear Foot:
_____Dollars
And _____Cents ($_____) 1,446 LF $_____

AA3-3. Six Inch PVC SDR 35 Pipe, Per Linear Foot:
_____Dollars
And _____Cents ($_____) 173 LF $_____

AA3-4. Four Inch PVC SDR 35 Pipe, Per Linear Foot:
_____Dollars
And _____Cents ($_____) 880 LF $_____

AA3-5. Manhole Frame and Cover, Per Each:
_____Dollars
And _____Cents ($_____) 10 EA $_____

AA3-6. Manhole Structures (4' Diameter), Per Vertical Foot:
_____Dollars
And _____Cents ($_____) 89 VF $_____

AA3-7. Three Inch Bituminous Pavement, Per Ton:
_____Dollars
And _____Cents ($_____) 162 TON $_____

AA3-8. Crushed Gravel, Per Cubic Yard:
_____Dollars
And _____Cents ($_____) 158 CY $_____

AA3-9. Bank Run Gravel, Per Cubic Yard:
_____Dollars
And _____Cents ($_____) 316 CY $_____

AA3-10. Two Inch Blue Board Insulation, Per Square Foot:
_____Dollars

And _____Cents ($_____) 192 SF $_____

AA3-11. Rock/Ledge Excavation, Per Cubic Yard:

_____Dollars

And _____Cents ($_____) 135 CY $_____

AA3-12. Unsuitable Material, Per Cubic Yard:

_____Dollars

And _____Cents ($_____) 20 CY $_____

AA3-13. Restoration of Surfaces, Per Lump Sum:

_____Dollars

And _____Cents ($_____) 1 LS $_____

AA3-14. Exploratory Excavation, Per Cubic Yard:

_____Dollars

And _____Cents ($_____) 30 CY $_____

AA3-15. Erosion Control Practices, Per Lump Sum:

_____Dollars

And _____Cents ($_____) 1 LS $_____

Total Alternate Bid Price in Words

Bid Bond

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned as _____ Principal, and as _____ Surety, are hereby held and firmly bound unto _____ as OWNER in the penal sum of _____ for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, successors and assigns.

Signed, this _____ day of _____ in the year ____.

The condition of the above obligation is such that whereas the Principal has submitted to _____ a certain BID, attached hereto and herby made a part hereof to enter into a contract in writing, for the _____

NOW, THEREFORE,

(a) If said BID shall be rejected, or

(b) If said BID shall be accepted and the Principal shall execute and deliver a contract in the Form of Contract attached hereto (Properly completed in accordance with said BID) and shall furnish a BOND for faithful performance of said contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said BID, then this obligation shall be void, otherwise, the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its BOND shall be in no way impaired or affected by any extension of the time within which the OWNER may accept such BID; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

Principal Signature	Witnessed By:
Surety Signature	Witnessed By:

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

2020

NHDES Front End Documents
Section B: Contract

Section B: Contract

NOTICE OF AWARD

Dated _____

TO: _____

ADDRESS: _____

Street Address City/Town State ZIP

Project Number | Owner Contract Number

Project : _____ | Contract For: _____

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

---

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

_____

_____

_____

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

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

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

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

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

   _____

   _____

   _____

   _____

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

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

_____

(OWNER)

_____

(Authorized Signature)

_____

(Title)

ACKNOWLEDGEMENT OF NOTICE

Receipt of the above NOTICE OF AWARD is hereby acknowledged:

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

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

AGREEMENT

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

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

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

u. SPECIFICATIONS prepared or issued by:

_____ and dated

_____, 20___

v. ADDENDA

No. _____ dated _____, 20___

No. _____ dated _____, 20___

No. _____ dated _____, 20___

No. _____ dated _____, 20___

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

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

OWNER: _____

By: _____

NAME: _____

(SEAL)
ATTEST: _____

NAME: _____

TITLE: _____

CONTRACTOR: _____

BY: _____

NAME: _____

ADDRESS: _____

(SEAL)
ATTEST: _____

NAME: _____

TITLE: _____

PAYMENT BOND

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

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

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

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

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

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

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

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

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

ATTEST:

_____
(PRINCIPAL)

BY: _____
(Principal) Secretary

BY: _____

_____
(ADDRESS)

_____

BY: _____
Witness as to Principal

_____
(ADDRESS)

_____
(SURETY)

ATTEST:

BY: _____
(ATTORNEY in FACT)

BY: _____
Witness to Surety

_____
(ADDRESS)

_____

_____

_____

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

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

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS: that

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

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

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

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

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

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

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

ATTEST:

BY: _____
(Principal) Secretary

_____
(PRINCIPAL)

BY: _____

_____
(ADDRESS)

_____

BY: _____
Witness as to Principal

_____
(ADDRESS)

_____
(SURETY)

ATTEST:

BY: _____
(ATTORNEY in FACT)

BY: _____
Witness to Surety

_____
(ADDRESS)

_____

_____

_____

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

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

NOTICE TO PROCEED

Dated _____ , 20 _____

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

ADDRESS: _____

OWNER'S PROJECT NO. _____

PROJECT: _____

OWNER'S CONTRACT NO. _____

CONTRACT FOR: _____

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

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

_____

_____

Copy to ENGINEER
(Use Certified Mail, return receipt Requested)

OWNER: _____

By: _____
(Authorized Representative)

NAME: _____
(Title)

ACKNOWLEDGEMENT OF NOTICE

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

_____
(Contractor)

This the _____, day of 20__, by _____

Employee Identification Number: _____

CHANGE ORDER

No. _____

PROJECT NAME: _____ DATE OF ISSUANCE: _____

OWNER: _____ OWNER PROJECT NO. _____

OWNER ADDRESS: _____

Street Name City/Town State ZIP

CONTRACTOR: _____

CONTRACT FOR: _____

ENGINEER: _____ ENG. PROJECT NO.

ENGINEER ADDRESS: _____

Street Name City/Town State ZIP

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

Description: _____

Purpose of Change Order: _____

Justification: _____

Attachments: (List documents supporting change)

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

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

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

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

CERTIFICATE OF SUBSTANTIAL COMPLETION

Owner Project No. _____ Engineer Project No. _____
Project: _____
Contractor: _____
Contract For: _____ Contract Date: _____

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

_____
_____
_____

To _____
(Owner)

And to _____
(Contractor)

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

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

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

RESPONSIBILITIES:
OWNER: _____
_____
CONTRACTOR: _____
_____

The following documents are attached to and made a 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 the Engineer on _____, 20__

_____
(Engineer)

By: _____

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

_____
(Contractor)

By: _____

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

_____
(Owner)

By: _____

CERTIFICATE OF FINAL COMPLETION

NHDES CLEAN WATER AND DRINKING WATER
STATE REVOLVING FUND

Owner Project No. _____ Engineer Project No. _____
Project: _____
Owner: _____
Contractor: _____
Engineer: _____
Agreement Date: _____
Notice to Proceed Date: _____
Contractual Substantial Completion date as modified by change orders: _____
Actual Substantial Completion date _____
Contractual final completion date as modified by Change Orders _____

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

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

Executed by Engineer on _____, 20__

By: _____

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

By: _____

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

By: _____

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

By: _____

CONTRACTORS AFFIDAVIT

STATE OF: _____

COUNTY OF: _____

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

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

_____
(Title)

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

_____
(Notary Public)

CONTRACTOR'S FINAL RELEASE AND WAIVER OF LIEN

Project Name: _____

Project Address: _____

Street Name City/Town State ZIP

Owner Name: _____

Contractor Name: _____

Contractor Address: _____

Street Name City/Town State ZIP

TO ALL WHOM IT MAY CONCERN:

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

The undersigned further hereby acknowledges that the sum of:

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

Dated this _____ day of _____ 20__

_____

(Contractor)

Witness to Signature

BY: BY:

_____ _____

Title Title

2020

NHDES Front End Documents
Section C: General Conditions

General Conditions

Section C: General Conditions

General Conditions

General Conditions

1. Contract and Contract Documents.

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

2. Definitions.

2.1 "Addenda" means written or graphic instruments issued prior to the execution of the agreement which modify or interpret the Contract Documents, drawings and specifications, by additions, deletions, clarifications or corrections. Such written or graphic instruments will be issued no less than five days before the bid opening.

2.2 "Bid" means the offer or proposal of the bidder submitted on the prescribed form setting forth the prices for the work to be performed.

2.3 "Bidder" means any person, firm or corporation submitting a bid for the work.

2.4 "Bonds" means bid, performance, and payment bonds and other instruments of security, furnished by the Contractor and his surety in accordance with the Contract Documents.

2.5 "Change Order" means a written order to the Contractor authorizing an addition, deletion or revision in the work within the general scope of the Contract Documents, or authorizing an adjustment in the Contract Price or Contract Time.

2.6 "Contract Documents" means the Contract, including any advertisement for bids, information for bidders, bid, bid bond, agreement, payment bond, performance bond, notice of award, notice to proceed, change orders, drawings, specifications and addenda.

2.7 "Contract Price" means the total monies payable to the Contractor under the terms and conditions of the Contract Documents.

2.8 "Contract Time" means the number of calendar days stated in the Contract Documents for the completion of the work.

2.9 "Contractor" means the person, firm or corporation with whom the owner has executed the agreement.

2.10 "Division" means the state of New Hampshire Department of Environmental Services, Water Division.

2.11 "Drawings" mean the part of the Contract Documents which show the characteristics and scope of the work to be performed and which have been prepared or approved by the engineer.

2.12 "Engineer" means the person, firm or corporation named as such in the Contract Documents.

2.13 "Field order" means a written order effecting a change in the work not relating to an adjustment in the Contract price or an extension of the Contract time and issued by the engineer to the Contractor during construction.

2.14 "Notice of Award" means the written notice of the acceptance of the bid from the owner to the successful Bidder.

2.15 "Notice to Proceed" means the written communication issued by the owner to the Contractor authorizing him to proceed with the Work and establishing the date of commencement of the work.

2.16 "Owner" means a public or quasi-public body or authority, corporation, association, partnership, or individual for whom the work is to be performed.

2.17 "Plans" means the Contract drawings or exact reproductions thereof which show the scope, character, dimensions and details of the work and which have been prepared or approved by the engineer.

2.18 "Project" means the undertaking to be performed as provided in the Contract Documents.

2.19 "Resident Project Representative" means the authorized representative of the owner who is assigned to the project site or any part thereof.

2.20 "Shop Drawings" means all drawings, diagrams, illustrations, brochures, schedules and other data which are prepared by the Contractor, a subcontractor, manufacturer, supplier or distributor, which illustrates how specific portions of the work shall be fabricated or installed.

2.21 "Special conditions" means revisions or additions to these general conditions, supplemental general conditions or specifications applicable to an individual project.

2.22 "Specifications" means a part of the Contract Documents consisting of written descriptions of a technical nature of materials, equipment, construction systems, standards and workmanship.

2.23 "Subcontractor" means an individual, firm or corporation having a direct Contract with the Contractor or with any other Subcontractor for the performance of a part of the work at the site.

2.24 "Substantial Completion" means that date as certified by the engineer when the construction of the Project or a specified part thereof is sufficiently completed, in accordance with the Contract Documents, so that the project or specified part can be utilized for the purposes for which it is intended.

2.25 "Supplemental General Conditions" means modifications to these general conditions required by a federal agency for participation in the Project and approved by the agency in writing prior to inclusion in the Contract Documents, or such documents that may be imposed by applicable state laws.

2.26 "Supplier" means any person or organization who supplies materials or equipment for the work, including that fabricated to a special design, but who does not perform labor at the site.

2.27 "Work" means all labor necessary to produce the construction required by the Contract Documents, and all materials and equipment incorporated or to be incorporated in the project.

2.28 "Written Notice" means any notice to any party of the agreement relative to any part of this agreement in writing and considered delivered and the service thereof completed, when posted by certified or registered mail to the said party at his last given address, or delivered in person to said party or his authorized representative on the work.

3. Additional Instructions and Detail Drawings.

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

4. Shop or Setting Drawings. Shop or setting drawings shall be in accordance with the following:

4.1 The Contractor shall furnish 6 copies of the manufacturer's shop drawings, specific design data as required in the detailed specifications, and technical literature covering all equipment and fabricated materials which he proposes to furnish under this Contract in sufficient detail to indicate full compliance with the specifications. Shop drawings shall indicate the method of installing, the exact layout dimensions of the equipment or materials, including the location, size and details of valves, pipe connections, etc.

4.2 No equipment or materials shall be shipped until the manufacturer's shop drawings and specifications or other identifying data, assuring compliance with these specifications, are approved by the engineer.

4.3 The Contractor shall check and verify all field measurements and shall be responsible for the prompt submission of all shop and working drawings so that there shall be no delay in the work.

4.4 Regardless of corrections made in or approval given to such drawings by the engineer, the Contractor will nevertheless be responsible for the accuracy of such drawings and for their conformity to the plans and specifications. The Contractor shall notify the engineer in writing of any deviations at the time he furnishes such drawings. He shall remain responsible for the accuracy of the drawings showing the deviations but not for the acceptance of the deviations from the original design shown in the plans and specification. Approval by the engineer and the owner of any deviation in material, workmanship or equipment proposed subsequent to approval of the shop drawings or design data, shall be requested in writing by the Contractor.

4.5 When submitted for the engineer's review, shop drawings shall bear the Contractor's certification that he has reviewed, checked and approved the shop drawings and that they are in conformance with the requirements of the Contract Documents.

5. Materials, Services, Facilities and Workmanship shall be furnished as follows:

5.1 Except as otherwise specifically stated in the Contract Documents, the Contractor shall provide and pay for all materials, labor, tools, equipment, water, light, power, transportation, superintendence, temporary construction of every nature, and all other services and facilities of every nature whatsoever necessary to execute, complete, and deliver the work within the specified time.

5.2 Unless otherwise specifically provided for in the specifications, all workmanship, equipment, materials and articles incorporated in the work shall be new and the best grade of the respective kinds for the purpose.

5.3 The Contractor shall furnish to the engineer for approval the manufacturer's detailed specifications for all machinery, mechanical and other special equipment, which he contemplates installing together with full information as to type, performance characteristics, and all other pertinent information as required.

5.4 Materials which are specified by reference to the number or symbol of a specific standard, such as an ASTM standard, a federal specification or other similar standard, shall comply with requirements in the latest revision thereof and any amendment or supplement thereto in effect on the date of the advertisement for bids, except as limited to type, class or grade, or modified in such reference. The standards referred to shall have full force and effect as though printed therein.

5.5 For equipment or for materials, when requested by the engineer, the Contractor shall submit certificates of compliance from the manufacturer, certifying that the equipment or the materials comply with the requirements of the specifications or the standards.

5.6 Manufactured articles, materials, and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned as directed by the manufacturer.

5.7 Materials, supplies, and equipment shall be in accordance with samples submitted by the Contractor and approved by the engineer.

6. Contractor's Title To Materials.

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

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

7.1 All materials and equipment used in the construction of the project shall be subject to inspection and testing by the engineer in accordance with accepted standards at any and all times during manufacture or during the project construction and at any or all places where such manufacture is carried on.

7.2 The Contractor shall furnish promptly upon request by the engineer, all materials required to be tested. All tests made by the engineer shall be performed in such manner and ahead of scheduled installation, as not to delay the work of the Contractor. When required, testing of concrete, masonry, soils, pipe and pipe materials will be made in accordance with provisions in the specifications.

7.3 Material required to be tested which is delivered to the job site shall not be incorporated into the work until the tests have been completed and approval or acceptance given in writing by the engineer.

7.4 Each sample submitted by the Contractor for testing shall carry an identification label containing such information as is requested by the engineer. It shall also include a statement that the samples are representative of the remaining materials to be used on the project.

7.5 Approval of any materials shall be general only and shall not constitute a waiver of the owner's right to demand full compliance with the Contract requirements.

7.6 The engineer may, at his own discretion, undertake the inspection of materials at the source. In the event plant inspection is undertaken, the following conditions shall be met:

a. The engineer shall have the cooperation and assistance of the Contractor and the producer with whom he has Contracted for materials.

b. The engineer shall have full entry at all reasonable times to such areas as may concern the manufacture or production of the materials being furnished.

c. If required, the Contractor shall arrange for a building for the use of the inspector; such building to be located near the plant, independent of any building used by the material producer, in which to house and use the equipment necessary to carry on the required tests. Cost for such arrangement shall be paid by the owner as a stated allowance in the bid.

d. Adequate safety measures shall be provided and maintained at all times.

7.7 Except as otherwise specifically stated in the Contract, the costs of sampling and testing will be divided as follows:

a. The Contractor shall furnish the engineer, without extra cost, all samples required for testing purposes. All sampling and testing including the number and selection of samples shall be determined by the engineer for his own information and use.

b. When testing of materials is specified in the appropriate section of the specifications, the cost of the same shall be charged to the owner or Contractor, as detailed in the specifications. However, costs of equipment performance tests shall be borne by the Contractor, as detailed in the appropriate section of the specifications.

c. When the Contractor proposes a material, article or component as equal to the ones specified, reasonable tests may, or may not, be required by the engineer. If the engineer requires tests of a proposed equal item, the Contractor will be required to assume all costs of such testing.

d. Any material, article or component which fails to pass tests required by the Engineer or by the specifications, will be rejected and shall be removed from the project site. However, if, upon request of the Contractor, retesting or further tests are permitted by the Engineer, the Contractor shall assume all costs related to such retesting or further tests.

e. Neither the Owner nor the Engineer will in any way be charged for the manufacturer's costs in supplying certificates of compliance.

7.8 If the Contract Documents, laws, ordinances, rules, regulations or orders of any public authority having jurisdiction require any Work to specifically be inspected, tested or approved by someone other than the Contractor, the Contractor will give the Engineer timely notice of readiness. The Contractor will then furnish the Engineer with the required certificates of inspection, testing or approval.

7.9 Inspections, tests, or approvals by the engineer or others shall not relieve the Contractor from obligations to perform the Work in accordance with the requirements of the Contract Documents.

8. “Or Equal ” Clause, Substitutions and Contractor Options.

8.1 Whenever a material, article, or piece of equipment is identified on the plans or in the specifications by reference to manufacturer's or vendor's names, trade names, catalogue numbers, etc., it is intended merely to establish a standard of quality and performance. Any material, article, or equipment of other manufacturers and vendors, which will perform satisfactorily the duties imposed by the general design, shall be considered equally acceptable provided the material, article, or equipment so proposed is, in the opinion of the Engineer, of equal quality and function. The Engineer shall determine equality based on such information, tests, or other supporting data that may be required of the Contractor.

8.2 Upon acceptance and approval by the Engineer of an equal product, it shall remain the responsibility of the Contractor to coordinate installation of the item with all other items to be furnished to assure proper fitting together of all items. Similar responsibility applies to items which are left to the Contractor's option. Any

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

8.3 If a specified or equal item is not available to meet the construction schedule, the Contractor may propose a substitute item of less than equal performance and quality. If this substitute is acceptable to the Engineer, any difference in purchase cost or costs incidental to the installation of such item will be negotiated between the parties to the Contract.

8.4 Neither equal nor substitute items shall be installed without written approval of the Engineer.

8.5 The Contractor shall warrant that if substitutes are approved, no major changes in the function or general design of the Project will result.

9. Patents. Patent information is as follows:

9.1 The Contractor shall hold and save the owner and its officers, agents, servants, and employees harmless from liability of any nature or kind, including cost and expenses for, or on account of, any patented or unpatented invention, process, article, or appliance manufactured or used in the performance of the Contract, including its use by the owner, unless otherwise specifically stipulated in the Contract Documents.

9.2 License and/or royalty fees for the use of a process used in wastewater plant design which is authorized by the owner for the project, must be reasonable, and paid to the holder of the patent, or his authorized licensee.

9.3 If the Contractor uses any design, device or materials in the construction methods for the project covered by patents or copyrights, he shall provide for such use by suitable agreement with the owner of such patented or copyrighted design, device or material. It is mutually agreed and understood, that, without exception, the Contract prices shall include all royalties or costs arising from the use of such design, device or materials, in any way involved in the work. The Contractor and/or his sureties shall indemnify and save harmless the owner of the project from any and all claims for infringement by reason of the use of such patented or copyrighted design, device or materials or any trademark or copyright in connection with work agreed to be performed under this Contract, and shall indemnify the Owner for any cost, expense or damage which it may be obliged to pay by reason of such infringement at any time during the construction of the work or after completion of the work.

10. Surveys. Surveys of land, property and construction shall be as follows:

10.1 The owner will provide all land surveys and will establish and locate all property lines relating to the project.

10.2 For structures, the Engineer will establish and stake out one or more base lines as needed and will establish bench marks in and around the project site for the use of the Contractor and for the Engineer's own reference in checking the work in progress. For structures such as pipelines, the Engineer will establish the location of the pipe, manholes and other appurtenances, and will establish bench marks along the route of the pipeline at intervals for the using of the Contractor and for his own reference in checking the pipe and manhole inverts and other elevations throughout the project. The Contractor shall utilize the lines and bench marks established by the Engineer to set up whatever specific detail controls he may need for establishing location, elevation lines and grades of all structures. All this work is subject to checking, approval, and continuous surveillance by the Engineer to avoid error. The Contractor shall provide the Engineer with a qualified man or men to assist in this checking as needed and on request of the Engineer.

10.3 For construction other than pipelines and appurtenances in roadways and cross country, the Contractor shall be responsible for the location and setting lines and grades. The Contractor shall establish the location for pump

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

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

11. Contractor's Obligations are as follows:

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

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

12. Weather Conditions.

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

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

13.1 The Contractor shall at all times safely guard the Owner's property from injury or loss in connection with this Contract. He shall at all times safely guard and protect his own work, and that of adjacent property, from damage. The Contractor shall replace or make good any such damage, loss or injury unless caused directly by errors contained in the Contract, or by the Owner, or his authorized representatives. The Contractor will notify owners of adjacent utilities when prosecution of the Work may affect them.

13.2 The Contractor shall take all necessary precautions for the safety of employees on the work site, and shall comply with all applicable provisions of federal, state and municipal safety laws and building codes to prevent accidents or injury to persons on, about or adjacent to the premises where the work is being performed. He shall erect and properly maintain at all times, as required by the conditions and progress of the work, all necessary safeguards for the protection of the workmen and the public and shall post danger signs warning against the hazards created by such features of construction as protruding nails, hoists, well holes, elevator hatchways, scaffolding, window openings, stairways, trenches and other excavations, and falling materials, and he shall designate a responsible member of his organization on the work, whose duty shall be the prevention of accidents. The name and position

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

13.3 In case of emergency which threatens loss or injury of property, and/or safety of life, the Contractor is allowed to act, without previous instructions from the Engineer. He shall notify the Engineer immediately thereafter. Any claim for compensation by the Contractor due to such extra work shall be promptly submitted in writing to the Engineer for approval.

13.4 When the Contractor has not taken action but has notified the Engineer of an emergency threatening injury to persons or damage to the work or any adjoining property, he shall act as instructed or authorized by the Engineer.

13.5 The intention is not to relieve the Contractor from acting, but to provide for consultations between Engineer and Contractor in an emergency which permits time for such consultations.

13.6 The amount of reimbursement claimed by the Contractor on account of any emergency action shall be determined in the manner provided in Article 17 (extra work and change orders) of the general conditions.

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

14.1 For purposes of inspection and for any other purpose, the Owner, the Engineer, and agents and employees of the Division or of any funding agency may enter upon the work and the premises used by the Contractor, and the Contractor shall provide safe and proper facilities therefore. The Engineer shall be furnished with every facility for ascertaining that the work is in accordance with the requirements and intention of this Contract, even to the extent of uncovering or taking down portions of finished work.

14.2 During construction and on its completion, all work shall conform to the location, lines, levels and grades indicated on the drawings or established on the site by the Engineer and shall be built in a workmanlike manner, in accordance with the drawings and specifications and the supplementary directions given from time to time by the Engineer. In no case shall any work which exceeds the requirements of the drawings and specifications be paid for as extra work unless ordered in writing by the Engineer.

14.3 Unauthorized work and work not conforming to plans and specifications shall be handled as follows:

a. Work considered by the Engineer to be outside of or different from the plans and specifications and done without instruction by the Engineer, or in wrong location, or done without proper lines or levels, may be ordered by the Engineer to be uncovered or dismantled.

b. Work done in the absence of the Engineer or his agent may be ordered by the Engineer to be uncovered or dismantled.

c. Should the work thus exposed or examined prove satisfactory, the uncovering or dismantling and the replacement of material and rebuilding of the work shall be considered as “Extra Work” to be processed in accordance with article 17.

d. Should the work thus exposed or examined prove to be unsatisfactory the uncovering or dismantling and the replacement of material and rebuilding of the work shall be at the expense of the Contractor.

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

16. **Superintendence by Contractor** shall be furnished as follows: At the site of the work, the Contractor shall employ a competent construction superintendent or foreman who shall have full authority to act for the Contractor. The superintendent or foreman shall have been designated in writing by the Contractor as the Contractor's representative at the site. It is understood that such representative shall be acceptable to the Engineer and shall be the one who can be continued in that capacity for the particular job involved unless he ceases to be on the Contractor's payroll. Such representative shall be present on the site at all times as required to perform adequate supervision and coordination of the Work.

17. **Extra Work and Change Orders** shall be processed as follows:

17.1 The Engineer may at any time by written order and without notice to the sureties require the performance of such extra work or changes in the work as may be found necessary. The amount of compensation to be paid to the Contractor for any extra work so ordered shall be made in accordance with one or more of the following methods in the order of precedence listed below:

a. A price based on unit prices previously approved; or

b. A lump sum price agreed upon between the parties and stipulated in the order for the extra work;

c. A price determined by adding 15 percent to the “reasonable cost” of the extra work performed, such “reasonable cost” to be determined by the Engineer in accordance with the following paragraph.

17.2 The Engineer shall include the reasonable cost to the Contractor of all materials used, of all labor, both common and skilled, of foreman, trucks, and the fair-market rental rate for all machinery and equipment for the period employed directly on the work. The reasonable cost for extra work shall include the cost to the Contractor of any additional insurance that may be required covering public liability for injury to persons and property, the cost of workmen's compensation insurance, federal social security, and any other costs based on payrolls, and required by law. The cost of extra work shall not include any cost or rental of small tools, buildings, or any portion of the time of the Contractor, his project supervisor or his superintendent, as assessed upon the amount of extra work, these items being considered covered by the 15 percent added to the reasonable cost. The reasonable cost for extra work shall also include the premium cost, if any, for additional bonds and insurance required because of the changes in the work.

17.3 In the case of extra work which is done by Subcontractors under the specific Contract, or otherwise if so approved by the Engineer, the 15 percent added to the reasonable cost of the work will be allowed only to the Subcontractor performing the work. On such work an additional 5 percent for reasonable cost will be paid to the Contractor for their work in directing the operations of the Subcontractor, for administrative supervision, and for any overhead costs. If two or more tiers of Subcontractors are involved in the extra work, a maximum of 27 percent of the cost incurred by the Subcontractor actually performing the work will be allowed to be added to the reasonable cost of the work. The 27 percent maximum represents 15 percent added to the reasonable cost of the work allowed by the Subcontractor performing the work, an additional 5 percent allowed to the next tier higher subcontractor and 5 percent allowed to the Contractor for their work in directing the operations of the Subcontractor, for administrative supervision, and for any overhead costs.

17.4 The Engineer may authorize minor changes or alterations in the work not involving extra cost and not inconsistent with the overall intent of the Contract Documents. These shall be accomplished by a written field order. However, if the Contractor believes that any minor change or alteration authorized by the Engineer entitles him to an increase in the Contract price, he may make a claim therefore as provided in article 21.

