

# CONTRACT DOCUMENTS

FOR

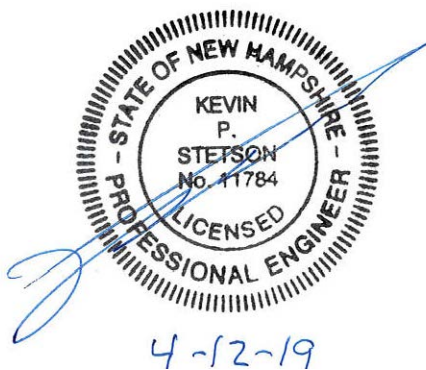
## HANOVER HIGH SCHOOL TURF FIELD DRAINAGE IMPROVEMENTS

SAU #70/DRESDEN SCHOOL DISTRICT

HANOVER NEW HAMPSHIRE

APRIL 12, 2019

Project No. 10021



EXECUTED DOCUMENTS

MAY 28, 2019



**PATHWAYS CONSULTING, LLC**

Planning • Civil & Environmental Engineering • Surveying • Construction Assistance  
240 Mechanic Street • Suite 100  
Lebanon, New Hampshire 03766  
(603) 448-2200 • Fax: (603) 448-1221



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Lebanon, New Hampshire 03766  
(603) 448-2200 • Fax: (603) 448-1221

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### **ADDENDUM NO. 1**

TO: ALL PLAN HOLDERS OF RECORD

FROM: JEFFREY D. DURELL, PROJECT ENGINEER

RE: ADDENDUM NO. 1 FOR THE HANOVER HIGH SCHOOL TURF FIELD  
DRAINAGE IMPROVEMENTS PROJECT, HANOVER, NEW HAMPSHIRE  
(Project No. 10021)

DATE: April 26, 2019

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This Addendum, titled ADDENDUM NO. 1, forms part of the CONTRACT DOCUMENTS and modifies the BIDDING DOCUMENTS, dated April 12, 2019, prepared by Pathways Consulting, LLC (Pathways). Amendments and additions are noted below.

Acknowledge receipt of this Addendum in the space provided on the Bid Proposal. Failure to do so may disqualify the Bidder.

### **IMPORTANT CONTRACT TIMEFRAME REVISIONS**

**Due to the School Districts need to begin the Turf replacement work by August 1, the date of Substantial Completion is revised to August 1, 2019. The date of Final Completion is revised to August 16<sup>th</sup>, 2019. Please see attached estimated construction schedule. Work on the south slope may begin in early June. Access to this area can be from the access road to the south off of Mitchell Lane and Barrett Road. Drainage work to the north side of the field cannot begin until after Hanover High School Commencement on June 14<sup>th</sup>.**

### **CLARIFICATIONS**

1. *Plan Sheet 4, Reference 1 Log Note: Tap Break-In Intruding approximately 272.3' from GMPS3 Per reference 3 – 8" to 12" in size (Sta. approximate 101+90.9 +/-). This protruding pipe is believed to already be filled (see attached photograph). Notes 1 to 6 on Plan Sheet 3 in reference to this pipe and filling shall be ignored.*

### **PLAN REVISIONS**

1. Since the plans were issued we have identified the actual location of DMH-GMPS3 and verified elevations of the pipe inverts in this structure. See revised plan sheets 4 and 5 attached providing clarifications.



USMH1 3  
DSMH1 4

09:53:07  
11/03/17

+0275.6ft↑

275.6 ft.

↶ 10  
▷ 30 ↷



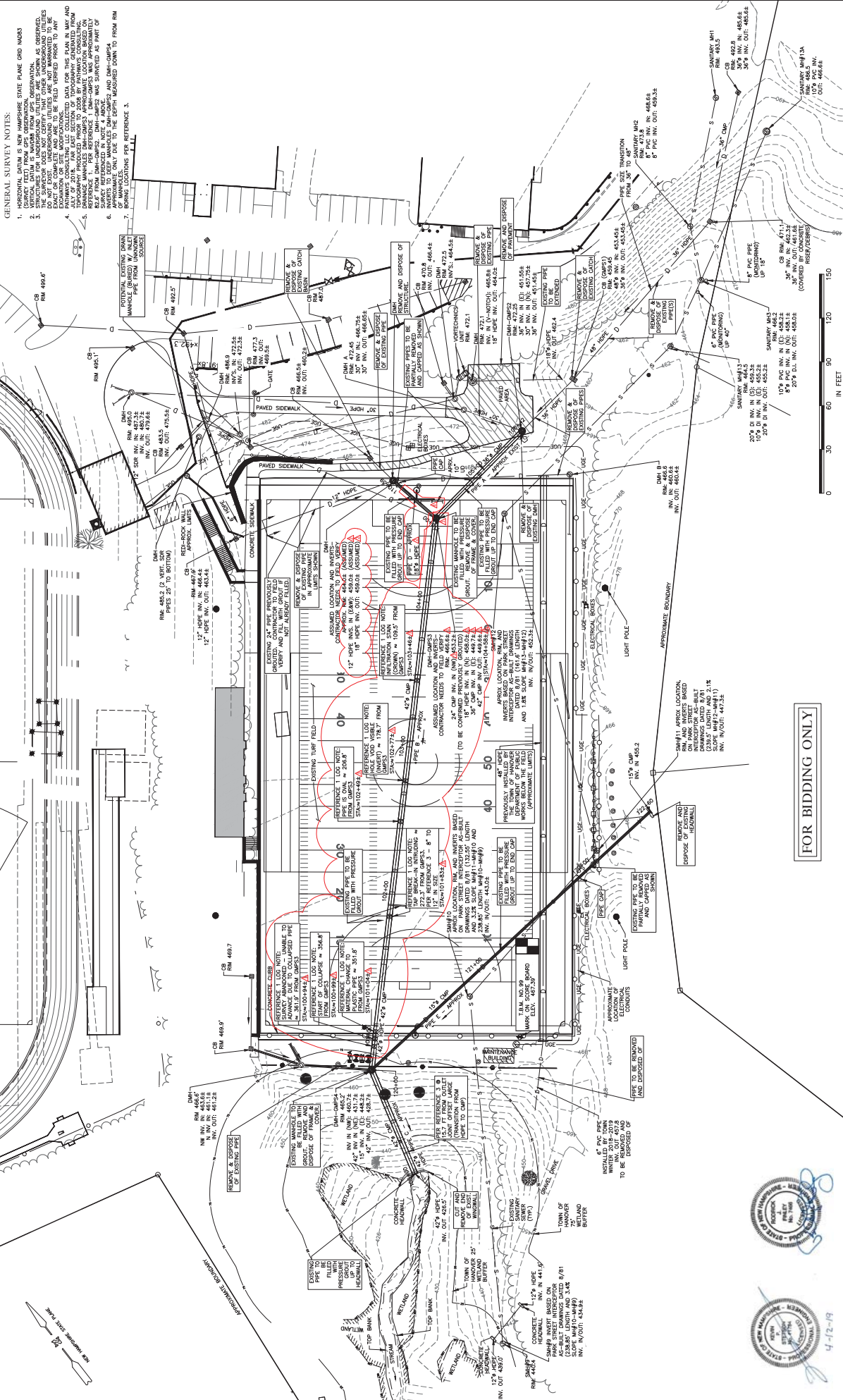


**USMH: 3**  
**DSMH: 4**

**09:22:13a**  
**11/03/17**

**+0262.6ft↑**





- GENERAL SURVEY NOTES:**
1. ALL SURVEY DATA IS BASED ON THE STATE PLANE GRID (NAD83).
  2. SURVEY DATA IS BASED ON THE STATE PLANE GRID (NAD83).
  3. SURVEY DATA IS BASED ON THE STATE PLANE GRID (NAD83).
  4. SURVEY DATA IS BASED ON THE STATE PLANE GRID (NAD83).
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  9. SURVEY DATA IS BASED ON THE STATE PLANE GRID (NAD83).
  10. SURVEY DATA IS BASED ON THE STATE PLANE GRID (NAD83).

FOR BIDDING ONLY

REVISION NO.		DATE	DESCRIPTION	MADE BY	CHECKED BY	APPROVED BY
1	4/15/18	4/15/18	ADDED 10' UNDERPASS LOCATION	DMW	JDD	BJF
2	4/15/18	4/15/18	ADDED 10' UNDERPASS LOCATION	DMW	JDD	BJF
3	4/15/18	4/15/18	ADDED 10' UNDERPASS LOCATION	DMW	JDD	BJF
4	4/15/18	4/15/18	ADDED 10' UNDERPASS LOCATION	DMW	JDD	BJF
5	4/15/18	4/15/18	ADDED 10' UNDERPASS LOCATION	DMW	JDD	BJF
6	4/15/18	4/15/18	ADDED 10' UNDERPASS LOCATION	DMW	JDD	BJF
7	4/15/18	4/15/18	ADDED 10' UNDERPASS LOCATION	DMW	JDD	BJF
8	4/15/18	4/15/18	ADDED 10' UNDERPASS LOCATION	DMW	JDD	BJF
9	4/15/18	4/15/18	ADDED 10' UNDERPASS LOCATION	DMW	JDD	BJF
10	4/15/18	4/15/18	ADDED 10' UNDERPASS LOCATION	DMW	JDD	BJF

**EXISTING CONDITIONS AND DEMOLITION/ABANDONMENT PLAN FOR HANOVER HIGH SCHOOL TURF FIELD DRAINAGE IMPROVEMENTS**

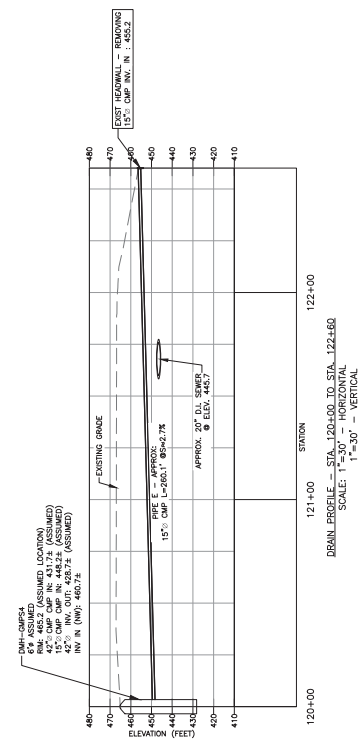
**SANBORN, HEAD & ASSOCIATES, INC.**  
187 SAINT PAUL STREET, SUITE 4-C  
BURLINGTON, VERMONT 05401  
(802) 391-8520

**PATHWAYS CONSULTING, LLC**  
240 NEWMAN STREET, SUITE 100  
LEBANON, NEW HAMPSHIRE 03766  
(603) 448-2200

DESIGNED BY: RJF/JD  
DRAWN BY: GRW/DMW  
CHECKED BY: RJF/JD  
DATE: 04/12/19  
PROJ. NO.: 10021

**4**

SHEET 4 OF 10

[illegible]

REVISION NO.	DATE	DESCRIPTION	MADE BY	CHECKED BY	APPROVED BY
1	4/19/19	ADD SEE 1 EXISTING BASED ON REVISION 1	CPM	JDO	RF
2	4/19/19	ADD 90% R/W LENGTH OF PIPE D BASED ON REV 1	CPM	JDO	RF
3	4/19/19	SHIFED 20% SLOPE LOCATION/ADD DRAIN-00953	CPM	JDO	RF
<p>REV AUTOCAD, ADD LINE &amp; LENGTH AND SLOPE</p>					

EXISTING DRAINAGE PROFILES FOR  
HANOVER HIGH SCHOOL  
TURF FIELD DRAINAGE IMPROVEMENTS

LEBANON STREET - HANOVER, NEW HAMPSHIRE

SANBORN, HEAD & ASSOCIATES, INC.  
187 SAINT PAUL STREET, SUITE 400  
BOULDER, COLORADO 80501  
(802) 391-8500

PATHWAYS CONSULTING, LLC  
240 MECHANIC STREET, SUITE 100  
LEBANON, NEW HAMPSHIRE 03666  
(603) 481-2200

SCALE: AS SHOWN

DESIGNED BY: RUF/D

DRAWN BY: CSM/OPM

CHECKED BY: RUF/SK

DATE: 04/12/19

PROJ. NO. 10021

SHEET 5 OF 10

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## **PATHWAYS CONSULTING, LLC**

Planning • Civil & Environmental Engineering • Surveying • Construction Assistance  
240 Mechanic Street • Suite 100  
Lebanon, New Hampshire 03766  
(603) 448-2200 • Fax: (603) 448-1221

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### **ADDENDUM NO. 2**

TO: ALL PLAN HOLDERS OF RECORD

FROM: JEFFREY D. DURELL, PROJECT ENGINEER

RE: ADDENDUM NO. 2 FOR THE HANOVER HIGH SCHOOL TURF FIELD  
DRAINAGE IMPROVEMENTS PROJECT, HANOVER, NEW HAMPSHIRE  
(Project No. 10021)

DATE: April 30, 2019

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This Addendum, titled ADDENDUM NO. 2, forms part of the CONTRACT DOCUMENTS and modifies the BIDDING DOCUMENTS, dated April 12, 2019, prepared by Pathways Consulting, LLC (Pathways). Amendments and additions are noted below.

Acknowledge receipt of this Addendum in the space provided on the Bid Proposal. Failure to do so may disqualify the Bidder.

### **REVISED BID PROPOSAL FORM**

**Please see attached revised Bid Proposal form. An error was found under the quantity for bid item 31 “Miscellaneous Work and Cleanup”. This bid item quantity is being bid as 1 Lump Sum in accordance with Section 01 15 00 “Measurement and Payment”. Please replace the bid form in the documents with the one attached.**



**CONTRACT DOCUMENTS**  
**for the**  
**TURF FIELD DRAINAGE IMPROVEMENTS**  
**SAU #70/DRESDEN SCHOOL DISTRICT**  
**HANOVER HIGH SCHOOL**

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## **SPECIFICATIONS**

### **DIVISION 01** **GENERAL REQUIREMENTS**

#### **Section**

01 10 10	Mobilization
01 10 30	Miscellaneous Work and Cleanup
01 10 40	Specifications and Drawings
01 10 90	Abbreviations and Terms
01 60 10	Submittals
01 70 00	Execution and Closeout Requirements

### **DIVISION 03** **CONCRETE**

#### **Section**

03 30 53	Miscellaneous Cast in Place Concrete
03 60 00	Grouting

### **DIVISION 31** **SITE WORK**

#### **Section**

31 23 00	Excavation and Fill
31 23 16.13	Trenching
31 23 19	Dewatering
31 23 23.23	Soil Compaction

### **DIVISION 32** **EXTERIOR IMPROVEMENTS**

#### **Section**

32 12 00	Flexible Paving
32 92 00	Lawns and Grasses

### **DIVISION 33** **UTILITIES**

#### **Section**

33 01 10.10	Existing Utilities and Underground Structures
33 41 00	Storm Utility Drainage Piping
33 44 00	Storm Utility Water Drains
33 44 40	Stone Masonry Headwalls

## APPENDIX

1. S.W. Cole Geotechnical Report
2. NHDES Wetland Permit (Pending)





**ADVERTISEMENT FOR BIDS  
HANOVER HIGH SCHOOL  
TURF FIELD DRAINAGE IMPROVEMENTS  
SAU # 70/DRESDEN SCHOOL DISTRICT**

SAU # 70 – Dresden School District invites sealed bids for the Turf Field Drainage Improvements at Hanover High School in Hanover, New Hampshire (NH) in accordance with Contract Documents prepared by Pathways Consulting, LLC, 240 Mechanic Street, Suite 100, Lebanon, NH 03766.

**Scope of Work:** This is a drainage improvements project located below and directly adjacent to the Hanover High School Athletic Turf Field. The Town of Hanover previously installed the section of new 48” pipe below the field in 2018. The intent of this project is to reroute the drainage that passes below the existing field through one common 48” pipe to a new outfall and at the same time grout fill and abandon or remove the existing pipes and structures below the field. The SAU office will also be replacing the turf once substantial completion is reached on this project. That work will be under separate contract, however the Contractor must communicate all work with the parties involved with the Turf replacement.

**Bids:** Sealed bids will be received at the SAU # 70 office, 41 Lebanon Street, Suite 2, Hanover, NH 03755-2147 until 1:00 p.m., Eastern Standard Time, on Friday, May 3, 2019. Bids must be submitted in accordance with the “Instructions for Bidders” section of the Contract Documents.

The Owner reserves the right to reject any and all bids and to waive any informality in the bid.

**Contract Completion Time:** Work is expected to begin in June 2019 following the end of the school year (week of June 17<sup>th</sup>). All work shall be substantially complete prior to August 16, 2019, and final completion shall be achieved by August 30, 2019. Replacement of the Turf field by others is scheduled to begin on August 16.

**Plans and Specifications:** Contract documents may be examined at the following offices during regular business hours:

Physical Copies:

1. Pathways Consulting, LLC, 240 Mechanic Street, Suite 100, Lebanon, NH 03766
2. SAU 70 Office, 41 Lebanon Street, Suite 2, Hanover, NH 03755-2147

PDF copies of plans and specifications may be requested from Pathways Consulting, LLC at no cost to the Bidder. Additional hard copies of the Plans and Contract Documents may be obtained at the office of Pathways Consulting, LLC upon receipt of \$90.00 for each set, which is non-refundable. Checks should be made payable to Pathways Consulting, LLC. All requests for mailed documents must be accompanied by an additional fee of \$30.00 to cover the cost of postage and handling. All questions concerning obtaining the plans and specifications shall be directed to Pathways Consulting, LLC.

**Pre-Bid Site Visit:** A non-mandatory pre-bid site visit will be held for this project at 11:00 a.m. on Friday, April 19, 2019. Interested contractors should meet at the project site behind Hanover High School. Contractors who do not attend the pre-bid site visit but intend to submit a bid should register with Jeff Durell ([jeff.durell@pathwaysconsult.com](mailto:jeff.durell@pathwaysconsult.com)) at the Pathways Consulting office to make sure that they receive any bid addenda or other contractor information. Failure to do so may result in a rejected bid.