18. Time For Completion and Liquidated Damages. The following paragraphs address time for completion and liquidated damages:

18.1 It is hereby understood and mutually agreed, by and between the Contractor and the Owner, that the date of beginning and the time for completion as specified in the Contract of the work to be done hereunder are Essential Conditions of this Contract; and it is further mutually understood and agreed that the work embraced in this Contract shall be commenced on a date to be specified in the "Notice to Proceed."

18.2 The Contractor agrees that said work shall be pursued regularly, diligently and continuously at such rate of progress as will insure full completion thereof within the time specified. It is expressly understood and agreed, by and between the Contractor and the Owner, that the time for the completion of the work described herein is a reasonable time, taking into consideration the average climatic range and usual industrial conditions prevailing in this locality.

18.3 If the Contractor shall neglect, fail or refuse to complete the work within the time herein specified, or any proper extension thereof granted by the Owner, then the Contractor does hereby agree, as a part consideration for the awarding of this Contract, to pay to the Owner the amount specified in the Contract, not as a penalty but as liquidated damages for such breach of Contract as hereinafter set forth, for each and every calendar day that the Contractor shall be in default after the time stipulated in the Contract for completing the work.

18.4 The liquidated damages amount is fixed and agreed upon by and between the Contractor and the Owner because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages the Owner would in such event sustain. Said amount is agreed to be the amount of damages which the Owner would sustain and said amount shall be deducted from time to time by the owner from current periodical payments.

18.5 It is further agreed that "time is of the essence" of each and every portion of this Contract and of the specifications wherein a definite and certain length of time is fixed for the performance of any act whatsoever; and where under the Contract an additional time is allowed for the completion of any work, the new time limit fixed by such extension shall "be of the essence." Provided, that the Contractor shall not be charged with liquidated damages or any excess cost when the Owner determines that the Contractor is without fault and the Contractor's reasons for the time extension are acceptable to the Owner; provided, further, that the Contractor shall not be charged with liquidated damages or any excess cost when the delay in the completion of the work is due to:

a. A preference, priority or allocation order duly issued by the government.

b. An unforeseeable cause beyond the control and without the fault or negligence of the Contractor, including, but not restricted to, acts of God, or of the public enemy, acts of the Owner, acts of another Contractor in the performance of a Contract with the Owner, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes and severe weather.

c. Any delays of Subcontractors or suppliers occasioned by any of the causes specified in subsections (a) and (b) of this article.

18.6 The Contractor shall promptly notify the Owner in writing of the causes of the delay. The Owner shall ascertain the facts and extent of the delay and notify the Contractor within a reasonable time of his decision in the matter.

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

19.1 The Contractor shall promptly remove from the premises all materials and work condemned by the Engineer as failing to meet Contract requirements, whether incorporated in the work or not, and the Contractor shall promptly replace and re-execute his own work in accordance with the Contract and without expense to the Owner and shall bear the expense of making good all work of other Contractors which was destroyed or damaged by such removal or replacement.

19.2 All removal and replacement work shall be done at the Contractor's expense. If the Contractor does not take action to remove such condemned work and materials within10 days after receipt of written notice, the Owner may remove them and store the material at the expense of the Contractor. If the Contractor does not pay the expense of such removal and storage within 10 days time thereafter, the Owner may, upon 10 days written notice, sell such materials at auction or at private sale and shall pay to the Contractor any net proceeds thereof, after deducting all the costs and expenses that should have been borne by the Contractor.

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

20.1 The Contractor shall promptly and before such conditions are disturbed, notify the Engineer in writing of:

a. Subsurface or latent physical conditions at the site differing materially from those indicated in this Contract; or,

b. Unknown physical conditions at the site, differing materially from those ordinarily encountered and generally recognized as inherent in the type of work provided for in this Contract.

20.2 The Engineer shall promptly investigate the conditions. If he finds that conditions differ materially and will cause an increase or decrease in the Contractor's cost or the time required to perform any part of the work under this Contract whether or not changed as a result of such conditions, the Engineer will notify the Owner and recommend an equitable adjustment. Contractor and Owner will enter into negotiations via the Engineer to modify the contact in writing.

20.3 No claim of the Contractor under this clause shall be allowed unless the Contractor has given proper notice as required in paragraph 20.1 of this clause.

20.4 No claim by the Contractor for an equitable adjustment shall be allowed if asserted after final payment under this Contract.

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

21.1 No claim for extra work or cost shall be allowed unless the same was done pursuant to a written order by the Engineer, approved by the Owner and the claim presented for payment with the first estimate after the changed or extra work is done. When work is performed under the terms of article 17, the Contractor shall furnish satisfactory bills, payrolls and vouchers covering all items of cost when requested by the Owner and shall allow the Owner access to accounts relating thereto.

21.2 If the Contractor claims that any instructions by drawings or similar documents issued after the date of the Contract involve extra cost under the Contract, he shall give the Engineer written notice after the receipt of such instruction and before proceeding to execute the work, except in an emergency which threatens life or property, then the procedure shall be as provided for under article 17, “Extra Work & Change Orders.” No claim shall be valid unless so made.

22. Right of Owner to Terminate Contract.

22.1 In the event that any of the provisions of this Contract are violated by the Contractor, or by any of his Subcontractors, the Owner may serve written notice upon the Contractor and the surety of its intention to terminate the Contract, and unless within 10 days after the serving of such notice upon the Contractor, such violation or delay shall cease and satisfactory arrangement for correction be made, the Contract shall, upon the expiration of said 10 days cease and terminate. In the event of any such termination, the Owner shall immediately serve notice thereof upon the surety and the Contractor and the surety shall have the right to take over and perform the Contract; provided, however, that if the surety does not commence performance thereof within 10 days from the date of the mailing to such surety of notice of termination, the Owner may take over the work and prosecute the same to completion by Contract or by force account for the account and at the expense of the Contractor and the Contractor and his surety shall be liable to the Owner for any excess cost occasioned the Owner thereby, and in such event the Owner may take possession of and utilize in completing the work, such materials, appliances, and plant as may be on the site of the work and necessary therefore.

22.2 If the Contractor should be adjudged bankrupt, or if he should make a general assignment for the benefit of his creditors, or if a receiver should be appointed on account of his insolvency, or if he should refuse or should fail, except in cases for which extensions of time are provided, to supply enough skilled workmen or materials, or if he should fail to make payments to Subcontractors or for material or labor, so as to affect the progress of the work, or be guilty of a violation of the Contract, then the Owner, upon the written notice of the Engineer that sufficient cause exists to justify such action may, without prejudice to any other right or remedy and after giving the Contractor and his surety 7 days' written notice, terminate the employment of the Contractor and take possession of the premises and of all materials, tools, equipment and other facilities installed on the work and paid for by the Owner, and finish the work by whatever method he may deem expedient. In the case of termination of this Contract before completion from any cause whatever, the Contractor, if notified to do so by the Owner, shall promptly remove any part or all of his equipment and supplies at the expense of the Contractor. If such expense exceeds such unpaid balance, the Contractor shall pay the difference to the Owner. The expense incurred by the Owner as herein provided, and the damage incurred through the Contractor's default, shall be approved by the Engineer.

22.3 Where the Contract has been terminated by the Owner, said termination shall not affect or terminate any of the rights of the Owner as against the Contractor or his surety then existing or which may thereafter accrue because of such default. Any retention or payment of monies by the Owner due the Contractor under the terms of the Contract, shall not release the Contractor or his surety from liability for his default.

22.4 After ten (10) days from delivery of a Written Notice to the Contractor and the Engineer, the Owner may, without cause and without prejudice to any other remedy, elect to abandon the Project and terminate the Contract. In such case the Contractor shall be paid for all Work executed and any expense sustained plus reasonable profit.

22.5 If through no act or fault of the Contractor, the work is suspended for a period of more than ninety (90) days by the Owner or under an order of court or other public authority, or the Engineer fails to act on any request for payment within thirty (30) days after approved by the engineer, or the Owner fails to pay the Contractor substantially the sum approved by the Engineer or awarded by arbitrators within thirty (30) days of its approval and presentation, then the Contractor may, after ten (10) days from delivery of a Written Notice to the Owner and the Engineer terminate the Contract and recover from the Owner payment for all Work executed and all expenses sustained. In addition and in lieu of terminating the Contract, if the Engineer has failed to act on a request for payment or if the Owner has failed to make any payment as aforesaid, the Contractor may upon ten (10) days written notice to the Owner and the Engineer stop the Work until paid all amounts then due, in which event and

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

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

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

23.1 Before starting the work or upon request by the Engineer during its progress, the Contractor shall submit to the Engineer a work plan showing construction methods and the various steps he intends to take in completing the work.

23.2 Before the first partial payment is made, the Contractor shall prepare and submit to the Engineer:

a. A written schedule fixing the dates for submission of drawings; and

b. A written schedule fixing the respective dates for the start and completion of segments of the work. Each such schedule shall be subject to review and change during the progress of the work.

c. Respective dates for submission of Shop Drawings and for the beginning of manufacture, the testing, and the installation of materials, supplies, and equipment.

d. A schedule of payments that the Contractor anticipates will be earned during the course of the Work.

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

24.1 Progress payments. The Owner will once each month make a progress payment to the Contractor on the basis of an estimate of the total amount of work done to the time of the estimate and its value as prepared by the Contractor and approved by the Engineer.

24.2 Retainage by Owner. The Owner will retain a portion of the progress payment, each month, in accordance with the following procedures:

a. The Owner will establish an escrow account in the bank of the Owner's choosing. The account will be established such that interest on the principal will be paid to the Contractor. The principal will be the accumulated retainage paid into the account by the Owner. The principal will be held by the bank, available only to the Owner, until termination of the Contract.

b. Until the work is 50% complete, as determined by the Engineer, retainage shall be 10% of the monthly payments claimed. The computed amount of retainage will be deposited in the escrow account established above.

c. After the work is 50% complete, and provided the Contractor has satisfied the Engineer in quality and timeliness of the work, and provided further that there is no specific cause for withholding additional retainage no further amount will be withheld. The escrow account will remain at the same balance throughout the remainder of the project, unless drawn upon by the Owner in accordance with articles 19, 22, and 56.

d. Upon substantial or final completion (as defined in article 25), the amount of retainage will be reduced to 2% of the total Contract Price plus an additional retainage based on the Engineer's estimate of the fair value of

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

24.3 In reviewing monthly estimates for payments of the value of work done, the Engineer may accept in the estimate, prior to subtracting the retainage, the delivered cost of certain equipment and nonperishable material which have been delivered to the site or off-site location and which are properly stored and protected from damage. With the estimate, the Contractor shall submit to the Engineer invoices as evidence that the material has been delivered to the site. Prior to submitting the next monthly estimate, the Contractor shall provide the Engineer with paid invoices or other evidence that the materials have been paid for. If the Contractor fails to submit such evidence, the Engineer may then subtract the value of such materials or equipment for which the Owner has previously paid, from the next monthly estimate. The type of equipment and material eligible for payment prior to being incorporated in the work will be at the Engineer's discretion. Material and equipment made specifically for the subject job will be eligible for payment.

24.4 All material and work for which partial payments have been made shall thereupon become the sole property of the Owner. This provision shall not be construed as relieving the Contractor from the sole responsibility for the care and protection of materials and work upon which payments have been made or for the restoration of any damaged work, or as a waiver of the right of the Owner to require compliance with all of the terms of the Contract.

24.5 Owner's right to withhold payments and make application. The Contractor agrees that he will indemnify and save the Owner or the Owner's agents harmless from all claims growing out of the lawful demands of Subcontractors, laborers, workmen, mechanics, material men, and furnishers of machinery and parts, equipment, power, tools and all supplies, including commissary, incurred in the furtherance of the performance of this Contract. The Contractor shall, at the Owner's request, furnish satisfactory evidence that all claims of the nature hereinabove designated have been paid, discharged, or waived. If the Contractor fails to do so, then the Owner may, upon written notice to the Contractor either pay unpaid bills of which the Owner has written notice directly, or withhold from the Contractor's unpaid compensation a sum of money to pay any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged. Payment to the Contractor shall then be resumed in accordance with the terms of this Contract but in no event shall the above provisions be construed to impose any obligations upon the Owner to either the Contractor or his surety or any third party. In paying any unpaid bills of the Contractor, the Owner shall be deemed the agent of the Contractor, and any payment so made by the Owner shall be considered as payment made under Contract by the Owner to the Contractor and the Owner shall not be liable to the Contractor for any such payments made in good faith.

24.6 If the Owner fails to make payment forty-five (45) days after approval by the Engineer, in addition to other remedies available to the Contractor, there shall be added to each such payment interest at an annual rate of 10% commencing on the first day after said payment is due and continuing until the payment is received by the Contractor.

25. Acceptance and Final Payment provisions shall be as follows:

25.1 Substantial completion and payment.

a. Substantial completion shall be that point, as certified by the Engineer, at which the Contract or specified part thereof, has been completed to the extent that the Owner may occupy and/or make use of the work

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

b. Upon receipt of written notice from the Contractor that the work is substantially complete, the Engineer shall promptly make an inspection, and when he finds the work complies with the terms of the Contract and the Contract is substantially completed, he will issue a signed and dated certificate, and a list of all items to be completed or corrected, stating that the work required by this Contract has been substantially completed and is accepted by him.

c. Upon substantial completion, the entire balance due and payable to the Contractor less 2 percent of the Contract Price, and less a retention based on the Engineer's estimate of the fair value for the cost of completing or correcting listed items of work with specified amounts for each incomplete or defective item of work shall be made.

d. The general guarantee period for the work shall begin on the date certified by the Engineer that the work is substantially completed.

25.2 Final completion shall be that point at which all work has been completed and all defective work has been corrected. Unless the Engineer has issued a certificate of substantial completion, the general guarantee period shall begin upon certification by the Engineer of final completion.

25.3 At the end of the general guarantee period for the entire Contract which has been certified finally completed or substantially completed, the Owner, through the Engineer, shall make a guarantee inspection of all or portions of the work. When it is found that the work is satisfactory and that no work has become defective under the terms of the Contract, the Owner will accept the entire project and make final payment, including the reimbursement of monies retained pursuant to the guarantee period.

25.4 If the guarantee inspection discloses any work as being unsatisfactory, the Engineer will give the Contractor the necessary instructions for correction of such work, and the Contractor shall immediately execute such instructions. Upon correction of the work, another inspection will be made which shall constitute the guarantee inspection, provided the work has been satisfactorily completed.

25.5 Before issuance of final payment, the Contractor shall certify in writing to the Engineer that all payrolls, material bills, and other indebtedness connected with the work have been paid or otherwise satisfied; except that in case of disputed indebtedness or liens, if the Contract does not include a payment bond, the Contractor may submit in lieu of certification of payment a surety bond in the amount of the disputed indebtedness or liens, guaranteeing payment of all such disputed amounts, including all related costs and interest in connection with said disputed indebtedness or liens which the Owner may be compelled to pay upon adjudication.

25.6 If upon substantial completion, full completion is delayed through no fault of the Contractor, and the Engineer so certifies, the Owner may, upon certificate of the Engineer, and without termination of the Contract, make payment of the balance due for that portion of the work fully completed and accepted. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

25.7 The acceptance by the Contractor of final payment shall release the Owner from all claims and all liability to the Contractor for all things relating to this work and for every act and neglect of the Owner and others relating to or arising out of this work. No payment, however, final or otherwise, shall operate to release the Contractor or his sureties from any obligations of the performance and payment bond under this Contract.

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

26.1 For all transportation and utility services not later than the 20th day of the calendar month following that in which services are rendered;

26.2 For all materials, tools, and other expendable equipment to the extent of 90 percent of the cost thereof, not later than the 20th day of the calendar month following that in which such materials, tools and equipment are delivered at the site of the work and the balance of the cost thereof not later than the 30th day following the completion of that part of the work in or on which such materials, tools and equipment are incorporated or used; and

26.3 To each of his Subcontractors, not later than the 5th day following each payment to the Contractor, the respective amounts allowed the Contractor on account of the work performed by his Subcontractors to the extent of each Subcontractor's interest therein.

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

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

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

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

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

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

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

27.4 The Contractor shall either:

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

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

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

27.6 The Contractor shall furnish the Owner with certificates showing the type, amount, class of operations covered, effective dates and dates of expiration of policies. Such insurance shall not be canceled or materially altered, except after 10 days written notice has been received by the Owner.

27.7 For builder's risk insurance (fire and extended coverage) and until the work is completed and accepted by the Owner, the Contractor is required to maintain builder's risk type insurance on a 100 percent completed value basis on the insurable portion of the work for the benefit of the Owner, the Contractor, and Subcontractors as their interests may appear.

27.8 The Contractor shall take out and furnish to the Owner and maintain during the life of this Contract, complete Owner's protective liability insurance.

Limits of Liability: $1,000,000 each occurrence;
$2,000,000 aggregate.

28. Contract Security. The Contractor shall within ten (10) days after the receipt of the Notice of Award furnish the Owner with a performance bond and a payment bond in penal sums equal to the amount of the Contract price conditioned upon the performance by the Contractor of all undertakings, covenants, terms, conditions and agreements of the Contract Documents, and upon the prompt payment by the Contractor to all persons supplying labor and materials in the prosecution of the Work provided by the Contract Documents. Such Bonds shall be executed by the Contractor and a corporate bonding company licensed to transact business in the state in which the Work is to be performed and named on the current list of "Surety Companies Acceptable on Federal Bonds" as published in the Treasury Department Circular Number 570. The expense of these Bonds shall be borne by the Contractor.

29. Additional or Substitute Bond. If at any time a surety on any such Bond is declared as bankrupt or loses its right to do business in the state in which the Work is to be performed, or is removed from the list of Surety Companies accepted on Federal Bonds, the Contractor shall within ten (10) days after notice from the Owner to do so, substitute an acceptable bond (or bonds) in such form and sum and signed by such other surety or sureties as may be satisfactory to the Owner. The premiums on such bond shall be paid by the Contractor. No further payments shall be deemed due nor shall be made until the new surety or sureties shall have furnished such an acceptable bond to the Owner.

30. Assignments. The Contractor shall not assign the whole or any part of this Contract or any monies due or to become due hereunder without written consent of the Owner. In case the Contractor assigns all or any part of any monies due or to become due under this Contract, the instrument of assignment shall contain a clause substantially to the effect that it is agreed that the right of the assignee in and to any monies due or to become due to the Contractor shall be subject to prior claims of all persons, firms and corporations for services rendered or materials supplied for the performance of the work called for in this Contract.

31. Mutual Responsibility of Contractors. If, through acts of neglect on the part of the Contractor, any other Contractor or any Subcontractor shall suffer loss or damage on the work site, the Contractor agrees to settle with such other Contractor or Subcontractor by agreement or arbitration if such other Contractor or Subcontractors will so settle. If such other Contractor or Subcontractors shall assert any claim against the Owner on account of any damage alleged to have been sustained, the Owner shall notify the Contractor, who shall indemnify and save harmless the Owner against any such claim.

32. Subcontracting. When subcontracting, the Contractor:

32.1 May utilize the services of specialty Subcontractors on those parts of the work which, under usual Contracting practices, are performed by specialty Subcontractors.

32.2 Shall be as fully responsible to the Owner for the acts and omissions of his Subcontractors, and of persons either directly or indirectly employed by them, as he is for the acts and omissions of persons directly employed by him.

32.3 Shall cause appropriate provisions to be inserted in all subcontracts relative to the work to bind Subcontractors to the Contractor by the terms of the Contract Documents insofar as applicable to the work of Subcontractors and to give the Contractor the same power as regards terminating any subcontract that the Owner may exercise over the Contractor under any provision of the Contract Documents.

32.4 Shall not create any Contractual relation between any Subcontractor and the Owner.

32.5 Shall not award Work to Subcontractor(s), in excess of fifty percent (50%) of the Contract Price, without prior written approval of the Owner.

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

33.1 Have the authority to suspend the work in whole or in part for such periods as he may deem necessary due to the failure of the Contractor to carry out provisions of the Contract or for failure of the Contractor to suspend work in weather conditions considered by the Engineer to be unsuitable for the prosecution of the work. The Engineer shall give all orders and directions under this Contract, relative to the execution of the work. The Engineer shall determine the amount, quality, acceptability, and fitness of the several kinds of work and materials which are to be paid for under this Contract and shall decide all questions which may arise in relation to the work. The Engineer's estimates and decisions shall be final and conclusive, except as otherwise provided. In case any question shall arise between the parties hereto relative to said Contract or specifications, the determination or decision of the Engineer shall be a condition precedent to the right of the Contractor to receive any money or payment for work under this Contract affected to any extent by such question. The Engineer shall decide the meaning and intent of any portion of the specifications and of any plans or drawings where the same may be found unclear. Any differences or conflicts in regard to their work which may arise between the Contractor under this Contract and other Contractors performing work for the Owner shall be adjusted and determined by the Engineer.

a. The purpose of the above article is not in any way to relieve the Contractor of his responsibilities for the safety of workmen or general public in the execution of the work. Attention is drawn to Article 13 of these Conditions which refers to the safety obligations of the Contractor.

b. The Engineer, acting on behalf of the Owner, has the authority to enforce corrective action for work not in accordance with the specifications.

c. In addition, the Engineer, acting on behalf of the Owner, is to ensure that the work is in accordance with the Contract Documents. He is not held responsible, however, for the methods of construction, sequences, schedules and procedures in the execution of the work. The Engineer does have the opportunity under 33.1 to reject the method of construction, work plan schedule, procedures, as he thinks appropriate.

33.2 Appoint assistants and representatives as he desires, and they shall be granted full access to the work under the Contract. They have the authority to give directions pertaining to the work, to approve or reject materials, to suspend any work that is being improperly performed, to make measurements of quantities, to keep records of

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

34. Stated Allowances. The Contractor shall include in his proposal for costs of materials not shown in his bid under "cash allowances" or "allowed materials," any cash allowances stated in the supplemental general conditions or other Contract Documents. The Contractor shall purchase the "allowed materials" as directed by the Owner on the basis of the lowest and best bid of at least 3 competitive bids. If the actual price for purchasing the "allowed materials" is more or less than the "cash allowance," the Contract price shall be adjusted accordingly. The adjustment in Contract price shall be made on the basis of the purchase price without additional charges for overhead, profit, insurance or any other incidental expenses. The cost of installation of the "allowed materials" shall be included in the applicable sections of the Contract specifications covering this work.

35. Use of Premises, Removal of Debris, Sanitary Conditions. In the use of premises or removal of debris, the Contractor expressly undertakes at his own expense: to take every precaution against injuries to persons or damage to property; to maintain sanitary conditions; to store his apparatus, materials, supplies and equipment in such orderly fashion at the site of the work as will not interfere with the progress of his work or the work of any other Contractors; to place upon the work or any part thereof only such loads as are consistent with the safety of that portion of the work; to clean up frequently all refuse, rubbish, scrap materials and debris caused by his operations, to the end that at all times the site of the work shall present an orderly and workmanlike appearance; before final payment to remove all surplus material falsework, temporary structures, including foundations thereof, plant of any description and debris of every nature resulting from his operations, and to put the site in an orderly condition; to effect all cutting, fitting or patching of his work required to make the same conform to the plans and specifications and, except with the consent of the Engineer, not to cut or otherwise alter the work of any other Contractor; to provide and maintain in a sanitary condition such toilet accommodations for the use of his employees as may be necessary to comply with the requirements of the state and local boards of health, or of other bodies or authorities having jurisdiction.

36. Quantities of Estimate. Wherever the estimated quantities of work to be done and materials to be furnished under this Contract are shown in any of the documents including the proposal, they are given for use in comparing bids and the right is specifically reserved except as herein otherwise specifically limited, to increase or decrease them as may be deemed reasonably necessary by the Owner to complete the work contemplated by this Contract, and such increase or decrease shall in no way invalidate this Contract, nor shall any such increase or decrease give cause for claims or liability for damages. Such increases or decreases shall not exceed 25 percent of the estimated quantities of work. An increase or decrease in quantities for subsurface materials (e.g. ledge, unsuitable backfill), which overrun or underrun by 25% or more of the bid quantity may be the basis for a Contract price adjustment, at the rate of a negotiated adjusted unit rate. Negotiated unit price rates shall be equitable and shall take into account, but not be limited to the following factors; bid unit rate, distribution of rates and bid balance, and the scope of work as affected by the changed quantities. Claims for extra work resulting from changed quantities shall be processed under article 21.

37. Lands and Rights-of-Way. Acquisition and usage of lands and rights-of-way shall be as follows:

37.1 Prior to issuing the Notice to Proceed, the Owner shall legally obtain all lands and rights-of-way necessary for carrying out and completing the work to be performed under this Contract.

37.2 The Contractor shall not (except after written consent from the Owner) enter or occupy with men, tools, materials, or equipment, any land outside the rights-of-way or property of the Owner. A copy of the written consent shall be given to the Engineer.

37.3 The Owner shall provide to the Contractor information which delineates and describes the lands owned and the rights-of-way acquired.

37.4 The Contractor shall provide at its own expense and without liability to the Owner any additional land and access thereto that the Contractor may desire for temporary construction facilities, or for storage of materials.

38. General Guarantee. With reference to warranties, neither the final certificate of payment nor any provision in the Contract Documents, nor partial or entire occupancy of the premises by the Owner, shall constitute an acceptance of work not done in accordance with the Contract Documents or relieve the Contractor of liability in respect to any express warranties or responsibility for faulty materials or workmanship. The Contractor shall remedy any defects in the work and pay for any damage to other work resulting therefrom, which appear within the warranty period one year or longer if required by the Contract, from the certified date of completion or substantial completion of the work. The Owner will give notice of observed defects within two working days of their discovery.

39. Errors and Inconsistencies. With reference to errors and inconsistency in Contract Documents, any provisions in any of the Contract Documents which may be in conflict with the paragraphs in these general conditions shall be subject to the following order of precedence for interpretation:

39.1 Drawings will govern technical specifications.

39.2 General conditions will govern drawings and technical specifications.

39.3 Supplemental general conditions will govern general conditions, drawings and technical specifications.

39.4 Special conditions will govern supplemental general conditions, general conditions, drawings and technical specifications.

39.5 The Contractor shall take no advantage of any apparent error or omission in the plans or specifications. In the event the Contractor discovers such an error or omission, he shall notify the Engineer. The Engineer will then make such corrections and interpretations as may be deemed necessary for fulfilling the intent of the plans and specifications.

39.6 Figure dimensions on Drawings shall govern over general drawings.

40. Notice and Service Thereof. Any notice to the Contractor from the Owner relative to any part of this Contract will be in writing and will be considered delivered and the service completed, when said notice is mailed, by certified registered mail, to the Contractor at his last given address, or delivered in person to the Contractor or his authorized representative on the work.

41. Required Provisions Deemed Inserted. Each and every provision of law and clause required by law to be inserted in this Contract shall be deemed to be inserted herein and the Contract shall be read and enforced as though it were included herein, and if through mistake or otherwise any such provision is not inserted or is not correctly

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

42. Protection of Lives and Health. The work under this Contract is subject to the safety and health regulations (CRF 29, part 1926, and all subsequent amendments) as promulgated by the U.S. Department of Labor on June 24, 1974. Contractors are urged to become familiar with the requirements of these regulations.

43. OSHA Construction Safety Program.

43.1 Pursuant to NHRSA 277:5-a, the Contractor shall provide an Occupational Health and Safety Administration (OSHA) 10-hour construction safety program for its on-site employees. All employees are required to complete the program prior to beginning work. The training program shall utilize an OSHA-approved curriculum. Graduates shall receive a card from OSHA certifying the successful completion of the training program.

43.2 Any employee required to complete the OSHA 10-hour construction safety program, and who cannot within 15 days provide documentation of completion of such program, shall be subject to removal from the job site.

43.3 The following individuals are exempt from the requirements of the 10-hour construction safety program: law enforcement officers involved with traffic control or jobsite security; flagging personnel who have completed the training required by the Department of Transportation; all relevant federal, state and municipal government employees and inspectors; and all individuals who are not considered to be on the site of work under the federal Davis-Bacon Act, including, but not limited to, construction and non-construction delivery personnel and non-trade personnel.

44. Equal Employment Opportunity. Under equal employment opportunity requirements and during the performance of this Contract the Contractor agrees to the following:

44.1 The Contractor will not discriminate against any employee or applicant for employment because of race, creed, color, national origin, or sex. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, creed, color, national origin, or sex. Such action shall include, but not be limited to, the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

44.2 The Contractor will in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment, without regard to race, creed, color, national origin, or sex.

44.3 The Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other Contract or understanding, a notice to be provided advising the labor union or worker's representative of the Contractor's commitment under section 202 of executive order no. 11246 of September 24, 1965, and 11375 of October, 13, 1967, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

44.4 The Contractor will comply with all provisions of executive orders no. 11246 and 11375.

44.5 The Contractor will furnish all information and reports required by executive orders no. 11246 and 11375.

44.6 In the event of the Contractor's noncompliance with the nondiscrimination clauses of this Contract or with any of such rules, regulations, or orders, this Contract may be canceled, terminated, or suspended in whole or in part by the Owner or the Department of Labor and the Contractor may be declared ineligible for further government Contracts or federally-assisted construction, however, that in the event the Contractor becomes involved in, or is threatened with, litigation with a Subcontractor or vendor as a result of such direction by the Department of Labor, the Contractor may request the United States to enter into such litigation to protect the interests of the United States.

44.7 A breach of this article may be grounds for termination of this Contract and for debarment as provided in 29 CFR 5.6.

45. Interest of Federal, State or Local Officials. No federal, state or local official shall be admitted to any share or part of this Contract or to any benefit that may arise therefrom, but this provision shall not be construed to extend to this Contract if made with a corporation for its general benefit.

46. Other Prohibited Interests. No official of the Owner who is authorized in such capacity and on behalf of the Owner to negotiate, make, accept or approve, or to take part in negotiating, making, accepting, or approving any architectural, Engineering, inspection, construction or material supply Contract or any subcontract in connection with the construction of the project, shall become directly or indirectly interested personally in this Contract or in any part hereof. No officer, employee, architect, attorney, Engineer or inspector of or for the Owner who is authorized in such capacity and on behalf of the Owner to exercise any legislative, executive, supervisory or other similar functions in connection with the construction of the project, shall become directly or indirectly interested personally in this Contract or in any part thereof, any material supply Contract, subcontract, insurance Contract, or any other Contract pertaining to the project.

47. Use and Occupancy Prior to Acceptance. Use and occupancy of a portion or unit of the project, upon completion of that portion or unit, and before substantial completion of the project, shall be a condition of this Contract with the following provisions:

47.1 The Owner will make his request for use or occupancy to the Contractor in writing.

47.2 There must be no significant interference with the Contractor's work or performance of duties under the Contract.

47.3 The Engineer, upon request of the Owner and agreement by the Contractor, will make an inspection of the complete part of the work to confirm its status of completion.

47.4 Consent of the surety and endorsement of the insurance carrier must be obtained prior to use and/or occupancy by the Owner. Also, prior to occupancy, the Owner will secure the required insurance coverage on the building.

47.5 The Owner will have the right to exclude the Contractor from the subject portion of the project after the date of occupancy but will allow the Contractor reasonable access to complete or correct items.

47.6 The warranty period shall begin upon substantial completion.

48. Suspension of Work. The Owner may, at any time and without cause, suspend the work or any portion thereof for a period of not more than 90 days by notice in writing to the Contractor and the Engineer. The Owner shall fix the date on which work shall be resumed. The Contractor will be allowed an increase in the Contract price or an extension of the Contract time, or both, directly attributable to any suspension if he makes a claim therefore as provided in articles 17 and 21.

49. [Reserved]

50. [Reserved]

51. [Reserved]

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

53. [Reserved]

54. Public Convenience and Traffic Control requirements:

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

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

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

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

56. Maintenance During Construction.

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

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

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

57. Cooperation with Utilities.

57.1 The Owner will notify all utility companies, all pipe line owners, or other parties affected, and have all necessary adjustments of the public or private utility fixtures, pipe lines, and other appurtenances within or adjacent to the limits of construction made as soon as practicable.

57.2 Water lines, gas lines, wire lines, service connections, water and gas meter boxes, water and gas valve boxes, light standards, cableways, signals, and all other utility appurtenances within the limits of the proposed construction which are to be relocated or adjusted are to be moved by the owners of such utilities at their expense, except as may otherwise be provided for in the special conditions or as noted on the plans.

57.3 It is understood and agreed that the Contractor has considered in his bid all of the permanent and temporary utility appurtenances in their present or relocated positions as shown on the plans and as evident on the site, and that no additional compensation will be allowed for any delays, inconvenience, damage sustained by him due to any interference from such utility appurtenances or the operation of moving them.

57.4 The Contractor shall cooperate with the Owners of any underground or overhead utility lines in their removal and rearrangement operations in order that these operations may progress in a reasonable manner, that duplication of rearrangements may be reduced to a minimum, and that services rendered by those parties will be minimal.

57.5 In the event of interruption to a water or utility service as a result of accidental breakage or as a result of being exposed or unsupported, the Contractor shall promptly notify the proper authority and shall cooperate with said authority in the restoration of services. If water service is interrupted, repair work shall be continuous until the service is restored. No work shall be undertaken around fire hydrants until provisions for continued service have been approved by the local fire authority. If any utility service is interrupted for more than 4 hours, the Contractor shall make provisions for temporary service at his own expense until service is resumed.

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

58.1 No work will be permitted at night or on Sundays or holidays except as approved in writing by the Engineer, and provided such work is not in violation of a local ordinance. When working at night, the Contractor shall provide flood lighting sufficient to insure the same quality of workmanship and the same conditions regarding safety as would be achieved in daylight.

58.2 Whenever Memorial Day or Fourth-of-July is observed on a Friday or a Monday and during the weekend of Labor Day, the Contractor may be required to suspend work for the 3 calendar days. Prior to the close of work, the work site shall be placed in a condition acceptable to the Engineer for the comfort and safety of the traveling public. An arrangement shall be made for responsible personnel acceptable to the Engineer to maintain the project in the above conditions.

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

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

59.2 Indemnification

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

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

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

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

60.1 Permits and licenses of a temporary nature necessary for the prosecution of the work shall be obtained and paid for by the Contractor. Permits, licenses and easements for permanent structures or permanent changes in existing facilities will be secured and paid for by the Owner. Permits may include:

a. New Hampshire Department of Transportation Highway Trench Permits.

b. RSA 485-A:17 and 483-A N.H. DES Wetlands Bureau Dredge and Fill Permit.

c. RSA 485-A:17 - N.H. DES Site Specific Permit (Water Quality)

d. RSA 149-M:10 N.H. DES Solid Waste Management Bureau - disposal of construction debris and/or demolition waste.

e. N.H. Department of Environmental Services Air Resources Division (burning permits).

f. Other permits, as required by State and Local laws and ordinances.

g. Notice of intent for coverage under EPA’s General NPDES Permit for construction dewatering activities.

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

61.1 During construction, the Contractor shall take precautions sufficient to avoid the leaching or runoff of polluting substances such as silt, clay, fuels, oils, bitumens, calcium chloride and any other polluting materials which are unsightly or which may be harmful to humans, fish, or other life, into groundwaters and surface waters of the State.

61.2 In waters used for public water supply or used for trout, salmon, or other game or forage fish spawning or nursery, control measures must be adequate to assure that turbidity in the receiving water will be increased not more than 10 standard turbidity units (s.t.u.) in the absence of other more restrictive locally-established limitations, unless otherwise permitted by the Division. In no case shall the classification for the surface water be violated.

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

62. Use of Explosives.

62.1 When the use of explosives is necessary for the prosecution of the Work, exercise the utmost care not to endanger life or property. The Contractor shall be responsible for any and all damage resulting from the use of explosives.

62.2 Store all explosives in a secure manner, in compliance with all State and local laws and ordinances, and legally mark all such storage places. Storage shall be limited to such quantity as may be needed for the work underway.

62.3 Designate as a “Blasting Area” all sites where electric blasting caps are located and where explosive charges are being placed. Mark all blasting areas with signs as required by law. Place signs as required by law from each end of the blasting area and leave in place while the above conditions prevail. Immediately remove signs after blasting operations or the storage of caps is over.

62.4 Notify each property Owner and public utility company having structures in proximity to the site of the work sufficiently in advance to enable the companies to take such steps as they may deem necessary to protect their property. Such notice shall not relieve the Contractor of any of his responsibility for damage resulting from his blasting operation. Warn all persons within the danger zone of blasting operations and do not perform blasting work until the area is cleared. Provide sufficient flagmen outside the danger zone to stop all approaching traffic and pedestrians. Provide watchmen during the loading period and until charges have been exploded. Place adequate protective covering over all charges before being exploded.

63. Arbitration by Mutual Agreement.

63.1 All claims, disputes, and other matters in question arising out of, or relating to, the Contract Documents or the breach thereof, except for claims which have been waived by making an acceptance of final payment as provided in Section 25, may be decided by arbitration if the parties mutually agree. Any agreement to arbitrate shall be specifically enforceable under the prevailing arbitration law. The award rendered by the arbitrators shall be final, and judgment may be entered upon it in any court having jurisdiction thereof.

63.2 Notice of the request for arbitration shall be filed in writing with the other party to the Contract Documents and a copy shall be filed with the Engineer. Request for arbitration shall in no event be made on any claim, dispute, or other matter in question which would be barred by the applicable statute of limitations.

63.3 The Contractor will carry on the Work and maintain the progress schedule during any arbitration proceedings, unless otherwise mutually agreed in writing.

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

65 Separate Contracts.

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

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

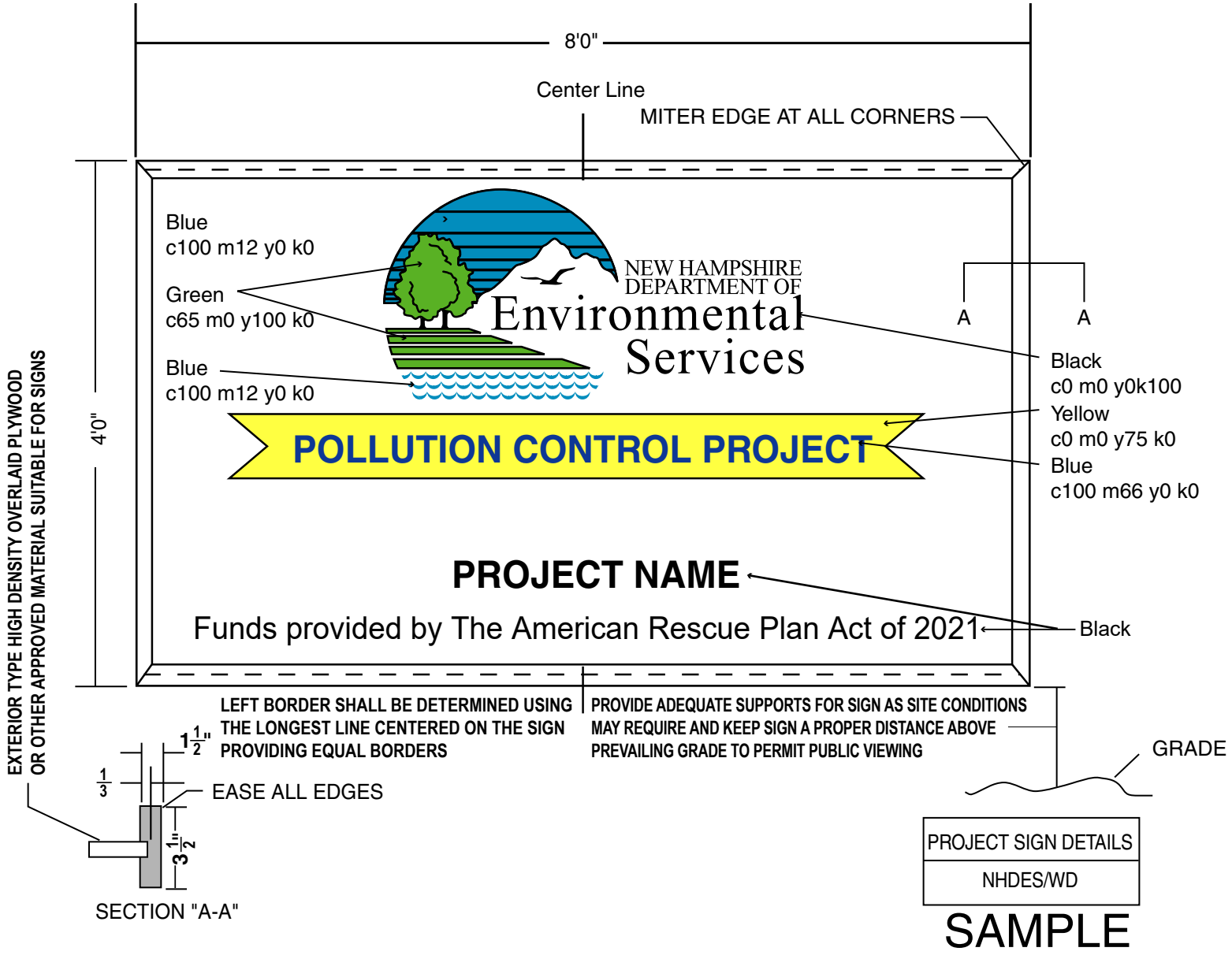
65.2 The Owner may perform additional Work related to the Project or the Owner may let other Contracts containing provisions similar to these. The Contractor will afford the other Contractors who are parties to such Contracts (or the Owner, if the Owner is performing the additional Work) reasonable opportunity for the introduction and storage of materials and equipment and the execution of the Work, and shall properly connect and coordinate the Work with theirs.

65.3 If the performance of the additional Work by other Contractors or the Owner is not noted in the Contract Documents prior to the execution of the Contract, written notice shall thereof be given to the Contractor prior to starting such additional Work. If the Contractor believes that the performance of such additional Work by the Owner or others involves it in additional expense or entitles it to an extension of the Contract Time, the Contractor may make a claim thereof as provided in Sections 17 and 18.

EXHIBIT 1

Project Sign Detail

[Insert project sign detail here - Contact NHDES for appropriate detail]


8'0"
Center Line
MITER EDGE AT ALL CORNERS
4'0"
Blue
c100 m12 y0 k0
Green
c65 m0 y100 k0
Blue
c100 m12 y0 k0
NEW HAMPSHIRE
DEPARTMENT OF
Environmental
Services
POLLUTION CONTROL PROJECT
PROJECT NAME
Funds provided by The American Rescue Plan Act of 2021
A
A
Black
c0 m0 y0k100
Yellow
c0 m0 y75 k0
Blue
c100 m66 y0 k0
Black
EXTERIOR TYPE HIGH DENSITY OVERLAID PLYWOOD
OR OTHER APPROVED MATERIAL SUITABLE FOR SIGNS
LEFT BORDER SHALL BE DETERMINED USING
THE LONGEST LINE CENTERED ON THE SIGN
PROVIDING EQUAL BORDERS
PROVIDE ADEQUATE SUPPORTS FOR SIGN AS SITE CONDITIONS
MAY REQUIRE AND KEEP SIGN A PROPER DISTANCE ABOVE
PREVAILING GRADE TO PERMIT PUBLIC VIEWING
GRADE
1 1/2"
1/3
EASE ALL EDGES
3 1/2"
SECTION "A-A"
PROJECT SIGN DETAILS
NHDES/WD
SAMPLE

DIVISION 01 – GENERAL REQUIREMENTS

SECTION 01 11 12

GENERAL REQUIREMENTS

PART 1 – GENERAL

1.1 GENERAL CONDITIONS

A. All work of this section is specifically subject to the General Conditions for the entire project.

B. Provide all items, articles, materials, operations, or methods listed, mentioned, scheduled on the Drawings and/or specified herein including all labor, materials, equipment and incidentals necessary and required for their completion.

1.2 INTENT

A. The intent of the Specifications and drawings is to call for finish work, tested and ready for operation.

B. Any apparatus, appliance, material or service not specified or indicated but necessary to make the work complete and perfect in all respects and ready for operations shall be provided.

C. The Drawings are generally diagrammatic, intended to convey the scope of the work and indicate the general arrangement of equipment and piping and approximate sizes and locations of equipment.

1.3 WORKMANSHIP

A. All work shall be executed in the best and most thorough manner under the direction of and to the satisfaction of the Engineer.

B. The Contractor shall, at all times, keep a competent foreman in charge of the works on the project, and shall facilitate it's inspection by the Engineer.

1.4 RULES AND REGULATIONS

A. All work shall comply with applicable portions of all state or local laws, ordinances, rules and regulations of local utility companies and fire departments, B.O.C.A., National Plumbing Code, recommendations of the National Board of Fire Underwriters, National Electrical Code and all other authorities having jurisdiction.

B. Nothing contained in these Specifications or indicated on the Drawings shall be construed to conflict with applicable portions of any laws, ordinances, rules and regulations.

1. All pressure vessels shall be furnished and installed in strict accordance with the applicable regulations of the state and the ASME codes and shall be equipped with all appurtenances required by the aforesaid codes.

1.5 GUARANTEE

A. Guarantee all work performed and materials and equipment installed to the full extent required by the Drawings and Specifications to be free from inherent defects.

B. Any materials or equipment which are corroded or otherwise damaged, through the Contractor's failure to properly operate and maintain the installation during construction or testing, shall be replaced prior to final acceptance.

C. Keep the work in repair and replace any defective materials, equipment or workmanship upon notice from the Owner's/Engineer's Representative for a period of one year from date of substantial completion. See Two (2) Year Guarantee period for Automatic Temperature Control System and Control Devices.

D. Materials or equipment requiring excessive service during the first year of operation shall be considered defective.

E. The date of acceptance shall be that which appears on the Owner's/Engineer's Certificate of Substantial Completion.

1.6 SEQUENCE OF WORK

A. Refer to the General Supplementary and Special Conditions for timing and coordination of the work.

B. Schedule the work accordingly and coordinate schedule with other Contractors to prevent delay.

1.7 OPERATING AND MAINTENANCE MANUAL

A. Furnish manufacturer's printed operating and maintenance instructions for each piece of equipment furnished under this Division.

B. Each manual shall be suitably and neatly marked to identify the particular equipment furnished and shall include lubricating charts.

C. All instructions and charts shall be bound in appropriate cover binders properly indexed, identified, and titled to provide three complete manuals.

D. Completed manuals shall be submitted to the Engineer for review and approval.

1.8 CUTTING AND PATCHING

A. The Contractor will provide openings in walls, floors, roof, ceilings and partitions to receive pipe lines, ductwork and other apparatus.

B. All sleeves shall be furnished by the Contractor and securely set as required for piping passing through walls, floors, roofs, ceilings and partitions.

C. All anchors and inserts shall be furnished and securely set as required for piping and equipment furnished under this Division.

1.9 SUBSTITUTES

A. Certain items of equipment have been specified by manufacturer's name and model number. It is not the intent to limit the Contractor to the equipment but to establish a type and quality required. The Contractor may substitute equipment of equal quality and capacity and shall be responsible for any changed required to install the substitution. All shop drawings will indicate the substitution and any deviations from the original specification.

B. Added support steel, anchors, braces, etc. required to permit the use of substituted equipment, shall be the cost and installation responsibility of the Contractor.

End of Section

SECTION 01 11 13

SUMMARY OF WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract apply to this Section.

1.2 PROJECT DESCRIPTION

A. The Project consists of constructing approximately 1600 linear feet of new gravity sewer main and 1900 LF of service lines, manholes and roadway patching along Harvard Street, Ithaca Lane, Colby Road, and Dartmouth Circle at The Crossings at Sleepy Hollow Cooperative, Inc. New gravity sewer mains shall connect to the existing recently updated sewer system.

1.3 WORK SEQUENCE

A. The Work will be conducted in a sequence and in such a manner as to minimize utility and traffic interruptions and to minimize the risk to health and the environment.

1.4 CONTRACTOR USE OF PREMISES

A. General: Limit use of the premises to construction activities in areas indicated; allow for Owner operation and use by the public.

1. Confine operations to areas within Contract limits indicated. Portions of the site beyond areas in which construction operations are indicated are not to be disturbed.

2. Keep driveways and entrances serving the premises clear and available to the Owner, the Owner's employees and the general public at all times. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on site.

3. Disposal of Excess, Unsuitable and/or Waste Materials: Unless otherwise approved by Engineer, all excess, unsuitable or waste materials shall be removed from the project site and shall be lawfully disposed of at Contractor's expense. Do not dispose of hazardous material on site, either by burial or by burning.

1.5 OWNER OCCUPANCY

A. Full Owner Occupancy: The Owner will occupy the site during the entire construction period. Cooperate with the Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with the Owner's operations.

1.6 MISCELLANEOUS PROVISIONS

A. The Project has been designed and the Contract Documents prepared with the intention that resulting Work will comply with applicable local, State, and Federal rules and regulations.

1. Before Substantial Completion inspect, test and adjust performance of every system or facility of the Work to ensure that overall performance is in compliance the Contract Documents and all permit requirements.

2. Instruct the Owner's operating personnel on operational requirements needed to maintain compliance.

PART 2 - PRODUCTS

Not Applicable

PART 3 – EXECUTION

Not Applicable

End of Section

SECTION 01 11 17

DRAWINGS AND SPECIFICATIONS

PART 1 – GENERAL

1.1 DESCRIPTION

A. This Section is intended to describe the general Intent of the Drawings and Specifications.

B. The Owner will furnish the Contractor up to five (5) copies of the drawings and specifications without charge.

1.2 EXISTING CONDITIONS

A. All existing conditions shown on the drawings are for information purposes only and are based on limited information. The Contractor shall verify existing conditions and shall not be entitled to extra compensation for failure to do so.

1.3 INTENT OF DRAWINGS AND SPECIFICATIONS

A. The drawings and specifications are intended to show the general intent of the work. The Owner has contracted for a complete project although every detail, component, fitting and appurtenance may not have been shown. The Contractor shall be responsible for all items necessary to make a complete functional system.

1.4 DIMENSIONS

A. Drawings should not be scaled. All dimensions shall be taken from figured dimensions on the drawings or by actual field measurements. The Contractor shall notify the Engineer immediately of any discrepancy between figured dimensions labeled on the drawings and actual field measurements, whenever such discrepancy may impact the installation or operation of the Work.

End of Section

SECTION 01 22 13

MEASUREMENT AND PAYMENT

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The provisions of the Contract, including General and Supplemental Conditions and General Requirements (if any), apply to the work specified in this Section.

1.2 RELATED WORK SPECIFIED ELSEWHERE

General Conditions
Supplemental Conditions

1.3 SCHEDULING

A. Notify Engineer as far in advance as possible of pay item measurements a minimum of three days prior to submission of the application for payment.

B. Allow for and afford Engineer ample time, space, and equipment to observe and verify measurements.

1.4 DESCRIPTION

A. For unit price items, the Contractor shall be paid for the actual amount of work accepted and for the actual amount of materials in place during the period of construction. After the work is completed and before final payment is made therefore, the Engineer shall make final measurements to determine the quantities of the various items of work accepted as the basis for final payment.

B. For lump sum items, the Contractor shall be paid on the basis of actual work accepted until the work item is completed. Upon completion of the item, 100 percent of the lump sum price may be paid, subject to the terms of the General Conditions or Supplemental Conditions.

C. 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.

1.5 MEASUREMENT REQUIREMENTS

A. Where payments are to be made on a unit price or adjustment item unit price basis, notify Engineer so that they may observe existing conditions and the status of work-in-place and may witness measurements being made. Where Engineer has not witnessed required measurements and cannot verify or substantiate quantities, they may not recommend payment for same.

B. Maintain complete and legible field notes for all measured items. Notes shall contain spaces for Contractor's and Engineer's signatures plus additional space for comments.

An original and copy shall be made for all notes with the copy being submitted to Engineer. The Engineer's signature shall not be construed as an acceptance of the Work or the measurements made but shall mean the Engineer was present when the measurements were made.

C. The Owner reserves the right to reject the Contractor's measurement of work in place and to have this Work measured by the Engineer or independent party acceptable to the Contractor at the Owner's expense.

1.6 SCOPE OF PAYMENT

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

B. The Contractor shall accept in 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 contemplated and embraced by the Contract; also 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. No extra payment shall be made to the Contractor for any delays caused by lack of progress, defective workmanship, or rescheduling of work by other contractors, subcontractors, or equipment and material suppliers.

D. No additional payment will be allowed because of differences between field dimensions and those shown on the Drawings.

E. Additional costs caused by ill-timed or defective work, or work not conforming to Contract Documents including costs for additional services of Engineer, shall be paid for by the party causing the rejected or non-conforming work.

F. Work done on written instructions of Engineer, other than defective or non-conforming work, shall be paid for by the Owner.

G. The cost of shop drawing reviewed by the Engineer in excess of two submissions shall be deducted from the Contractor's monthly invoices, based upon a rate of $100 per hour.

1.7 PAYMENT FOR INCREASED OR DECREASED QUANTITIES

A. When alterations in the quantities of work not requiring Change Orders, as herein provided for, 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 Change Orders will be paid for as stipulated in such Change Orders.

1.8 ELIMINATED ITEMS

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

B. Should any equipment or material be eliminated under a lump sum item, a Change Order shall be issued as stipulated in the General Conditions.

1.9 PARTIAL PAYMENTS

A. Partial payments shall be made monthly as the work progresses. All partial invoices and 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 Documents, or when in his judgment the total value of the Work performed since the last payment amounts to less than $1,000.

C. Retained amounts shall be limited, except where greater retention is necessary under specific circumstances specifically provided for in the General Conditions.

D. 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 the Contract.

1.10 FINAL PAYMENT

A. The Contractor will prepare a final payment requisition for review by the Engineer for the work performed. Upon approval by the Engineer, the Owner will pay the entire sum found to be due less any retainage provided for in the General Conditions and any previous payments.

1.11 PAYMENT FOR MATERIAL DELIVERED

A. When requested by the Contractor, and at the discretion of the Owner, payment may be made for all or part of the value of acceptable, non-perishable materials and equipment which are to be incorporated into the Work, which have not been used and which have been delivered to the construction site and placed in storage places acceptable to the Owner. The Application for Payment shall be accompanied by such data, satisfactory to the Owner, that will establish the Owner's title to the material and equipment and protect the Owner's interest therein, including insurance.

Each subsequent Application for Payment shall include an affidavit of the Contractor stating that all previous progress payments received on account of the Work have been applied to discharge in full all of the Contractor's obligations reflected in prior Applications for Payment. The Owner shall have the right to deduct from the next progress payment an amount equal to payment for said material and/or equipment if reasonable and adequate proof is not submitted.

B. Materials and equipment, 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 and equipment in the construction of the Work. The Contractor shall be responsible for any damage to, or loss of, the materials and equipment. The amount thus paid by the Owner shall reduce the estimated amounts due the Contractor as the material is incorporated into the Work.

1.12 DESCRIPTION OF PAY ITEMS

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

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

1.13 PAY ITEMS

Item No. 1 Mobilization

A. Measurement for payment for General Conditions and Mobilization shall consist of project management, preparatory, and miscellaneous work and operations including but not limited to the following:

1. Supervision and project management
2. Overnight accommodations
3. Submittals
4. Equipment delivery
5. Office trailers and utilities
6. Sanitary facilities
7. Detour/construction/project signs
8. Furnishing of Bonds/Insurance
9. Utility crossings and relocations (unless otherwise provided for)
10. Project record drawings and record tie sheets
11. Testing
12. Removal and disposal of existing pipe within trench if needed
13. Removal of existing sewer service lines and cleanouts as specified
14. Cutting and capping of all mains and services to be abandoned
15. Tree clearing, grubbing, and disposal
16. Dust Control
17. Survey/Layout

B. Payments:

1. Payment shall be made at the contract lump sum price, which price shall be full compensation for all costs incurred in furnishing labor, tools, materials and equipment and incidental work item costs for the preparatory work and operations described in the above Measurement section for General Conditions and Mobilization.