## **INSTRUCTIONS FOR BIDDERS**

SAU # 70 – Dresden School District invites sealed bids for the Turf Field Drainage Improvements at Hanover High School in Hanover, New Hampshire (NH) in accordance with Contract Documents prepared by Pathways Consulting, LLC, 240 Mechanic Street, Suite 100, Lebanon, NH 03766. Sealed bids will be received at the SAU # 70 office, 41 Lebanon Street, Suite 2, Hanover, NH 03755-2147 until 1:00 p.m., Eastern Standard Time, on Friday, May 3, 2019. Bids must be submitted in accordance with the “Instructions for Bidders” section of the Contract Documents. If mailed, bids must be received no later than the time and date stated above. All bids should be sealed and clearly marked as “Turf Field Drainage Improvements Hanover High School” and as indicated in the Instructions to Bidders. Bids shall be accompanied by a Bid Bond and all documentation requested in the Contract Documents. Bids cannot be submitted electronically.

**LOCATION:** The site is located at Hanover High School, 41 Lebanon Street, Hanover, New Hampshire.

**PROJECT SUMMARY:** This is a drainage improvements project located below and directly adjacent to the Hanover High School Athletic Turf Field. The Town of Hanover previously installed the section of new 48” pipe below the field in 2018. The intent of this project is to reroute the drainage that passes below the existing field through one common 48” pipe to a new outfall and at the same time grout fill and abandon or remove the existing pipes and structures below the field. The SAU office will also be replacing the turf once substantial completion is reached on this project. That work will be under separate contract, however the Contractor must communicate all work with the parties involved with the Turf replacement.

**CONTRACT COMPLETION TIME:** Work is expected to begin in June 2019 following the end of the school year (week of June 17<sup>th</sup>). All work shall be substantially complete prior to August 16, 2019, and final completion shall be achieved by August 30, 2019.

This contract shall not be subject to Liquidated Damages.

**PLANS:** PDF copies of plans and specifications may be requested from Pathways Consulting, LLC at no cost to the Bidder. Additional hard copies of the Plans and Contract Documents may be obtained at the office of Pathways Consulting, LLC upon receipt of \$90.00 for each set, which is non-refundable. Checks should be made payable to Pathways Consulting, LLC. All requests for mailed documents must be accompanied by an additional fee of \$30.00 to cover the cost of postage and handling. All questions concerning obtaining the plans and specifications shall be directed to Pathways Consulting, LLC.

### **PLANS, SPECIFICATION, AND PROPOSAL MAY BE VIEWED AT THE OFFICE OF:**

Physical Copies:

1. Pathways Consulting, LLC, 240 Mechanic Street, Suite 100, Lebanon, NH 03766
2. SAU 70 Office, 41 Lebanon Street, Suite 2, Hanover, NH 03755-2147

**PRE-BID SITE VISIT:** A non-mandatory pre-bid site visit will be held for this project at 11:00 a.m. on Friday, April 19, 2019. Interested contractors should meet at the project site behind Hanover High School. Contractors who do not attend the pre-bid site visit but intend to submit a bid should register with Jeff Durell (jeff.durell@pathwaysconsult.com) at the Pathways Consulting office to make sure that they receive any bid addenda or other contractor information. Failure to do so may result in a rejected bid.

**QUESTIONS:** During the advertising phase of this project, all questions shall be addressed in writing solely to Jeff Durell, Project Engineer, Pathways Consulting, LLC, Phone (603) 448-2200 or submitted in writing to [jeff.durell@pathwaysconsult.com](mailto:jeff.durell@pathwaysconsult.com). No additional questions will be received after 5:00 p.m. on Thursday April 25, 2019 in order to allow for sufficient time to issue a final bid addendum, if required.

#### **BID PREPARATION AND SUBMISSION:**

- A. Bidders are expected to examine the specifications, drawings, all instructions, and the construction site. Failure to do so will be at the bidder's risk. A non-mandatory pre-bid conference is scheduled to present the proposed project and field conditions.
- B. All bids must be submitted on the forms provided by the OWNER. Bidders shall furnish all the information required by the solicitation. Bids must be signed and the bidder's name typed or printed on the bid sheet and each continuation sheet, which requires the information by the bidder. Erasures or other changes must be initialed by the person signing the bid. Bids signed by an agent shall be accompanied by evidence of the agent's authority; bidders should retain a copy of their bid for their own records.
- C. All bid documents shall be sealed in an envelope which shall be clearly marked with the words "Hanover High School Turf Field Drainage Improvements", any project or other identifying number, the bidder's name, and the date and time for receipt of bids.
- D. This solicitation requires bidding on all items; failure to do so will disqualify the bid.
- E. Unless expressly authorized elsewhere in this solicitation, alternate bids will not be considered.
- F. Bids submitted by electronic methods, telegram, or facsimile (fax) machines will be considered, but the contractor is responsible for verifying receipt.
- G. All blank spaces under the page(s) headed "Bid Proposal" must be filled in with ink or typewriter in both words and figures indicating the unit price for each respective bid item. The bid total shall also be written in words and figures.
- H. In case of a discrepancy between the bid total written in words and that entered as a figure, the price written in words shall govern.
- I. In case of a discrepancy between a unit price written in words and one entered in figures, the price written in words shall govern.
- J. The estimate quantities are not guaranteed but are given as a basis for the comparison of bids.

#### **BID VALID PERIOD:**

Bidder shall hold prices on bid form for 60 days from the date the bids are to be submitted.

#### **EXPLANATION AND INTERPRETATION TO PROSPECTIVE BIDDERS:**

- A. Any prospective bidder desiring an explanation or interpretation of the solicitation, specification, drawings, etc., must request it in writing to Jeff Durell, Project Engineer, Pathways Consulting, LLC., Phone (603) 448-2200 [jeff.durell@pathwaysconsult.com](mailto:jeff.durell@pathwaysconsult.com). No additional questions will be received after 5:00 p.m. on Thursday, April 25, 2019. The Engineer will provide the appropriate addendum to answer bidder questions to all registered plan holders a minimum 4-5 working days before the bid due date.
- B. Any information obtained by, or provided to, a bidder other than by formal addendum to the solicitation shall not constitute a change to the solicitation.

#### **ADDENDUM TO INVITATION TO BIDS AND INSTRUCTIONS TO BIDDERS:**

- A. If this information is amended, then all terms and conditions which are not modified remain



- unchanged.
- B. Bidders shall acknowledge receipt of any addendum to this solicitation by identifying the addendum number and date on the bid form. Bids which fail to acknowledge the bidder's receipt of any addendum may result in the rejection of the bid if the addendum (addenda) contained information which substantively changed the OWNER'S requirements.

## **RESPONSIBILITY OF PROSPECTIVE CONTRACTOR**

- A. A prospective bidder/contractor may not have been suspended, debarred, voluntarily excluded, or determined ineligible by any Federal or State agency within the last three (3) years; or have a proposed suspension, debarment, voluntary exclusion or ineligibility determination pending; or have been indicted, convicted, or had civil judgment rendered against it by a court of law having jurisdiction in any matter involving fraud or official misconduct within the past three (3) years.
- B. A prospective bidder/contractor must be registered with the State of NH Secretary of State's office to do business within the State of NH by the execution date of any contract.
- C. A bidder may submit a unit bid price that is obviously below the cost of the bid item. If the OWNER awards and enters into a contract with a Bidder that has submitted a unit bid price that is obviously below cost, the contractor shall be obligated to perform the work under such item as indicated in the contract documents and/or directed by the Engineer.
- D. If a bidder submits a unit bid price of zero for a contract bid item, the bid will be declared informal and rejected from consideration.
- E. When "Alternate Bid Items" are indicated in the Proposal bidders must bid on all pay items in each set of "Alternate Bid Items." Failure to bid on all of the "Alternate Bid Items" in the proposal may result in rejection of the Bid.
- F. When it is indicated in the contract documents or drawings that the payment or costs of work are incidental or subsidiary to one or more other contract items (but not to specific other items), such costs shall be included by the bidder in the price bid for all other contract items.

## **AVAILABILITY OF LANDS FOR WORK, ETC.**

- A. All work shall be limited to within the limits of disturbance depicted on the Drawings. All additional lands and access thereto required for temporary construction facilities, construction equipment or storage of materials and equipment to be incorporated in the work are to be obtained and paid for by the Contractor. Use of those lands shall be compliant with all federal, state, and local laws, regulations, and ordinances.

## **FAMILIARITY WITH LAWS, ORDINANCES, AND REGULATIONS**

- A. By submitting a bid a prospective bidder/contractor certifies that it is familiar with all Federal, State, and local laws, ordinances, and regulations which affect in any way the materials, equipment, haul roads used in or upon the work, the conduct of the work, and the persons engaged or employed in the performance of the work to be performed pursuant to the contract.
- B. By submitting a bid a prospective bidder/contractor certifies that it shall forthwith report in writing to the ENGINEER any provisions in the plans, proposal, specifications or proposed contract that the bidder/contractor believes is in conflict with or inconsistent with any Federal, State, or local laws, ordinance, or regulation.
- C. By submitting a bid a prospective bidder/contractor certifies that if, during its investigation of the work in the process of preparing its bid, it discovers or encounters subsurface or latent physical conditions at a project site differing materially from those ordinarily encountered and generally recognized as inherent in the work provided for in the contract, it

shall notify in writing the ENGINEER of the specific differing conditions immediately upon discovering or encountering the differing site conditions.

- D. A prospective bidder/contractor further certifies that if it fails to notify the Engineer of any differing site conditions as described above, it shall waive any and all rights that it might have to additional compensation from the OWNER for additional work as a result of the differing site conditions and that it shall not bring claim for additional compensation because of differing site conditions.
- E. By submitting a bid a prospective bidder/contractor certifies that no claim or defense or ignorance or misunderstanding concerning Federal, State, or local laws, ordinances and/or regulations will be employed by a bidder/contractor or considered by the OWNER in claims, litigation, alternate dispute resolution procedures, or other matters concerning the contract for which the bid is submitted.

## **LATE SUBMISSION, MODIFICATIONS, AND WITHDRAWAL OF BIDS**

- A. Any bid received at a place designated in the solicitation after the exact time specified for receipt will not be considered.
- B. Any modification or withdrawal of a bid is subject to the same conditions as in Paragraph A of this provision.
- C. The only acceptable evidence to establish the time of the receipt at the OWNER is the time/date stamp of the OWNER on the proposal wrapper, or other documentary evidence of receipt maintained by the OWNER.
- D. Bids may be withdrawn in written notice at any time before the exact time set for opening of bids. A bid may be withdrawn in person by a bidder or its authorized agent if, before the exact time set for opening of bids, the identity of the person requesting withdrawal is established and the person signs a receipt for the bid.

## **REJECTION OF BIDS**

- A. A proposal may be declared “informal” and hence rejected if it shows any alteration of form, omissions or additions not called for in the proposal, lacks proper signatures, is a conditional bid, has alternate bids unless required in the proposal, has irregularities of any kind, has changes to the printed content, is submitted on a form not furnished by the OWNER, is incomplete, fails to acknowledge receipt of one or more addendums, or includes a clause in which a bidder reserves a right to accept or reject the contract award.
- B. A proposal may be rejected at the time of bid opening or following analysis to confirm the proposal.
- C. The OWNER may reject any or all proposals, waive any or all technicalities, and/or advertise for new proposals if in its sole judgment, or that of the awarding authority, the best interest of the OWNER, or the awarding authority, will be served.
- D. Bids that fail to acknowledge the bidders receipt of any addendum will result in the rejection of the bid if the addendum (addenda) contained information which substantively changed the OWNER’S requirements.
- E. The OWNER will decide whether any bid prices are unbalanced above or below a reasonable cost analysis value as evaluated by the Design Engineer. Proposals in which bid prices are unbalanced, mathematically and/or materially, may be rejected at the sole discretion of the OWNER. For purposes of this subsection “mathematically unbalanced bid” and “materially unbalanced bid” shall have the same meaning as in 23 CFR Part 635-Construction and Maintenance.
- F. Prospective bidders may be disqualified for various reasons including (a) submission of more than one proposal for the same work by an entity under the same or different names, (b) evidence of collusion among bidders, or (c) any other cause for suspension or debarment.

## **CONTRACT AWARD**

- A. The OWNER will evaluate bids in response to this solicitation without discussions and will award a contract to the lowest responsive and responsible bidder whose bid, conforming to the solicitation, will be most advantageous to the OWNER considering only price and any price related factors specified in the solicitation.
- B. Opened proposals will be considered and submitted bids confirmed on the basis of the summation of the products of the quantities shown in each proposal's Schedule of Items multiplied by the unit bid prices bid. In the event of a discrepancy between the written bid amount and the alpha numeric figure, the written amount shall govern. In the event of a discrepancy between a unit price and the calculated extension, the product based on the unit bid price and the mathematically correct summation of the products shall govern.
- C. A written award shall be furnished to the successful bidder within the period for acceptance specified in the bid and shall result in a binding contract without further action by either party.
- D. Signing of the agreement will follow once the required bonds and insurances are in hand with the OWNER.

## **BID GUARANTEE**

- A. All bids must be accompanied by a negotiable bid guarantee which shall not be less than five percent (5%) of the amount of the bid. The bid guarantee may be a certified check, bank draft, U.S. Government Bonds at par value, or a bid bond secured by a surety company acceptable to the U.S. Government and authorized to do business in the State of NH. Certified checks and bank drafts must be made payable to the order of the OWNER. The bid guarantee shall insure the execution of the contract and the furnishing of a method of assurance of completion by the successful bidder as required by the solicitation. Failure to submit a bid guarantee with the bid shall result in rejection of the bid. Proposal guarantees of the two lowest bidders that have submitted proposals that comply with all the provisions required to render them formal will be retained until the contract and bonds have been signed by all parties. Bid guarantees submitted by the remaining unsuccessful bidders will be returned as soon as practicable after bid opening.
- B. Bids shall be considered valid for 60 days from receipt of the bid's date.

## **CONTRACT BONDS**

- A. The successful bidder will be required to furnish a Performance Bond and Payment Bond in the amount of one hundred percent (100%) of the bid submitted. Surety companies executing the Bond must appear on the U.S. Treasury Department's most current list (Circular 570, as amended) and must be authorized to transact business in the State of NH.

## **SIGNING THE CONTRACT**

- A. A contract signing will be scheduled between the OWNER and the successful bidder/contractor following distribution of the Notice of Award.
- B. Failure to comply with any of the requirements of these provisions relative to signing the contract or failure to furnish the required surety prior to the contract signing shall be just cause for the annulment of the award of the contract.
- C. If the contract award or the contract is annulled, the OWNER may award the contract to the next lowest responsible bidder that has submitted a proposal that complies with all the provisions required to make it formal or advertise a new request for bids in the contract(s).
- D. Failure by the contractor to sign the contract within the time provided by this subsection shall not be a reason for an extension of the contract completion date.

## **TAXES AND INSURANCE REQUIREMENTS**

In accordance with the General Conditions

## **PERMITS**

The work is subject to the conditions included in the following permits:

- A. NH Department of Environmental Services, Standard Dredge and Fill Wetland Permit **(PENDING)**.

BID PROPOSAL (REVISED IN ADDENDUM No. 2)

Proposal of Nott's Excavating, Inc.  
(hereinafter called "BIDDER"), organized and existing under the laws of the State of  
Vermont  
doing business as a Corporation  
Corporation, Partnership, or an Individual  
To SAU #70 Dresden School District (hereinafter called "OWNER").

In compliance with your Advertisement for Bids, BIDDER hereby proposes to perform all WORK for the construction of the Hanover High School Turf Field Drainage Improvements 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 his own organization, that this BID has been arrived at independently, without consultation, communication, or agreement as to any matter relating to this BID with any other BIDDER or with any competitor.

The BIDDER will commence the work required by the CONTRACT DOCUMENTS within 10 calendar days after the date of the NOTICE TO PROCEED. Substantial Completion shall be achieved by August 1, 2019, and final completion shall be achieved by August 16, 2019.

BIDDER ACKNOWLEDGES RECEIPT OF THE FOLLOWING ADDENDA:

Addendum No. 1  
Addendum No. 2

BIDDER agrees to perform all WORK described in the CONTRACT DOCUMENTS for the following lump sums and/or unit prices.