2. For the purpose of computing payments, the adjusted contract price shall include all contract unit price and lump sum items except the contract lump sum price for this Item.

3. Payments shall be made as follows:

    a. First payment of fifty percent (50%) of the contract lump sum price for Mobilization or 2.5 percent of the adjusted contract price, whichever is less, will be made not later than payment of the first application for payment following the completion of five percent (5%) of the total contract price.

    b. Second payment of twenty five percent (25%) of the contract lump sum price for Mobilization or 1.2 percent of the adjusted contract price, whichever is less, will be made not later than payment of the first application for payment following the completion of fifty percent (50%) of the total contract price.

    c. Upon substantial completion of all work on the project, payment of the remainder of the contract lump sum price for Mobilization will be paid.

Item No. 2 – Eight Inch PVC SDR 35 Pipe

A. Measurement for payment shall be per the actual length in feet of sewer main furnished and installed. Measurement shall be made along the centerline of the pipe from center of manhole to center of manhole.

B. Payment for furnishing and installing pipe of the size specified shall be made for the quantity installed at the unit bid price per linear foot as stated in the Bid. Payment shall be full compensation for trenching, clearing/tree branch trimming, holding utility poles, excavation (except rock excavation and exploratory excavation), sheeting and bracing, dewatering, trench dams, pipe, polyethylene wrap if required, bedding, jointing, connections to existing, select backfill around and over pipe, warning tape, tracer wire (for PVC pipe), in-kind soil backfilling, compaction, restoring the trench surface to grade, in kind gravel backfill, testing, and all work incidental to the satisfactory completion of the item for which payment is not provided under other items. Payment will be made for ninety (90) percent of the price upon completion of installation; the remaining ten (10) percent upon completing satisfactory testing subject to other retainages set forth in the Contract Documents. Payment for this item may be withheld if the Record Drawings do not reflect the work for which payment is requested.

Item No. 3 – Six Inch PVC SDR 35 Pipe

A. Measurement for payment shall be per the actual length in feet of sewer main furnished and installed. Measurement shall be made along the centerline of the pipe from center of manhole to center of manhole.

B. Payment for furnishing and installing pipe of the size specified shall be made for the quantity installed at the unit bid price per linear foot as stated in the Bid. Payment shall be full compensation for trenching, clearing/tree branch trimming, holding utility poles, excavation (except rock excavation and exploratory excavation), sheeting and bracing, dewatering, trench dams, pipe, polyethylene wrap if required, bedding, jointing, connections to existing, select backfill around and over pipe, warning tape, tracer wire (for PVC pipe), in-kind soil backfilling, compaction, restoring the trench surface to grade, in kind gravel backfill, testing, and all work incidental to the satisfactory completion of the item for which payment is not provided under other items. Payment will be made for ninety (90) percent of the price upon completion of installation; the remaining ten (10) percent upon completing satisfactory testing subject to other retainages set forth in the Contract Documents. Payment for this item may be withheld if the Record Drawings do not reflect the work for which payment is requested.

Item No. 4 – Four Inch PVC SDR 35 Pipe

A. Measurement for payment shall be per the actual length in feet of sewer service furnished and installed. Measurement shall be made along the centerline of the pipe from connection location to existing home service outlets to center of sewer main it is connected to.

B. Payment for furnishing and installing pipe of the size specified shall be made for the quantity installed at the unit bid price per linear foot as stated in the Bid. Payment shall be full compensation for trenching, clearing/tree branch trimming, holding utility poles, excavation (except rock excavation and exploratory excavation), sheeting and bracing, dewatering, trench dams, pipe, polyethylene wrap if required, bedding, jointing, bend installation, cleanout installation, connections to existing home service outlets, select backfill around and over pipe, warning tape, tracer wire (for PVC pipe), in-kind soil backfilling, compaction, restoring the trench surface to grade, in kind gravel backfill, testing, and all work incidental to the satisfactory completion of the item for which payment is not provided under other items. Payment will be made for ninety (90) percent of the price upon completion of installation; the remaining ten (10) percent upon completing satisfactory testing subject to other retainages set forth in the Contract Documents. Payment for this item may be withheld if the Record Drawings do not reflect the work for which payment is requested.

Item No. 5 – Manhole Frame and Cover

A. Measurement shall be per the actual number of manhole frame and cover combos furnished and installed.

B. Payment for furnishing and installing manhole frames and covers shall be made for the quantity installed at the unit bid price per each as stated in the Bid. Payment shall be full compensation for holding utility poles, excavation (except rock excavation and

exploratory excavation), sheeting and bracing, dewatering, materials included in specific item, risers, masonry work, waterproof sealing of joints, jointing, bedding, select backfill, in-kind soil backfilling, compaction, restoring the trench surface to grade, in kind gravel backfill at surface, testing, and all work incidental to the satisfactory completion of the item for which payment is not provided under other items.

Item No. 6 – Manholes Structures (4' Diameter)

A. Measurement shall be per the actual quantity of vertical feet of 4' diameter manholes, excluding frame and covers. Measurement shall be made from center of bottom of structure vertically to top of cone elevation.

B. Payment for furnishing and installing 4' diameter manholes shall be made for the quantity installed at the unit bid price per vertical foot as stated in the Bid. Payment shall be full compensation for holding utility poles, excavation (except rock excavation and exploratory excavation), sheeting and bracing, dewatering, materials included in specific item, bedding, jointing, select backfill, in-kind soil backfilling, compaction, restoring the trench surface to grade, in kind gravel backfill at surface, testing, and all work incidental to the satisfactory completion of the item for which payment is not provided under other items.

Item No. 7 – Manholes Structures (5' Diameter)

A. Measurement shall be per the actual quantity of vertical feet of 5' diameter manholes, excluding frame and covers. Measurement shall be made from center of bottom of structure vertically to rim elevation.

B. Payment for furnishing and installing 5' diameter manholes shall be made for the quantity installed at the unit bid price per vertical foot as stated in the Bid. Payment shall be full compensation for holding utility poles, excavation (except rock excavation and exploratory excavation), sheeting and bracing, dewatering, materials included in specific item, bedding, jointing, select backfill, in-kind soil backfilling, compaction, restoring the trench surface to grade, in kind gravel backfill at surface, testing, and all work incidental to the satisfactory completion of the item for which payment is not provided under other items.

Item No. 8 – Bituminous Pavement

A. Measurement shall be the actual number of tons in place as determined by actual field measurement. Weight slips shall be used for comparison only. The average depth of the pavement shall be 3 inches.

B. Payment for furnishing and installing double course pavement shall be at the unit price per ton as stated in the Bid. Payment shall be full compensation for removing existing pavement, furnishing and installing bituminous concrete materials, fine subgrade grading, existing pavement preparation, tack coat, compaction, pavement striping, and all work incidental to the satisfactory completion of the item for which payment is not provided under other items.

Item No. 9 – Crushed Gravel

A. Measurement shall be per cubic yard furnished, installed, and compacted as measured in the field.

B. Payment for furnishing and installing crushed gravel shall be made for the quantity installed at the cubic yard bid price as stated in the Basis of Bid. Payment shall be full compensation for surface preparation, crushed gravel material, placement, rough grading and fine grading, compaction, and all work incidental to the satisfactory completion of the item for which payment is not provided under other items.

Item No. 10 – Bank Run Gravel

A. Measurement shall be per cubic yard furnished, installed, and compacted as measured in the field.

B. Payment for furnishing and installing crushed gravel shall be made for the quantity installed at the cubic yard bid price as stated in the Basis of Bid. Payment shall be full compensation for surface preparation, crushed gravel material, placement, rough grading and fine grading, compaction, and all work incidental to the satisfactory completion of the item for which payment is not provided under other items.

Item No. 11 – Two-Inch Blue Board Insulation

A. Measurement shall be per the actual number of square feet furnished and installed.

B. Payment for furnishing and installing 2" insulation board shall be made for the quantity installed at the unit bid price per square foot as stated in the Bid. Payment shall be full compensation for installation, sheeting and bracing, dewatering, materials included in specific item, in-kind soil backfilling, compaction, restoring the disturbed area surface to grade, in kind gravel backfill at surface, testing, and all work incidental to the satisfactory completion of the item for which payment is not provided under other items.

Item No. 12 – Ledge Excavation

A. Method of Measurement:

1. The quantity to be measured for payment shall be the actual in place volume, in cubic yards, of ledge removed within the stipulated pay limits. The width used to compute the volume of ledge for payment shall be the width, as shown of the Drawings. The depth used to compute the volume of ledge removed shall be determined from the actual ledge surface elevation and shall extend 6 inches below the bottom of the pipe or structure.

2. Measurements for computing volumes shall be determined by one of the following methods as selected by the Engineer:

    a. By field measurement of the depth and width of ledge excavation as determined by the Engineer.

b. From actual ledge profile taken of exposed ledge before proceeding with the ledge excavation.

3. Rocks or boulders greater than two (2) cubic yards in volume shall be considered as ledge excavation only if blasting or power drilling is required to remove the rock. Volume of rocks and boulders shall be determined from their average length, width and depth as determined by the Engineer.

4. Loose rock which can be removed without blasting or power drilling will not be paid for under this item. Loose rock fitting this description shall be paid for under Item No. 13.

B. Payment shall be made at the unit price per cubic yard as stated in the Bid which shall be full compensation for removing rock and replacement with suitable fill and for all labor, materials, tools and equipment, and for all work and expenses incidental thereto for which payment is not provided under other items.

Item No. 13 – Unsuitable Material

A. Measurement shall be the in-place volume in cubic yards of unsuitable material removed, disposed, and refilled with Select Fill as directed by the Engineer, to the payment limits shown on the plans. Material that is found to be unsuitable due to saturated moisture conditions only shall be stockpiled until sufficiently dewatered to allow its reuse. Material of this nature will not be considered unsuitable. Material that contains large rocks as described in Item No. 12 A 3-4 that may be screened by the contractor is not eligible for payment under this item. Only the volume, as measured in the field, that has been removed via screening is eligible for payment under this item.

B. Payment for removing and disposing of unsuitable material and material refill shall be at the unit price per cubic yard as stated in the Bid. Payment shall be full compensation for removal, disposal, directed refill, compaction and all other work incidental to the satisfactory completion of the item for which payment is not provided under other items.

Item No. 14 – 15" HDPE Culvert Replacement

A. Measurement for payment shall be per the actual length in feet of culvert furnished and installed. Measurement shall be made along the centerline of the pipe.

B. Payment for furnishing and installing pipe of the size specified shall be made for the quantity installed at the unit bid price per linear foot as stated in the Bid. Payment shall be full compensation for directional boring, clearing/tree branch trimming, holding utility poles, excavation (except rock excavation), sheeting and bracing, dewatering, trench dams, pipe, polyethylene wrap if required, select backfill around and over pipe, in-kind soil backfilling, compaction, restoring the trench surface to grade, in kind gravel backfill, and all work incidental to the satisfactory completion of the item for which payment is not provided under other items.

Item No. 15 – Restoration of Surfaces

A. Measurement shall be lump sum.

B. Payment for restoration of surfaces shall be made for the quantity installed at the lump sum price as stated in the Bid. Payment shall be full compensation for removal and replacement of signage, fencing, mailboxes, boulder walls, grading and compaction of shoulders and lawn areas, crushed shoulder gravel as required, landscaping restoration, speed bump removal and pavement repair, and all work incidental to the satisfactory completion of the item for which payment is not provided under other items.

Item No. 16 – Exploratory Excavation

A. Method of Measurement:

1. The quantity to be measured for payment shall be the actual in place volume, in cubic yards, of material removed within the Engineer field approved location of exploratory excavation. The dimensions used for volume calculation shall be determined by the engineer before exploratory excavation has commenced. The limit of depth of payment shall be no more than 6" below the depth of the proposed sewer pipe.

2. Measurements for computing volumes shall be determined by the following method.

   c. By field measurement of the depth and width of exploratory excavation as determined by the Engineer.

3. Rocks or boulders greater than two (2) cubic yards in volume shall not be considered as ledge excavation if located outside the given limits of disturbance and encountered during exploratory excavation.

B. Payment shall be made at the unit price per cubic yard as stated in the Bid which shall be full compensation for removing rock and replacement with suitable fill and for all labor, materials, tools and equipment, and for all work and expenses incidental thereto for which payment is not provided under other items.

Item No. 17 – Manhole Grading Repair

A. Measurement shall be lump sum.

B. Payment for excavating, grading, materials, labor, paving and traffic control to raise the rim elevation of the existing manhole to surrounding pavement elevation located at the intersection of Dartmouth Circle and Columbia Street. Payment shall be made for the quantity provided at the lump sum price as stated in the Bid. Payment shall be full compensation for all work incidental to the satisfactory completion of the item for which payment is not provided under other items.

Item No. 18 - Traffic Control

A. Measurement shall be lump sum.

B. Payment for furnishing traffic control plans and traffic controls (signage, lights, uniformed officers and vehicles, flaggers, etc.) as needed, as required for safe management of traffic and prosecution of the work, and as required by the Owner and/or NHDOT. Payment shall be made for the quantity provided at the lump sum price as stated in the Bid. Payment shall be full compensation for all work incidental to the satisfactory completion of the item for which payment is not provided under other items.

Item No. 19 - Erosion Control

A. Measurement shall be lump sum.

B. Payment for furnishing, installing, and maintaining erosion controls measures adequate for control shall be made for the quantity installed at the lump sum price as stated in the Bid. Payment shall be full compensation for all required erosion and sedimentation measures necessary and all work incidental to the satisfactory completion of the item for which payment is not provided under other items.

End of Section

SECTION 01 26 13

REQUESTS FOR INFORMATION

PART 1 – GENERAL

1.1 GENERAL

A. The Contractor shall prepare and submit Requests for Information ("RFIs") if it requires clarification of the Contract Documents. All RFIs shall be in writing using the attached form. The Contractor may fax, deliver, or mail RFIs to the Engineer. RFIs from the Contractor's subcontractors or suppliers will not be accepted or processed.

B. If the information can be found in the Contract Documents, it will be indicated in the RFI and returned to the Contractor. The Engineer's time for preparing responses to RFIs that are self-evident in the Contract Documents will be charged to the Contractor.

C. The Engineer's review of the RFI will be conducted with reasonable promptness while allowing sufficient time in the Engineer's judgment to permit adequate review. In general, the Engineer anticipates responding to the RFI within four (4) business days.

PART 2 – PRODUCTS

(Not Applicable)

PART 3 – EXECUTION

3.1 GENERAL

A. All RFIs shall be numbered sequentially starting with No. 001. The Contractor shall maintain a log of all RFIs submitted including at a minimum the date of submittal, subject and receipt of response from the Engineer. An electronic copy of the following form will be provided to the Contractor.

End of Section

REQUEST FOR INFORMATION

PROJECT: Crossings at Sleepy Hollow Cooperative, Inc.
Sewer System Improvement Projects

TO: Horizons Engineering
Attn: _____
34 School Street
Littleton, NH 03561
Fax: 603.444.1343

REQUEST					
Title:				Date:	
Drawing No.:		Specification Section No.:			
Date Response Required:					
Attachments:					
Contractor:		Submitted by:			

RESPONSE				
Horizons Engineering	Reviewed by:		Date:	

SECTION 01 31 13

PROJECT COORDINATION

PART 1 – GENERAL

1.1 SUMMARY

A. This Section specifies administrative and supervisory requirements necessary for Project coordination including, but not necessarily limited to:

1. Administrative and supervisory personnel.
2. General installation provisions.
3. Cleaning and protection.

1.2 COORDINATION

A. Coordination: Coordinate construction activities to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations for proper installation, connection, and operation.

1. Where installation of one part of the Work is dependent on installation of other components, either before or after its own installation, schedule construction activities in the sequence required to obtain the best results.

2. Where availability of space is limited, coordinate installation of different components to ensure maximum accessibility for required maintenance, service and repair that meets each component manufacturer's written installation requirements.

3. Make adequate provisions to accommodate items scheduled for later installation.

B. Where specified, prepare memoranda for distribution to each party involved outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings.

1. Prepare similar memoranda for the Owner and separate contractors where coordination of their work is required.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and ensure orderly and timely progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of schedules.
2. Installation and removal of temporary facilities.
3. Delivery and processing of submittals.

4. Progress meetings.
5. Project close-out activities.

D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.

1. Salvage materials and equipment involved in performance of, but not actually incorporated in, the Work. Refer to other sections for disposition of salvaged materials that are designated as Owner's property.

E. Utilities: Coordinate Work with applicable utilities within the Project limits. Contact DigSafe at 811 or 888-DIG-SAFE to locate utilities prior to starting Work as well as if damage occurs or if conflicts or emergencies arise during the Work.

1.4 SUBMITTALS

A. Provide the following submittals in accordance with Section 01 33 23.

B. Coordination Drawings: Prepare and submit coordination drawings where close and careful coordination is required for installation of products and materials fabricated off-site by separate entities, and where limited space availability necessitates maximum utilization of space for efficient installation of different components.

1. Show the interrelationship of components shown on separate Shop Drawings.
2. Indicate required installation sequences.

C. Staff Names: Within 15 days of Notice to Proceed, submit a list of the Contractor's principal staff assignments, including the Superintendent and other onsite personnel; identify individuals with their duties and responsibilities; list their addresses and telephone numbers.

1. Post copies of the list in the Project meeting room, in the temporary field office, and at each temporary land telephone.

PART 2 – PRODUCTS

(Not Applicable)

PART 3 – EXECUTION

3.1 GENERAL INSTALLATION PROVISIONS

A. Inspection of Conditions: Require the installer of each major component to inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.

B. Manufacturer's Instructions: Comply with manufacturer's written installation instructions and recommendations to the extent that those instructions and recommendations are more explicit or stringent than the Contract Documents' requirements.

C. Inspect materials or equipment immediately upon delivery and again prior to installation. Reject damaged and defective items.

D. Provide attachment and connection devices and methods necessary for securing Work. Secure Work true to line and level. Allow for expansion and structure movement.

E. Visual Effects: Provide uniform joint widths in exposed Work. Arrange joints in exposed Work to obtain the best visual effect. Refer questionable choices to the Engineer for final decision.

F. Recheck measurements and dimensions before starting each installation.

G. Install each component during weather conditions and Project status that meet industry and manufacturer installation requirements. Isolate each part of the completed construction from incompatible material as necessary to prevent deterioration.

H. Coordinate temporary enclosures with required inspections and tests, to minimize the necessity of uncovering completed construction for that purpose.

I. Mounting Heights: Where mounting heights are not indicated, install individual components at standard mounting heights recognized within the industry for the particular application indicated. Refer questionable mounting height decisions to the Engineer for final decision.

3.2 CLEANING AND PROTECTION

A. During handling and installation, clean and protect construction in progress and adjoining materials in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

B. Clean and maintain completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

C. Limiting Exposures: Supervise construction activities to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

End of Section

SECTION 01 31 19

PROJECT MEETINGS

PART 1 – GENERAL

1.1 SUMMARY

A. This Section specifies administrative and procedural requirements for project meetings including but not limited to:

1. Pre-Construction Conference.
2. Pre-Installation Conferences.
3. Coordination Meetings.
4. Progress Meetings.

1.2 PRE-CONSTRUCTION CONFERENCE

A. Schedule a pre-construction conference and organizational meeting at the Project site or other convenient location no later than 15 days after the Effective Date of the Contract and prior to commencement of construction activities. Conduct the meeting to review responsibilities and personnel assignments.

B. Attendees: The Owner, Engineer and their consultants, the Contractor and its superintendent, major subcontractors, and other concerned parties shall each be represented at the conference by persons familiar with and authorized to conclude matters relating to the Work.

C. Agenda: Discuss items of significance that could affect progress including such topics as:

1. Designation of responsible personnel
2. Owner authority and responsibilities
3. Contractor authority and responsibilities
4. Engineer authority and responsibilities
5. Distribution of Contract Documents
6. Office, Work, and storage areas
7. Tentative construction schedule
8. Temporary utilities
9. Subcontractors
10. Equipment deliveries and priorities
11. Schedule of Values
12. Preliminary Progress Schedule, critical Work sequencing
13. Submittals
14. Procedures for processing Applications for Payment
15. Preparation of record documents
16. Procedures for processing field decisions and Change Orders

17. Use of the premises, staging, storage
18. Safety procedures, first aid
19. Security
20. Housekeeping
21. Working hours
22. Project permits
23. Quality control and testing
24. Work of other contractor(s) that Contractor needs to coordinate with to complete the Work
25. Progress meetings

1.4 PRE-INSTALLATION CONFERENCES

A. Conduct a pre-installation conference at the site before each construction activity that requires coordination with other construction. The installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow shall attend the meeting. Advise the Engineer of scheduled meeting dates.

1. Review the progress of other construction activities and preparations for the particular activity under consideration at each pre-installation conference, including requirements for:

    a. Contract Documents
    b. Options
    c. Related Change Orders
    d. Purchases
    e. Deliveries
    f. Shop Drawings, Product Data and quality control Samples
    g. Possible conflicts
    h. Compatibility problems
    i. Time schedules
    j. Weather limitations
    k. Manufacturer's recommendations
    l. Compatibility of materials
    m. Acceptability of substrates
    n. Temporary facilities
    o. Space and access limitations
    p. Governing regulations
    q. Safety
    r. Inspection and testing requirements
    s. Required performance results
    t. Recording requirements
    u. Protection

2. Record significant discussions and agreements and disagreements of each conference along with the approved schedule. Promptly distribute the record of the meeting to everyone concerned including the Owner and Engineer.

3. Do not proceed if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of Work and reconvene the conference at the earliest feasible date.

1.5 PROGRESS MEETINGS

A. Conduct progress meetings at the Project site at regularly scheduled intervals. Notify the Owner, Engineer, and other concerned parties of scheduled meeting dates. Coordinate dates of meetings with preparation of the payment request.

B. Attendees: In addition to representatives of the Contractor, Owner, and Engineer, each subcontractor, supplier, or other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings by persons familiar with the Project and authorized to conclude matters relating to progress.

C. Agenda: Review and correct or approve minutes of the previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the current status of the Project.

1. Contractor's Construction Schedule: Review progress since the last meeting. Determine the status of each activity in relation to the Contractor's construction schedule, whether on time, ahead of schedule, or behind schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

2. Review the present and future needs of each entity present, including such items as:

    a. Interface requirements
    b. Time
    c. Sequences
    d. Deliveries
    e. Off-site fabrication problems
    f. Access
    g. Site utilization
    h. Temporary facilities and services
    i. Hours of work
    j. Hazards and risks
    k. Housekeeping
    l. Quality and work standards
    m. Change orders

n. Documentation of information for payment requests
o. Inspection and acceptance of equipment
p. Requirements for equipment start-up

3. Status of submittals

4. Status of progress payments

5. Any conflicts, discrepancies, or other difficulties requiring resolution

D. Reporting: No later than 3 days after each progress meeting date, distribute copies of minutes of the meeting to each party present and to other parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.

1. Schedule Updating: Revise the construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue the revised schedule concurrently with the report of each meeting.

PART 2 – PRODUCTS

(Not Applicable)

PART 3 – EXECUTION

(Not Applicable)

End of Section

SECTION 01 32 23

PROJECT SURVEY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division - 01 General Requirements, apply to this Section.

1.2 SUMMARY

A. General: This Section specifies administrative and procedural requirements for field engineering services, including, but not necessarily limited to, the following:

1. Layout
2. Civil engineering services

1.3 SUBMITTALS

A. None

1.4 QUALITY ASSURANCE

A. All survey work shall be done by a qualified surveyor, as Chief of Party, and qualified assistants experienced in this type of work.

B. Contractor is responsible for the accuracy of his work and shall maintain all reference points, stakes, etc., throughout the life of the Contract.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Provide all instruments, rods, measures, stakes, ribbons, nails and all other materials and equipment to perform the work of this Section.

PART 3 - EXECUTION

3.1 EXAMINATION

A. The Owner will identify control points and will provide horizontal and vertical layout information in digital format sufficient to construct the work.

B. It shall be the Contractor's responsibility to preserve control points. Replacement of control points damaged or destroyed by the Contractor shall be at the Contractor's expense.

C. Verify layout information shown on the Drawings, in relation to apparent field boundary evidence and existing benchmarks before proceeding with the work. Locate and protect existing benchmarks and control points. Preserve permanent reference points during construction.

D. The locations of buried utilities and/or structures shown on the drawings should be considered approximate. Before beginning work, investigate and verify the existence and location of underground utilities and other structures.

3.2 PERFORMANCE

A. Establish control as needed to properly locate each element of the work. Calculate and measure required dimensions within indicated or recognized tolerances. Do not scale drawings to determine dimensions.

B. Surveyor's Log: Maintain a surveyor's log of control and other survey work. Make this log available for reference.

1. Record deviations from required lines and levels, and advise the Engineer when deviations that exceed indicated or recognized tolerances are detected. On Project Record Drawings, record deviations that are accepted and not corrected.

C. Site Improvements: Locate and lay out site improvements, including pavements, stakes for grading, fill and topsoil placement, utility slopes and invert elevations by instrumentation and similar appropriate means.

D. Existing Utilities: Furnish information necessary to adjust, move or relocate existing structures, utility poles, lines, services or other appurtenances located in, or affected by construction. Coordinate with local authorities having jurisdiction.

End of Section

SECTION 01 32 33

CONSTRUCTION PHOTOGRAPHS

PART 1 – GENERAL

1.1 DESCRIPTION

A. Work covered under this section includes the furnishing of visual records of the work area and work by video and/or still photography.

1.2 RELATED REQUIREMENTS SPECIFIED ELSEWHERE

Summary of Work	01 11 13
Project Record Drawings	01 78 39

1.3 QUALITY ASSURANCE

A. Provide video tape with audio of all streets and easements where construction is to be performed under this contract prior to commencing work. Video tapes shall be recorded while walking the project area. A running audio will state the street or easement area. The project, photographers name, date, and time of day shall be stated at the beginning of the taping of each street or easement.

B. The Contractor shall video tape with audio all areas along the construction route. Examples being: cracked foundations or paved drives, lawns, ditch lines, mailbox and culvert locations, etc. When noting such items as stated above, audio reference shall be made to location by street, house number or any other identifying land marks.

C. Provide construction progress photographs during the contract period as directed by the Engineer.

D. Cost of the video taping and photographs to be considered incidental to the project.

1.4 NEGATIVES

A. Remain property of photographer.

B. Maintain negatives for a period of two years from Date of Completion of entire project.

C. Furnish additional prints during that time, to Owner and Engineer, at commercial rates applicable at time of purchase.

1.5 VIDEO TAPES

A. Video tapes shall be provided to and will remain the property of the Owner.

B. Contractor will retain video tape before erasing for a period of two years upon job completion.

PART 2 - PRODUCTS

2.1 PRINTS

A. Color

B. Finish: Smooth surface, glossy.

2.2 IDENTIFICATION

A. Identify each print on front.

1. Name of project.
2. Description of view.
3. Time and date of exposure.
4. Key plan, with location of camera and arrow to indicate the direction of view (structures only).
5. Name and address of photographer.
6. Photographer's numbered identifications of exposure.

2.3 VIDEO TAPES WITH AUDIO

A. Video tapes shall be in color.

B. Contractor is advised to playback portions of tape at the beginning of each taping session to assure proper recording of audio and visual.

PART 3 – EXECUTION

3.1 TECHNIQUE

A. Factual presentation.

B. Correct exposure and focus.

1. High resolution and sharpness.
2. Maximum depth-of-field.
3. Minimum distortion.

3.2 VIEWS REQUIRED

A. Photograph from locations to adequately illustrate state of project, or condition of construction.

End of Section

SECTION 01 33 23

SUBMITTALS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division - 01 General Requirements, apply to this Section.

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements for submittals required for performance of the Work, including;

1. Contractor's construction schedule
2. Submittal schedule
3. Daily construction reports
4. Shop Drawings
5. Product Data
6. Samples

B. Administrative Submittals: Refer to other Division - 01 Sections and other Contract Documents for requirements for administrative submittals. Such submittals may include, but are not limited to:

1. Permits
2. Applications for payment
3. Insurance certificates
4. List of Subcontractors
5. Equal Employment Opportunity and Labor Laws

1.3 SUBMITTAL PROCEDURES

A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay. Provide six (6) copies of submittals to the Engineer for review.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals and related activities that require sequential activity.

2. Coordinate transmittal of different types of submittals for related elements of the Work so processing will not be delayed by the need to review submittals concurrently for coordination.

a. The Engineer reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

3. Processing: Allow sufficient review time so that installation will not be delayed as a result of the time required to process submittals, including time for resubmittals.

a. Allow two weeks for initial review. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. The Engineer will promptly advise the Contractor when a submittal being processed must be delayed for coordination.

b. If an intermediate submittal is necessary, process the same as the initial submittal.

c. No extension of Contract Time will be authorized because of failure to transmit submittals to the Engineer sufficiently in advance of the Work to permit processing.

B. Submittal Preparation: Place a permanent label or title block on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label or title block.

1. Provide a space approximately 4" x 5" on the label or beside the title block on Shop Drawings to record the Contractor's review and approval markings and the action taken.

2. Include the following information on the label for processing and recording action taken.

a. Project name
b. Date
c. Name and address of Engineer
d. Name and address of Contractor
e. Name and address of subcontractor
f. Name and address of supplier
g. Name of manufacturer
h. Number and title of appropriate Specification Section
i. Drawing number and detail references, as appropriate

C. Package each submittal appropriately for transmittal and handling. Transmit each submittal from Contractor to Engineer using a transmittal form. Submittals received from sources other than the Contractor will be returned without action.

1. On the transmittal record relevant information and requests for data. On the

form, or separate sheet, record deviations from Contract Document requirements, including minor variations and limitations. Include Contractor's Certification that information complies with Contract Document requirements.

1.4 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Prepare a fully developed, horizontal bar chart type Contractor's construction schedule. Submit within 15 days of "Notice to Proceed".

1. Provide a separate time bar for each significant construction activity. Provide a continuous vertical line to identify the first working day of each week. Use the same breakdown of units of the Work as indicated in the "Schedule of Values", if applicable.

2. Within each time bar indicate estimated completion percentage in 10 percent increments. As Work progresses, place a contrasting mark in each bar to indicate Actual Completion.

3. Prepare the schedule on a sheet, or series of sheets, of sufficient width to show data for the entire construction period.

4. Secure time commitments for performing critical elements of the Work from parties involved. Coordinate each element on the schedule with other construction activities; include minor elements involved in the sequence of the Work. Show each activity in proper sequence. Indicate graphically sequences necessary for completion of related portions of the Work.

5. Coordinate the Contractor's construction schedule with the schedule of values (if applicable), list of subcontracts, submittal schedule, progress reports, payment requests and other schedules.

B. Phasing: Provide notations on the schedule to show how the sequence of the Work is affected by requirements for phased completion to permit work by separate Contractors and partial occupancy by the Owner prior to Substantial Completion.

C. Work Stages: Indicate important stages of construction for each major portion of the Work, including testing and installation.

D. Area Separations: Provide a separate time bar to identify each major construction area for each major portion of the Work. Indicate where each element in an area must be sequenced or integrated with other activities.

E. Distribution: Following response to the initial submittal, print and distribute copies to the Engineer, Owner, subcontractors, and other parties required to comply with scheduled dates. Post copies in the Project meeting room and temporary field office.

1. When revisions are made, distribute to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in construction activities.

F. Schedule Updating: Revise the schedule after each meeting or activity, where revisions have been recognized or made. Issue the updated schedule concurrently with report of each meeting.

1.5 SUBMITTAL SCHEDULE

A. After development and acceptance of the Contractor's construction schedule, prepare a complete schedule of submittals. Submit the schedule within 7 days of the date required for establishment of the Contractor's construction schedule.

B. Distribution: Following response to initial submittal, print and distribute copies to the Engineer, Owner, subcontractors, and other parties required to comply with submittal dates indicated. Post copies in the Project meeting room and field office.

1. When revisions are made, distribute to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in construction activities.

C. Schedule Updating: Revise the schedule after each meeting or activity, where revisions have been recognized or made. Issue the updated schedule concurrently with report of each meeting.

1.6 SHOP DRAWINGS

A. Submit newly prepared information, drawn to accurate scale. Indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis for Shop Drawings.

B. Shop Drawings include fabrication and installation drawings, setting diagrams, schedules, patterns, templates and similar drawings. Include the following information:

1. Dimensions
2. Identification of products and materials included
3. Compliance with specified standards
4. Notation of coordination requirements
5. Notation of dimensions established by field measurement
6. Sheet Size: Except for templates, patterns and similar full size drawings, submit Shop Drawings on sheets at least 8-1/2" x 11" but no larger than 24" x 36"
7. Submittals: Submit six (6) copies of all information to the Engineer for review.

8. Distribution: Furnish copies of final submittal to installers, subcontractors, suppliers, manufacturers, fabricators, and others required for performance of construction activities. Show distribution on transmittal forms.
9. Do not use Shop Drawings without an appropriate final stamp indicating action taken in connection with construction.

1.7 PRODUCT DATA

A. Collect Product Data into a single submittal for each element of construction or system. Product Data includes printed information such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, standard wiring diagrams and performance curves.

1.8 SAMPLES

A. Submit samples as required. Samples include, but are not limited to, physical examples of the work, such as sections of manufactured or fabricated work, small cuts or containers of materials, complete units of repetitively-used products, color/texture/pattern swatches and range sets, specimens for coordination of visual effects, graphic symbols, and units of work to be used by the Engineer or Owner for independent inspection and testing, as applicable to the work.

1. Submittals: Except for Samples illustrating assembly details, workmanship, fabrication techniques, connections, operation and similar characteristics, submit 3 sets; one will be returned marked with the action taken.

2. Maintain sets of Samples, as returned, at the Project site, for quality comparisons throughout the course of construction.

3. Distribution of Samples: Prepare and distribute additional sets to subcontractors, manufacturers, fabricators, suppliers, installers, and others as required for performance of the Work. Show distribution on transmittal forms.

1.9 ENGINEER'S ACTION

A. Except for submittals for record, information or similar purposes, where action and return is required or requested, the Engineer will review each submittal, mark to indicate action taken, and return promptly.

1. Compliance with specified characteristics is the Contractor's responsibility.

B. Action Stamp: The Engineer will stamp each submittal with a uniform, self-explanatory action stamp. The stamp will be appropriately marked, as follows, to indicate the action taken:

1. Reviewed as submitted: Where submittals are marked "Reviewed as submitted,"

that part of the work covered by the submittal may proceed provided it complies with requirements of the Contract Documents; final acceptance will depend upon that compliance.

2. Reviewed – make corrections noted: When submittals are marked "Reviewed – make corrections noted," that part of the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents; final acceptance will depend on that compliance.

3. Rejected – revise and re-submit: When submittal is marked "Rejected - revise and resubmit", do not proceed with that part of the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal in accordance with the notations; resubmit without delay.

PART 2 - PRODUCTS

Not Applicable

PART 3 – EXECUTION

Not Applicable

End of Section

SECTION 01 42 16

REFERENCE STANDARDS AND DEFINITIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division - 01 General Requirements, apply to this Section.

1.2 DEFINITIONS

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. Indicated: The term indicated refers to graphic representations, notes, or schedules on the Drawings, or other Paragraphs or Schedules in the Specifications, and similar requirements in the Contract Documents. Terms such as shown, noted, scheduled, and specified are used to help the reader locate the reference. There is no limitation on location.

C. Directed: Terms such as directed, requested, authorized, selected, approved, required, and permitted mean directed by the Engineer, requested by the Engineer, and similar phrases.

D. Approve: The term approved, when used in conjunction, with the Engineer's action on the Contractor's submittals, applications, and requests, is limited to the Engineer's duties and responsibilities as stated in the Conditions of the Contract.

E. Regulation: The term regulations includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.

F. Furnish: The term furnish means supply and deliver to the Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

G. Install: The term install describes operations at the Project site including the actual unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

H. Provide: The term provide means to furnish and install, complete and ready for the intended use.

I. Installer: An Installer is the Contractor or an entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier, to perform a particular construction activity, including installation, erection, application, and similar operations.

Installers are required to be experienced in the operations they are engaged to perform.

1. The term experienced, when used with the term Installer means having a minimum of five previous projects similar in size and scope to this Project, being familiar with the special requirements indicated, and having complied with requirements of the authority having jurisdiction.

2. Trades: Using terms such as carpentry is not intended to imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as carpenter. It also does not imply that requirements specified apply exclusively to tradespersons of the corresponding generic name.

3. Assigning Specialists: Certain Sections of the Specifications require that specific construction activities shall be performed by specialists who are recognized experts in those operations. The specialists must be engaged for those activities, and their assignments are requirements over which the Contractor has no choice or option. However, the ultimate responsibility for fulfilling Contract requirements remains with the Contractor.

    a. This requirement shall not be interpreted to conflict with enforcement of building codes and similar regulations governing the Work. It is also not intended to interfere with local trade union jurisdictional settlements and similar conventions.

J. Project Site is the space available to the Contractor for performing construction activities, either exclusively or in conjunction, with others performing other work as part of the Project. The extent of the Project Site is shown on the Drawings and may or may not be identical with the description of the land on which the Project is to be built.

K. Testing Agencies: A testing agency is an independent entity engaged to perform specific inspections or tests, either at the Project Site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.

1.3 SPECIFICATION FORMAT AND CONTENT EXPLANATION

A. Specification Format: These Specifications are organized into Divisions and Sections based on the Construction Specifications Institute's 16-Division format.

B. Specification Content: This Specification uses certain conventions regarding the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations or circumstances. These conventions are explained as follows:

4. Abbreviated Language: Language used in Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words that are implied, but not stated, shall be interpolated as the

sense requires. Singular words will be interpreted as plural and plural words interpreted as singular where applicable as the context of the Contract Documents indicates.

5. Imperative and streamlined language is used generally in the Specifications. Requirements expressed in the imperative mood are to be performed by the Contractor. At certain locations in the Text, subjective language is used for clarity to describe responsibilities that must be fulfilled indirectly by the Contractor, or by others when so noted.

1.4 INDUSTRY STANDARDS

A. Applicability of Standards: Except where the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with the standards in effect as of the date of the Contract Documents.

C. Conflicting Requirements: Where compliance with two or more standards is specified, and where the standards may establish different or conflicting requirements for minimum quantities or quality levels, refer requirements that are different, but apparently equal, and uncertainties to the Engineer for a decision before proceeding.

1. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of the requirements. Refer uncertainties to the Engineer for a decision before proceeding.

D. Copies of Standards: Each entity engaged in construction on the Project is required to be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

2. Where copies of standards are needed to perform a required construction activity, the Contractor shall obtain copies directly from the publication source.

E. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. Where such acronyms or abbreviations are used in the Specifications or other Contract Documents, they mean the recognized name of the trade association, standards-generating organization, authority having jurisdiction, or other entity applicable to the context of the text provision. Refer to the "Encyclopedia of Associations," published by Gale Research Co., available in most libraries.

F. The following is a partial listing of organizations and their abbreviations which may apply to the Contract Documents.

AA	Aluminum Association
AAN	American Association of Nurserymen
AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
ACIL	American Council of Independent Laboratories
ACPA	American Concrete Pipe Assoc.
AGA	American Gas Association
AI	Asphalt Institute
AIA	American Institute of Architects
AIHA	American Industrial Hygiene Assoc.
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
AMCA	Air Moving and Conditioning Association, Inc.
ANSI	American National Standards Institute
API	American Petroleum Institute
AREA	American Railway Engineering Association
ARI	Air conditioning and Refrigeration Institute
ASA	Acoustical Society of America
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASPE	American Society of Plumbing Engineers
ASSE	American Society of Sanitary Engineering
ASTM	American Society for Testing and Materials
AWPA	American Wood Preservers' Association
AWS	American Welding Society
AWWA	American Water Works Assoc.
CBM	Certified Ballast Manufacturers
CE	Corps of Engineers
CFR	Code of Federal Regulations (Available from the Government Printing Office)
CISPI	Cast Iron Soil Pipe Institute
CPSC	Consumer Product Safety Commission
CRSI	Concrete Reinforcing Steel Institute
DHUD	U.S. Department of Housing and Urban Development
EIA	Electronic Industries Association
EIMA	Exterior Insulation Manufacturers Assoc.
EJMA	Expansion Joint Manufacturers Assoc.
EPA	U.S. Environmental Protection Agency (USEPA)
ETL	Electrical Testing Laboratories, Inc.

FAA	Federal Aviation Administration
FCC	Federal Communications Commission
FHA	Federal Housing Administration
FM	Factory Mutual Laboratories
FS	Federal Specification
GSA	General Services Administration
IBR	Institute of Boiler and Radiator Manufacturers
IEEE	Institute of Electrical and Electronics Engineers
IPCEA	Insulated Power Cable Engineers Association
NAPA	National Asphalt Pavement Assoc.
NBFU	National Board of Fire Underwriters
NBS	National Bureau of Standards
NCSPA	National Corrugated Steel Pipe Association
NEC	National Electric Code (from NFPA)
NECA	National Electrical Contractors Assoc.
NEMA	National Electrical Manufacturers Assoc.
NEWWA	New England Water Works Association
NFPA	National Fire Protection Assoc.
NPCA	National Paint and Coatings Assoc.
NSF	National Sanitation Foundation
OSHA	Occupational Safety and Health Administration
PCA	Portland Cement Assoc.
PCI	Precast/Prestressed Concrete Institute
PS	Product Standard
RD	Rural Development
SCS	U.S. Soil Conservation Service
SDI	Steel Door Institute
SSPC	Steel Structures Painting Council
UBC	Uniform Building Code
UL	Underwriters Laboratories, Inc.
USDA	U.S. Department of Agriculture
WWPA	Western Wood Products Association

1.5 GOVERNING REGULATIONS AND AUTHORITIES

A. The Engineer has contacted authorities having jurisdiction where necessary to obtain information to prepare Contract Documents. Contact authorities having jurisdiction directly for information and decisions regarding the Work.

B. Copies of Regulations: Obtain copies of the following regulations and retain at the Project site to be available for reference by parties who have a reasonable need.

1.6 SUBMITTALS

A. Permits, Licenses, and Certificates: For the Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices,

receipts for fee payments, judgments, and similar documents, correspondence, and records established in conjunction with compliance with standards and regulations bearing upon performance of the Work.

PART 2 - PRODUCTS

Not Applicable

PART 3 – EXECUTION

Not Applicable

End of Section

SECTION 01 45 29

TESTING LABORATORY SERVICES

PART 1 -GENERAL

1.1 GENERAL

A. This Section specifies requirements for testing laboratory services. These services include inspections and tests performed by independent contractors, governing authorities, as well as the Contractor.

B. Related Work specified elsewhere includes:

Division - 02

1.2 QUALITY ASSURANCE

A. Duties of the Testing Company: The company engaged to perform inspections and testing shall cooperate with the Engineer and Contractor in performance of its duties, and provide qualified personnel to perform inspections and tests.

1. The agency shall notify the Engineer and Contractor promptly of deficiencies observed during performance of its services.

2. The agency is not authorized to release, revoke, alter or enlarge requirements of the Contract Documents, or approve or accept any portion of the Work.

B. Coordination: The Contractor and each agency engaged to perform inspections and tests shall coordinate the sequence of activities to accommodate services with a minimum of delay. The Contractor and each agency shall coordinate activities to avoid removing and replacing construction to accommodate inspections and tests.

1. The Contractor is responsible for scheduling inspections, tests, taking samples and similar activities.

1.3 SUBMITTALS

A. Submit three (3) certified copies of test results from the laboratory to the Engineer.

B. The Contractor shall submit the name, address, and telephone number of a qualified testing laboratory whose services will be used for the testing required under these Specifications. Provide documentation outlining the experience, ability, facilities, and fees of the proposed laboratory. The Engineer will authorize or reject the use of the proposed laboratory based on evaluation of this information.

1.4 DELIVERY, HANDLING, AND STORAGE

A. Care shall be taken during the collection, storage, and transportation of samples to prevent disturbances of damage.

B. Follow recognized procedures for collecting, storing, and transporting samples to the testing laboratory.

1.5 SCHEDULING AND PAYMENT

A. The Engineer shall determine the date, time, and quantity of samples and tests to be taken unless otherwise specified. The Engineer shall notify the Contractor of his decision to perform testing. It shall be the Contractor's responsibility to notify the testing laboratory and have the testing performed as requested by the Engineer.

B. Initial testing shall be paid for by the Owner. Retesting necessary due to failing test results and/or non-conforming work shall be at the Contractor's expense.

C. Every effort shall be made to avoid delays in the Work which may impact scheduled testing. Should testing be impossible due to construction delays, reschedule testing to a date acceptable to the Engineer.

D. If sampling or testing cannot be performed when required, delay the Work until such testing can be performed. If requested by the Engineer, uncover work which has been covered or hidden without being tested. The Engineer reserves the right to reject any work which cannot be tested, and the Contractor shall be responsible for all costs associated with said rejection.

PART 2 – PRODUCTS

2.1 REPORTING

A. All test reports shall be submitted in writing and shall include date, time, and location of the testing or sampling. The report shall also specify the testing method used, the test results, project name, and any other information pertinent to the report.

B. Each report shall be signed by an officer of the testing laboratory and forwarded to the Engineer.

2.2 PAYMENT

A. The Owner shall pay the cost of all initial tests. Costs for any testing required because of improperly installed or nonconforming work shall be borne by the Contractor.

PART 3 – EXECUTION

3.1 TESTING AND SAMPLING

A. Samples shall be taken by and testing performed by persons who are employed by the testing laboratory and familiar with sampling and testing procedures, unless otherwise directed by the Engineer.

B. Provide the representative of the testing laboratory and the Engineer with all materials, equipment, and facilities necessary to secure samples and otherwise perform work under this Section.

End of Section

SECTION 01 77 19

PROJECT CLOSEOUT

PART 1 — GENERAL

1.1 GENERAL

A. Substantial Completion: Before requesting inspection for Statement of Substantial Completion, complete the following:

1. In the Application for Payment that coincides with the date Substantial Completion is claimed, show 100 percent completion for the portion of the Work claimed substantially complete.

2. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications and similar documents.

3. Submit record drawings, maintenance manuals, final project photographs, damage or settlement survey, property survey, and similar record information.

4. Change-over permanent locks and transmit keys to the Owner.

5. Complete start-up testing of systems, and instruction of the Owner's personnel. Remove temporary facilities from the site, along with construction tools, mock-ups, and similar elements.

6. Complete final clean up. Touch-up and repair and restore marred exposed finishes.

B. Inspection Procedures: On receipt of a request for inspection, the Engineer will proceed or advise the Contractor of unfilled requirements. The Engineer will prepare the Statement of Substantial Completion following inspection, or advise the Contractor of construction that must be completed or corrected before the certificate will be issued.

1. The Engineer will repeat inspection when requested and assured that the Work has been substantially completed.

2. Results of the completed inspection will form the basis of requirements for final acceptance.

C. Final Acceptance: Before requesting inspection as basis for final acceptance and final payment, complete the following:

1. Submit final payment request with releases.

2. Submit a final statement, accounting for changes to the Contract Sum.

3. Submit a copy of the final inspection list stating that each item has been completed or otherwise resolved for acceptance.

4. Submit final meter readings for utilities, a record of stored fuel, and similar data as of Substantial Completion.

5. Submit consent of surety to final payment.

6. Submit evidence of continuing insurance coverage complying with insurance requirements.

D. Reinspection Procedure: The Engineer will reinspect the Work upon receipt of notice that the Work has been completed, except items whose completion has been delayed because of circumstances acceptable to the Engineer.

1. Upon completion of reinspection, the Engineer will prepare a Statement of final acceptance, or advise the Contractor of work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.

2. If necessary, reinspection will be repeated.

E. Record Document Submittals: Do not use Record Documents for construction purposes; protect from loss in a secure location; provide access to Record Documents for the Engineer's reference.

F. Record Drawings: Maintain a clean, undamaged set of blue or black line white-prints of Contract Drawings and Shop Drawings. Mark-up these drawings to show the actual installation. Mark whichever drawing is most capable of showing conditions accurately. Give particular attention to concealed elements that would be difficult to measure and record at a later date.

1. Organize record drawing sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates and other identification on the cover.

G. Record Specifications: Maintain one copy of the Project Manual, including addenda. Mark to show variations in actual Work performed in comparison with the Specifications and modifications. Give particular attention to substitutions, selection of options and similar information on elements that are concealed or cannot be readily discerned later by direct observation. Note related record drawing information and Product Data.

1. Upon completion of the Work, submit record Specifications to the Engineer for the Owner's records.

H. Maintenance Manuals: Organize maintenance data into sets of manageable size. Bind in individual heavy-duty 3-ring vinyl-covered binders, thickness as necessary to accommodate contents, with pocket folders for folded sheet information. Mark identification on front and spine of each binder. Include the following information:

1. Shop Drawings and Product Data.
2. Wiring diagrams.
3. Spare parts list.
4. Tools and lubricants.
5. Copies of warranties.
6. Start-up and shut-down procedures.
7. Control Sequences.
8. Adjustments.
9. Maintenance schedules.
10. Inspection procedures.
11. Trouble shooting guides.
12. Hazards and safety procedures.
13. Emergency procedures.
14. Maintenance agreements and similar continuing commitments.

I. Operating and Maintenance Instructions: Arrange for the installer of equipment that requires regular maintenance to meet with the Owner's personnel to provide instruction in proper operation and maintenance. Include a detailed review of all applicable items listed above.

J. As part of instruction for operating equipment, demonstrate the following procedures:

1. Start-up and shutdown.
2. Control Sequences.
3. Adjustments.
4. Inspection procedures.
5. Safety procedures.
6. Emergency operations.

K. Final Cleaning: Employ experienced workers for final cleaning. Clean each surface to the condition expected in a commercial building cleaning and maintenance program. Complete the following before requesting inspection for Statement of Substantial Completion:

1. Remove labels that are not permanent labels.

2. Clean transparent materials. Remove glazing compound. Replace chipped or broken glass.

3. Clean exposed hard-surfaced finishes to a dust-free condition, free of stains, films and similar foreign substances. Restore reflective surfaces to their original reflective condition. Leave concrete floors broom clean. Vacuum carpeted surfaces.

4. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps.

5. Clean the site of rubbish, litter and other foreign substances. Sweep paved areas; remove stains, spills and other foreign deposits. Rake grounds that are neither paved nor planted, to a smooth even-textured surface.

L. Removal of Protection: Remove temporary protection and facilities.

M. Compliance: Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Remove waste materials from the site and dispose of in a lawful manner.

PART 2 — PRODUCTS

Not Applicable

PART 3 — EXECUTION

Not Applicable

End of Section

SECTION 01 78 39

PROJECT RECORD DRAWINGS

PART 1 – GENERAL

1.1 DESCRIPTION

A. Work covered under this Section includes the preparation and submittal of record documents.

1.2 SUBMITTALS

A. As soon as possible after the completion of the Work, submit record documents as specified in the Section to the Engineer for review and final payment.

B. The Engineer will retain all materials submitted by the Contractor.

PART 2 – PRODUCTS

2.1 RECORD DRAWINGS

A. One (1) set of legibly marked plans showing all work as actually installed.

PART 3 – EXECUTION

3.1 RECORD DOCUMENTS

A. Maintain on-site in a clean, orderly fashion one (1) set of all drawings, specifications, addenda, change orders, test reports, submittals, and all other information pertinent to the work.

3.2 RECORD DRAWINGS

A. Maintain one (1) set of record drawings which accurately depicts existing conditions on-site, the Work as it is actually installed, and all existing utilities, etc. encountered during the installation of the work.

B. Legibly mark up one (1) set of drawings with the following information as a minimum:

1. The work as it is actually installed.
2. All approved field changes.
3. All pipes, structures, or obstructions encountered during the performance of the work, including the limits and depth of rock or unstable materials.

4. Locations, ties, and elevations of all buried utilities, appurtenances, and/or structures to the nearest 0.1 foot.
5. All changes to the work not shown on original construction drawings.
6. Locations and elevations of all Work; limits and quantities of all pay items.

End of Section

DIVISION 02 – EXISTING CONDITIONS

SECTION 02 01 00

EXISTING UTILITIES AND UNDERGROUND STRUCTURES

PART 1 – GENERAL

1.1 DESCRIPTION

A. The Engineer and Owner have made limited investigations to determine the locations of underground utilities and structures. Because of the nature of subsurface utilities and the difficulty in determining exact locations, the locations as shown on the plans should be considered approximate. Wherever underground utilities are encountered by the Contractor during construction they shall be protected by the Contractor, at his own expense, until the construction work is complete and the existing structures are made secure. Injury to any such utilities/structures caused by or resulting from the Contractor's work shall be repaired at the Contractor's expense. No additional compensation will be allowed for any delays sustained by the Contractor due to any interference from underground utilities.

B. It shall be the Contractor's responsibility to notify Dig Safe and locate all utilities within the construction area prior to proceeding with construction.

C. The restoration of existing property shall be done as promptly as practicable and shall not be left until the end of the construction period.

D. Cooperation with Utilities:

1. The Contractor shall allow the Owner or its agents and other contractors, and public service corporations, or their agents, to enter upon the work for the purpose of constructing, maintaining, repairing, removing, altering or replacing such pipes, sewers, conduits, manholes, wires, poles, or other structures and appliances as are now located or as may be required or permitted at or on the work by the Engineer.

   The Contractor shall cooperate with all aforesaid parties and shall allow reasonable facilities for the prosecution of any other work by the Owner, or of public service corporation, to be done in connection with this work. Care shall be taken at all times to inconvenience abutters as little as possible.

PART 2 – PRODUCTS

Not Used

PART 3 – EXECUTION

Not Used

End of Section

DIVISION 31 – EARTHWORK

SECTION 31 08 00

RESTORATION OF SURFACES

PART 1 – GENERAL

1.1 DESCRIPTION

A. Work covered in this Section includes the restoration of surfaces and items disturbed during the Work.

B. Related work described elsewhere:

Earthwork	Division - 31

1.2 QUALITY ASSURANCE

A. Restoration of surfaces and items shall be done in accordance with the requirements of those authorities having jurisdiction.

B. Existing pavements and bituminous walks shall be replaced using new pavement equal to or better than the existing in quality and thickness, except where otherwise specified. Pavements shall be free from all noticeable sags, humps, cracks, or other defects.

C. Replacement curbing shall be of the same size, material, and appearance as adjoining curbing.

D. Grassed and vegetated areas shall be loamed and replanted with healthy vegetation of a type and quality equal to or superior to existing vegetation.

E. Miscellaneous items including but not limited to mailboxes, fencing, signage, etc. shall be carefully removed and replaced.