**HANOVER HIGH SCHOOL  
TURF FIELD DRAINAGE IMPROVEMENTS PROJECT  
BID PROPOSAL**

BID ITEM	EST. QUANT.	DESCRIPTION	UNIT PRICE IN FIGURES	AMOUNT IN FIGURES
		UNIT BID PRICE IN WORDS		
1	1	Mobilization		
	LS	fifteen thousand dollars	\$ 15,000.00	\$ 15,000.00
2	520	Remove and Dispose of Existing Drainage Pipe		
	LF	thirty-one dollars	\$ 31.00	\$ 16,120.00
3	320	Removal and Disposal of Existing Pavement (Saw-cutting Incidental)		
	SY	eight dollars twenty-five cents	\$ 8.25	\$ 2,640.00
4	215	Common Excavation to Subgrade (Pavement Area)		
	CY	twelve dollars	\$ 12.00	\$ 2,580.00
5	4	Remove and Dispose of Existing Drainage Structures		
	EA	one thousand five hundred dollars	\$ 1,500.00	\$ 6,000.00
6	1	Remove and Dispose of Existing Headwall		
	EA	one thousand five hundred dollars	\$ 1,500.00	\$ 1,500.00
7	1	Cut and Remove End of Existing Wing Wall		
	LS	one thousand five hundred dollars	\$ 1,500.00	\$ 1,500.00
8	1	Pressure Grouting All Pipes and Manholes		
	LS	one hundred eighty-seven thousand dollars	\$ 187,000.00	\$ 187,000.00
9	1	Coring/Adjusting Existing Structure Inverts for New Pipes (Brick and Mortar Incidental)		
	LS	four thousand dollars	\$ 4,000.00	\$ 4,000.00
10	1	Riser Replacement/Adjustment (CB-A)		
	LS	one thousand six hundred dollars	\$ 1,600.00	\$ 1,600.00
11	1	4' Diameter Concrete Catch Basin w/Frame and Grate		
	EA	three thousand six hundred dollars	\$ 3,600.00	\$ 3,600.00

**HANOVER HIGH SCHOOL  
TURF FIELD DRAINAGE IMPROVEMENTS PROJECT  
BID PROPOSAL**

BID ITEM	EST. QUANT.	DESCRIPTION	UNIT PRICE IN FIGURES	AMOUNT IN FIGURES
		UNIT BID PRICE IN WORDS		
12	2	6' Diameter Drain Manhole w/Frame and Cover		
	EA	eight thousand dollar	\$ 8,000.00	\$ 16,000.00
13	2	8' Diameter Drain Manhole w/Frame and Cover		
	EA	eight thousand six hundred seventy-two dollar	\$ 8,672.00	\$ 17,344.00
14	85	12" HDPE Drain Pipe		
	LF	fifty-two dollar	\$ 52.00	\$ 4,420.00
15	255	15" HDPE Drain Pipe		
	LF	forty-five dollar	\$ 45.00	\$ 11,475.00
16	12	18" HDPE Drain Pipe		
	LF	one hundred thirty-nine dollars	\$ 139.00	\$ 1,668.00
17	64	30" HDPE Drain Pipe		
	LF	one hundred seven dollars	\$ 107.00	\$ 6,848.00
18	144	36" HDPE Drain Pipe		
	LF	one hundred seven dollar	\$ 107.00	\$ 15,408.00
19	96	48" HDPE Drain Pipe		
	LF	one hundred fifty-five dollars	\$ 155.00	\$ 14,880.00
20	105	48" RCP Drain Pipe		
	LF	two hundred seven dollars	\$ 207.00	\$ 21,735.00
21	2	Pipe Dam with Cutoff Underdrain		
	EA	two hundred fifty dollars	\$ 250.00	\$ 500.00
22	3	Stone Masonry Headwall		
	EA	four thousand five hundred dollar	\$ 4,500.00	\$ 13,500.00

**HANOVER HIGH SCHOOL  
TURF FIELD DRAINAGE IMPROVEMENTS PROJECT  
BID PROPOSAL**

BID ITEM	EST. QUANT.	DESCRIPTION	UNIT PRICE IN FIGURES	AMOUNT IN FIGURES
		UNIT BID PRICE IN WORDS		
23	1	48" Concrete Outlet Headwall		
	LS	thirteen thousand three hundred fifty-six dollars	\$ 13,356.00	\$ 13,356.00
24	1	Stone Outlet With Energy Dissipater and Boulder Wall		
	LS	eight thousand dollars	\$ 8,000.00	\$ 8,000.00
25	160	Gravel NHDOT 304.2		
	CY	twenty-seven dollars	\$ 27.00	\$ 4,320.00
26	55	Crushed Gravel NHDOT 304.3		
	CY	thirty-two dollars	\$ 32.00	\$ 1,760.00
27	1	Restoration of Slope and Grasses (Erosion Control Blankets on Slope Incidental)		
	LS	twelve thousand one hundred dollars	\$ 12,100.00	\$ 12,100.00
28	500	Erosion Control Sock		
	LF	four dollars	\$ 4.00	\$ 2,000.00
29	10	Stone Check Dams		
	EA	sixty dollars	\$ 60.00	\$ 600.00
30	320	Bituminous Concrete Pavement (3.5" Thickness)		
	SY	twenty-seven dollars	\$ 27.00	\$ 8,640.00
31	1	Miscellaneous Work and Cleanup		
	LS	twenty-five thousand dollars	\$ 25,000.00	\$ 25,000.00
32	125	Repair Turf Field Subbase where Trenching was Completed (8" Free Draining Subbase, 1 1/2" Free Draining Stone Choker Coarse) Repair of Flat Panel Drains incidental as needed.		
	SY	twenty-five dollars	\$ 25.00	\$ 3,125.00
33	40	Repair Turf Field Concrete Header Curb (6"x12")		
	LF	ten dollars	\$ 10.00	\$ 400.00

**HANOVER HIGH SCHOOL  
TURF FIELD DRAINAGE IMPROVEMENTS PROJECT  
BID PROPOSAL**

**TOTAL BID SUMMARY**

**BASE BID SHEET SUMMARY**

Subtotal, Page BP-2	\$ 241,540.00
Subtotal, Page BP-3	\$ 123,778.00
Subtotal, Page BP-4	\$ 79,301.00
TOTAL BASE BID PRICE	\$ 444,619.00

four hundred forty-four thousand six hundred nineteen dollars

Total Base Bid Price in Words

1. All prices must be written in ink. Unit prices must be written in words as well as figures for the entire proposal. In case of discrepancy, the amount written in words shall govern. The OWNER reserves the right to accept or reject any or all BIDS.
2. Measurement and Payment for all bid items shall be in accordance with section 01 15 00 "Measurement and Payment".
3. BIDS for this WORK will be compared on the basis of the aggregate sums of the products of the various unit prices and lump sum items multiplied by the quantities given in the Bid Schedule. Equal items in all sections of each individual bid proposal shall have the same unit price. All work depicted on the drawings or required by the Contract Documents that does not have a specific pay item shall be considered subsidiary and incidental to the contract.

Ray Mott #  
(Signature of BIDDER)  
Vice President  
(Title of BIDDER)  
185 Equestrian Way  
(Business Address of BIDDER)  
Worcester, VT 05001  
(Town) (State) (Zip Code)

Dated at: Hartford this 3rd day of May, 2019

The Bidder is requested to state below what works of a similar character to that included in the proposed contract he has done to give references that will enable the Owner to judge his 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.

1. Name of Bidder Nott's Excavating, Inc.
2. Permanent Main Office address 185 Eggenman way, West VT 05001
3. When organized? 1967
4. When incorporated? 1999
5. Is bidder registered with the Secretary of State to do business in New Hampshire? yes
6. Is bidder pre-qualified with the New Hampshire Department of Transportation for work of this scope? yes
7. How many years have you engaged in the contracting business under your present firm name? 20
8. Contracts on hand (Schedule these, showing gross amount of each contract and the approximate anticipated dates of completion) - see attached
9. General character of work performed by your company. Site work
10. Have you ever failed to complete any work awarded to you?  
\_\_\_\_\_ YES ☒ NO If so, where and why?
11. Have you ever defaulted on a contract?  
\_\_\_\_\_ YES ☒ NO If so, where and why?
12. List the more important contracts recently executed by your company, stating approximate cost for each, and the month and year completed. - see attached
13. List your major equipment available for this contract.  
all that is required
14. List your key personnel such as Project Superintendent and foremen that will be available for this contract. Provide resumes for each of the project managers and superintendents that you intend to use on the project and provide each person's relevant project experience Raymond S. Nott II, Jason Nott
15. List any SUBCONTRACTORS whom you would expect to use for the following (unless this work is to be done by your own organization):
  1. Civil Engineering Na

2. Utility Installation \_\_\_\_\_

3. Other work ECI (grouting), Blaktop Inc.

16. With what banks do you do business?  
Mascoma Savings Bank

Do you grant the Engineer permission to contact this (these) institutions?

✓ YES \_\_\_\_\_ NO

**NOTE: BIDDERS MAY BE REQUESTED TO FURNISH THEIR LATEST FINANCIAL STATEMENT AS PART OF THE AWARD PROCESS.**

Respectfully Submitted:

Raymond S. Nott II  
Signature  
Vice President  
Title

185 Equestrian Way  
Address Wright VT 05001  
May 3, 2019  
Date

Raymond S. Nott II Being duly sworn, deposes and  
says that he is Vice President of Nott's Excavating, Inc.  
Name of Organization

and that the answers to the foregoing questions and all statements contained therein are true and correct.

Sworn to before me this 3rd day of May, 2019

Mary Ann O'Neil  
Notary Public

Mary A. Nott  
My commission expires: 1/31/21

(SEAL If bid is by Corporation)

ATTEST

[Signature]

Nott's Excavating, Inc.  
Sample of Recent Completed Projects

PROJECT NAME	TYPE OF WORK	LOCATION
DHMC Hospice Building	foundation, road, drainage, water, sewer	Lebanon, NH
Quechee Water Storage Tank & Main	foundation, road, water, stabilization	Hartford, VT
12 Morgan Centerra	foundation, stabilization, road, water, sewer, drainage	Lebanon, NH
Hartford Scattered Sites	foundation, road, water, sewer, drainage	Hartford, VT
Chase, Oak and Hadley Streets	water and sewer	Bel lows Falls, VT
DHMC Data Center	foundation, road, water, drainage	Lebanon, NH
West Lebanon Retail	foundation, road, water, sewer, drainage	West Lebanon, NH
July 1, 2017 Storm Event Repair Project Turnpike Rd and Tigertown Rd	roads, stabilization	Norwich, VT
Hartford School District Parking Lot Improvements	road, parking, drainage, sidewalks	Hartford, VT
Upper Valley Waldorf School Addition	foundation, drainage, utilities, road	Quechee, VT



Nott's Excavating, Inc.  
SCHEDULES OF CONTRACTS IN PROGRESS  
May 3, 2019

Project Name	Contract Amount	% Complete	Anticipated Completion
ICV Treetop at Etha Road	1,700,503	60%	7/2019
XYZ Dairy LLC Crafts Ave Sewer and Roadway Improvements	745,269	95%	5/2019
DEW Construction 23 South Main Street Expansion	428,294	50%	9/2019
DEW Construction LED Dynamics	907,048	90%	5/2019
Estes & Gallup Tracy Street	428,049	70%	6/2019
DEW Construction Geokon	356,987	60%	10/2019
Engelberth Construction GW Plastics	650,000	0	10/2019



## BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned, Nott's Excavating, Inc.  
\_\_\_\_\_ as Principal, and  
Aegis Security Insurance Company \_\_\_\_\_ as Surety, are hereby  
held and firmly bound unto SAU #70/Dresden School District as OWNER in the penal sum of \_\_\_\_\_  
Five Percent of Bid Attached (5% Attached)

for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves,  
successors and assigns.

Signed, this 3rd day of May, 2019.

The Condition of the above obligation is such that whereas the Principal has submitted to The SAU  
70/Dresden School District a certain BID, attached hereto and hereby made a part hereof to enter  
into a contract in writing, for the construction of the Hanover High School Turf Field Drainage  
Improvements.

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 attachment 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 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.

Nott's Excavating, Inc.

(L.S.)

By:

Principal

*Paul Nott*

Aegis Security Insurance Company

Surety

By:

*Christina Henderson*

Christina Henderson, Attorney-In-Fact

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 where  
the project is located.

THIS POWER NULL AND VOID IF NUMBER IS NOT IN RED  
POWER CERTIFICATE NO. VT 209

AEGIS SECURITY INSURANCE COMPANY  
POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS, THAT AEGIS SECURITY INSURANCE COMPANY does hereby make, constitute and appoint: ADAM C. OSHA, CHRISTINA HENDERSON, CHRISTINE M. SLOCUM, ELIZABETH HARLOW, AMANDA RUDIO

its true and lawful Attorney-in-Fact, to make, execute and deliver on its behalf surety bonds, undertaking and other instruments of similar nature as follows: \$5 MILLION

This Power of Attorney is granted and sealed under and by the authority of the following Resolution adopted by the Board of Directors of the Company on the 4<sup>th</sup> day of February, 1993.

"Resolved, That the President, any Vice President, the Secretary and any Assistant Secretary appointed for that purpose by the officer in charge of surety operations shall each have authority to appoint individuals as Attorney-in-Fact or under other appropriate titles with authority to execute on behalf of the Company, fidelity and surety bonds and other documents of similar character issued by the Company in the course of its business. On any instrument making or evidencing such an appointment, the signatures may be affixed by facsimile. On any instrument conferring such authority or on any bond or undertaking of the Company, the seal or facsimile thereof may be imposed or fixed or in any other manner reproduced; provided, however, that the seal shall not be necessary to the validity of any such instrument or undertaking."

"Resolved, That the signature of each of the following officers; President, Vice President, any Assistant Vice President, any Secretary or Assistant Secretary and the seal of the Company may be affixed by facsimile to any Power of Attorney or to any Certificate relating thereto, appointing Resident Vice Presidents, Resident Assistant Secretaries or Attorneys-in-Fact for the purpose only of executing and attesting bonds and undertaking and other writings upon the Company and any such power required and certified by such facsimile signature and facsimile seal shall be valid and binding on the Company in the future with respect to any bond or undertaking to which it is attached."

IN WITNESS WHEREOF, AEGIS SECURITY INSURANCE COMPANY has caused its official seal to be hereunto affixed, and these presents to be signed by its President this 7<sup>th</sup> day of February, 2019.

AEGIS SECURITY INSURANCE COMPANY

By:

*W. J. Wollyung III*

W. J. WOLLYUNG, III  
President



Commonwealth of Pennsylvania }  
County of Dauphin } s.s.: Harrisburg

On this 7<sup>th</sup> day of February, 2019, before me personally came William J. Wollyung, III to me known, who being by me duly sworn, did depose and say that he is President of AEGIS SECURITY INSURANCE COMPANY, the corporation described herein and which executed the above instrument; that he knows the seal of the said corporation, that the seal affixed to the said instrument is such corporate seal; that it was so affixed by order of the Board of Directors of said corporation and that he signed his name thereto by like order.

*Jeanne LP Tennis*

JEANNE LP TENNIS  
Notary Public  
My Commission Expires June 16, 2021



I, the undersigned, Secretary of AEGIS SECURITY INSURANCE COMPANY, a Pennsylvania corporation, DO HEREBY CERTIFY that the foregoing and attached Power of Attorney remains in full force and has not been revoked; and furthermore that the Resolution of the Board of Directors, set forth in the said Power of Attorney, is now in force.

Signed and sealed at the City of Harrisburg, in the Commonwealth of Pennsylvania, dated this 3 day of May, 2019

*Rebecca J. Liddick*

REBECCA J. LIDDICK  
Secretary





## CONTRACT AGREEMENT

**THIS AGREEMENT**, made this 13th day of May, 20 19 by  
and between SAU #70 Dresden School District, hereinafter called "**OWNER**"  
(Name of OWNER)  
and Nott's Excavating, Inc. doing business as (an individual,) or (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

Hanover High School Turf Field Drainage Improvements  
(Project)

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 7 calendar days after the date of the **NOTICE TO PROCEED unless the period for completion is extended otherwise by the CONTRACT DOCUMENTS**. Work on the project shall be as follows: Substantial Completion shall be achieved by August 1, 2019, and final completion shall be achieved by August 16, 2019. All work below field must be completed by Substantial Completion to allow for Turf Contractor to reconstruct the field.

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 \$444,619.00  
or as shown in the **BID** schedule.

5. The term "**CONTRACT DOCUMENTS**" means and includes the following:

- (A) ADVERTISEMENTS FOR BIDS
- (B) INSTRUCTIONS FOR BIDDERS
- (C) BID PROPOSAL
- (D) AGREEMENT
- (E) GENERAL CONDITIONS
- (F) PAYMENT BOND
- (G) PERFORMANCE BOND
- (H) NOTICE OF AWARD
- (I) NOTICE TO PROCEED
- (J) CONTRACTORS AFFIDAVIT
- (K) CONTRACTORS RELEASE

(L) CERTIFICATE OF SUBSTANTIAL COMPLETION

(M) CHANGE ORDER(S)

(O) DRAWINGS prepared by:

Pathways Consulting, LLC

numbered 1 through 10, and dated April 12, 20 19

(Q) SPECIFICATIONS prepared or issued by:

Pathways Consulting, LLC

, and dated April 12, 20 19

(R) ADDENDA:

No. 1, dated April 26, 20 19

No. 2, dated April 30, 20 19

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 four (4) copies, each of which shall be deemed an original on the date first above written.



Notary Public

ATTEST: Brooke Lyman

Name: Brooke Lyman

Title: Office Assistant

**OWNER:** SAU #70 Dresden School District

Signature: Jamie J. Teague

Name: Jamie J. Teague  
(Please type)

**CONTRACTOR:** Nott's Excavating, Inc.

Signature: Raymond S. Nott II

Name: Raymond S. Nott II, V.P.

Address: 185 Equestrian Way

White River Jct., VT 05001





NOTTEXC-01

CHENDERSON

## CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

5/20/2019

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

**IMPORTANT:** If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

<b>PRODUCER</b> Kinney Pike Insurance Inc. 1011 North Main Street, Suite 4 White River Junction, VT 05001	<b>CONTACT NAME:</b>	
	<b>PHONE (A/C, No, Ext):</b> (802) 295-3329	<b>FAX (A/C, No):</b> (802) 295-7701
<b>INSURED</b>  Nott's Excavating Inc. Raymond & Marcy Nott 185 Equestrian Way White River Jct., VT 05001	<b>E-MAIL ADDRESS:</b>	
	<b>INSURER(S) AFFORDING COVERAGE</b>	
	<b>INSURER A:</b> Acadia Insurance	
	<b>INSURER B:</b>	
	<b>INSURER C:</b>	
	<b>INSURER D:</b>	
<b>INSURER E:</b>		
<b>INSURER F:</b>		
<b>NAIC #</b>		
31325		

## COVERAGES

## CERTIFICATE NUMBER:

## REVISION NUMBER:

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
A	<input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS-MADE <input checked="" type="checkbox"/> OCCUR <input checked="" type="checkbox"/> per loc/proj agg  GEN'L AGGREGATE LIMIT APPLIES PER: <input type="checkbox"/> POLICY <input checked="" type="checkbox"/> PROJECT <input type="checkbox"/> LOC OTHER:	X		CPA5252857-12	8/1/2018	8/1/2019	EACH OCCURRENCE \$ 1,000,000 DAMAGE TO RENTED PREMISES (Ea occurrence) \$ 300,000 MED EXP (Any one person) \$ 5,000 PERSONAL & ADV INJURY \$ 1,000,000 GENERAL AGGREGATE \$ 2,000,000 PRODUCTS - COMP/OP AGG \$ 2,000,000
A	<input checked="" type="checkbox"/> AUTOMOBILE LIABILITY <input checked="" type="checkbox"/> ANY AUTO OWNED AUTOS ONLY <input type="checkbox"/> SCHEDULED AUTOS <input type="checkbox"/> HIRED AUTOS ONLY <input type="checkbox"/> NON-OWNED AUTOS ONLY			CAA5252858-12	8/1/2018	8/1/2019	COMBINED SINGLE LIMIT (Ea accident) \$ 1,000,000 BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$
A	<input checked="" type="checkbox"/> UMBRELLA LIAB <input checked="" type="checkbox"/> OCCUR <input type="checkbox"/> EXCESS LIAB <input type="checkbox"/> CLAIMS-MADE DED <input checked="" type="checkbox"/> RETENTION \$ 0			CU5252859-12	8/1/2018	8/1/2019	EACH OCCURRENCE \$ 5,000,000 AGGREGATE \$ 5,000,000
A	<input checked="" type="checkbox"/> WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	Y/N N	N/A	WCA5252860-12	8/1/2018	8/1/2019	<input checked="" type="checkbox"/> PER STATUTE <input type="checkbox"/> OTHER E.L. EACH ACCIDENT \$ 1,000,000 E.L. DISEASE - EA EMPLOYEE \$ 1,000,000 E.L. DISEASE - POLICY LIMIT \$ 1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)  
Workers Compensation Statutory Coverage applies in VT & NH. No Excluded Officers.

Certificate Holder is named Additional Insured with respect to general liability to the extent required in executed written contract RE: Hanover High School Turf Field Drainage

## CERTIFICATE HOLDER

## CANCELLATION

Dresden School District  
SAU#70 Office  
41 Lebanon Street, Suite 2  
Hanover, NH 03755

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE



NOTTEX-01

CHENDERSON

## CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

5/20/2019

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

**IMPORTANT:** If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

<b>PRODUCER</b> Kinney Pike Insurance Inc. 1011 North Main Street, Suite 4 White River Junction, VT 05001	<b>CONTACT NAME:</b>	
	<b>PHONE (A/C, No, Ext):</b> (802) 295-3329 <b>FAX (A/C, No):</b> (802) 295-7701	
	<b>E-MAIL ADDRESS:</b>	
	<b>INSURER(S) AFFORDING COVERAGE</b>	<b>NAIC #</b>
	<b>INSURER A : Acadia Insurance</b>	<b>31325</b>
<b>INSURED</b>  Nott's Excavating Inc. Raymond & Marcy Nott 185 Equestrian Way White River Jct., VT 05001	<b>INSURER B :</b>	
	<b>INSURER C :</b>	
	<b>INSURER D :</b>	
	<b>INSURER E :</b>	
	<b>INSURER F :</b>	

## COVERAGES

CERTIFICATE NUMBER:

REVISION NUMBER:

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
A	<input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS-MADE <input checked="" type="checkbox"/> OCCUR <input checked="" type="checkbox"/> per loc/proj agg  GEN'L AGGREGATE LIMIT APPLIES PER: <input type="checkbox"/> POLICY <input checked="" type="checkbox"/> PRO-JECT <input type="checkbox"/> LOC OTHER:	X		CPA5252857-12	8/1/2018	8/1/2019	EACH OCCURRENCE \$ 1,000,000 DAMAGE TO RENTED PREMISES (Ea occurrence) \$ 300,000 MED EXP (Any one person) \$ 5,000 PERSONAL & ADV INJURY \$ 1,000,000 GENERAL AGGREGATE \$ 2,000,000 PRODUCTS - COMP/OP AGG \$ 2,000,000
A	<input checked="" type="checkbox"/> AUTOMOBILE LIABILITY <input checked="" type="checkbox"/> ANY AUTO <input type="checkbox"/> OWNED AUTOS ONLY <input type="checkbox"/> SCHEDULED AUTOS <input type="checkbox"/> HIRED AUTOS ONLY <input type="checkbox"/> NON-OWNED AUTOS ONLY			CAA5252858-12	8/1/2018	8/1/2019	COMBINED SINGLE LIMIT (Ea accident) \$ 1,000,000 BODILY INJURY (Per person) \$ BODILY INJURY (Per accident) \$ PROPERTY DAMAGE (Per accident) \$
A	<input checked="" type="checkbox"/> UMBRELLA LIAB <input checked="" type="checkbox"/> OCCUR <input type="checkbox"/> EXCESS LIAB <input type="checkbox"/> CLAIMS-MADE DED <input checked="" type="checkbox"/> RETENTION \$ 0			CU5252859-12	8/1/2018	8/1/2019	EACH OCCURRENCE \$ 5,000,000 AGGREGATE \$ 5,000,000
A	<input checked="" type="checkbox"/> WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) <input checked="" type="checkbox"/> Y/N <input checked="" type="checkbox"/> N If yes, describe under DESCRIPTION OF OPERATIONS below	N/A		WCA5252860-12	8/1/2018	8/1/2019	<input checked="" type="checkbox"/> PER STATUTE <input type="checkbox"/> OTH-ER E.L. EACH ACCIDENT \$ 1,000,000 E.L. DISEASE - EA EMPLOYEE \$ 1,000,000 E.L. DISEASE - POLICY LIMIT \$ 1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)  
Workers Compensation Statutory Coverage applies in VT & NH. No Excluded Officers.

Certificate Holder is named Additional Insured with respect to general liability to the extent required in executed written contract RE: Hanover High School Turf Field Drainage

## CERTIFICATE HOLDER

## CANCELLATION

Dresden School District  
SAU#70 Office  
41 Lebanon Street, Suite 2  
Hanover, NH 03755

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

# THE AMERICAN INSTITUTE OF ARCHITECTS



AIA Document A312

## Performance Bond

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

CONTRACTOR (Name and Address):  
**Nott's Excavating, Inc.**  
**185 Equestrian Way**  
**White River Jct., VT 05001**

SURETY (Name and Principal Place of Business):  
**Aegis Security Insurance Company**  
**2407 Park Drive**  
**Harrisburg, PA 17110**

OWNER (Name and Address):  
**Dresden School District**  
**SAU #70 Office**  
**41 Lebanon Street, Suite 2**  
**Hanover, NH 03755**

CONSTRUCTION CONTRACT  
Date: **May 20, 2019**  
Amount: **\$394,289.00**  
Description (Name and Location): **Hanover High School Turf Field Drainage**

### BOND

Date (Not earlier than Construction Contract Date): **May 20, 2019**  
Amount: **\$394,289.00**  
Modifications to this Bond:

☒ None

☐ See Page 3

CONTRACTOR AS PRINCIPAL  
Company: (Corporate Seal)  
**Nott's Excavating, Inc.**

SURETY  
Company: (Corporate Seal)  
**Aegis Security Insurance Company**

Signature: *Raymond S. Nott*  
Name and Title: *Raymond S. Nott, VP*

Signature: *Christina Henderson*  
Name and Title: *Christina Henderson, Attorney-in-Fact*

(Any additional signatures appear on page 3)

(FOR INFORMATION ONLY - Name, Address and Telephone)

AGENT or BROKER:  
Kinney Pike Insurance  
1011 N. Main Street, Ste 4  
White River Jct., VT 05001  
Tel: 802-295-3329

OWNER'S REPRESENTATIVE (Architect, Engineer or other party):

**1** The Contractor and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

**2** If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except to participate in conferences as provided in Subparagraph 3.1.

**3** If there is no Owner Default, the Surety's obligation under this Bond shall arise after:

**3.1** The Owner has notified the Contractor and the Surety at its address described in Paragraph 10 below that the Owner is considering declaring a Contractor Default and has requested and attempted to arrange a conference with the Contractor and the Surety to be held not later than fifteen days after receipt of such notice to discuss methods of performing the Construction Contract. If the Owner, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default; and

**3.2** The Owner has declared a Contractor Default and formally terminated the Contractor's right to complete the contract. Such Contractor Default shall not be declared earlier than twenty days after the Contractor and the Surety have received notice as provided in Subparagraph 3.1; and

**3.3** The Owner has agreed to pay the Balance of the Contract Price to the Surety in accordance with the terms of the Construction Contract or to a contractor selected to perform the Construction Contract in accordance with the terms of the contract with the Owner.

**4** When the Owner has satisfied the conditions of Paragraph 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

**4.1** Arrange for the Contractor, with consent of the Owner, to perform and complete the Construction Contract; or

**4.2** Undertake to perform and complete the Construction Contract itself, through its agents or through independent contractors; or

**4.3** Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and the contractor selected with the Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Paragraph 6 in excess of the Balance of the Contract Price incurred by the Owner resulting from the Contractor's default; or

**4.4** Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

**.1** After investigation, determine the amount for

which it may be liable to the Owner and, as soon as practicable after the amount is determined, tender payment therefor to the Owner; or

**.2** Deny liability in whole or in part and notify the Owner citing reasons therefor.

**5** If the Surety does not proceed as provided in Paragraph 4 with reasonable promptness, the Surety shall be deemed to be in default on this Bond fifteen days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the surety proceeds as provided in Subparagraph 4.4, and the Owner refuses the payment tendered or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

**6** After the Owner has terminated the Contractor's right to complete the Construction Contract, and if the Surety elects to act under Subparagraph 4.1, 4.2, or 4.3 above, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. To the limit of the amount of this Bond, but subject to commitment by the Owner of the Balance of the Contract Price to mitigation of costs and damages on the Construction Contract, the Surety is obligated without duplication for:

**6.1** The responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

**6.2** Additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Paragraph 4; and

**6.3** Liquidated damages, or if not liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

**7** The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators or successors.

**8** The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

**9** Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

10 Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the signature page.

11 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

## 12 DEFINITIONS

**12.1 Balance of the Contract Price:** The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts received or to be received

by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

**12.2 Construction Contract:** The agreement between the Owner and the Contractor identified on the signature page, including all Contract Documents and changes thereto.

**12.3 Contractor Default:** Failure of the Contractor, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Construction Contract.

**12.4 Owner Default:** Failure of the Owner, which has neither been remedied nor waived, to pay the Contractor as required by the Construction Contract or to perform and complete or comply with the other terms thereof.

**MODIFICATIONS TO THIS BOND ARE AS FOLLOWS: None**

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL  
Company:

(Corporate Seal)

SURETY  
Company:

(Corporate Seal)

Signature: \_\_\_\_\_  
Name and Title: \_\_\_\_\_  
Address: \_\_\_\_\_

Signature: \_\_\_\_\_  
Name and Title: \_\_\_\_\_  
Address: \_\_\_\_\_



# THE AMERICAN INSTITUTE OF ARCHITECTS



AIA Document A312

## Payment Bond

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

**CONTRACTOR:**

**Nott's Excavating, Inc.**  
185 Equestrian Way  
White River Jct., VT 05001

**SURETY:**

**Aegis Security Insurance Company**  
2407 Park Drive  
Harrisburg, PA 17110

**OWNER:**

**Dresden School District**  
SAU #70 Office  
41 Lebanon Street, Suite 2  
Hanover, NH 03755

**CONSTRUCTION CONTRACT**

Date: **May 20, 2019**

Amount: **\$394,289.00**

Description (Name and Location): **Hanover High School Turf Field Drainage**

**BOND**

Date: **May 20, 2019**

Amount: **\$394,289.00**

Modifications to this Bond: **None**

**CONTRACTOR AS PRINCIPAL**

Company: **Nott's Excavating, Inc.**  
(Corporate Seal)

**SURETY**

Company: **Aegis Security Insurance Company**  
(Corporate Seal)

Signature: \_\_\_\_\_

Name and Title: **Raymond S. Nott II, VP**

(Any additional signatures appear on page 6)

Signature: \_\_\_\_\_

Name and Title: **Christina Henderson, Attorney In Fact**

(FOR INFORMATION ONLY - Name, Address and Telephone)

AGENT or BROKER:

OWNER'S REPRESENTATIVE (Architect, Engineer  
other party):

1 The Contractor and the Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner to pay for labor, materials and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference.

2 With respect to the Owner, this obligation shall be null and void if the Contractor:

2.1 Promptly makes payment, directly or indirectly, for all sums due Claimants, and

2.2 Defends, indemnifies and holds harmless the Owner from claims, demands, liens or suits by any person or entity whose claim, demand, lien or suit is for the payment for labor, materials or equipment furnished for use in the performance of the Construction Contract, provided the Owner has promptly notified the Contractor and the Surety (at the address described in Paragraph 12) of any claims, demands, liens or suits and tendered defense of such claims, demands, liens or suits to the Contractor and the Surety, and provided there is no Owner Default.

3 With respect to Claimants, this obligation shall be null and void if the Contractor promptly makes payment, directly or indirectly, for all sums due.

4. The Surety shall have no obligation to Claimants under this Bond until:

4.1 Claimants who are employed by or have a direct contract with the Contractor have given notice to the Surety (at the address described in Paragraph 12) and sent a copy, or notice thereof, to the Owner, stating that a claim is being made under this Bond and, with substantial accuracy, the amount of the claim.

4.2 Claimants who do not have a direct contract with the Contractor:

.1 Have furnished written notice to the Contractor and sent a copy, or notice thereof, to the Owner, within 90 days after having last performed labor or last furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials were furnished or supplied or for whom the labor was done or performed; and

.2 Have either received a rejection in whole or in part from the Contractor, or not received within 30 days of furnishing the above notice any communication from the Contractor by which the Contractor has indicated the claim will be paid directly or indirectly; and

.3 Not having been paid within the above 30 days, have sent a written notice to the Surety (at the address described in Paragraph 12) and sent a copy, or notice thereof, to the Owner, stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to the Contractor.

5 If a notice required by Paragraph 4 is given by the Owner to the Contractor or to the Surety, that is sufficient compliance.

6 When the Claimant has satisfied the conditions of Paragraph 4, the Surety shall promptly and at the Surety's expense take the following actions:

6.1 Send an answer to the Claimant, with a copy to the Owner, within 45 days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed.

6.2 Pay or arrange for payment of any undisputed amounts.

7 The Surety's total obligation shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

8 Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any Construction Performance Bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and the Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.

9 The Surety shall not be liable to the Owner, Claimants or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.

10 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

11 No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the location in which the work or part of the work is located or after the expiration of one year from the date (1) on which the Claimant gave the notice required by Subparagraph 4.1 or Clause 4.2.3, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12 Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the signature page. Actual receipt of notice by Surety, the Owner or the Contractor, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.

13 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirements shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory bond and not as a common law bond.



14 Upon request by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor shall promptly furnish a copy of this Bond or shall permit a copy to be made.

## 15 DEFINITIONS

**15.1 Claimant:** An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used

in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials or equipment were furnished.

**15.2 Construction Contract:** The agreement between the Owner and the Contractor identified on the signature page, including all Contract Documents and changes thereto.

**15.3 Owner Default:** Failure of the Owner, which has neither been remedied nor waived, to pay the Contractor as required by the Construction Contract or to perform and complete or comply with the other terms thereof.

## MODIFICATIONS TO THIS BOND ARE AS FOLLOWS:

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL

Company: \_\_\_\_\_ (Corporate Seal)

SURETY

Company: \_\_\_\_\_ (Corporate Seal)

Signature: \_\_\_\_\_

Name and Title: \_\_\_\_\_

Address: \_\_\_\_\_

Signature: \_\_\_\_\_

Name and Title: \_\_\_\_\_

Address: \_\_\_\_\_

**AEGIS SECURITY INSURANCE COMPANY  
POWER OF ATTORNEY**

its true and lawful Attorney-in-Fact, to make, execute and deliver on its behalf surety bonds, undertaking and other instruments of similar nature as follows: **\$5 MILLION**

A circular ink stamp from the Regis Security Insurance Company. The outer ring contains the text "REGIS SECURITY INSURANCE COMPANY" at the top and "PENNSYLVANIA" at the bottom, separated by a small star on the right. The center of the stamp features the words "CORPORATE SEAL" at the top and the year "1977" in large, bold numerals.

GENERAL CONDITIONS

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## 1. CONTRACT AND CONTRACT DOCUMENTS

The Plans 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 - Written or graphic instruments which modify or interpret the Contract Documents, Drawings and Specifications, by additions, deletions, clarifications, or corrections.
- 2.2 Change Order - A written order to the Contractor authorizing an addition, deletion, or revision in the Work within the general scope of the Contract Documents.
- 2.3 Contract Documents - The contract, including Advertisement for Bids, Information for Bidders, Bid, Bid Bond, Agreement, General Conditions, Supplemental General Conditions, Special Conditions, Payment Bond, Performance Bond, Notice of Award, Notice to Proceed, Contractor's Affidavit, Contractor's Release, Certificate of Substantial Completion, Change Order, Drawings, Specifications and Addenda.
- 2.4 Contractor - The person, firm, or corporation which shall perform the Work.
- 2.5 Engineer - The person, firm, or corporation named as such in the Contract Documents.
- 2.6 Owner - A public or quasi-public body or authority, corporation, association, partnership, or individual for whom the Work is to be performed.
- 2.7 Plans - 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.
- 2.8 Specifications - A part of the Contract Documents consisting of written descriptions of a technical nature of materials, equipment, construction systems, standards and workmanship.
- 2.9 Special Conditions - Revisions or additions to these General Conditions or Specifications applicable to an individual project.
- 2.10 Supplemental General Conditions - Additions or modifications to these General Conditions supplying detailed information required for the project documents.
- 2.11 Work - 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.

This list of definitions may be extended as required by an individual project.

### 3. ADDITIONAL INSTRUCTIONS AND DETAIL DRAWINGS

The Contractor will 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. The Contractor shall carry out the work in accordance with the additional detail drawings and instructions. The Contractor and the Engineer will prepare jointly (a) a schedule, fixing the dates at which special detail drawings will be required, such drawings, if any, to be furnished by the Engineer in accordance with said schedule, and (b) a schedule fixing the respective dates for the submission of shop drawings, the beginning of manufacture, testing and installation of materials, supplies and equipment, and the completion of the various parts of the work; each such schedule to be subject to change from time to time in accordance with the progress of the work.

### 4. SHOP OR SETTING DRAWINGS

- 4.1 The Contractor shall furnish six hard copies or one electronic copy 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 furnished 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 specifications.

Approval by the Engineer, or 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.