1.3 SUBMITTALS

A. Submittals shall be submitted in accordance with Section - 01 33 23 “Submittals”.

1.4 SCHEDULING

A. All surfaces shall be restores as soon as possible after completion of that portion of the Work.

PART 2 – MATERIALS

2.1 NEW MATERIALS

A. New materials shall comply with the requirements of the authority having jurisdiction.

2.2 REUSED MATERIALS

A. Items such as granite curbs, fencing, signs, walks, etc. which have been disturbed during the Work may be replaced with existing materials when, in the opinion of the Engineer, such materials are in acceptable condition.

PART 3 – EXECUTION

3.1 INSPECTION

A. Prior to restoring any surfaces, carefully inspect the Work to ensure that the work is complete. Unnecessary disturbance of restored surfaces is to be avoided.

3.2 PLANTS

A. Replace in their original locations all surviving, health plants, shrubs, trees, etc. which were removed during installation of the Work.

B. Replace with the same type and size any vegetation which does not survive moving.

3.3 GRASS AND LAWNS

A. Grassed areas are to be restored in accordance with Section 32 92 00 “Loaming, Seeding, and Fertilizing”.

3.4 BITUMINOUS PAVING

A. All Work shall conform to Section 32 12 16.31 “Bituminous Concrete Pavement – NH”.

B. Replace all pavement markings immediately after installation of new pavement.

3.5 MISCELLANEOUS

A. Replace miscellaneous items such as fencing, gates, signage, mailboxes, etc. in the same location as soon as possible after installation of the Work.

End of Section

SECTION 31 11 00

CLEARING, GRUBBING, and STRIPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division - 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Protection of existing trees
2. Removal of trees and other vegetation
3. Topsoil stripping
4. Clearing and grubbing
5. Removing above-grade improvements
6. Removing below-grade improvements

1.3 PROJECT CONDITIONS

A. Traffic: Conduct site clearing operations to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities. Do not close or obstruct streets, walks or other occupied or used facilities without permission from authorities having jurisdiction.

B. Protection of Existing Improvements: Provide protections necessary to prevent damage to existing improvements indicated to remain in place.

1. Protect improvements on adjoining properties and on Owner's property.
2. Restore damaged improvements to their original condition, as acceptable to property owners.

C. Protection of Existing Trees and Vegetation: Protect existing trees and other vegetation indicated to remain in place, against unnecessary cutting, breaking or skinning of roots, skinning or bruising of bark, smothering of trees by stockpiling construction materials or excavated materials within drip line, excess foot or vehicular traffic, or parking of vehicles within drip line. Provide temporary guards to protect trees and vegetation to be left standing.

3. Water trees and other vegetation to remain within limits of contract work as required to maintain their health during course of construction operations.

4. Provide protection for roots over 1-1/2 inch diameter that are cut during construction operations. Coat cut faces with an emulsified asphalt, or other acceptable coating, formulated for use on damaged plant tissues. Temporarily cover exposed roots with wet burlap to prevent roots from drying out; cover with earth as soon as possible.

5. Repair or replace trees and vegetation indicated to remain which are damaged by construction operations, in a manner acceptable to Engineer. Employ a competent arborist to repair damages to trees and shrubs.

6. Replace trees which cannot be repaired and restored to full-growth status, as determined by arborist.

D. Salvageable Equipment and Materials: Carefully remove any items indicated to be salvaged, and store on Owner's premises where indicated or directed.

PART 2 - PRODUCTS

Not Applicable

PART 3 - EXECUTION

3.1 SITE CLEARING

A. General: Remove trees, shrubs, grass and other vegetation, improvements, or obstructions as required to permit installation of new construction. Do not exceed clearing limits shown on the plans and clear only the minimum area required to install the work. Excessive clearing is to be avoided.

1. Cut minor roots and branches of trees indicated to remain in a clean and careful manner, where such roots and branches obstruct installation of new construction.

B. Clearing and Grubbing: Clear indicated areas of site of trees, shrubs and other vegetation, except for those indicated to be left standing.

1. Completely remove stumps, roots, and other debris protruding through ground surface. Stockpile separate from other materials to avoid contamination.

2. Use only hand methods for grubbing inside drip line of trees indicated to remain.

3. Fill depressions caused by clearing and grubbing operations with common earth, unless further excavation, earthwork or surface treatment is indicated.

    a. Unless indicated otherwise, place fill material in horizontal layers not exceeding one (1) foot loose depth, and compact to a density nearly equal to that of adjacent, original ground.

C. Removal of Improvements: Remove existing above-grade and below-grade improvements as indicated and as necessary to facilitate new construction.

3.2 DISPOSAL OF WASTE MATERIALS

A. Removal from Owner's Property: Remove and properly dispose of stumps, waste materials and unsuitable or excess earth materials off site unless otherwise directed by the Engineer.

End of Section

SECTION 31 23 16

EARTHWORK

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work covered by this Section includes Drawings and general provisions of the Contract, including General and Supplementary Conditions, Division 01 and Division 31 Specification Sections.

B. Work performed under this Section is intended to conform with State of New Hampshire, Department of Transportation, "Standard Specifications for Road and Bridge Construction (latest revision)".

1.2 SUMMARY

A. This Section includes the following:

1. Preparing subgrade, subbase and base for building slabs, walks, and pavements.

2. Excavating, trenching and backfilling of underground utilities, structures and foundations.

3. Preparing subgrade and installing earthen material courses for site projects.

1.3 DEFINITIONS

A. Borrow consists of approved material required for the construction of fills or other portions of the work, and shall be obtained from approved sources, which sources may be designated in the Contract.

B. Earth consists of clay, loam, sand, gravel, topsoil and other materials not otherwise classified.

C. Excavation consists of removal of material encountered to subgrade elevations or dimensions indicated and subsequent disposal of materials removed, classified as follows:

1. Earth Excavation includes excavation of pavements and other obstructions visible on surface; underground structures, utilities, and other items indicated to be demolished and removed; together with earth and other materials encountered that are not classified as rock or unauthorized excavation.

    a. Common Earth Excavation consists of all excavation other than Trench Earth Excavation and Rock Excavation.

b. Trench Earth Excavation consists of excavations for pipelines, cables, conduits, manholes and other related work where the bottom-width limit of excavation does not exceed 8 feet.

2. Rock Excavation consists of all solid rock which cannot be removed without blasting or ripping. Intermittent drilling, blasting, or ripping performed to increase production and not necessary to permit excavation of material encountered will be classified as earth excavation.

   a. Site Rock Excavation consists of all rock excavation other than Trench Rock Excavation and includes the excavation of boulders and parts of masonry structures when found to measure 2 cubic yards or more.

   b. Trench Rock Excavation consists of rock excavation where solid rock and boulders or parts of masonry structures found to measure 1 cubic yard of more are removed from trenches where the bottom-width limit of excavation does not exceed 8 feet.

3. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of Engineer. Unauthorized excavation, as well as remedial work directed by Engineer, shall be at Contractor's expense.

   a. Under footings, foundation bases, or retaining walls, fill unauthorized excavation by extending indicated bottom elevation of footing or base to excavation bottom, without altering required top elevation. Lean concrete fill may be used to bring elevations to proper position, when acceptable to Engineer.

   b. In locations other than those above, backfill and compact unauthorized excavations as specified for authorized excavations of same classification, unless otherwise directed by Engineer.

4. Additional Excavation: When excavation has reached required subgrade elevations, notify Engineer, who will observe subgrade conditions. If Engineer believes that bearing materials at required subgrade elevations are unsuitable, continue excavation until suitable bearing materials are encountered and replace excavated material as directed by Engineer.

   a. Removal of unsuitable material and its replacement as directed will be paid on basis of Conditions of the Contract relative to changes in work.

D. Subgrade consists of the undisturbed earth or the compacted soil layer immediately below indicated surface treatment systems.

E. Structure: Buildings, foundations, slabs, tanks, curbs, or other man-made stationary features occurring above or below ground surface.

F. Unstable Material consists of debris, frozen materials, topsoil, quick-sand, and all wet, soft or loose material which does not provide sufficient bearing capacity to satisfactorily support pipes or other work.

G. Unsuitable Material consists of excavated material which does not meet requirements for backfilling purposes and includes solid and loose rock and unstable material.

H. Paved Areas consist of the area which lies directly under a paved surface, whether it is asphalt, concrete, or other paving materials.

I. Select Fill – Consists of Select Earth, imported sand and or other granular materials as specified and/or approved by the Engineer.

J. Earth Overburden – Earth overlying solid rock and in place during blasting operations or earth not classified as Select or Common Earth.

K. Pipe Bedding – Sand, crushed stone, or other processed granular materials as approved by the Engineer. Pipe bedding material(s) shown on the Drawings take precedence over this paragraph.

L. Wood Sheeting and Bracing – Sound timber, free from defects which might impair its strength and effectiveness.

M. Steel Sheeting and Bracing – ASTM A328.

N. Backfill – General – To the extent suitable materials are available, backfill shall consist of excavated material. Where excavation does not provide sufficient approved material, import additional material from off-site.

O. Backfill-Trenches – Select fill from pipe bedding material up to a minimum of 12” over the top of pipe; suitable Common Earth, Select Earth, of Select Fill for the remainder of the trench. Backfill materials shown on the Drawings take precedence over this paragraph.

P. Backfill – Around Structures – In paved areas, Select Fill, or a better material when required, for the full depth. In unpaved areas, Select Fill for the full depth. Backfill materials shown on the Drawings take precedence over this paragraph.

Q. Concrete for Cradles and Encasements – Class C concrete.

1.4 SUBMITTALS

A. Test Reports: Submit the following reports directly to Engineer from the testing services, with copy to Contractor:

1. Certified copies of all results of moisture-density tests and field compaction density tests.
2. Gradations of materials proposed for use in the Work.
3. Copies of measurements and computed volumes of unstable material removed.
4. Certification from testing laboratory that materials meet permeability requirements at required compaction.
5. Verification of suitability of each footing subgrade material, in accordance with specified requirements.
6. Report of actual unconfined compressive strength and/or results of bearing tests of each strata tested.

1.5 QUALITY ASSURANCE

A. All fill material shall be subject to the approval of the Engineer.

B. Codes and Standards: Perform excavation work in compliance with applicable requirements of authorities having jurisdiction.

C. Testing and Inspection Service: Contractor shall employ and pay for (unless specified otherwise) a qualified independent geotechnical testing laboratory to perform soil testing and inspection service during earthwork operations.

D. Testing Laboratory Qualifications: To qualify for acceptance, the geotechnical testing laboratory must demonstrate to Engineer's satisfaction, based on evaluation of laboratory-submitted criteria conforming to ASTM E 699, that it has the experience and capability to conduct required field and laboratory geo-technical testing without delaying the progress of the Work.

E. Moisten or dry backfill to the proper moisture content as determined in accordance with ASTM D1577.

1.6 PROJECT CONDITIONS

A. Site Information: Subsurface explorations data, if made available to the Contractor, is for informational purposes only. Conditions are not intended as representations or warranties of accuracy or continuity between subsurface explorations. The Owner will not be responsible for interpretations or conclusions drawn from this data by Contractor.

1. Additional test pits, borings or other explorations may be performed by Contractor, at the Contractor's option; however, no change in the Contract Sum will be authorized for such additional explorations.

B. Existing Utilities: Locate existing underground utilities in areas of excavation work. If utilities are indicated to remain in place, provide adequate means of support and protection during earthwork operations.

1. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility owner immediately for directions. Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.

2. Do not interrupt existing utilities serving facilities occupied by Owner or others, during occupied hours, except when permitted in writing by Engineer and then only after acceptable temporary utility services have been provided.

    a. Provide minimum of 48-hour notice to Engineer, and receive written notice to proceed before interrupting any utility.

3. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies for shutoff of services if lines are active.

C. Use of Explosives: Do not bring explosives onto site or use in work without prior written permission from authorities having jurisdiction.

D. Protection of Persons and Property: Barricade open excavations occurring as part of this work per applicable regulatory requirements.

1. Operate warning lights as recommended by authorities having jurisdiction.

2. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

3. Perform excavation by hand within drip-line of large trees to remain. Protect root systems from damage or dry-out to the greatest extent possible. Maintain moist condition for root system and cover exposed roots with moistened burlap.

E. Maintain excavations and trenches free of groundwater, sewage, storm water, ice and snow.

F. Backfilling with frozen materials or when materials already in place are frozen is not permitted.

DELIVERY, STORAGE, AND HANDLING

A. Segregate topsoil, excavated materials, and other earth materials on the site to prevent contamination.

B. Store excavated materials meeting the requirements for backfill a sufficient distance away from excavations and trenches to avoid overloading and to prevent slides or cave-ins. Do not store materials on, over, or adjacent to structures or utilities, which may collapse or become damaged due to the added weight. Remove excess excavated material promptly and dispose of off- site.

C. No construction activity, access, storage or other use shall take place beyond the construction easement boundaries.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Common Earth – Clay, loam, sand, gravel, topsoil and similar materials which may contain some stones, pebbles, lumps and rock fragments up to 6" in largest dimension, nut does not contain debris, organic or frozen material.

B. Select Earth – Sand, gravel and similar materials which may contain small amounts of stones, pebbles, or lumps over 1" but not over 2" in largest dimension, but does not contain clay, silt, loam, organic material, debris and frozen material.

C. Embankment Fill: Shall have no stones larger than six inches in size, organic material or debris, construction debris, clumps of silt or clay, or other deleterious materials.

Gradation:	Passing 6" Sieve	=	100%
	Passing No. 4 Sieve	=	70-100%
	Passing No. 40 Sieve	=	40-80%
	Passing No.100 Sieve	=	25-60%
	Passing No.200 Sieve	=	20-45%

D. Sand - Conforming to NHDOT Item No. 304.1.

Gradation:	Passing 1/2" Sieve	=	100%
	Passing No. 4 Sieve	=	70-100%
	Passing No.200 Sieve	=	0-12%
	(Based on Fraction Passing No. 4)		

E. Gravel (Bank Run) – Conforming to NHDOT Item No. 304.2.

Gradation:	Passing 6" Sieve	=	100%
	Passing No. 4 Sieve	=	25-70%
	Passing No.200 Sieve	=	0-12%

(Based on Fraction Passing No. 4)

F. Screened Gravel – Uniformly graded, clean, hard, and durable particles free from an excess of soft, thin, elongated, laminated, or disintegrated pieces and be free form silt, loam, clay, or organic matter.

Gradation:	Passing 1-1/2" Sieve	=	100%
	Passing 3/4" Sieve	=	90-100%
	Passing 3/8" Sieve	=	0-30%
	Passing No. 4 Sieve	=	0-5%

G. Pea Gravel: Natural stone, washed free of clay, shale and organic matter, graded in accordance with ANSI/ASTM C136 to the following: maximum size 5/8 inch, minimum size 1/4 inch.

H. Crushed Gravel – Conforming to NHDOT Item No. 304.3.

Gradation:	Passing 3" Sieve	=	100%
	Passing 2" Sieve	=	95-100%
	Passing 1" Sieve	=	55-85%
	Passing No. 4 Sieve	=	27-52%
	Passing No. 200 Sieve	=	0-12%
	(Based on Fraction Passing No. 4)		

I. Crushed Aggregate For Shoulders - Conforming to NHDOT Item No. 304.33.

Gradation:	Passing 1-1/2" Sieve	=	100%
	Passing 1" Sieve	=	90-100%
	Passing No. 4 Sieve	=	30-65%
	Passing No. 200 Sieve	=	0-10%
	(Based on Total Sample)		

J. Crushed Stone (Fine) - Conforming to NHDOT Item No. 304.4.

Gradation:	Passing 2" Sieve	=	100%
	Passing 1-1/2" Sieve	=	85-100%
	Passing 3/4" Sieve	=	45-75%
	Passing No. 4 Sieve	=	0-45%
	Passing No. 200 Sieve	=	0-5%
	(Based on Total Sample)		

K. Crushed Stone (Course) – Conforming to NHDOT Item No. 304.5.

Gradation:	Passing 3-1/2" Sieve	=	100%
	Passing 3" Sieve	=	85-100%
	Passing 1-1/2" Sieve	=	60-90%

Passing 3/4" Sieve	=	40-70%
Passing No. 4 Sieve	=	15-40%
Passing No.200 Sieve	=	0-5%
(Based on Total Sample)		

L. Loam (Topsoil) – Loam shall be the surface layer of natural workable soil containing 3% minimum to10% maximum organic matter (determined by loss by ignition), capable of sustaining the growth of vegetation, with no admixture of refuse or material toxic to plant growth. It shall be relatively free from stones, lumps, stumps or similar objects larger than 1" in greatest diameter, sterile soil, roots and brush. Ordinary sods of herbaceous growth such as grass and non-noxious weeds will be permitted. The loam shall be free from subsoil. The acidity range of the loam prior to treatment as specified herein shall be between pH 5.0 and 6.0 inclusive. Not more than 65% shall pass the No. 200 Sieve as determined by the wash test in accordance with ASTM D 1140. No more than 20% of the material passing the No. 4 Sieve shall consist of clay particles.

M. Silt - Silt Loam or Silt, at least 50% of material by weight shall have a particle size less than 0.05 mm. The material shall be free of debris, frozen material, and stones greater than 3" in largest dimension. The saturated permeability of the compacted material shall not exceed 1 X 10^{-5} as determined by the U.S. Army Corps of Engineers "Falling Head Permeability Test EM1110-2-1906, Appendix 7", when compacted to 85% of the maximum density obtainable at optimum moisture content (as determined by ASTM D1557, Method C).

N. Spalls - Stones or broken rock ranging downward from the maximum size indicated.

O. Stabilization Fabric: "Mirafi Filterweave FW 700" or approved equivalent.

P. Stone Filter Blanket - Clean durable fragments of either ledge rock, boulders or both, reasonably free of thin or elongated pieces and organic material.

Gradation:	Passing 5" Sieve	=	100%
	Passing 4" Sieve	=	85-100%
	Passing 1-1/2" Sieve	=	20-55%
	Passing ¾" Sieve	=	0-25%

Q. Structural Fill – Hard durable particles or fragments of stone, gravel and natural sand free from deleterious amounts of clay, silt or organic matter. At least 30 percent of the materials retained on the No. 4 sieve shall have a fractured face.

Gradation:	Passing 2" Sieve	=	100%
	Passing 1-1/2" Sieve	=	90-100%
	Passing No. 4 Sieve	=	30-60%
	Passing No.100 Sieve	=	0-12%
	Passing No.200 Sieve	=	0-5%

(Based on Fraction Passing No. 4)

R. Pipe Bedding – Screened gravel and/or crushed stone free from organic matter, clay, and/or loam meeting ASTM C33 Stone Size No. 67.

Gradation:	Passing 1" Sieve	=	100%
	Passing ¾" Sieve	=	90-100%
	Passing 3/8" Sieve	=	20-55%
	Passing No. 4 Sieve	=	0-10%
	Passing No. 8 Sieve	=	0-5%

PART 3 – EXECUTION

3.1 EXCAVATION - GENERAL

A. Notify "Dig Safe" (800-225-4977) of intended excavation.

B. Identify and mark known underground utilities.

C. Identify required lines, levels, contours and datum.

D. Comply with local codes, ordinances, and requirements of agencies having jurisdiction.

E. Do not perform rock excavation work until material to be excavated has been measured and classified by Engineer.

3.2 STABILITY OF EXCAVATIONS

A. Slope sides of excavations to comply with local codes, ordinances, and requirements of agencies having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated. Maintain sides and slopes of excavations in safe condition until completion of backfilling.

B. Shoring and Bracing: Provide materials for shoring and bracing, such as sheet piling, uprights, stringers, and cross braces, in good serviceable condition. Maintain shoring and bracing in excavations regardless of time period excavations will be open. Extend shoring and bracing as excavation progresses.

1. Provide permanent steel sheet piling or pressure-creosoted timber sheet piling wherever subsequent removal of sheet piling might permit lateral movement of soil under adjacent structures. Unless indicated otherwise, cut off tops a minimum of 2.5 feet below final grade and leave permanently in place.

3.3 DEWATERING

A. Prevent surface and ground water from flowing into excavations and from flooding project

site and surrounding area.

1. Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to stability of subgrades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations without erosion or sedimentation.

2. Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rain water and water removed from excavations to collecting or runoff areas. Do not use trench excavations as temporary drainage ditches.

3.4 STORAGE OF EXCAVATED MATERIALS

A. Stockpile excavated materials acceptable for backfill and fill where directed. Place, grade, shape and stabilize stockpiles as necessary to prevent storm water erosion.

1. Locate and retain soil materials away from edge of excavations. Do not store within drip line of trees indicated to remain.

2. Dispose of excess excavated soil material and materials not acceptable for use as backfill or fill.

3.5 EXCAVATION FOR STRUCTURES

A. Conform to elevations and dimensions shown within a tolerance of plus or minus 0.10 foot, and extending a sufficient distance from footings and foundations to permit placing and removal of concrete form-work, installation of services, and other construction and for inspection.

1. Excavations for footings and foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before concrete reinforcement is placed. Trim bottoms to required lines and grades to leave solid base to receive other work.

2. For pile foundations, stop excavations from 6 inches to 12 inches above bottom of footing before piles are placed. After piles have been driven, remove loose and displaced material. Excavate to final grade, leaving solid base to receive concrete pile caps.

3. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Structures: Conform to elevations and dimensions indicated within a tolerance of plus or minus 0.10 foot; plus a sufficient distance to permit placing and removal

of concrete form-work, installation of services, and other construction and for inspection. Do not disturb bottom of excavations, intended for bearing surface.

3.6 EXCAVATION FOR PAVEMENTS

A. Cut surface under pavements to comply with cross-sections, elevations and grades as indicated.

3.7 TRENCH EXCAVATION FOR PIPES AND CONDUIT

A. Excavate trenches sufficiently wide to provide ample working room but not wider than the maximum width indicated.

B. Where it is necessary for pipes to be laid in fill, place Select fill in uniform horizontal layers not over 6" in compacted thickness. Carry fill up to elevation at least two feet above the elevation of the top of the pipe to be laid and then excavate trench.

C. Bedding requirements are detailed on the plans.

D. Excavate trenches and conduit to depth indicated or required to establish indicated slope and invert elevations and to support bottom of pipe or conduit on undisturbed soil or compacted bedding material as indicated. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.

1. Where rock is encountered, carry excavation 6 inches below invert elevation and backfill with a 6-inch layer of stone bedding prior to installation of pipe.

2. For pipes or conduit less than 6 inches in nominal size, and for flat-bottomed, multiple-duct conduit units, hand-excavate bottom cut to accurate elevations and support pipe or conduit on undisturbed soil or compacted bedding material as indicated.

3. For pipes or conduit 6 inches or larger in nominal size, shape trench bottom or bedding to fit bottom of pipe for 90 degrees (bottom 1/4 of the circumference). Where no bedding is indicated, fill depressions with granular fill-sand and tamp. At each pipe joint, dig bell holes to relieve pipe bell of loads to ensure continuous bearing of pipe barrel on bearing surface.

3.8 COLD WEATHER PROTECTION

A. Protect excavation bottoms against freezing when atmospheric temperature is less than 35 degrees F.

3.9 REQUIREMENTS PRIOR TO BACKFILLING

A. Backfill excavations as promptly as work permits, but not until completion of the following:

1. Acceptance of construction below finish grade including, where applicable, damp-proofing, waterproofing, and perimeter insulation.

2. Inspection, testing, approval, and recording locations of underground utilities have been performed and recorded.

3. Removal of concrete form-work.

4. Removal of shoring and bracing, and backfilling of voids with satisfactory materials. Cut off temporary sheet piling driven below bottom of structures and remove in manner to prevent settlement of the structure or utilities, or leave in place if required.

5. Removal of trash and debris from excavation.

6. Permanent or temporary horizontal bracing is in place on horizontally supported walls.

7. Inspection, testing and approval of subgrade.

3.10 SUBGRADE PREPARATION

A. Clear, grub and dispose of vegetation. Strip humus, excavate unsuitable materials and remove obstructions. Uniformly grade subgrade to indicated lines, grades and acceptable grading tolerances. Grade subgrade to be free of non-draining depressions where practical.

B. When subgrade density is less than that specified under "Compaction" for particular area classification, break up surface, pulverize, moisture-condition to optimum moisture content, and compact to required depth and percentage of maximum density.

C. Unless otherwise indicated, roughen sloped surfaces steeper than 1 vertical to 4 horizontal so that fill material will bond with existing surface.

3.11 GENERAL BACKFILL AND FILL PLACEMENT

A. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.

B. Place backfill and fill materials in layers not more than 12 inches in loose depth for material compacted by heavy compaction equipment, and not more than 6 inches in loose depth for material compacted by hand-operated tampers.

C. Place backfill and fill materials evenly adjacent to structures, piping, or conduit to required

elevations. Prevent wedging action of backfill against structures or displacement of piping or conduit by carrying material uniformly around structure, piping, or conduit to approximately same elevation in each lift.

D. Backfill trenches with concrete where trench excavations pass within 18 inches of column or wall footings and that are carried below bottom of such footings or that pass under wall footings. Place concrete to level of bottom of adjacent footing.

1. Do not backfill trenches until tests and inspections have been made and backfilling is authorized by Engineer. Use care in backfilling to avoid damage or displacement of pipe systems.

3.12 PLACING SUB-PAVEMENT GRAVEL COURSES

A. General: Sub-pavement gravel courses consist of placing subbase and base gravel materials, in layers of specified thickness, over subgrade surface to support pavements.

1. Refer to other Division - 31 sections for paving specifications.

B. Grade Control: During construction, maintain lines and grades including crown and cross-slope of sub-pavement gravel courses.

C. Shoulders: Place shoulders along edges of sub-pavement gravel courses to prevent lateral movement. Construct shoulders of acceptable soil materials, placed in such quantity to compact to thickness of each sub-pavement gravel course layer. Compact and roll at least a 12-inch width of shoulder simultaneous with the compaction and rolling of each layer of sub-pavement gravel.

D. Placing: Place sub-pavement gravel course material on prepared subgrade in layers of uniform thickness, conforming to indicated cross-section and thickness. Maintain optimum moisture content for compacting sub-pavement gravel material during placement operations.

2. When a compacted sub-pavement gravel course is indicated to be 6 inches thick or less, place material in a single layer. When indicated to be more than 6 inches thick, place material in equal layers, except no single layer shall be more than 6 inches or less than 3 inches in thickness when compacted.

3.13 PLACING SLAB STRUCTURAL FILL COURSE

A. General: Structural fill course consists of placement of structural fill material, in layers of indicated thickness, over subgrade surface to support concrete building slabs.

B. Placing: Place structural fill material on prepared subgrade in layers of uniform thickness, conforming to indicated cross-section and thickness. Maintain optimum moisture content for compacting material during placement operations.

1. When a compacted structural fill course is indicated to be 6 inches thick or less, place material in a single layer. When indicated to be more than 6 inches thick, place material in equal layers, except no single layer shall be more than 6 inches or less than 3 inches in thickness when compacted.

3.14 BACKFILLING TRENCHES

A. Pipe Bedding – Bedding requirements shall be as shown on the plans. Provide bedding to the spring line of the pipe. Place fill by hand in not greater than 6 inch compacted layers.

B. 12" Over Pipes – Provide 12 inches of Select Fill over the top of the pipe as detailed on the plans. Place fill by hand in not greater than 6 inch layers. Bring Select Fill up evenly on both sides of pipes and carefully and thoroughly compact.

C. Remainder of Trench – Paved Areas – Select Fill, Select Earth, or Common Earth placed no greater than 12 inch compacted layers.

D. Remainder of Trench – Other Areas – Select Fill, Select Earth, or Common Earth placed no greater than 12 inch compacted layers.

3.15 BACKFILLING AROUND STRUCTURES

A. Uniformly spread and deposit backfill in horizontal layers, not over twelve inches in compacted thickness. Take special precautions to prevent damage to new construction.