### 5. MATERIALS, SERVICES, FACILITIES, AND WORKMANSHIP

- 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 New Materials: 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 Equipment: 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: Materials specified by reference to the number or symbol of a specific standard, such as an ASTM Standard, AWWA Standard, a Federal Specification or other similar standard, shall comply with requirements in the latest revision thereof and any amendment or supplement thereto.
- 5.5 Certification: 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. Such certification shall be in the following general form:

(SAMPLE)  
MANUFACTURER'S LETTERHEAD  
CERTIFICATE OF COMPLIANCE  
(Manufactured or Fabricated Material)

Date \_\_\_\_\_, 20\_\_\_\_

WE HEREBY CERTIFY that \_\_\_\_\_  
(Description, Kind of Material, Model #, etc.)

Furnished to \_\_\_\_\_  
(Name of CONTRACTOR) (Prime or Sub.)

For Use On \_\_\_\_\_  
(Project Name)

No. \_\_\_\_\_ OWNER \_\_\_\_\_

In the Amount of \_\_\_\_\_  
(Quantity Represented)

Identified By \_\_\_\_\_  
(Label, Marking, Seal No., Consignment, or Waybill No.)

Shipped on \_\_\_\_\_ 20\_\_, Delivered on \_\_\_\_\_ 20

Shipped Via \_\_\_\_\_  
(Method of Shipment, Car No., Truck No.)

MEETS THE REQUIREMENTS OF THE PERTINENT PROJECT PLANS, SPECIAL  
CONDITIONS AND SPECIFICATIONS OF THE SUBJECT PROJECT IN ALL RESPECTS.  
PROCESSING, PRODUCT TESTING AND INSPECTION CONTROL OF RAW  
MATERIALS ARE IN CONFORMANCE WITH ALL APPLICABLE SPECIFICATIONS,  
DRAWINGS AND/OR STANDARDS OF ALL ARTICLES FURNISHED.

All records and documents pertinent to this certificate and not submitted herewith will be  
maintained available by the undersigned for a period of not less than three years from the date of  
this certificate.

\_\_\_\_\_  
(Manufacturer)

Signed By \_\_\_\_\_

Title \_\_\_\_\_



6. CONTRACTOR'S WARRANTY OF 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 no formal contract is entered into for such materials.

7. INSPECTION AND TESTING OF MATERIALS

- 7.1 All materials and equipment used in the construction of the project shall be subject to observation 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 a timely request by the Engineer, all materials required to be tested. All tests made by the Engineer will be performed in such manner and sufficiently ahead of scheduled installation, as not to delay the work of the Contractor unnecessarily. When required, testing of concrete, soils, and other materials will be made in accordance with provisions in the appropriate part of 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 is given in writing by the Engineer.
- 7.4 Each sample submitted by the Contractor 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 parts of the plant as may concern the manufacture or production of the materials being furnished.
  - c) 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 will be decided by the Engineer for his own information and use.
  - b) When testing of materials is specified in the appropriate section of the Specifications, the costs of same will be charged to the Owner. 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 an item as equivalent to the item or items specified, reasonable tests may, or may not be required by the Engineer. If the Engineer requires tests of a proposed equivalent item, the Contractor will be required to assume all costs of such testing.
  - d) Normally, any item 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 re-testing 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.

8. "OR EQUIVALENT" CLAUSE, SUBSTITUTIONS, AND CONTRACTOR'S 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. Any material, article, or equipment of other manufacturers and vendors, which will perform satisfactorily the duties imposed by the general design will be considered equally acceptable provided the material, article, or equipment so proposed is, in the opinion of the Engineer, of equivalent quality and function. The Engineer will determine equality based on such information, tests, or other supporting data they may require of the Contractor.
- 8.2 Furthermore, upon acceptance and approval by the Engineer of an equivalent 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 equivalent 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 In the event that a specified or equivalent item is not available, or that delivery time is so long as to result in delays which are unacceptable to the Owner, the Contractor may propose a substitute item of less than equivalent performance and quality. If

this substitute is acceptable to the Engineer, any difference in purchase cost or costs incidental to the installation of such an item will be negotiated between the parties.

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

9. PATENTS

- 9.1 The Contractor shall hold and save the Owner and their officers, agents, and employees harmless from liability of any nature, 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 or Royalty Fees: License and/or Royalty Fees for the use of a process in the design of the project which is authorized by the Owner of the project must be reasonable, and paid to the holder of the patent, or his authorized licensee, direct by the Owner and not by or through the Contractor.
- 9.3 If the Contractor uses any design, device or materials in the construction methods for the project covered by letters, patent or copyright, 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 prosecution of the work or after completion of the work.

10. SURVEYS

10.1 Land and Property

The Owner will provide all land surveys, if available, and will establish approximate property lines relating to the project, as necessary.

- 10.2 Construction Surveys: The Engineer will establish the locations of drainage structures for the project, and will establish one bench mark within the project site for the use and convenience of the Contractor, and for the Engineer's own reference in checking the work in progress.

The Contractor shall utilize the drainage structure location and bench mark established by the Engineer to set up whatever specific detail controls he may need for establishing elevation lines and grades for all project components. All this work is subject to observation, approval, and continuous surveillance by the Engineer.

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 Protection of Stakes: The Contractor shall protect and preserve all of the established field stake-out information including stakes, nails, bench marks, or other controls placed by the Engineer. Offset stakes and/or nails and additional bench marks shall be established by, and used by, the Contractor to preserve existing field stake out and bench mark information set 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

The Contractor shall and will, 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, 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 the Owner.

12. WEATHER CONDITIONS

In the event of temporary suspension of work, or during inclement weather, or whenever the Engineer shall direct; the Contractor will, and will cause his Subcontractor's to protect carefully his and 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 Subcontractor's to so protect his work, such materials shall be removed and replaced at the expense of the Contractor.

13. PROTECTION OF WORK AND PROPERTY - EMERGENCY

- 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 such be caused directly by errors contained in the Contract, or by the Owner, or his duly authorized representatives.
- 13.2 The Contractor shall take all necessary precautions for the safety of employees on the work, 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 workmen and the public and shall post danger signs warning against the hazards created by such features of construction as protruding nails, hoist, 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 non-working hours.

13.3 In case of emergency which threatens loss or injury of property, and/or safety of life, the Contractor will be allowed to act, without previous instructions from the Engineer, in a diligent manner. 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.

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.

13.5 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. OBSERVATION OF WORK FOR CONFORMANCE WITH PLANS AND SPECIFICATIONS

14.1 Observation: For purposes already specified and for any other purpose, the Owner, Engineer and their agents and employees 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 reasonable 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 Conformance: During its progress and upon 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 thoroughly substantial and workmanlike manner, in accordance with the drawings and specifications and the supplementary directions given from time to time by the Engineer. In no case will any work in excess of the requirements of the drawings and specifications be paid for unless ordered in writing by the Engineer.

#### 14.3 Unauthorized Work

- (a) Work not according to Plans and Specifications: 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 the wrong location, or done without proper lines or levels, may be ordered to be uncovered or dismantled.
- (b) Work done in the absence of the Engineer or his agent: similarly such work performed in the absence of the Engineer or his agent, may be ordered 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".
- (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

The Contractor shall submit to the Owner such schedule of quantities and costs, progress schedules, reports, estimates, records and other data as the Owner may request concerning work performed or to be performed under this contract.

16. SUPERINTENDENCE BY CONTRACTOR

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. It is understood that such representative shall be acceptable to the Engineer and shall be one who can be continued in that capacity for the particular job involved unless he ceases to be on the Contractor's payroll.

17. EXTRA WORK AND CHANGE ORDERS

17.1 The Engineer and/or Owner 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 or desirable. Change in the work and written orders for extra work (Change Orders) must be approved in writing by the Engineer and Owner prior to the Contractor executing the work. The amount of compensation to be paid to the Contractor for any extra work so ordered shall be made in accordance with whichever of the following plans the Engineer elects: (1) a price agreed upon between the parties and stipulated in the order for the extra work; (2) a price based on the unit prices of the contract; or (3) a price determined by adding 15% 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 In arriving at the "reasonable cost" for the purposes of (3) above, 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 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 fifteen per cent (15%) added to the reasonable cost. Furthermore, no allowance for use of capital or premium on the bond will be considered unless the extra work includes an extension of time approved and authorized by the Owner.

17.3 In the case of extra work which is done by Subcontractor's, whether these are under the specific contract items provided herein, or otherwise if so approved by the Engineer, the 15% added to the reasonable cost of the work will be allowed only to the Subcontractor. On such work an additional percentage of the reasonable cost (before addition of the 15%) will be paid to the Contractor for his work in directing the operations of the Subcontractor, for administrative supervision, and for any overhead involved. Such percentage shall be in accordance with the following schedule: Reasonable cost up to and including \$50,000 - 10%, \$50,000 to and including \$100,000 - 7½%; greater than \$100,000 - 5%.

- 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 may 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

- 18.1 The Contractor agrees that said work shall be prosecuted regularly, diligently, and uninterrupted at such rate of progress as will insure full completion thereof within the time agreed upon. It is expressly understood and agreed, by the Contractor, that the time for the completion of the work described herein is a reasonable time for the completion of the same, taking into consideration the average climatic range and usual industrial conditions prevailing in this locality.
- 18.2 If the said Contractor shall neglect, fail or refuse to complete the work within the time allowed, or any proper extension thereof granted by the Owner, then the Contractor does hereby agree, to pay to the Owner the amount agreed upon between the Owner and the Contractor 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.
- 18.3 The said 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, and said amount is agreed to be the amount of damages which the Owner would sustain for delays and engineering services during the delay and said amount shall be retained from time to time by the Owner from current periodical estimates.
- 18.4 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 of this contract. 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 completion of the work is due:
- (a) To any preference, priority or allocation order duly issued by the Government;
  - (b) To 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; and
  - (c) To any delays of Subcontractor's or suppliers occasioned by any of the causes specified in subsections (a) and (b) of this article.

- 18.5 Provided, further, that the Contractor shall promptly notify the Owner in writing if the causes of the delay, who shall ascertain the facts and extent of the delay, and notify the Contractor within a reasonable time of their decision in the matter.

19. DEFECTIVE WORK

- 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 Contractor's destroyed or damaged by such removal or replacement.
- 19.2 All removal and replacement work shall be done at the Contractor's expense. If the Contractor does not take action to remove such condemned work and materials within 30 days after 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 ten days time thereafter, the Owner may, upon ten days written notice, sell such materials at an auction or through 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. SUBSURFACE CONDITIONS FOUND DIFFERENT

During the progress of the work, if subsurface or latent physical conditions are encountered at the Project Site differing materially from those indicated in the Contract or if unknown physical conditions of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in the work provided for in the Contract, are encountered at the site, the party discovering such conditions shall promptly notify the other Engineer in writing of the specific differing conditions before the site is disturbed and before the affected work is performed.

Upon written notification, the Engineer will investigate the conditions, and if it is determined that the conditions materially differ and cause an increase or decrease in the cost and/or time required for the performance of any work under the Contract, an adjustment, excluding anticipated profits, will be made and the Contract modified in writing accordingly. The Engineer will notify the Contractor of the determination as to whether or not an adjustment of the Contract is warranted.

No Contract adjustment which results in a benefit to the Contractor will be allowed unless the Contractor has provided the required written notice. No Contract adjustment will be allowed under this clause for any effects caused on unchanged work.

21. CLAIMS FOR EXTRA COST

- 21.1 No claim for extra work or cost shall be allowed unless the same was done in pursuance of a written order of the Engineer approved by the Owner as aforesaid, and the claim presented 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 and when requested by the Owner, and give the Owner access to accounts relating thereto.



- 21.2 If the Contractor claims that any instructions by drawings or otherwise issued after the date of the Contract involve extra cost under the Contract, he shall give the Engineer written notice thereof after the receipt of such instruction, but in any event before proceeding to execute the work, except an emergency situation endangering life or property, and the procedure shall then be as provided for under Article 17, (Extra Work and Change Orders). No such claim shall be valid unless so made.

22. RIGHT OF THE 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 Subcontractor's, the Owner may serve written notice upon the Contractor and the Surety of its intention to terminate the contract. Such notices are to contain the reasons for such intentions to terminate the contract, and unless, within ten (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 ten (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 ten (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 judged as 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 persistently or repeatedly refuse or should fail, except in cases for which extensions or time are provided, to supply enough properly skilled workmen or materials, or if he should fail to make payments to Subcontractor's or for material or labor, so as to affect the progress of the work, or persistently be guilty of a substantial 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 seven 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 from the property of the Owner. The Owner shall have the right to remove such equipment and supplies at the expense of the Contractor. If such expense shall exceed 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 certified 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 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.

23. CONSTRUCTION SCHEDULE AND PERIODIC ESTIMATES

- 23.1 Before starting the work and from time to time during its progress, as the Engineer may request, the Contractor shall submit to the Engineer a written description of the methods he plans to use in doing the work and the various steps he intends to take.
- 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 at which additional drawings, if any, will be required and (b) a written schedule fixing the respective dates for the start and completion of various parts of the work. Each such schedule shall be subject to review and change from time to time during the progress of the work.

24. PAYMENTS TO THE CONTRACTOR

24.1 Progress Payments

The Owner will, once a month and within 30 days of receipt of a certificate of payment from the Engineer make a progress payment to the Contractor on the basis of an estimate of the total amount of work done to the time of such estimate and the value thereof as prepared by the Contractor and approved by the Engineer.

24.2 Retainage by Owner

The Owner will retain an amount of the progress payment in accordance with the following procedures:

- (a) Until construction is 50% complete, as determined by the Engineer, retainage shall be 10% of the monthly payments claimed.
- (b) After construction is 50% complete, and provided the Contractor has performed to the satisfaction of the Engineer and the Owner, and provided further that there is no specific cause for greater retainage, no further monies will be withheld. Retainage will remain at the same balance throughout the remainder of the project, unless drawn upon by the Owner in accordance with Articles 19 and 22.
- (c) Upon substantial or final completion (see Article 25, Acceptance and Payment) the amount of retainage will be reduced to 2% of the total contract amount, which shall include any contract amount increase or decrease resulting from change orders. An additional retainage amount will be developed and added to the 2% 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 additional retainage until the entire project is declared completed. The 2% retainage will be held by the Owner for a period of one year and will be released upon observation by the Engineer that there is no deficient work necessary to be corrected (See Article 25).

#### 24.3 Payment for Materials

In reviewing monthly estimates 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 has been delivered to the site and which is properly stored and protected from damage. With the estimate, the Contractor shall furnish the Engineer receipted 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 subtract the value of such materials or equipment, previously paid for by the Owner, 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. In general, larger items of material and equipment, and material and equipment made specifically for the subject job, will be eligible for payment.

#### 24.4 Care and Protection of Materials and Work

All material and work covered by partial payments made shall thereupon become the sole property of the Owner, but 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 the restoration of any damaged work, or as a waiver of the right of the Owner to require the fulfillment of all of the terms of the contract.

#### 24.5 Owner's Right to Withhold Certain Amounts and Make Application Thereof

The Contractor agrees that he will indemnify and save the Owner harmless from all claims growing out of the lawful demands of Subcontractor's, laborers, workmen, mechanics, material men, and furnishers of machinery and parts thereof, 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 obligations of the nature hereinabove designated have been paid, discharged, or waived. If the Contractor fails so to do, then the Owner may, after having served written notice on the said Contractor either pay unpaid bills of which the Owner has written notice, direct, or withhold from the Contractor's unpaid compensation a sum of money deemed reasonably sufficient to pay any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged whereupon payment to the Contractor shall be resumed, in accordance with the terms of this Contract but in no event shall the provisions of this sentence be construed to impose any obligations upon the Owner to either the Contractor or his Surety. 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 a payment made under the 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.

### 25. ACCEPTANCE AND FINAL PAYMENT

#### 25.1 Substantial Completion and Payment Therefore

Substantial completion shall be that point at which the work has been completed to the extent that the Owner may occupy and make use of the project (or portion of the

project) 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.

Upon receipt of written notice from the Contractor that the work is substantially complete, the Engineer will promptly conduct a site visit to observe the status/condition of the project and completion thereof with the Owner, and when he finds the work acceptable under the terms of the Contract and the Contract substantially completed, he will issue a dated certificate, and a punch list of all items to be completed or corrected, over his own signature, stating that the work required by this Contract has been substantially completed and is accepted by him under the terms and conditions thereof. The entire balance due the Contractor less two percent (2%) of the total Contract amount, and less a retention based on the Engineer's estimate of the fair value of the punch list items and the cost of completing or correcting such items of work with specified amounts for each incomplete or defective item of work, will be due and payable.

The general guarantee period for the work substantially completed by the Contractor shall begin on the date of the certificate of substantial completion provided by the Engineer.

#### 25.2 Final Completion and Payment Therefore

Final completion shall be that point at which all work on the project or portion of the project has been completed, all defective work has been corrected, and all miscellaneous work and clean-up has been accomplished. Unless a certificate of substantial completion has been issued, the general guarantee period shall begin on the date of the certificate final completion provided by the Engineer.

#### 25.3 Final Acceptance

Following the termination of the general guarantee period for the entire project which has been certified completed or substantially completed, the Owner, through the Engineer, may, at the option of either, make a final inspection of all or portions of the project. When it is found that the work is still acceptable, 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 therein any monies retained during the guarantee period.

#### 25.4 If, however, the inspection discloses any work in whole or in part, as being unsatisfactory, the Engineer will give the Contractor the necessary instructions for correction of such work, and the Contractor shall immediately comply with and execute such instructions. Upon correction of the work, another inspection will be made which shall constitute the final 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 after the work has been substantially completed, full completion thereof is materially delayed through no fault of the Contractor and the Engineer so certifies, the Owner may, upon certificate of the Engineer, and without terminating the Contract, make payment of the balance due for the 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 be and shall operate as a release to the Owner of all claims and all liability to the Contractor for all things done or furnished in connection with 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 under this contract of the Performance and Payment Bond.

26. PAYMENTS BY CONTRACTOR

The Contractor shall pay (a) for all transportation and utility services not later than the 20th day of the calendar month following that in which services are rendered, (b) for all materials, tools, and other expendable equipment to the extent of ninety percent (90%) 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 project, 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 (c) to each of his Subcontractor's, 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 Subcontractor's to the extent of each Subcontractor's interest therein.

27. INSURANCE

Prior to commencement of the Work, Contractor shall furnish Owner with an acceptable insurance certificate from Contractor's insurer naming Owner as an additional insured evidencing that Contractor has the following coverage and liability limits:

- 27.1 Workmen's Compensation: Statutory requirements apply.
- 27.2 Employer's Liability Insurance: \$100,000 each accident, \$500,000 disease policy limit, \$100,000 each employee.
- 27.3 Commercial General Liability: \$1,000,000 each occurrence bodily injury and property damage, \$2,000,000 general aggregate - include per project endorsement, \$2,000,000 projects/completed operations aggregate.
- 27.4 Owner's Protective Liability: \$2,000,000 aggregate.
- 27.5 Comprehensive Automotive Liability: \$1,000,000 combined single limit for bodily injury and property damage.
- 27.6 Commercial Umbrella Liability: \$1,000,000 each occurrence, \$1,000,000 aggregate.

27.7 Builders Risk - all risk: Insurable Value of Contract.

27.8 If blasting or demolition or both is required by the Contract, the Contractor or Subcontractor shall obtain the respective coverage and shall furnish to the Engineer a Certificate of Insurance evidencing the required coverages prior to commencement of any operations involving blasting or demolition or both. Contractor shall maintain such insurance at all times hereunder.

28. CONTRACT SECURITY

28.1 The Contractor shall furnish a Performance Bond in an amount at least equal to one hundred percent (100%) of the Contract price agreed upon as security for the faithful performance of this Contract and also a Payment Bond in an amount not less than one hundred percent (100%) of the Contract price or in a sum not less than that prescribed by State, or local law, as security for the payment of all persons performing labor on the project under this Contract and furnishing materials in connection with this Contract.

28.2 RSA 44:16 of the State of New Hampshire requires that the aforementioned bonds be issued through a resident agent licensed to do business in the State of New Hampshire.

29. ADDITIONAL OR SUBSTITUTE BOND

If at any time the Owner for justifiable cause shall be or become dissatisfied with any Surety or Sureties, for the Performance or Payment Bonds, the Contractor shall within five (5) days after notice from the Owner, 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, the Contractor agrees to settle with such other Contractor or Subcontractor by agreement or arbitration if such other Contractor or Subcontractor's will so settle. If such other Contractor or Subcontractor 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

- 32.1 The Contractor may utilize the services of specialty Subcontractor's on those parts of the work which, under normal contracting practices, are performed by specialty Subcontractor's.
- 32.2 The Contractor shall not award any work to any Subcontractor without prior written approval of the Owner.
- 32.3 The Contractor shall be as fully responsible to the Owner for the acts and omissions of his Subcontractor's, and of persons either directly or indirectly employed by them, as he is for the acts and omissions of persons directly employed by him.
- 32.4 The Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the work to bind Subcontractor to the Contractor by the terms of the General Conditions and other Contract Documents insofar as applicable to the work of Subcontractor's and to give the Contractor the same power in regard to terminating any subcontract that the Owner may exercise over the Contractor under any provision of the Contract Documents.
- 32.5 Nothing contained in this Contract shall create any contractual relation between any Subcontractor and the Owner.

### 33. AUTHORITY OF ENGINEER AND HIS REPRESENTATIVES

- 33.1 The Engineer, acting on behalf of the Owner, will 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 correct conditions unsafe for the workmen or the general public; for failure to carry out provisions of the contract; for failure to carry out orders; for conditions considered unsuitable for the prosecution of the work, including unfit weather; or for any other condition or reason deemed to be in the public interest.

The purpose of the above articles 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.

The Engineer, acting on behalf of the Owner, has the authority to enforce corrective action for work not in accordance with the specifications or for conditions which he finds unsafe.

The Engineer, acting on behalf of the Owner, shall give all orders and directions contemplated under the contract and specifications, relative to the execution or 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 said work and the construction thereof. The Engineer's estimates and decisions shall be final and conclusive, except as herein otherwise expressly provided. In case any question shall arise between the parties thereto 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 in any manner or to any extent by such question.

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 and procedures as he thinks appropriate.

In any and all claims against the Owner or the Engineer, or any of their agents or employees, by any employee of the Contractor, any 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 or for the Contractor or any Subcontractor under workmen's compensation acts, disability benefit acts or other employee benefits 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.

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 obscure or be in dispute. Any differences or conflicts in regard to their work which may arise between the Contractor under this Contract and other Contractor's performing work for the Owner shall be adjusted and determined by the Engineer.

- 33.2 The Engineer may appoint such assistants and representatives as he desires, and they shall be granted full access to the work under the Contract. They shall have the authority to give directions pertaining to the work or to the safety and convenience of the public, 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. The Contractor may, however, appeal from their decision to the Engineer himself, but any work done pending settlement 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 releasing the Contractor from the fulfillment of the terms of the contract.

All transactions between the Contractor and the representative 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 contract price any cash allowances stated in the Supplemental General Conditions. The Contractor shall purchase the "Allowed Materials" as directed by the Owner on the basis of the lowest and best bid of at least three 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 the work.

35. USE OF PREMISES, REMOVAL OF DEBRIS, SANITARY CONDITIONS

The Contractor expressly undertakes at his own expense:

- to take every precaution against injuries to persons or damage to property;
- to store his apparatus, materials, supplies and equipment in such orderly fashion at the site of the work as will not unduly interfere with the progress of his work or the work of any other Contractor's;
- 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 daily 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 a neat, 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 a neat orderly condition;
- to effect all cutting, fitting or patching of his work required to make the same to 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; and
- to provide and maintain in a neat, 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, they are given for use in comparing bids and the right is especially reserved except as herein otherwise specifically limited, to increase or diminish them as may be deemed reasonably necessary or desirable by the Owner to complete the work contemplated by this Contract, and such increase or diminution shall in no way vitiate this Contract, nor shall any such increase or diminution give cause for claims or liability for damages.

37. LANDS AND RIGHTS-OF-WAY

- 37.1 Prior to the start of construction, the Owner will 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 proper parties) enter or occupy with men, tools, materials, or equipment, any land outside of the rights-of-way or property of the Owner. A copy of the written consent shall be given to the Engineer.

38. GENERAL GUARANTY

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 two years from the certified date of completion or substantial completion of the work unless a longer period is specified. The Owner will give notice of observed defects with reasonable promptness.

39. 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.

- (1) Supplementary Conditions will govern Federal Conditions.
- (2) Technical Specifications will govern Supplementary Conditions and General Conditions.
- (3) Plans will govern Technical Specifications, Supplementary Conditions and General Conditions.
- (4) Special conditions will govern Plans, Technical Specifications, Supplementary Conditions and General Conditions.

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 immediately 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.

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 thereof completed, when said notice is mailed, by certified or registered mail, to the said Contractor at his last given address, or delivered in person to the said 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, then upon the application of either party the Contract shall forthwith be physically amended to make such insertion or correction.

42. SAFETY AND HEALTH REGULATIONS

This project is subject to all of 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. Contractor's are urged to become familiar with the requirements of these regulations.

43. USE AND OCCUPANCY PRIOR TO FINAL ACCEPTANCE BY OWNER  
(BENEFICIAL OCCUPANCY)

## 43.1 General

Use and occupancy of a portion or unit of the project, upon substantial completion of that portion or unit, and before final acceptance of the entire project, shall be a condition of this Contract with the following provisions:

- (a) The Owner will make his request to the Contractor in writing.
- (b) There must be no significant interference with the Contractor's operations on other parts of the project.
- (c) The Engineer, upon request of the Owner and agreement by the Contractor, that the portion or unit is substantially complete will make an inspection of the subject part of the project to confirm its status of completion. The Engineer will then follow the procedures described in Article 25, (Acceptance and Final Payment).
- (d) Consent of the surety and endorsement of the insurance carrier must be obtained prior to use and/or occupancy by the Owner. Furthermore, in the case of building occupation, the Owner will secure the necessary insurance coverage on the building.
- (e) The Owner will have the right to exclude the Contractor from the subject portion of the project after the date stipulated in the Engineer's Certificate but will allow the Contractor reasonable access to complete or correct the items on the Engineer's punch list.

The provisions stated above do not apply during the installation or construction phase of this Contract, nor do those provisions restrict use and access by Contractor of the Owner obligated to perform work within the limits of the Project under legal contractual agreement, providing access and use do not infringe upon the work of this Contract.

## 43.2 Warranty Period

- (a) Pipeline or building: Upon use or occupancy of pipeline or building, by the Owner, the warranty period shall begin and run for a period of two years.
- (b) Mechanical equipment, pumps, etc.: The warranty period of such equipment shall begin only after a specified test period has been completed and the equipment has demonstrated an ability to perform in accordance with the technical specification.
- (c) Pavement: Upon issuance of certificate of substantial completion the warranty period shall extend for two years.
- (d) Loamed, Seeded and Mulched Areas: Upon issuance of certificate of substantial completion the warranty period shall extend for two years.

44. PHOTOGRAPHS OF THE PROJECT

The Contractor is required to furnish and submit pre-construction, construction, and post-construction photographs of the project to the Owner.

45. SUSPENSION OF WORK

- 45.1 The Owner may, at any time and without cause, suspend the Work or any portion thereof for a period of not more than ninety days by notice in writing to the

Contractor and the Engineer which shall fix the date on which Work shall be resumed. The Contractor will resume the work on the date so fixed. 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 18 and 21.

- 45.2 In the event of a Suspension of Work initiated by the Contractor for any reason including, but not limited to, winter shut-down, settlement of claims, delay in delivery of materials, the Owner shall receive thirty (30) days prior notice, in writing, giving detailed reasons for the suspension of work and an approximate date of resumption of work.

#### 46. SIGNS

The Contractor shall furnish and erect roadway construction signs for the safety of the public and in accordance with the MUTCD, local and state standards, and such additional signs as determined necessary by the Engineer and as shown on construction drawings.

#### 47. PUBLIC CONVENIENCE AND TRAFFIC CONTROL

- 47.1 The Contractor shall at all times so conduct his work as to assure the least possible obstruction to traffic for the general public and the residents along the project route and the protection of persons and property shall be provided for by the Contractor. The Owner shall be responsible for proper and timely notification to local residents before making any interruptions of their access.
- 47.2 Fire hydrants and water holes for fire protection on or adjacent to the project site shall be kept accessible to the fire apparatus at all times, and no obstructions shall be placed within 10 feet of any such facility. No footways, gutters, sewer inlets, or portions of highways adjoining the project site shall be obstructed more than is necessary. 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 accommodations, satisfactory to the Owner and Engineer, for residences and businesses along and adjacent to the roadway so closed.
- 47.3 When the maintenance of traffic is considered by the Engineer to be of minor significance, certain contracts 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 the project undergoing improvements and of constructing and maintaining such approaches, crossings, intersections, rights-of-way and other features as may be necessary, without direct compensation.

#### 48. PRE-CONSTRUCTION CONFERENCE

The Contractor shall not commence work until a conference has been held at which representatives of the Contractor, Engineer, and Owner are present. The pre-construction conference will be arranged by the Engineer.

#### 49. MAINTENANCE DURING CONSTRUCTION

- 49.1 The Contractor shall maintain the work during construction and until the project is accepted. This maintenance shall constitute 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.

49.2 All cost of maintaining work during construction and before the project is accepted shall be included in the unit prices bid on the various pay items, and the Contractor will not be paid an additional amount for such work.

49.3 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 in any such order, the Engineer may immediately cause the project to be maintained and the entire cost of this maintenance will be deducted from money due or to become due the Contractor on this contract.

## 50. COOPERATION WITH UTILITIES

50.1 The Contractor will notify all applicable utility companies, all pipe line owner's, or other parties affected, and endeavor to 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.

50.2 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 owner's of such utilities at their expense, except as may otherwise be provided for in the Special Conditions, as shown or noted on the construction drawings and as specified in the Contract.

50.3 It is understood and agreed that the Contractor has considered 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, or damage sustained by him due to any interference from such utility appurtenances or the operation of moving them.

50.4 The Contractor shall cooperate with the owner's 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 rearrangement work may be reduced to a minimum, and that services rendered by those parties will not be unnecessarily interrupted.

50.5 In the event of interruption to water or utility services 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 the said authority in the restoration of services. If water service is interrupted, repair work shall be continuous with all necessary assistance by the Contractor 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.

51. WORK PERFORMED AT NIGHT AND ON SUNDAYS AND HOLIDAYS

- 51.1 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 degree of accuracy of workmanship and the same conditions regarding safety as would be achieved in daylight.
- 51.2 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 three calendar days. Prior to the close of work, the project shall be placed in the best possible condition for the comfort and safety of the traveling public, and arrangements shall be made for responsible personnel to maintain the project in the above conditions.

52. LAWS TO BE OBSERVED

The Contractor shall keep fully informed of all Federal and State laws, all local laws, ordinances, and regulations, and all orders and decrees of bodies of tribunals having any jurisdiction or authority, which in any manner affect those engaged or employed on the work, or which in any way affect the conduct of 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 Owner 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.

53. PERMITS

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

- 53.1 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 to be secured by the Contractor may include:
- 53.2 RSA 149-M:10 New Hampshire Bureau of Solid Waste - disposal of construction debris and/or demolition waste.
- 53.3 NHDES Air Resources Division (burning permits).
- 53.4 Control of Pollution Due to Construction
- (a) 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 groundwater and surface waters of the State.
  - (b) 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 NHDES. In no case shall the classification for the surface water be violated unless otherwise permitted by the NHDES.

- (c) In water used for other purposes, the turbidity must not exceed 25 s.t.u. unless otherwise permitted by the NHDES.

54. SUBCONTRACTORS

The Contractor will insert any subcontracts, articles 50 through 55, contained herein; also, a clause requiring the Subcontractor's to include these clauses in any lower tier subcontracts which they may enter into, together with a clause requiring this insertion in any further subcontracts that may in turn be made.

55. EQUAL EMPLOYMENT OPPORTUNITY

Under equal employment opportunity requirements and during the performance of this contract the Contractor agrees to the following:

- 55.1 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, transfer, 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 non-discrimination clause.
- 55.2 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.
- 55.3 The Contractor will send to each labor union or representative or workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the labor union to work's representative of the Contractor's commitment under section 202 or 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.
- 55.4 The Contractor will comply with all provisions of executive orders no. 11246 and 11375.
- 55.5 The Contractor will furnish all information and reports required by executive orders no. 11246 and 11375.
- 55.6 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 cancelled, 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.

56. 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.

57. 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 a capacity and on behalf of the Owner to exercise any legislative, executive, supervisory or their 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.



## NOTICE OF AWARD

Dated May 8, 20 19

TO: Nott's Excavating, Inc.

(BIDDER)

ADDRESS: 185 Equestrian Way, White River Junction VT 05001

OWNER'S PROJECT NO: \_\_\_\_\_

PROJECT: Hanover High School Turf Field Drainage Improvements

CONTRACT FOR: Dresden School District

You are notified that your Bid dated May 3, 2019 for the above Contract has been considered. You are the apparent successful bidder and have been awarded a contract for:

Total Base Bid

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

The Contract Price of your contract is Four Hundred Forty-Four Thousand Six Hundred Nineteen and 00/100 Dollars (\$ 444,619.00 ).

four (4) 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 ten 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. 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 other conditions precedent).

Provide Certificate of Insurance in accordance with the Contract

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 ten 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.

Jay D. Badams  
(OWNER)  
By [Signature]  
(AUTHORIZED SIGNATURE)

Superintendent - Dresden School  
(TITLE) District

#### ACCEPTANCE OF NOTICE

Receipt of the above NOTICE OF AWARD is hereby acknowledged

By Nott's Excavating, Inc.

The 21st day of May, 20 19

By [Signature]

Title Raymond S. Nott II, v.p.

Copy to ENGINEER

(Use Certified Mail, Return Receipt Requested)

# NOTICE TO PROCEED

Dated May 24, 20 19

TO: Nott's Excavating, Inc.

(Insert Name of CONTRACTOR as it appears in the Bid Documents)

ADDRESS: 185 Equestrian Way, White River Junction VT 05001

OWNER'S PROJECT NO. \_\_\_\_\_

PROJECT: Hanover High School Turf Field Drainage Improvements

CONTRACT FOR (OWNER): SAU #70/Dresden School District

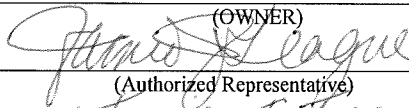
You are notified that the Contract Time under the above contract will commence to run on June 3, 20 19. By that date, you are to start performing your obligations under the Contract Documents. In accordance with paragraph 3 of the Agreement, the dates of Substantial Completion and Final Completion are August 1, 20 19 and August 16, 20 19, 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.

Copy to ENGINEER

(Use certified Mail, return Receipt Requested)

SAU #70/Dresden School District

By  (OWNER)  
(Authorized Representative)  
Jamie J. Teague  
(Title)

## ACCEPTANCE OF NOTICE

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

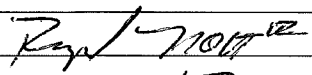
Nott's Excavating, Inc.

(CONTRACTOR)

Employer Identification

this the 24 day of May, 20 19

Number: \_\_\_\_\_

By:   
V.P.  
(Title)



## CHANGE ORDER

No. 1

PROJECT:	SAU #70/Dresden School District Hanover High School Turf Field Drainage	DATE OF ISSUANCE:	May 20, 2019
OWNER:	SAU #70/Dresden School District	OWNER's Project No.	N/A
CONTRACTOR:	Nott's Excavating, Inc.	ENGINEER:	Pathways Consulting, LLC
CONTRACT FOR:	SAU #70/Dresden School District	ENGINEER's Project No.	10021

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

Description: **Revise the following lump sum bid amount for bid item No. 8 "Pressure Grouting all Pipes and Manholes." The total cost for this bid item shall be revised from \$187,000 to \$136,670. Total cost savings of \$50,330.**

**Total reduction to the Contract price as part of this Change Order is (\$50,330).**

Purpose of Change Order: The Purpose for this Change Order is to revise the Contract cost for Grouting based on efforts by the Contractor to obtain additional subcontractor pricing for this work. This change order is a credit.