B. In paved areas, backfill with Select Fill for the full depth. In unpaved areas, backfill with Select Fill, Select Earth or Common Earth.

3.16 SHEETING AND BRACING

A. Provide and maintain adequate sheeting and bracing as required for the safety and protection of the Work, persons and adjacent property and structures in accordance with federal, state and local laws, codes ordinances, and standards.

B. Where sheeting is placed along side pipe and extends below mid-diameter, it shall be cut off and left in place to an elevation not less that one foot above the top of the pipe. The Engineer may, at his discretion, order sheeting and bracing to be cut-off and left in place. Where, in the opinion of the Contractor, damage may result from withdrawing sheeting, he shall immediately notify the Engineer. Sheeting ordered left in place adjacent to piping shall be cut-off at least three feet below grade but not less than one foot above the top of the pipe.

C. Contractor is fully responsible for the design and construction of all sheeting and bracing used and for all damages resulting from improper quality, strength, placing, maintenance or removal of sheeting and bracing.

3.17 UNSTABLE MATERIALS

A. Remove unstable materials in excavations and trench bottoms which are incapable of supporting pipes or structures, to the extent and depths directed by the engineer, and properly dispose of off-site. Refill and compact the excavation as required.

B. Whenever the material encountered is, in the Contractor's opinion, incapable of providing adequate support, he shall immediately notify the Engineer.

3.18 DISPOSAL OF EXCAVATED MATERIALS

A. Excavated materials which meet the requirements for embankment fill or backfill may be used for constructing embankments and backfilling, as possible. Remove excess excavated materials and dispose of off-site.

B. The storing and stockpiling of unsuitable material on-site is not permitted.

3.19 COMPACTION AND MOISTURE CONDITIONING

A. Control soil and fill compaction and moisture conditioning, providing minimum percentage of density specified for each area classification indicated below or in accordance with Section 31 23 23.23. Correct improperly compacted areas or lifts as directed by Engineer if soil density tests indicate inadequate compaction.

1. Percentage of Maximum Density Requirements: Compact soil to not less than 95% of maximum density, in accordance with ASTM D 1557, Method C.

2. Moisture Control: Where subgrade or layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade or layer of soil material. Apply water in minimum quantity as necessary to prevent free water from appearing on surface during or subsequent to compaction operations.
   a. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.

   b. Stockpile or spread soil material that has been removed because it is too wet to permit compaction. Assist drying by discing, harrowing, or pulverizing until moisture content is reduced to a satisfactory value.

3.20 FIELD QUALITY CONTROL

A. Quality Control Testing During Construction: Allow testing service to inspect and approve each subgrade and fill layer before further backfill or construction work is performed in accordance with Section 31 23 23.23 Soil Compaction.

3.21 GRADING

A. General: Uniformly grade areas within limits of grading, including adjacent transition areas. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are indicated or between such points and existing grades.

B. Grading Outside Building Lines: Grade areas adjacent to building lines to drain away from structures and to prevent ponding.

C. Grading Surface of Fill under Building Slabs: Grade smooth and even, free of voids, compacted as specified, and to required elevation. Provide final grades within a tolerance of 0.05 foot when tested with a 10-foot straight edge.

D. Compaction: After grading, compact subgrade surfaces to the depth and indicated percentage of maximum or relative density for each area classification.

3.22 EROSION CONTROL

A. Provide measures as necessary to control all erosion and sedimentation resulting from construction activities as indicated, warranted or required by authorities having jurisdiction.

3.23 MAINTENANCE

A. Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.

B. Repair and reestablish grades in settled, eroded, and rutted areas to specified tolerances.

C. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape, and compact to required density prior to further construction.

D. Settling: Where settling is measurable or observable at excavated areas during general project warranty period, remove surface (pavement, lawn, or other finish), add backfill material, compact, and replace surface treatment. Restore appearance, quality, and condition of surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.24 DISPOSAL OF EXCESS AND WASTE MATERIALS

A. Do not dispose of spoil materials on or off site in wetlands or other environmentally sensitive areas unless properly permitted through regulatory authorities having jurisdiction and conducted in accordance with the permit conditions thereof.

B. Remove spoil materials and legally dispose of off site.

End of Section

SECTION 31 23 16.26

ROCK REMOVAL

PART 1 — GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division - 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the removal and disposal of rock from the site and trench excavations.

B. Refer to other "Division - 31 — Earthwork" Sections for additional requirements relating to this Section.

1.3 DEFINITIONS

A. Rock Excavation consists of all solid rock which cannot be removed without blasting or ripping. Intermittent drilling, blasting, or ripping performed to increase production and not necessary to permit excavation of material encountered will be classified as earth excavation.

1. Site Rock Excavation consists of all rock excavation other than Trench Rock Excavation and includes the excavation of boulders and parts of masonry structures when found to measure two (2) cubic yards or more.

2. Trench Rock Excavation consists of rock excavation where solid rock and boulders or parts of masonry structures found to measure two (2) cubic yards or more are removed from trenches where the bottom-width limit of excavation does not exceed 8 feet.

B. Unauthorized Excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of Engineer. Unauthorized excavation, as well as remedial work directed by Engineer, shall be at Contractor's expense.

1.4 SUBMITTALS

A. Name, qualifications, experience records, certificates of insurances and copies of licenses.

B. Listing and description of materials and methods proposed for use.

C. Prior to blasting, the Contractor shall at his own expense have a survey done of all

existing structures and utilities on the site and within 500 feet of the site. Said survey shall be conducted by an independent entity approved by the Engineer and shall address the structural integrity of all existing structures and utilities. Upon completion of blasting operations, the Contractor shall have prepared by the same independent entity, a survey addressing the structural integrity of the same structures and utilities.

D. Written notice to Owner, Engineer, and individual property owners in immediate vicinity at least 48 hours in advance of blasting operations.

E. On a daily basis, the Contractor shall submit to the Engineer accurate records including but not limited to, the location, depth, elevation of blast, maximum explosive weight per delay and the date and time of blast.

1.5 QUALITY ASSURANCE

A. All blasting operations shall be conducted in full compliance with all laws of the State, all local ordinances, and with all possible care so as to avoid injury to persons and property. The rock shall be well covered, and sufficient warning given to all persons in the vicinity of the work before blasting. Care shall be taken to avoid injury to all structures, utilities and property. The Contractor, in addition to observing all municipal and other ordinance relating to the storage and handling of explosives, shall also conform to and further requirements the Engineer deems necessary.

1.6 PROJECT CONDITIONS

A. Site information: Subsurface explorations data, if made available to the Contractor, is for informational purposes only. Conditions are not intended as representations or warranties of accuracy or continuity between subsurface explorations. The Owner will not be responsible for interpretations or conclusions drawn from this data by the Contractor.

1. Additional test pits, borings, or other explorations may be performed by Contractor, at the Contractor's option; however, no change in the Contract Sum will be authorized for such additional explorations.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Handle and store explosives in strict accordance with requirements of regulatory authorities have jurisdiction.

B. Keep explosives on site only in such quantity as may be needed for the work under way and only during such time as they are to be used.

C. Store explosives in a secure manner separate from all tools, with caps or detonators safely stored at a separate point more than 100 feet distant.

D. Disposal of rock shall be by one of the following:

1. If rock is suitable in nature and of the proper size, it may be used as rock channel, outlet, or slope lining.

2. If the Contract Documents permit or require the use of rock in embankments, fills or other areas, it may be incorporated into the Work accordingly.

3. If the Contract Documents designate a spoil or stockpile area, deliver and neatly place the rock in the designated area.

4. Delivered to an area designated by the Owner or Engineer.

5. If none of the above apply, remove the rock from the project site and dispose of off-site in a lawful manner.

PART 2 — PRODUCTS

2.1 MATERIALS

A. Concrete used to fill over-excavations shall be Class C (28 day compressive strength of 2,000 psi) as specified in Division - 03 Section "Cast-in-Place Concrete".

B. Other Materials required for the complete removal and for providing a safe operation shall be as selected by the Contractor, as complying with the requirements of regulatory authorities having jurisdiction, subject to the approval of the Engineer.

PART 3 — EXECUTION

3.1 GENERAL

A. Where rock is encountered, it shall be uncovered but not excavated until measurements have been made by the Engineer.

B. Attempt to remove rock by mechanical means before resorting to blasting.

C. Protect structures, utilities, sidewalks, pavements, and other facilities and property from blasting hazards.

D. Remove rock to the limits indicated or directed by Engineer.

3.2 UNAUTHORIZED EXCAVATION

A. Rock excavated below foundation subgrades, not authorized by Engineer, shall be refilled with Class C concrete or other materials approved by Engineer, to the indicated subgrade elevation.

B. Other unauthorized rock excavations shall be backfilled and compacted as specified for authorized excavations of same classification, unless otherwise directed by Engineer.

C. Excavations which are made wider than shown on the Drawings, specified or authorized by Engineer, may necessitate redesigns and stronger materials for which all costs shall be borne by Contractor.

End of Section

SECTION 31 23 19

DEWATERING

PART 1 – GENERAL

1.1 WORK INCLUDED

Work included under this Section includes the dewatering equipment for the control of ground and surface water entering excavations on the project site.

1.2 RELATED WORK

Excavating, Trenching, and Backfilling	31 23 33
Erosion Control	31 25 00

1.3 QUALITY ASSURANCE

A. The Contractor shall employ whatever means deemed appropriate to control water on the Site. The Owner and Engineer shall not be responsible for the means and methods of dewatering. Unless otherwise noted, dewatering shall be incidental in the work.

B. The Contractor shall keep work free of standing or flowing groundwater, surface water, sewage, snow, or ice. Unless otherwise directed by the Engineer, the placement of work is not permitted.

PART 2 – PRODUCTS

2.1 GENERAL

A. Provide, operate and maintain a dewatering system to remove all water from excavations and trenches including pumps, drains, wellpoints, piping and any other facilities necessary to keep the excavations and trenches free from water.

B. Assure proper permits have been acquired for dewatering of excavations if the discharge from the dewatering operations will reach surface waters or wetlands. Coverage under any of the following permits, and performance of any of the associated sampling requirements, shall be deemed to satisfy this section:

1. U.S. EPA National Pollution Discharge Elimination System (NPDES) Construction General Permit; or,

2. US EPA National Pollution Discharge Elimination System (NPDES) Construction Dewatering Permit.

PART 3 – EXECUTION

3.1 PERFORMANCE

A. Keep excavations and trenches dry until the structures, pipes and appurtenances have been completed.

B. Dispose of water pumped or drains from the construction site in a suitable manner to avoid public nuisance, injury to public health, damage to public and private property, and damage to work completed or in progress. Water discharged to a natural drainage course or stream shall pass through a sediment trap prior to discharge. Discharge water from excavations shall be treated to meet applicable treatment performance standards specified in state or federal permits. In no case shall discharges to surface waters exceed state water quality standards for turbidity.

C. All damage from dewatering operations, or the failure of the Contractor to maintain the work in a suitable dry condition shall be repaired by the Contractor, at no additional cost to the Owner,

D. Cofferdams shall be utilized where necessary for the dewatering, control and diversion of water to keep excavations and trenches free of water. Design and construct cofferdams to withstand all imposed loads to prevent injury to persons and property. Construct cofferdams to depths to permit a reasonable change in depths of the work, of sufficient height to prevent flooding, and of such dimensions to give sufficient clearance for construction and inspection.

E. Temporary underdrains – When and where found necessary, install temporary underdrains in the excavation. Surround the underdrain and fill the space between the underdrain and the pipe or structure with crushed stone to prevent the migration of fines.

F. Wellpoint system – If required, dewater the excavations and trenches by an efficient drainage wellpoint system to drain the soil and prevent saturated soils from flowing in to the excavated area.

End of Section

SECTION 31 23 23.23

SOIL COMPACTION

PART 1 — GENERAL

1.1 DESCRIPTION

A. This Section covers the requirements for all soil compaction.

B. Related work specified elsewhere includes:

Earthwork	31 23 16

1.2 QUALITY ASSURANCE

A. The Contractor shall provide at least one person who shall be present at all times during the soil compaction operations and who shall be thoroughly familiar with proper soil compaction techniques.

1.3 SUBMITTALS

A. All submittals shall be in accordance with Section 01 33 23 “Submittals”.

B. Provide six (6) copies of the results of the laboratory sieve analyses, moisture density tests, and any other test results required by this or other Sections.

1.4 JOB CONDITIONS

A. Compaction shall not take place in freezing weather or when materials to be compacted are frozen, too wet or moist, or too dry.

B. Schedule the Work to allow ample time for laboratory tests and to permit the collecting of samples and the performing of field density tests during the backfilling and compaction operations.

PART 2 — PRODUCTS

2.1 COMPACTION

A. Utilize the proper compaction methods and equipment to suit the soils and conditions encountered.

2.2 LABORATORY TESTING

A. Testing performed under this Section shall be by an independent testing firm qualified to provide the necessary services. The firm shall be approved by the Engineer before any

testing is performed.

2.3 LABORATORY TEST REPORTS

A. As a minimum, the laboratory testing reports shall contain the following:

1. Laboratory's name.
2. Date, time and specific location from which sample was taken and name of person who collected the sample.
3. Designation of the test method used.
4. A description of the sample, the test, and the test results.
5. The date the test was performed and the person who performed the test.
6. The Project name, identification, and Contractor's name.

PART 3 — EXECUTION

3.1 INSPECTION

A. Verify that layers of material are no thicker than twelve (12) inches.

B. Verify that moisture content is nearly optimum.

C. Do not begin compaction operations until conditions are satisfactory.

3.2 PERFORMANCE

A. Compaction densities shown are percentage of the maximum density obtainable at optimum moisture content as determined by ASTM D1557, Method C (Modified Proctor).

B. Compact each layer of material to the following required densities:

Location	Density
Under concrete slabs, foundations and footings	95%
Backfill around structures	95%
Embankments	95%
Cross country areas	85%

C. Embankment material shall be compacted using a vibratory sheepsfoot roller or other method that kneads successive lifts and does not cause potential layering.

3.3 FIELD QUALITY CONTROL

A. Perform a laboratory moisture density test for each type of soil proposed for use or encountered in the Work. Determine optimum moisture content in accordance with ASTM D1557, Method C.

B. Costs for initial field density tests shall be paid for as in Laboratory Services. Costs for retesting shall be borne by the Contractor. Field density tests shall be performed in accordance with the following average frequencies;

1. Under Structures – One test for every 200 square feet of area of each layer of compacted granular.
2. Around Structure – One test for each foot of backfill at intervals of approximately fifty (50) feet around the structure.
3. Trenches – One test at intervals of approximately 300' along the trench.
4. Embankment – Three tests for each foot of compacted fill.

C. Testing frequency indicated in Paragraph 3.3 B is at the discretion of the Engineer and may be decreased as the Project progresses.

D. Field density and moisture testing shall conform to the requirements of ASTM D1556 or D2922 and ASTM D3017. Soils shall be described in accordance with ASTM D2488, Visual-Manual Procedure.

E. Soils not meeting the specified in-place densities shall be excavated and re-compacted at the Contractor's expense.

3.4 COORDINATION

A. Provide all assistance and cooperation during testing and coordinate operations to allow ample time for the required sampling and testing.

End of Section

SECTION 31 25 00

EROSION CONTROL

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work covered by this Section includes the control of erosion, siltation, and sedimentation.

B. Related work described elsewhere:

Earthwork	Division - 31

1.2 PROJECT REQUIREMENTS

A. Take every reasonable precaution and do whatever is necessary to avoid any erosion and to prevent silting of rivers, streams, lakes, reservoirs, impoundments, wetlands, drainage ditches and swales.

B. The exposure of uncompleted cut slopes, embankments, trench excavations, and site graded areas shall be kept as short as possible. Initiate seeding and other erosion control measures on each segment as soon as reasonably possible.

C. Adhere to any and all applicable local, state, and federal requirements and permits related to erosion control.

1.3 SEDIMENT CONTROL GUIDELINES

A. U.S. Environmental Protection Agency Publication 430/9-73-007 "Processes, Procedures and Methods to Control Pollution Resulting from All Construction Activity."

B. “Stormwater Management and Erosion and Sediment Control Handbook for Urban and Developing Areas in New Hampshire” Rockingham County Conservation District, August 1992.

1.4 SUBMITTALS

A. The Contractor shall furnish to the Engineer, in writing, his plan for controlling erosion and siltation before beginning the construction work. Said plan shall also include the methods to be utilized for protecting and stabilizing steep slopes, stream banks, and channels which will be affected by the construction work.

B. Where earth disturbance will exceed once acre, the Contractor shall prepare a Storm Water Pollution Prevention Plan (SWPPP) that conforms to the requirements of the USEPA National Pollution Discharge Elimination System (NPDES) Construction General Permit, or agree to abide by an alternate SWPPP if one has been prepared by the Owner or their agent. In the latter instance, the singing of the SWPPP by the contractor shall constitute such an agreement.

1. Contractor shall prepare and submit a Construction General Permit Notice of Intent form at least 7 days prior to beginning earth disturbance activities, and only after a SWPPP has been prepared. Earthwork shall not commence until the Contractor has received confirmation from EPA that said Contractor has obtained coverage under the Construction General Permit.

C. Acceptance of a plan will not relieve the Contractor of responsibility for completing the work as specified.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Dewatering Bag- Dirt Bag as manufactured by ACF or approved equal

B. Erosion Stone- See 02341

C. Matting for erosion control - jute mat or excelsior mat

D. Hay bales - rectangular-shaped bales of hay or straw weighing at least 40 pounds per bale and free from primary noxious weed seeds and rough or woody materials

E. Mulch - Cured hay free from primary noxious weed seeds and rough or woody materials

F. Seed for erosion control shall be annual or perennial ryegrass, and NH Conservation Seed Mix

G. Silt fence: Envirofence as manufactured by Mirafi, Inc. or approved equal.

H. Wattles- Sediment Log as manufactured by the American Excelsior Company or approved equal

PART 3 - EXECUTION

3.1 PERFORMANCE

A. Erosion and sediment controls shall be operated to prevent violations of NH water quality standards (NH Env-Ws 1700).

B. Diverting Surface Water:

1. Perform no earthwork in flowing waters. Build, maintain, and operate all cofferdams, channels, flumes, slope drains, sumps, and other temporary diversion and protection works needed to divert stream flow, runoff, water from seeps in cut slope, and other surface water through or around the construction site and away from the construction work while construction is in progress.

2. Protect areas where existing stream banks are to be excavated by constructing hay bale dikes at the top of slope to divert storm runoff from the disturbed area and at the toe of the slope to retain sediments.

3. A diversion shall outlet to a durable surface that prevents erosion at the point of discharge.

4. Contain turbid discharge from pumped dewatering operations by a filter bag or a dike located in an upland area at least 20 feet from surface waters or wetlands and constructed to prevent silt from entering the stream and to protect the area of the outlet pipe against erosion by flowing water by the construction of a rock or timber apron.

5. Prior to removal of all sediment control dikes, remove all retained silt, filter bags or other materials at no additional cost to the Owner.

C. Erosion Prevention Provisions:

1. Limit period of time that disturbed soils are exposed to precipitation.

   a. Apply stabilization measures within 72 hours of completing earth disturbing work adjacent to wetlands.

   b. Apply stabilization measures within 14 days of finish grading areas that are not adjacent to wetlands.

2. Apply matting to seeded slopes steeper than 3:1. Apply mulch to all other seeded slopes.

3. Mulch:

    a. Undertake immediately after each area has been properly prepared.

    b. Place mulch on the seeded areas within 48 hours after seeding.

    c. Apply hay that has been thoroughly fluffed at approximately, but not to exceed, 2 tons per acre unless otherwise ordered.

4. Matting:

    a. Place strips lengthwise in the direction of the flow of water.

    b. Where strips are laid parallel or meet as in a tee, overlap at least 4 inches.

    c. Ends: Overlap at least 6 in., shingle fashion.

    d. The up-slope end of each strip of the matting shall be turned down and buried to a depth of not less than 6 in. with the soil firmly tamped against it.

5. Install rock check dams, hay bale check dams, or other temporary grade controls structures in swales and temporary channels that receive concentrated flow.

D. Sediment Control Provisions:

6. Install silt fence and other perimeter controls at early stages of earth disturbance. As shown on plans and as directed by engineer. Avoid usage where concentrated flow may occur. Back up silt fence with wire backing or hay bales as needed.

7. Install coarse stone tracking pad at site exit to prevent sediments from being tracked onto pavement by construction vehicles. Supplement with street sweeping.

8. Avoid interim grading that concentrates runoff to unstable ground or channels. Utilize temporary water bars or other methods to interrupt long flowpaths on unfinished roads and convey runoff to stable upland areas.

9. Install temporary sediment basins in swales and temporary channels that receive concentrated flow. Locate for convenience of frequent maintenance, but do not site in areas where inadvertent basin breeching would cause safety hazards, property damage, or result in preventable environmental impacts.

10. Place erodable material stockpiles on level ground and away from drainage channels. Install silt fence along downgradient perimeter of stockpile between pile and nearest surface water or wetlands.

E. Winter Erosion Control

1. All proposed vegetative areas which do not exhibit a minimum of 85% vegetative growth by October 15th. Or which are disturbed after October 15th, shall be stabilized by seeding and installing erosion control blankets on slopes greater than 3:1, and seeding and placing 3 to 4 tons of mulch per acre, secured with anchored netting, elsewhere. The installation of erosion control blankets or mulch and netting shall not occur over accumulated snow or frozen ground and shall be completed in advance of thaw or spring melt events.

2. All ditches or swales which do not exhibit a minimum of 85% vegetative growth by October 15th, or which are disturbed after October 15th, shall be stabilized temporarily with stone or erosion control blankets appropriate for the design flow conditions.

3. After November 15th, incomplete road or parking surfaces, where work has stopped for the winter season, shall be protected with a minimum of 3 inches of crushed gravel per NHDOT Item 304.3.

3.2 MAINTENANCE

A. Maintain all temporarily stabilized surfaces until they are stable

1. Repair rills that form on gravel stabilized roadways until paving occurs.

2. Apply supplemental seed, fertilizer and lime as needed to achieve final stabilization; defined by NHDES as 85% vegetative growth.

B. If any matting staples become loosened or raised or if any matting becomes loose, torn, or undermined, make satisfactory repairs immediately.

C. Maintain areas mulched or matted, with no extra compensation, until the completion of the Contract.

D. Maintain siltation fence by checking the installation for fallen segments and keep build-up of silt to less than 50% of its height.

E. Check all sediment capturing devices at a regular frequency, after storms, and as dictated by applicable permits. Remove sediments from sediment capturing features when 50% of the devices volume is occupied by sediment and prior to anticipated large storms.

1. Place sediments cleaned from basins and other devices in upland area and out of drainage paths.

3.3 REMOVAL OF TEMPORARY WORKS

A. Remove or level and grade to the extent 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.

End of Section

DIVISION 32 – EXTERIOR SURFACES

SECTION 32 12 16.31

BITUMINOUS CONCRETE PAVING – NH

PART 1 – GENERAL

1.1 QUALITY ASSURANCE

A. All work performed under and relating to this Section shall be in conformance to the State of New Hampshire - Department of Transportation, Standard Specifications for Road and Bridge Construction (latest revision).

B. Provide at least one person who shall be present at all times during the execution of this portion of the Work and who shall be thoroughly trained and experienced in the placing of the type of asphalt pavement specified and who shall direct all work performed under this Section.

C. All materials and the asphalt plant will be subject to inspections and tests by Engineer and by the approved testing laboratory. Provide all equipment, materials, facilities and labor as specified in the Standard Specification for Road and Bridge Construction.

1.2 SUMMARY

A. This Section includes provisions for hot-mixed asphalt paving over sub-pavement gravel courses and over existing asphalt surfaces.

B. This Section is also applicable to hot-mixed asphalt temporary pavements.

C. Proof rolling of prepared sub-pavement gravel courses is included in this Section.

D. Saw-cutting of existing pavement edges is included in this Section.

E. Traffic and lane markings are covered by this Section.

1.3 SUBMITTALS

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

B. Material Certificates signed by material producer and Contractor, certifying that each material item complies with or exceeds specified requirements.

1.4 SITE CONDITIONS

A. Weather Limitations: Apply prime and tack coats when ambient temperature is above 50 deg F (10 deg C) and when temperature has not been below 35 deg F (1 deg C) for 12 hours

immediately prior to application. Do not apply when base is wet or contains an excess of moisture.

B. Construct hot-mixed asphalt surface course when base is dry and when atmospheric temperature is above 40 deg F for courses greater than 1-1/4 inches compacted depth and when atmospheric temperature is above 50 deg F for courses less than 1-1/4 inches in compacted depth. Base course may be placed when air temperature is above 35 deg F and rising.

C. Grade Control: Establish and maintain required lines and elevations.

PART 2 – PRODUCTS

2.1 MATERIALS

A. General: Use locally available materials and gradations that exhibit a satisfactory record of previous installations.

B. When products are not otherwise specified by Engineer, provide products meeting the requirements of applicable city or town public works department's highway construction standards. In the absence of applicable local highway construction standards, provide products meeting the requirements of the Department of Transportation of the state in which the project is located, as appropriate, based on highway class designation, traffic loading and surfacing requirements.

C. Restore existing pavements damaged by construction in kind with regard to materials and thickness of courses unless otherwise directed by Engineer.

PART 3 – EXECUTION

3.1 SURFACE PREPARATION

A. General: Remove loose material from compacted sub-pavement gravel course surface immediately before applying herbicide treatment or prime coat.

B. Proof-roll prepared sub-pavement gravel course surface to check for unstable areas and areas requiring additional compaction. Do not begin paving work until deficient areas have been corrected and are ready to receive paving.

C. Herbicide Treatment: When indicated or warranted, apply chemical weed control agent in strict compliance with manufacturer's recommended dosages and application instructions. Apply to compacted, dry sub-pavement gravel course surface prior to application of prime coat.

D. Prime Coat & Sealants: When indicated or warranted, apply at rate necessary to penetrate and seal, but not flood, surface. Squeegee excess material from surface. Cure and dry as

long as necessary to attain penetration and evaporation of volatile. If the prime coat fails to penetrate within the time specified and the roadway must be used by traffic, blotter material shall be spread in the amounts required to absorb excess bituminous material. When the bituminous material is sufficiently cured, blotter material remaining shall be removed by sweeping.

E. Saw-cut: Neatly saw-cut existing pavements to be joined and damaged pavements to be joined or over-laid. Remove saw cut pavement disturbing adjoining pavements as little as possible.

F. Tack Coat: Clean the edges of previously constructed asphalt or Portland cement concrete pavements to be joined. Apply uniformly to contact surfaces of previously constructed pavements and to drainage or utility casting surfaces abutting or projecting into hot-mixed asphalt pavement. Allow to dry until at proper condition to receive paving. Exercise care in applying bituminous materials to avoid smearing of adjoining concrete surfaces.

3.2 PLACING MIX

A. General: Place hot-mixed asphalt mixture on prepared surface, spread, and strike off. Spread mixture at minimum temperature of 250 deg F. Use of hand method of placement is limited to the paving of raised islands, slopes, cattle passes, areas between rails at railroad crossings, sidewalks, driveways and aprons and incidental paving in areas inaccessible to equipment. Place each course to required grade, cross-section, and compacted thickness. Place temporary pavements to indicated thickness and in no case less than 1".

B. Paver Placing: Place in strips not less than 10 feet wide, unless otherwise acceptable to Engineer. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Complete base course for a section before placing surface course.

C. Immediately correct surface irregularities in finish course behind paver. Remove excess material forming high spots with shovel or lute.

D. Joints: Make joints between old and new pavements, or between successive days' work, to ensure continuous bond between adjoining work. Construct joints to have same texture, density, and smoothness as other sections of hot-mixed asphalt course. Clean contact surfaces and apply tack coat.