Attachment: None

CHANGE IN CONTRACT PRICE:	CHANGE IN CONTRACT TIME:
Original Contract Price \$444,619.00	Original Contract Time Substantial Completion by August 1, 2019 Final Completion by August 16, 2019
Previous Change Orders No. <u>0</u> to No. <u>0</u> \$0.00	Net Change from previous Change Orders 0 calendar days
Contract Price prior to this Change Order \$444,619.00	Contract Time Prior to this Change Order Substantial Completion by August 1, 2019 Final Completion by August 16, 2019
Net (DECREASE) of this Change Order (\$50,330.00)	Net INCREASE (DECREASE) of this Change Order 0 calendar days
Contract Price with all approved Change Orders \$394,289.00	Contract Time with all approved Change Orders Substantial Completion by August 1, 2019 Final Completion by August 16, 2019

Recommended:  
Engineer

Approved  
Contractor

Approved  
SAU #70







## CONTRACTOR'S AFFIDAVIT

STATE OF: New Hampshire

COUNTY OF: Grafton County

Before me, the undersigned, a \_\_\_\_\_  
(Notary Public, Justice of Peace, Alderman)  
in and for said County and State personally appeared, \_\_\_\_\_  
(Individual, Partner or duly  
authorized representative of corporate CONTRACTOR) 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 \_\_\_\_\_ of \_\_\_\_\_  
(CONTRACTOR)  
dated \_\_\_\_\_ for the construction of the \_\_\_\_\_  
and necessary appurtenant installations have been paid in full.

\_\_\_\_\_  
(Individual, Partner, or duly authorized representative of corporate CONTRACTOR)  
\_\_\_\_\_  
(Title)

Sworn to and subscribed before me  
this \_\_\_\_\_ day of \_\_\_\_\_, 20 \_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_  
Notary Public





## CONTRACTOR'S RELEASE

KNOW ALL MEN BY THESE PRESENTS that \_\_\_\_\_

\_\_\_\_\_  
(CONTRACTOR)

of \_\_\_\_\_, County of \_\_\_\_\_  
and State of \_\_\_\_\_ do \_\_\_\_\_ hereby acknowledge that

\_\_\_\_\_  
(CONTRACTOR)

has \_\_\_\_\_ this day had, and received of and from \_\_\_\_\_

\_\_\_\_\_  
(OWNER)

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

\_\_\_\_\_  
(CONTRACTOR)

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

\_\_\_\_\_  
(OWNER)

and \_\_\_\_\_

\_\_\_\_\_  
(CONTRACTOR)

dated \_\_\_\_\_ for \_\_\_\_\_  
(Project)

NOW, THEREFORE, the said \_\_\_\_\_

(CONTRACTOR)

(for myself, my heirs, executors and administrators) (for itself, its successors and assigns)

do/does, by these presents remise, release, quit-claim and forever discharge \_\_\_\_\_  
(OWNER)

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

\_\_\_\_\_  
(OWNER)

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

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

IN WITNESS WHEREOF, \_\_\_\_\_

\_\_\_\_\_  
(CONTRACTOR)

has caused these presents to be duly executed this \_\_\_\_\_ day of \_\_\_\_\_, 20 \_\_\_\_\_

Signed, Sealed and Delivered in the presence of:

\_\_\_\_\_  
(Individual - CONTRACTOR) (seal)

\_\_\_\_\_  
(Partnership - CONTRACTOR) (Seal)

\_\_\_\_\_  
(seal) By \_\_\_\_\_  
(Partner)

Attested:

\_\_\_\_\_  
(Corporation)

\_\_\_\_\_  
(Secretary) By \_\_\_\_\_  
(President or Vice President)

(Corp. Seal)

OWNER's Project No.:	ENGINEER's 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:	
<div style="border: 1px solid black; height: 150px;"></div>	
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	
(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 14 calendar days of the above date of 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 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: \_\_\_\_\_

## SECTION 01 10 10

### MOBILIZATION

#### PART 1 – GENERAL

##### 1.01 DESCRIPTION

- A. This item shall consist of preparatory work and operations, including, but not limited to, those necessary to the movement of personnel, equipment, supplies, and incidentals to the site of the work; and for all other work and operations which must be performed or for costs which must be incurred prior the beginning work on the various items.

#### PART 2 – PRODUCTS

(Not Applicable)

#### PART 3 - EXECUTION

##### 3.01 BASIS OF PAYMENT

- A. Partial payments for this item will be made approximately as follows:
  - (a) When 5 percent of the original Contract amount is earned, the accumulated total to be paid will be 25 percent of the amount bid, or 2-1/2 percent of the original Contract amount, whichever is the lesser.
  - (b) When 10 percent of the original Contract amount is earned, the accumulated total to be paid will be 50 percent of the amount bid, or 5 percent of the original Contract amount, whichever is the lesser.
  - (c) When 25 percent of the original Contract amount is earned, the accumulated total to be paid will be 60 percent of the amount bid, or 6 percent of the original Contract amount, whichever is the lesser.
  - (d) When 50 percent of the original Contract amount is earned, the accumulated total to be paid will be 100 percent of the amount bid, or 10 percent of the original Contract amount, whichever is the lesser.
- B. Upon completion of all work, payment of any amount bid for this item in excess of 10 percent of the original Contract amount will be paid.
- C. Upon written request by the Contractor made within 30 days of the Award of Contract, an amount equal to 25 percent of the amount bid for this item or 1 percent of the Contract amount, whichever is lesser, will be paid.
- D. The total sum of all payments will not exceed the original Contract amount bid for

this item, regardless of the fact that the Contractor may have, for any reason, shut down his work on the project or moved equipment away from the project and then back again.

END OF SECTION 01 10 10

SECTION 01 10 30

MISCELLANEOUS WORK, CLEANUP

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

Provide all labor, materials, and equipment necessary to complete miscellaneous items and cleanup not specified elsewhere. This section includes the following:

1. Installation and maintenance of daily erosion and sediment control items necessary to complete the work, frequent roadway maintenance, dust control and maintenance of dust with project limits, and daily project cleanup.
2. Temporary Facilities, Storage, Staging and Controls.
3. The cost of all bonds and insurances.
4. Coordination and cooperation with the other Contractor's working in the area, the local Public Works Department, Project Abutters, local utility companies, and other State and Local officials.
5. Protection of materials delivered to the site, stored on-site, and work which is in the process of or that has been completed on the project.
6. Collection and maintaining daily records of construction progress.
7. Excavation and work around existing utilities within the Project limits.
8. Temporary stabilization of all disturbed areas of the project if not stabilized within 2 weeks of final grading.
9. Temporary maintenance/bypass of all existing drainage flows pertaining to the project scope.
10. Maintenance and installation of stabilized construction entrances, haul roads, and construction lay down area.
11. Trench boxes, shoring, bracing, sheeting and all miscellaneous materials and equipment necessary to complete the project.
12. Full cost of hiring a private utility locating company to locate private utilities not located by DIG-Safe within the project limits.
13. Completion of test pits and exploratory excavation necessary to verify existing utilities necessary to complete the work.

PART 2 – COOPERATIONS WITH OTHERS

## 2.01 COOPERATION WITH OTHERS

Delays in the Work caused by the actions of others shall be expedited as promptly as possible by the Owner(s). The Contractor shall notify the Owner of any delays caused by circumstances beyond his control.

## 2.02 SCHEDULE OF VALUES

- A. Contractor shall submit a detailed breakdown of miscellaneous work items in the form of a schedule of values with the Bid Proposal for review by the Engineer and the Owner prior to signing the Agreement. This breakdown will be used for partial payment of the included miscellaneous work items.
- B. Failure to comply with the requirements of related Sections or of items listed herein shall be cause for the withholding of sums defined in the lump sum breakdown schedule of values.

END OF SECTION 01 10 30



## SECTION 01 10 40

### SPECIFICATIONS AND DRAWINGS

#### PART 1 - GENERAL

##### 1.01 CONTRACT DOCUMENT DRAWINGS

The Specifications and Drawings referenced in this section may be modified by addenda and will be issued for construction purposes. The Drawings may be supplemented or suspended by such additional general and detail Drawings as may be necessary as the work progresses. The Drawings issued for construction at that time or after the signing of the Contract Documents will become the Contract Drawings.

##### 1.02 EXISTING AND ADJACENT CONDITIONS

Existing conditions and construction not intended as part of the Work are shown for informational purposes only. Before starting any work affected by such existing conditions, the Contractor shall have made himself familiar with all conditions affecting his work, and shall not be entitled to extra compensation for any work or expense arising from or caused by his failure to have verified all existing conditions.

##### 1.03 DIMENSIONS

In general, the Drawings are made to scale, but working dimensions shall be taken only from calculated dimensions or by actual measurements at the site. The Contractor shall compare all Drawings and verify all figures before laying out or constructing the work and shall be responsible for any and all errors in the work resulting from his failure to do so. Deviations from the Drawings and the dimensions given thereon shall be made only after corrected revision is obtained in writing from the Engineer. The Contractor shall take all measurements of existing established conditions regardless of the figured dimensions on the Drawings. When figured dimensions are not in agreement with the Contractor's measurements, the Contractor will adjust the measurement as necessary and provide the Engineer with justification for said revisions.

##### 1.04 DISCREPANCIES

Any discrepancies discovered during the Work between the Drawings, Specifications, and actual conditions shall be immediately brought to the attention of the Engineer. Work performed after such discovery, without the Engineer's knowledge, shall be at the risk of the Contractor. If discrepancies are discovered by the Contractor and the Engineer is properly notified, the Engineer shall be given reasonable time to correct the issue prior to the Contractor continuing with work.

1.05 DIAGRAMMATIC DRAWINGS

- A. Plans or Drawings where work is shown diagrammatically indicate general working systems. Drawings of a purely representational nature shall not be used to take off the specific items of the Work. To carry out the true intent and purpose of the Contract Documents, correct working systems or installations shall be included as if detailed on the Drawings.
- B. The location of equipment shown on the Drawings, unless exactly dimensioned, shall be considered as approximate only. The Contractor shall adjust the position of the equipment in accordance with good working practices to avoid interferences, provide proper clearance and space for operation and maintenance.

1.06 TYPICAL DETAILS

Where shown on the Drawings, typical details shall apply to each and every item of the Contract Work where such items are incorporated and the detail is applicable.

1.07 COPIES OF DRAWINGS FURNISHED

- A. The Engineer or the Owner will furnish the Contractor, without charge, up to four (4) copies of the Drawings and Specifications for execution of the Contract Work. Additional copies will be furnished at the Contractor's expense when requested.
- B. All Drawings and Specifications are the property of the Engineer or of the Owner. The Contractor shall return all copies if so requested.

PART 2 - PRODUCTS      NOT USED

PART 3 – EXECUTION      NOT USED

END OF SECTION 01 10 40

SECTION 01 10 90

ABBREVIATIONS AND TERMS

PART 1 - GENERAL

1.01 ABBREVIATIONS AND REFERENCES

A. The following abbreviations may be used in these Specifications:

AA	-	Aluminum Association
AAMA	-	Architectural Aluminum Manufacturers Association
AASHO	-	The American Association of State Highway Officials
ACI	-	American Concrete Institute
AGA	-	American Gas Association, Inc.
AGMA	-	American Gear Manufacturers Association
AIEE	-	American Institute of Electrical Engineers
AISC	-	American Institute of Steel Construction, Inc.
AITC	-	American Institute of Timber Construction
AMCA	-	- Air Moving and Conditioning Association
API	-	American Petroleum Institute
ARI	-	Air Conditioning and Refrigeration Institute
ASA	-	American Standards Association
ASCE	-	American Society of Civil Engineers
ASHRAE	-	American Society of Heating, Refrigeration, Air Conditioning Engineers
ASME	-	American Society of Mechanical Engineers
ASTM	-	American Society of Testing Materials
AWI	-	Architectural Woodwork Institute
AWPB	-	American Wood Preserves Bureau
AWS	-	American Welding Society, Inc.
AWWA	-	American Water Works Association
CIPRA	-	Cast Iron Pipe Research Association
CISPI	-	Cast Iron Soil Pipe Institute
CRSI	-	Concrete Reinforcing Steel Institute
CVEC	-	Connecticut Valley Electric Company
CVPS	-	Central Vermont Public Service Corporation
DIPRA	-	Ductile Iron Pipe Research Association
Fed.Spec	-	Federal Specifications
FO&M	-	Facilities Operations & Maintenance - Dartmouth College
GSE	-	Granite State Electric Co.
Milspec	-	Military Specifications
NAAMM	-	National Association of Architectural Metal Manufacturers
NEC	-	National Electrical Code
NEES	-	New England Electric Service

NEMA	-	National Electrical Manufacturers Association
NEMI	-	New England Masonry Institute, Inc.
NET	-	NYNEX (formerly New England Telephone Co.)
NEWWA	-	New England Water Works Association
NFPA	-	National Fire Protection Association
NHDES	-	New Hampshire Department of Environmental Services
NHDOT	-	New Hampshire Department of Transportation
NYNEX	-	Bell Atlantic (formerly NYNEX)
SCPI	-	Structural Clay Products Association
SDI	-	Steel Door Institute
SMACNA	-	Sheet Metal and Air Conditioning CONTRACTORs National Association
U.L.	-	Underwriters Laboratory

- B. Where reference is made to a specification by one of the above mentioned or other organizations, it is understood that the latest revision thereof shall apply.
- C. In case of conflict, this Contract Specification shall take precedence over the above-noted specifications.
- D. Intention of Terms: In order to avoid cumbersome and confusing repetition of expressions in these specifications, it is provided that whenever anything is, or is to be, done, determined, directed, specified, authorized, ordered, given, designated, indicated, considered necessary, deemed necessary, permitted, reserved, suspended, established, suitable, accepted, satisfactory, unsatisfactory, sufficient, insufficient, rejected, or condemned, it shall be understood as if the expression were followed by the words "by the Engineer" or "to the Engineer".

PART 2 – PRODUCTS      NOT USED

PART 3 – EXECUTION      NOT USED

END OF SECTION 01 10 90

## SECTION 01 15 00

### MEASUREMENT AND PAYMENT

#### PART 1 - GENERAL

##### 1.01 DESCRIPTION

- A. This section describes the measurement and payment for the Work to be completed under each bid item in the Proposal. Work that is specified or shown on the drawings but not specifically designated as a Bid Proposal Item is considered incidental to the Contract.
- B. Progress payment procedures are described elsewhere in the Contract Documents.
- C. Individual bid items referencing NHDOT item No.'s in the bid item name shall comply with the NHDOT Specifications for Road and Bridge Construction 2018 for the material referenced.

##### 1.02 SUBMITTALS

- A. Within 7 days of the date of the Agreement, submit a schedule of values for all lump sum items. Break the items down in detail sufficient to determine the value of work at any degree of completion. Partial payment of lump sum items is based on the schedule of values as approved by the Engineer.
- B. Monthly applications for payment shall be on forms provided in these documents.

##### 1.03 SCHEDULING

- A. Notify the Engineer or Owners Representative, as far in advance as possible, of the taking of measurements so that they may observe existing conditions, work being performed, and measurements being made.
- B. Allow for and afford Engineer or Owners Representative ample time, space and equipment to complete measurements and to verify contractor's measurements and elevations. If the contractor does not allow for the Engineer or Owners Representative to make their measurements, the Engineer or Owners Representative calculated quantities will govern.

##### 1.04 PRODUCTS

- A. Provide all labor, materials, facilities, levels, measuring devices and all other equipment and items necessary to properly and accurately perform all measurements for payment purposes with the Engineer.

## 1.05 GENERAL REQUIREMENTS

### A. GENERAL REQUIREMENTS AND STIPULATION

1. Perform all measuring required under this section.
2. No separate payments will be made for work under the contract. All costs in connection with the Work shall be included in one or more of the pay items as appropriate.
3. Each pay item shall be full compensation for all costs in connection with the item including but not limited to:
  - a. The furnishing of all materials, labor, equipment, tools, and all incidentals
  - b. The installation of all materials, equipment, tools, and incidentals.
  - c. The proper share of overhead and profit.
  - d. Any excavation, trenching, backfilling, dewatering, shoring, or testing required.
  - e. The restoration of unpaved surfaces.
  - f. Any temporary facilities or controls required or found necessary.
  - g. Protection of all work being installed from damage.
  - h. Cost of shipping, handling, storing necessary for all materials.
  - i. All required testing of work and materials on the project.
  - j. All required recordkeeping (record drawings) for work installed.
  - k. Disposal off-site of any and all materials and items remaining at completion of the work and items demolished as part of the work.
  - l. All related and incidental work and items necessary or required to complete the work and to provide completely connected and operational and approved systems capable of performing as required.
4. Each pay item which specifically involves excavation shall be considered to include full compensation for:
  - a. Excavation in earth.
  - b. Disposal of any surplus.
  - c. Handling of water/dewatering as required.
  - d. Installation and removal of sheeting, shoring, and bracing with all necessary personal protective equipment to comply with OSHA regulations.
  - e. Required, bedding and backfill materials.
  - f. Furnishing and installing insulation as required.
  - g. Compaction.
5. If solid rock excavation is required in accordance with section 31 23 16.26, additional compensation will be paid under the item " Rock and Boulder Excavation" with the exception of items that specifically include payment for rock excavation.

## 1.06 EXECUTION

- A. The names of the following items may or may not be abbreviated form of the Bid items as contained in the Bid Proposal forms. The names, as shown below or on the Bid Form, shall not be construed to represent a complete description of all the work

included under such items are provided only as a means of identification and for ease of conversation.

## PART 2 – MEASUREMENT AND PAYMENT

### 2.01 DESCRIPTION OF PAY ITEMS

#### A. Item 1 Mobilization

1. Payment: shall be at the lump sum price as stated in the Bid Proposal. Payment shall be in accordance with specification section 01 10 10.
2. Measurement shall be in accordance with specification section 01 10 10.