E. Curbs: Construct curbs over compacted pavement surfaces. Apply a light tack coat unless pavement surface is still tacky and free from dust.

F. Place curb materials to cross-section indicated or, if not indicated, to local standard shapes, by machine or by hand in wood or metal forms. Tamp hand-placed materials and screed to smooth finish. Remove forms as soon as material has cooled.

3.3 ROLLING

A. General: Begin rolling when mixture will bear roller weight without excessive displacement.

B. Compact mixture with hot hand tampers or vibrating plate compactors in areas inaccessible to rollers.

C. Breakdown Rolling: Accomplish breakdown or initial rolling immediately following rolling of joints and outside edge. Check surface after breakdown rolling and repair displaced areas by loosening and filling, if required, with hot material.

D. Second Rolling: Follow breakdown rolling as soon as possible, while mixture is hot. Continue second rolling until mixture has been evenly compacted.

E. Finish Rolling: Perform finish rolling while mixture is still warm enough for removal of roller marks. Continue rolling until roller marks are eliminated and course has attained 95 percent laboratory density.

F. Patching: Remove and replace paving areas mixed with foreign materials and defective areas. Cut out such areas and fill with fresh, hot-mixed asphalt. Compact by rolling to specified surface density and smoothness.

G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

H. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.4 CLEANUP

A. General: Any bituminous material remaining on exposed surfaces of curbs, sidewalks, or other masonry structures shall be removed at the Contractor's expense.

3.5 TRAFFIC AND LANE MARKINGS

A. Cleaning: Sweep and clean surface to eliminate loose material and dust.

B. Do not apply traffic and lane marking paint until layout and placement have been verified with Engineer.

C. Apply paint with mechanical equipment to produce uniform straight edges. Apply at manufacturer's recommended rates and thickness.

D. Protect painted markings until dry enough to withstand traffic loading.

3.6 FIELD QUALITY CONTROL

A. General: Testing in-place hot-mixed asphalt courses for compliance with requirements for thickness and surface smoothness will be done by Owner's testing laboratory. Repair or remove and replace unacceptable paving as directed by Engineer.

B. Thickness: In-place compacted thickness tested in accordance with ASTM D 3549 will not be acceptable if exceeding following allowable variations:
1. Base Course: Plus or minus 3/8 inch.
2. Surface Course: Plus or minus 3/16 inch.

C. Surface Smoothness: Test finished surface of each hot-mixed asphalt course for smoothness, using 10-foot straightedge applied parallel with and at right angles to centerline of paved area. Any variations from a true profile exceeding 3/16 of an inch shall be satisfactorily eliminated.

1. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4 inch.

D. Check surface areas at intervals as directed by Engineer.

End of Section

SECTION 32 92 00

LOAMING, SEEDING, AND FERTILIZING

PART 1 – GENERAL

1.1 DESCRIPTION

A. Work included under this Section includes furnishing all labor, materials, equipment, and incidentals necessary to place topsoil, fertilizer, seed and mulch as required.

1.2 QUALITY ASSURANCE

A. Employ trained personnel experienced in this type of work.

1.3 PRODUCT DELIVERY AND STORAGE

A. Fertilizer shall be delivered to the Site showing the manufacturer's guaranteed analysis and stored so that when used it shall be dry and free flowing.

B. Lime shall be delivered and maintained in a dry, free flowing condition until used.

C. All seed shall be delivered in sealed containers bearing the dealer's guaranteed analysis and stored in a dry, protected place.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Loam shall be the surface layer of natural workable soil containing organic matter, or material generally humus in nature capable of sustaining the growth of vegetation. It shall be free from stones, lumps, stumps, or similar objects larger than 2 inches in greatest diameter, sterile soil, roots, and brush. The loam shall be free from subsoil.

B. The acidity range of the loam prior to treatment as specified herein shall be between pH 5.0 and 6.0 inclusive.

C. The gradation analysis of the loam shall be as follows:

Passing	Percentage
1" Screen	100%
¼" Screen	3 %(max)
No. 100 USS mesh sieve	40 to 60 %

D. Loam shall not be delivered until representative samples proposed for use have been furnished by the Contractor and approved by the Engineer. When requested to do so, the Contractor shall furnish at his own expense, a certified analysis of the loam made by an approved soil testing laboratory.

E. Fertilizer shall be a complete commercial fertilizer, 5-10-10 grade.

F. Lime shall be ground limestone containing not less than 85% calcium and magnesium carbonate.

G. Seed shall be from the same or previous year's crop and shall have not more than 1% weed content. Seed shall also meet the following requirements:

1. Grass seed of the specified mixtures shall be furnished in fully labeled, standard, sealed containers.

2. Percentage and germination of each seed type in the mixture, purity and weed seed content of the mixture shall be clearly stated on the label.

3. Seed shall be furnished on a percentage of live seed basis.

H. Lawn areas shall be seeded with a Class A mixture of the following:

Class A (Lawn Seed)

Species	Minimum Purity % / Minimum Germination %	Lbs/Acre
▪ Kentucky Blue Grass (at least two varieties America, Liberty Crest, Monopoly, etc.)	97/85	105
▪ Creeping Red Fescue	96/85	44
▪ Perennial Rye Grass (Manhattan III, Envy, Fiesta II, Caliente, etc.)	98/90	25
TOTAL		**174**

I. Class B shall normally be used for all slope work. And shall conform to the following:

Class B (Slope Seed)

Species	Minimum Purity % / Minimum Germination %	Lbs/Acre
▪ Creeping Red Fescue	96/85	35
▪ Perennial Rye Grass	98/90	30
▪ Redtop	95/80	5
▪ Alsike Clover	97/90	5
▪ Birdsfoot Trefoil (Empire variety preferred Inoculum)	98/80	5
TOTAL		**80**

J. Red clover and birdsfoot trefoil seed shall include not more than 25% hard seed. If necessary, to meet this requirement extra seed shall be supplied at no expense to the Owner.

K. Inoculum specific to birdsfoot trefoil must be used with this mixture. The inoculum shall be a pure culture of nitrogen-fixing bacteria selected for maximum vitality and the ability to transform nitrogen from the air into soluble nitrates and to deposit them in the soil. The inoculum shall not be used later than the date indicated on the container or later than specified. The inoculum shall be subject to approval.

L. Hay and straw mulch shall consist of mowed and properly cured grass or legume mowings, reasonably free from swamp grass, seeds, weeds, twigs, debris or other deleterious material. It shall be free from rot or mold.

PART 3 – EXECUTION

3.1 GENERAL

A. Loosen any heavily compacted subsoil to a depth of 12 inches. Rake the subgrade of all areas to receive loam and remove rubbish, sticks, roots and stones larger than 2 inches in diameter. Spread and lightly compact loam to finish grade as shown on the Drawings.

B. After the loam is placed and before it is raked to true lines and rolled, spread limestone evenly and thoroughly incorporate into the loam by heavy raking to at least one-half the depth of the loam. The amount of limestone shall be based on a soil test with recommendations from the Engineer.

C. Uniformly spread fertilizer and immediately mix with the loam.

D. Immediately following this preparation, uniformly apply the seed and lightly rake the seed in to the surface. Apply mulches before rolling. Lightly compact the soil using a light weight roller or a tracked dozer run parallel with the slope. Water with a fine spray on a regular basis to ensure germination.

E. Seeding and fertilizing shall be done between April 1 and June 1, between August 15 and October 15, or as directed or permitted. Seeding shall not be done during windy weather or when the ground is frozen, excessively wet, or otherwise untellable.

F. Mulching should consist of light and uniform mulch over the area as follows:

Class A areas – use straw mulch
Class B areas – use hay mulch

G. Protect seeded areas from pedestrian and vehicular traffic.

3.2 APPLICATION RATES

A. Spread loam over properly prepared areas to give a covering which will be 4 inches in compacted depth.

B. Apply lime at the recommended rate determined by the Engineer.

C. Apply fertilizer at a rate of 20 pounds per 1,000 square feet.

D. Apply mulch at a rate of 90 pounds per 1,000 square feet.

E. The Engineer reserves the right to vary the amounts of materials used, as required to produce optimum results.

3.3 MAINTENANCE

A. Keep all seeded areas watered, reseeding if and when necessary, until a healthy, uniform growth is established over the entire area.

3.4 GUARANTEE

A. The Contractor shall guarantee for a period of one year from the date of substantial completion that the new grass will be free from dead areas or washout. The Contractor shall reseed areas necessary to establish a firm, healthy stand of grass.

End of Section

DIVISION 33 – UTILITIES

SECTION 33 14 00

WATER UTILITY PIPING, VALVES, AND ACCESSORIES

PART 1 – GENERAL

1.1 SCOPE OF WORK

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

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

1.2 SUBMITTALS

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

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

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

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

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

F. Operation and maintenance data for valves.

1.3 QUALITY ASSURANCE

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

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

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

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

1.4 DELIVERY, STORAGE, AND HANDLING

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

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

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

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

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

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

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

1.5 PROJECT CONDITIONS

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

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

1.6 SEQUENCING AND SCHEDULING

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

B. Coordinate with interior water distribution piping.

C. Coordinate with other utility work.

PART 2 – PRODUCTS

2.1 WATER MAIN PIPE AND FITTINGS

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

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

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

D. High Density Polyethylene (HDPE) Pipe, 1- through 24-inch. High density polyethylene pipe shall be manufactured from PE4710 resin, conform to ASTM D3350 and AWWA C906, and be certified per NSF/ANSI 61. Provide standard pipe having plain ends for heat welded joints and cast iron equivalent outside diameter. Provide DR 13.5 for a 160 psi pressure rating or as shown on the Drawings.

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

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

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

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

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

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

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

2.2 WATER SERVICE LINE AND FITTINGS

A. Copper Tubing (COP)

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

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

C. Fittings

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

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

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

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

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

2.3 VALVES

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

B. Buried Operators

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

2.4 VALVE BOXES

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

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

2.5 PRESSURE REDUCING VALVES – 1" AND SMALLER

A. None

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

A. None

2.7 RESIDENTIAL WATER METERS

A. None

2.8 METER PITS

A. None

2.9 FIRE HYDRANTS

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

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

C. Pipe Connection: 6 inch mechanical joint.

D. Pressure Rating: 250 psi rated working pressure.

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

F. Hydrant drains shall be plugged.

2.10 FLEXIBLE COUPLINGS

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

2.11 TAPPING SLEEVES

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

2.12 ANCHORAGES

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

B. Rods: ASTM A 575, steel.

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

D. Bolts: ASTM A 307, steel.

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

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

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

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

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

2.13 IDENTIFICATION

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

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

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

2.14 TRACER WIRE

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

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

PART 3 – EXECUTION

3.1 PREPARATION OF BURIED PIPE FOUNDATION

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

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

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

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

3.2 INSTALLATION OF PIPE AND PIPE FITTINGS

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

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

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

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

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

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

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

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

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

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

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

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

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

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

3.3 INSTALLATION OF VALVES

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

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

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

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

3.4 INSTALLATION OF ANCHORAGES

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

3.5 APPLICATION OF PROTECTIVE COATINGS

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

3.6 INSTALLATION OF HYDRANTS

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

3.7 INSTALLATION OF VALVE PITS AND WATER METER PITS

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

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

3.8 INSTALLATION OF IDENTIFICATION

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

3.9 RECORD DRAWINGS

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

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

3.10 CLEANING AND DISINFECTION

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

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

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

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

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

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

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

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

3.11 HYDROSTATIC TESTING

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

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

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

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

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

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

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

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

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

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

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

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

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

I. Evaluation of Results/Corrective Actions:

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

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

End of Section

SECTION 33 31 13

SANITARY SEWERS, MANHOLES, and APPURTENANCES – NH

PART 1 – GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Furnishing and installing sanitary sewers
2. Furnishing and installing building sewer service laterals
3. Furnishing and installing pre-cast concrete manholes
4. Furnishing and installing manhole frames and covers
5. Miscellaneous sewerage system appurtenances
6. Testing

1.2 SUBMITTALS

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

1. Name, address and telephone number of suppliers of all manufactured products.

2. Product data containing information and instructions relating to the storage, handling, installation, and inspection of furnished pipe, fittings and appurtenances.

3. Pipe and fitting manufacturers' Certificate of Compliance with specified standards and tests for each lot of pipe and fittings supplied. Immediately turn certificates over to Engineer. Materials delivered to the job site without accompanying certificates will be subject to rejection.

4. Shop drawings and technical data for pre-cast concrete sanitary manholes, including frames and covers, pipe penetration and wall joint sealing systems, and water proof coatings.

5. Certified copy of all leakage tests including all failures and retests.

1.3 QUALITY ASSURANCE

A. Pipe and fittings shall be produced in a plant of recognized reputation that is regularly engaged in the production of pipe conforming to the specified standards. Pipe and pipe fittings of the same type shall be the product of a single manufacturer.

B. All pre-cast concrete manhole sections and all castings shall be the product of a single manufacturer who can furnish evidence of satisfactory experience in the production of high quality products of the type indicated and specified.

C. Provide at least one skilled mason who shall be present at all times during the installation of inverts, shelves and chimneys and who shall personally direct the masonry work performed under this Section.

D. Comply with applicable regulations and standards of all local, state, and federal regulatory authorities having jurisdiction.

1.4 DELIVERY, STORAGE AND HANDLING

A. Carefully handle all pipes and fittings when loading and unloading. Lift pipes by hoists or lower on skid-ways in manner to avoid shock. Lower pipe into trench with suitable equipment as recommended by manufacturer. Do not dump or drop pipe or fittings. Those that are dumped or dropped are subject to rejection by Engineer.

B. Each length of pipe delivered to the job site shall be clearly marked with the name of the manufacturer, class of pipe and pipe diameter. Store in accordance with manufacturer's recommendations.

C. Pre-cast manhole sections shall not be shipped until the concrete has attained a compressive strength of 3,000 psi or until 5 days after fabrication, whichever is longer.

D. All pre-cast manhole sections shall be lifted and moved by use of suitable lifting slings, plugs, and holes so as not to damage ship-lap joints or edges.

E. All materials found at anytime during the work to be defective will be rejected, marked and promptly removed from the job site.

1.5 PROJECT CONDITIONS

A. Verify existing utility and connection locations and elevations. Affirm that sewerage system piping may be installed in compliance with original design and referenced standards. Immediately notify the Engineer of any conflicts which may require design modifications and do not initiate or resume construction until such conflicts have been resolved.

1. Locate existing sanitary sewerage system piping and structures that are to be abandoned and closed.

1.6 SEQUENCING AND SCHEDULING

A. Coordinate construction schedule, service interruptions, traffic control, leakage testing and project start-up with Owner, Engineer and regulatory authorities having jurisdiction.

B. Coordinate building sewer service lateral construction with interior building sanitary sewerage piping.

C. Coordinate with other utility work.

PART 2 – PRODUCTS

2.1 PIPE AND FITTINGS

A. General: Provide pipe and pipe fitting materials compatible with each other.

B. Ductile-Iron Pressure Pipe: AWWA C151, Class 52, for push-on joints.

1. Lining: AWWA C104, cement lining.
2. Gaskets: AWWA C 111, rubber.
3. Ductile-Iron Fittings: AWWA C110, ductile-iron, or AWWA C153, ductile-iron compact fittings.

    a. Lining: AWWA C104, cement lining.
    b. Gaskets: AWWA C111, rubber.

C. PVC (Polyvinyl Chloride) Sewer Pipe and Fittings:

1. Gravity Sewer - ASTM D3034, SDR 35, elastomeric gasket joints. Gaskets to meet ASTM F477, elastomeric seal.
2. Force Main (Pressure) Sewer – ASTM D2241 or ASTM D1785, SDR 26, elastomeric gasket joints.

D. Non-pressure Couplings: Rubber or elastomeric sleeve and stainless steel band assembly fabricated to match outside diameters of pipes to be joined.

1. Sleeves: ASTM C 425, rubber for vitrified clay pipe; ASTM C 443, rubber for concrete pipe; ASTM C 564, rubber for cast-iron soil pipe; and ASTM F 477, elastomeric seal for plastic pipe. Sleeves for dissimilar or other pipe materials shall be compatible with pipe materials being joined.

2. Bands: Stainless steel, one at each pipe insert.

E. Non-pressure Joint Seals: Rubber or elastomeric compression gasket, made to match pipe inside diameter or hub, and adjoining pipe outside diameter.

1. Gaskets: ASTM C 425, rubber for vitrified clay pipe; ASTM C 443, rubber for concrete pipe; ASTM C 564, rubber for cast-iron soil pipe; and ASTM F 477, elastomeric seal for plastic pipe. Gaskets for dissimilar or other pipe materials shall be compatible with pipe materials being joined.

2.2 MANHOLES

A. Precast Concrete Manholes: ASTM C 478, pre-cast reinforced H-20 loading rated concrete, of depth indicated with provision for rubber gasket joints.

1. Base Section: 6-inch minimum floor thickness and 5-inch minimum thickness for walls and base riser section, and having a base section with integral floor.

2. Riser Sections: 5-inch minimum thickness; 48-inch minimum diameter, and barrel heights to provide depth indicated.

3. Top Section: Eccentric cone type, unless concentric cone or flat-slab-top type is indicated.

4. Horizontal Joint Sealant: Double row, Bitumastic.

5. Pipe Connectors: Lock-Joint Flexible Manhole Sleeve or Kor-N-Seal Joint Sleeve, for each pipe connecting to base section.

6. Inverts and Shelves: Brick paved.

7. Mortar and Parging: ASTM C 270, Type S, using ASTM C 150, Type II Portland cement.

8. Bricks: Bricks for shelves, inverts, and grade adjustment shall conform to Env-Wq 704.13 (a) (9), Grade SS hard brick. No more than five (5) brick courses shall be allowed for grade adjustment.

9. Manhole Mortar: Mortar for pointing and sealing manholes shall conform to Env-Wq 704.13 (c).

10. All manholes shall be water proofed, at the factory, with two seal coats applied to the exterior of the manhole in accordance with the seal coating manufacturer's recommendations. Water proofing shall be masonry seal MSP-1 waterproofing material as made by the Masonry Seal Foundation, 7500 West Ridge Road, Elyria, Ohio, or Foundation Coating 47-461 as made by TNEMEC. Exterior of all joints shall be coated with waterproofing after setting.

B. Reinforcement: Steel conforming to the following:

1. Fabric: ASTM A 185, welded wire fabric, plain.
2. Reinforcement Bars: ASTM A 615, Grade 60, deformed.

C. Precast Concrete Structure Steps: Manholes shall not be provided with steps. Steps for other structures, if required shall be as follows: Stainless steel or plastic covered steel or

plastic shaped so they cannot be pulled out of the concrete wall in which they are secured. All steps shall meet the requirements of ASTM C478 for load carrying capacity and pull-out resistance and steps shall not be secured with mortar. The steps shall have a drop section or raised abutments to prevent sideways slippage off the step, the foot contact surface shall have non-skid safety serrations and steps shall be approximately 14" X 10".

D. Manhole Frames and Covers: ASTM A 48, Grade 30, heavy-duty, grey cast iron, H-20 loading rated, 30-inch minimum clear opening, 6-inch minimum riser with 4-inch minimum width flange, and 31-3/4-inch diameter cover, indented top design, with 3-inch lettering "SANITARY SEWER" cast into cover, coal tar epoxy coated.

1. Standard Frame and Cover: Quality Water Products, Style 30, or equivalent.

2. Water-Tight Frame and Cover: Quality Water Products Style C-47 WT.

2.3 IDENTIFICATION

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

PART 3 – EXECUTION

3.1 PREPARATION OF FOUNDATION FOR BURIED SANITARY SEWERAGE SYSTEMS

A. Grade trench subgrade to provide a smooth, firm, stable, and rock-free foundation, throughout the length of the pipe.

B. Remove unstable, soft, and unsuitable materials below subgrade to depth directed by Engineer. Refill to subgrade with course gradation crushed stone or screened gravel.

C. Place stone bedding and shape bottom of trench to fit bottom of pipe. Dig bell holes at each pipe joint to relieve the bells of all loads and to ensure continuous bearing of the pipe barrel on the bedding.

3.2 PIPE APPLICATIONS FOR UNDERGROUND SANITARY SEWERS

A. Gravity Sewers: PVC SDR 35 sewer pipe and fittings or DI Class 52 pressure pipe and fittings, materials and sizes as indicated on plan profile drawings.

B. Building Sewer Service Laterals: PVC SDR 35 sewer pipe and fittings, 4-inch minimum diameter.

3.3 INSTALLATION - GENERAL

A. General Locations and Arrangements: Drawings (plans and details) indicate the general location and arrangement of the underground sanitary sewerage system piping. Location and arrangement of piping layout take into account many design considerations. Install the piping as indicated, to the extent practical.

B. Install piping beginning at low point of systems, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Place stone haunching and chink pipe to grade. Install gaskets, seals, sleeves, and couplings in accordance with manufacturer's recommendations for use of lubricants, cements, and other installation requirements. Place and compact initial backfill and suitable backfill materials as indicated in "Section 31 23 16 – Earthwork".

C. Use manholes for changes in direction and at all main intersections. Use wye or tee fittings for branch connections, except where direct tap into existing sewer is indicated.

D. Use proper size increasers, reducers, and couplings, where different size or material of pipes and fittings are connected. Reduction of the size of piping in the direction of flow is prohibited.

E. When installing below pavement sewers at depths less than 6-feet or cross-country sewers less than 4-feet, install 2-inch thick extruded polystyrene insulation 6 inches over piping. Width of insulation shall be a minimum of 24 inches, centered on the centerline of pipe. Joints between sheets shall be covered with a 12-inch long sheet of insulation, centered on the joint. Any variation from the minimum depth requirements (six feet under pavement or four feet under cross country areas) must be granted a waiver prior to construction in accordance with the requirements of Env-Wq 716.02.

F. Install building sewer service laterals, of sizes and in locations indicated or directed. Plug service at street right-of-way, connect to existing building sewer or terminate or connect to building sanitary drains at a point 5 feet beyond foundation exterior wall, as indicated or directed.

G. When installing building sewer service laterals at depths less than 3 feet, install 1-inch-thick extruded polystyrene over piping. Width of insulation shall extend minimum of 12 inches beyond each side of pipe. Install directly over and center on pipe center line.

H. Tunneling: Install pipe under streets or other obstructions that cannot be disturbed, by tunneling, jacking, or a combination of both.

3.4 PIPE JOINT CONSTRUCTION AND INSTALLATION

A. Join and install ductile-iron pipe with ductile-iron push-on joint fittings and rubber gaskets in accordance with AWWA C600.

B. Join and install PVC pipe as follows:

1. Pipe and gasketed fittings, joining with elastomeric seals in accordance with ASTM D 3212.

2. Installation in accordance with ASTM D 2321.

C. Join different types of pipe with standard manufactured couplings and fittings intended for that purpose.

3.5 MANHOLES

A. General: Install manholes complete with accessories as indicated. Utilize overlapping joint type for pre-cast concrete construction. Construct continuous brick paved inverts and shelves between inlets and outlet. Set tops of frames and covers flush with finish surface where manholes occur in pavements. Elsewhere, set tops 3 inches above finish surface, unless otherwise indicated.

B. Place pre-cast concrete manhole sections as indicated, and install in accordance with ASTM C 891.

C. Provide a double row of bitumastic joint sealant at horizontal wall section joints.

D. Apply bituminous mastic coating at joints of sections.

3.6 INSTALLATION OF IDENTIFICATION

A. Install continuous plastic metallic lined underground warning tape during back-filling of trench for underground water service piping. Locate 2-feet above pipe crown and centered on pipe.

3.7 FIELD QUALITY CONTROL

A. Perform testing of sewer system in accordance with local authorities having jurisdiction.

B. Gravity Sewer Testing: All new gravity sewers shall be tested for water tightness by the use of low-pressure air tests. The Engineer shall observe all testing. Low-pressure air testing shall be in conformance with ASTM F 1417-92 (2005) "Standard Test Methods for Installation Acceptance of Plastic Gravity Sewer Lines Using Low-Pressure Air"; or Uni-Bell PVC Pipe Association Uni-B-6, "Low–Pressure Air Testing of Installed Sewer Pipe" (1998). All new gravity sewer pipes shall be cleaned and visually inspected using a lamp and shall be true to line and grade following installation and prior to use. All new gravity sewer pipe shall be deflection tested not less than 30 days nor more than 90 days following installation. The maximum allowable deflection of flexible sewer pipe shall be 5% percent of average inside diameter. A rigid ball or mandrel with a diameter of at least 95% of the average inside pipe diameter shall be used for testing pipe deflection. The deflection test

shall be conducted without mechanical pulling devices. Sections which do not permit ball passage shall be reinstalled to attain satisfactory results.

C. Force Main and Low Pressure Sewer Testing: Force mains shall be tested in accordance with Section 5 of AWWA C600-10 "Installation of Cast Iron Water Mains and Their Appurtenances", at a pressure equal to the greater of 150 percent of the design operating total dynamic head or at least 100 psi. The Engineer shall observe all testing.

D. Manhole Testing

(a) Manholes shall be tested for leakage using a vacuum test in accordance with the ASTM C1244 standard in effect when the testing is performed. A manhole may be backfilled prior to performing a vacuum test, but if the manhole fails the vacuum test, backfill shall be removed so repairs to the manhole can be made from the outside of the manhole prior to retesting.
(b) The manhole vacuum test shall conform to the following:
(1) The initial vacuum gauge test pressure shall be 10 inches Hg; and
(2) The minimum acceptable test hold time for a 1-inch Hg pressure drop to 9 inches Hg shall be:
a. Not less than 2 minutes for manholes less than 10 feet deep in depth;
b. Not less than 2.5 minutes for manholes 10 to 15 feet deep; and
c. Not less than 3 minutes for manholes more than 15 feet deep;
(c) The manhole shall be repaired and retested if the test hold times fail to achieve the acceptance limits specified in (b), above.
(d) Inverts and shelves shall not be installed until after successful testing is completed.
(e) Immediately following completion of the leakage test, the frame and cover shall be placed on the top of the manhole or some other means used to prevent accidental entry by unauthorized persons, children, or animals, until the contractor is ready to make final adjustment to grade.

1. Cleaning: Clear interior of piping and structures of dirt and other superfluous material as work progresses. Place plugs in ends of uncompleted pipe at end of day or whenever work stops.
2. Flush piping between manholes, if required by local authority, to remove collected debris.

E. Interior Inspection: Inspect piping to determine whether line displacement or other damage has occurred.

1. Make inspections after pipe between manholes and manhole locations has been installed and approximately 2 feet of backfill is in place, and again at completion of project.

2. If inspection indicates poor alignment, debris, displaced pipe, infiltration or other defects correct such defects, and re-inspect.

3.8 PROTECTION OF WATER SUPPLIES

A. There shall be no physical connection between a public or private potable water supply system and a sewer or sewer appurtenance which would permit the passage of sewage or polluted water into the potable supply. No water pipe shall pass through or come in contact with any part of a sewer or sewer manhole.

B. No sewer shall be located within the well protective radii established in Env-Ws 300 for any public water supply wells or within 100 feet of any private water supply well.

C. Sewers shall be located at least 10 feet horizontally from any existing or proposed water main.

D. A deviation from the separation requirements of B or C above shall be allowed where necessary to avoid conflict with subsurface structures, utility chambers and building foundations, provided that the sewer is constructed in accordance with the force main construction requirements specified in Env-Wq 704.06.

E. Whenever sewers must cross water mains, the sewer shall be constructed as follows:

1. Vertical separation of the sewer and water main shall be not less than 18 inches, with the water above sewer; and,

2. Sewer joints shall be located at least 6 feet horizontally from the water main.

END OF SECTION