#### B. Item 2– Remove and Dispose of Existing Drainage Pipe (Sizes Vary)

1. Payment: shall be at the unit cost per linear foot as stated in the Bid Proposal. Inclusive of all work necessary to remove of pipes on the project. Additional material for backfill are incidental to this work. Pipe capping is also incidental to this work. This includes pipes 12-inches in diameter and larger only as identified on the drawings. All smaller pipes are incidental to the contract.
2. Measurement will be for the actual number of linear feet of pipe removed and approved by the Owner. Pipe to be measured along the top crown of the pipe removed to the nearest foot.

#### D. Item 3 – Removal and Disposal of Existing Pavement (Saw-cutting incidental)

1. Payment: shall be at the unit price per square yard as stated in the Bid Proposal. Inclusive of removal of all bituminous pavements within limits depicted on the drawings or otherwise approved by the Engineer with disposal off-site.
2. Measurement shall be measured base on the average end area method to the nearest square yard.

#### E. Item 4 – Common Excavation to Subgrade (Pavement Area)

1. Payment: shall be at the unit price per cubic yard as stated in the Bid Proposal. Inclusive of all excavation necessary to establish subgrade for new gravels within the pavement limits depicted on the drawings or as otherwise approved by the Engineer.
2. Measurement shall be per the average end area method multiplied by the depth of gravel required by the contract. Item will be measured to the nearest cubic yard.

F. Item 5 – Remove and Dispose of Existing Drainage Structures

1. Payment: shall be at the unit price per each stated in the Bid Proposal. Inclusive of demolition/removal and disposal of drainage structures with various components identified for removal on the drawings. Additional material needed to backfill is considered incidental to this item.
2. Measurement for payment for this item shall be for each structure removed and disposed of off-site and approved by the Engineer.

G. Item 6 – Remove and Dispose of Existing Headwall

1. Payment: shall be at the unit price per each as stated in the Bid Proposal. Inclusive of demolition/removal and disposal of headwalls identified on the drawings. Additional material needed to backfill is considered incidental to this item.
2. Measurement for payment for this item shall be for each headwall removed and disposed of off-site and approved by the Engineer.

H. Item 7 – Cut and Remove End of Existing Wing Wall

1. Payment: shall be at the lump sum price as stated in the Bid Proposal. Inclusive of concrete cutting and removal of existing concrete wing wall and disposal off-site.
2. Measurement: This item will be paid in full upon completion of the work and accepted by the Engineer.

I. Item 8 - Pressure Grouting All Pipes and Manholes

1. Payment: shall be at the lump sum price as stated in the Bid Proposal. Inclusive of all work necessary to pressure grout existing pipes and structures identified on the drawings and outlined in the specifications, obtaining access to pipes and structures, building bulkheads, vents, or caps, removal and disposal of frames and covers for structures to be abandoned, shoring, and all else necessary to complete the work to successfully fill and abandon existing drainage infrastructure below the field.
2. Measurement for payment will be for the percentage of work completed based on a schedule of values to be provided by the Contractor.

J. Item 9 – Coring/Adjusting Structure Inverts for New Pipes

1. Payment: shall be at the lump sum price as stated in the Bid Proposal. Inclusive of all work necessary to modify existing structures to accept new pipes at the inverts depicted on the drawings. Includes all brick and mortar needed to properly seal each penetration new and old.
2. Measurement for payment will be for the percentage of work completed based on a schedule of values to be provided by the Contractor.



K. Item 10 – Riser Replacement/Adjustment (CB A)

1. Payment: shall be at the lump sum price as stated in the bid proposal. Inclusive of all work necessary to modify existing CB A per the plans and specifications.
2. Measurement: item shall be paid in full upon completion of the work and approval by the Engineer.

L. Items 11, 12, and 13– New Catch Basins and Drain Manholes

1. Payment: shall be at the unit price per each as stated in the bid proposal. Inclusive of furnishing and installing new structures and various components with frames and covers. Use of a crane and building access for a crane to set structures is incidental to these items. All penetrations shall be properly sealed and water tight before payment shall be made.
2. Measurement shall be for reach structure installed and approved by the Engineer.

M. Items 14, 15, 16, 17, 18, 19, and 20– Drainage Piping

1. Payment: shall be at the unit price per linear foot as stated in the bid proposal. Inclusive of furnishing and installing all required piping per the drawings, specifications, and manufacturer requirements. Fittings necessary to transition new pipe to existing pipe are considered incidental to this item.
2. Measurement shall for payment will be along the centerline of the pipe installed through all necessary fittings to the nearest foot.

N. Item 21 – Pipe Dam with Cutoff Underdrain

1. Payment: shall be at the unit price per each as stated in the Bid Proposal. Inclusive of furnishing impervious material and constructing a trench dam with cutoff underdrain and outlet pipe to new structures in accordance with the plans and specifications. All pipe and fittings are incidental.
2. Measurement for payment shall be based on each pipe dam with cutoff underdrain installed and approved by the Engineer.

O. Item 22 – Stone Masonry Headwall

1. Payment: shall be at the unit price per each as stated in the Bid Proposal. Inclusive of furnishing and installing all materials and constructing stone masonry headwalls per plans and specifications.
2. Measurement for payment shall be based on each headwall constructed and approved by the Engineer.

P. Item 23 – 48” Concrete Outlet Headwall

1. Payment: shall be at the lump sum price per the bid proposal. Inclusive of preparing engineer stamped shop drawings, furnishing and constructing a reinforced pre-cast concrete headwall with wing walls or a reinforced cast in place concrete headwall with wing walls in accordance with the plans and specifications. Includes all bedding stone and backfill. The use of a crane is incidental to this item if deemed necessary for installation.
2. Measurement: Item shall be paid in full upon completion of the item and approval by the Engineer.

Q. Item 24 – Stone Outlet with Energy Dissipater and Boulder Wall

1. Payment: shall be at the lump sum price per the bid proposal. Inclusive of furnishing and installing required stone, boulders, and materials, excavation to subgrades and disposal of excess materials, bypass of flows while under construction, and all else necessary to complete the item. Construction of stone outlet at headwall 5 is incidental to this item.
2. Measurement for payment shall be the percentage of work completed based on the schedule of values provided by the Contractor and accepted by the Engineer.

R. Items 25 and 26– Gravels

1. Payment shall be at the unit cost per cubic yard as stated in the bid proposal. Inclusive of furnishing and installing approved gravels below pavement area to restore sidewalk and driveway to original condition.
2. Measurement for payment shall be by the in-place compacted section and average end-area calculation multiplied by the thickness required by the drawings to the nearest cubic yard.

S. Item 27 – Restoration of Slope and Grasses

1. Payment shall be per the lump sum price as stated in the Bid Proposal. Payment includes rough and finish grading, furnishing and installing screened topsoil (4" minimum thickness or as shown on drawings), hauling, handling, raking to grade, liming, fertilizing, seeding, following seed application rates, rolling, mulching, erosion blanket on slopes, water (as required), maintenance, and all else necessary to establish a healthy stand of grass.
2. Measurement for payment shall be based on the percentage of the work completed and approved by the Owner.

T. Item 28 – Erosion Control Sock

1. Payment shall be at the unit price per linear foot as stated in the Bid Proposal. Inclusive of furnishing and installing 12” diameter Siltsoxx per the manufacturers requirements, staking, maintenance, as well as removal

- and disposal once vegetation has properly established.
2. Measurement for payment will be along the top of sock installed to the nearest linear foot. Sock that has not been properly staked will not be measured.

U. Item 29 – Stone Check Dams

1. Payment shall be at the unit price per each as stated in the bid proposal. Inclusive of furnishing and installing stone in accordance with the plans and specifications as well as necessary maintenance and removal.
2. Measurement for each stone check dam properly installed on-site.

V. Item 30 – Bituminous Concrete Pavement

1. Payment shall be at the unit price per square yard as stated in the bid proposal. Inclusive of furnishing and installing bituminous pavement in two lifts (base course/wearing course) in accordance with the plans and specifications. Includes emulsified binder for seams and between lifts.
2. Measurement for payment shall be for the actual number of square yard of pavement installed per the plans and specifications at a total minimum thickness of 3 ½”.

W. Item 31 – Miscellaneous Work and Cleanup

1. Payment: shall be at the lump sum price as stated in the Bid Proposal. Item shall be in accordance with the drawings and specifications and approved by the Engineer and Owner. Payment includes all work specified in section 01 10 30.
2. Measurement for payment shall be the percentage of work completed based on the schedule of values provided by the Contractor and accepted by the Engineer and/or Owner. The final 25% of this lump sum item will not be paid until the project reaches final approval by the Owner in accordance with the Contract.

X. Item 32 – Repair Turf Field Subbase where Trenching was Completed (8” Free Draining Subbase, 1 ½” Free Draining Stone Choker Coarse) Repair of Flat Panel Drains incidental as needed.

1. Payment: shall be at the unit price per square yard as stated in the Bid Proposal. Inclusive of furnishing and installing materials to repair field where trenching occurs as part of this project. Preparation of subgrades incidental.
2. Measurement for payment will be measured in place per square yard by average end area method to the nearest square yard. Trench payment limit width will be limited to 10’ wide.

Y. Item 33 – Repair Turf Field Concrete Header Curb (6”x12”)

1. Payment: shall be at the unit price per linear foot as stated in the bid proposal. Inclusive of all forms, excavation and preparation of surfaces, dowel connectors,

concrete, and all else necessary to repair sections of header curbing removed or disturbed as part of this project.

2. Measurement for payment will be measured in place per linear foot along the top of the header curb for new curbing installed and will be paid to the nearest linear foot.

END OF SECTION 01 15 00

## SECTION 01 60 10

### SUBMITTALS

#### PART 1 - GENERAL

##### 1.01 DESCRIPTION OF REQUIREMENTS

- A. Submittal requirements specified in this section include shop drawings, product data, samples, and miscellaneous work-related items. Refer to other Contract Documents for the requirements of administrative submittals.
- B. Work-related submittals of this Section are categorized as follows:
  - 1. Shop Drawings include specially prepared technical data, including drawings, diagrams, data sheets, schedules, and instructions.
  - 2. Product Data include standard printed information on materials, products, and systems not specially prepared for this Project, other than the designation of selections from among products specified herein.
  - 3. Samples include fabricated examples of materials, natural materials, products, and units of work either for limited visual inspection or for testing and analysis to determine compliance with other Sections of the Specifications.
- C. Miscellaneous submittals related directly to the Work include warranties, maintenance agreements, workmanship bonds, construction schedules, survey data and reports, quality control testing and reports, copies of industry standards, operations, and maintenance reports and other similar information, devices, and materials applicable to the Work.

##### 1.02 GENERAL SUBMITTAL REQUIREMENTS

- A. Coordination and sequencing of submittals shall be scheduled to precede work performance to avoid undue delays. Submittals that cover differing types of materials, but represent a complete part of the Work should be submitted as a whole, rather than as a unit.
- B. Submittal identification shall be consistent throughout the Project. Each submittal or group of submittals shall bear Project name, date, specification number, Contractor, Subcontractor, submittal name and information to distinguish it from other submittals. Show the Contractor's executed review stamp and provide space for the Engineer's review marking. Submittals received without the Contractor's review marking will be returned to the Contractor without action.
- C. Grouping of submittals to signify similar information or related parts of a whole is required. Partial submittals may be rejected as not complying with the Provisions of the Contract Documents.

- D. Transmittal forms shall be attached to indicate Project, date, names of Subcontractor's, suppliers, manufacturers, category and type of submittal, purpose, copy routing, and signature of Contractor, agent, or supplier.
- E. Submit six (6) copies of each submittal. The Contractor may alternately submit submittals in an electronic form with all appropriate transmittal and routing documents.

### 1.03 SPECIFIC-CATEGORY SUBMITTAL REQUIREMENTS

- A. Shop Drawings shall be information of the latest revision, on reproducible sheets, with graphic information at accurate scale, with name of preparer indicated (firm name). Show dimensions and note those based on field measurement. Identify materials and products in the work shown. Indicate compliance with standards. Submit blue-line or black-line prints.
- B. Product Data: Collect required data into one submittal for each unit of work or system; and mark each copy to show which choices and options are applicable to project. Include manufacturer's standard printed recommendations for application and use, compliance with standards, application of labels and seals, notation of field measurements which have been checked, and special coordination requirements. Maintain one set of product data (for each submittal) at project site, available for reference by the Owner and others.
- C. Construction Schedule: Submit within 10 days of signing the Agreement a detailed schedule of construction activities and anticipated monthly payments.

PART 2 - PRODUCTS      NOT USED

PART 3 – EXECUTION      NOT USED

END OF SECTION 01 60 10

## SECTION 01 70 00

### EXECUTION AND CLOSEOUT REQUIREMENTS

#### PART 1 - GENERAL

##### 1.01 DESCRIPTION OF WORK

- A. Definitions: “Closeout” is defined as a checklist of general requirements near the Contract deadline, in preparation for final acceptances, final payment, normal contract completion or occupancy by the Owner and similar actions evidencing completion of work.
- B. “Closeout” is directly related to “substantial completion” and may be a single time period or a succession of time periods for segments of the work which have been certified by the OWNER as substantially complete on varying dates.

##### 1.02 REQUIREMENTS FOR SUBSTANTIAL COMPLETION

- A. General: Prior to a request for Owner’s inspection for certification of substantial completion, complete the following list and include known exceptions in the request:
  - 1. Progress Payment Request: Show either 100% completion for work claimed, and value, or show incomplete items, value and reason for being incomplete.
  - 2. Include supporting documentation for completion as required by these Contract Documents.
  - 3. Advise Owner of impending insurance change-over requirements.
  - 4. Submit specific warranties, maintenance bonds and agreements, final certification and related documents.
  - 5. Deliver tools, spare parts, materials, O&M manuals, stocks and equipment to the Owner.
  - 6. Remove temporary facilities and utility services.
- B. Inspection Procedures: The Owner will proceed with Final Inspection upon receipt of Contractor’s request or notification of completion of above requirements. Following inspection, the Owner will either issue Certification of Substantial Completion or Punch List detailing work to be done prior to issuance of Certificate.

##### 1.03 REQUIREMENTS FOR FINAL ACCEPTANCE

- A. General: Prior to requesting the OWNER’S final inspection for Certification of Final Acceptance and final payment as defined by General Conditions, satisfy the following criteria and list exceptions:

1. Submit final payment request with final releases, invoices and supporting documentation. Include Certificates of Insurance for products and equipment, if required.
  2. Submit updated final statement, accounting for final changes to Contract sum.
  3. Submit final punch list with corrected items endorsed by Engineer.
  4. Submit Record Drawing(s).
  5. Submit, if applicable, final liquidated damages statement, endorsed by Owner.
  6. Revise and submit evidence of final continuing insurance coverage meeting insurance requirements (General Conditions, etc.).
- B. Reinspection Procedure: Upon Contractor's notice that punch list work toward Certificate of Final Acceptance has been completed, Engineer will observe the work. Engineer will either prepare Certificate of Final Acceptance or order re-working of punch list items found deficient or not fulfilled as required for final acceptance.

#### 1.04 RECORD DOCUMENTS SUBMITTALS

- A. General: See individual sections of these Specifications for specific requirements. Provide access to records for Owner's reference.
- B. Record Drawings: Maintain a field set of red-line Contract Drawings and Shop Drawings in clean, undamaged condition with mark-up of all items installed utilities depicting depth and asbuilt locations.
1. Organize Red-Line Asbuilt Drawings into a cohesive, bound set with suitable dates, titles and locations shown clearly on front sheet and submit to the Engineer at completion of utility installation.
- C. Record Specifications: Where required, maintain one copy of notated Specifications showing Addenda and Change Orders. Show substitutions, options selected and similar information on work that is concealed. Cross reference to other documents.
- D. Record Product Data: Maintain one copy of each product data submittal. If a change occurs from the original submittal, include both submittals for comparison. Pay particular attention to documenting concealed items, not readily identified at a later date.

PART 2 - PRODUCTS            NOT USED

END OF SECTION 01 70 00



SECTION 03 30 53

MISCELLANEOUS CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.01 DESCRIPTION OF WORK

Provide cast-in-place concrete work as depicted on the Drawings.

1.02 QUALITY ASSURANCE AND REFERENCES

- A. Codes and Standards: Comply with the provisions of the following codes and standards:

ACI 301 - "Specifications for Structural Concrete for Buildings"

ACI 318 - "Building Code Requirements for Reinforced Concrete"

ASTM C94 - "Specification for Ready-Mix Concrete"

CRSI - "Specifications for Placing Reinforcement"

NHDOT - "NHDOT Standards for Road and Bridge Construction"

- B. Testing and Services by Contractor: By an approved testing laboratory at the Contractor's expense:

1. Aggregate tests.
2. Concrete mix designs.
3. All tests not specifically indicated as the responsibility of the Owner, including retesting of rejected work or materials in-place.
4. Furnish equipment, buckets, shovels, wheelbarrows necessary for sampling of concrete mix, molds for compression test cylinders, curing and storing facilities, and labor to assist test technician. Testing shall be completed in accordance with 01 40 00.

- C. Materials in-place may require testing or retesting during the progress of the work. Allow free access to material stockpiles and facilities. Retesting of substandard work or materials is to be done by an approved independent laboratory at the Contractor's expense.

- D. Testing by Owner: An independent testing laboratory will conduct field test of concrete mix and materials. Tests for slump, air content, temperature and compression test cylinders will be paid for by the Owner.

- E. Tests for Small Placements: Placement of 15 cubic yards or less will require a digression from standard ASTM requirement of sampling the middle portion of a batch for testing. In order to prevent defective first portion of a defective batch from being placed, devise a first portion sampling and testing procedure acceptable

to the Engineer.

### 1.03 SUBMITTALS

- A. Mix Design and Laboratory Test Reports: Submit laboratory test reports for concrete materials and mix design test as specified.
- B. Product Data: Submit manufacturer's product data with application and installation instructions for proprietary materials including reinforcement, forming accessories, admixtures, patching compounds, curing compounds, waterstop, chairs, inserts, finish materials, and others as requested by the Engineer.
- C. Shop Drawings, Reinforcement: Submit shop drawings for fabrication, bending and placement of concrete reinforcement. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures", showing bar schedules, stirrup spacing's, diagramming of bent bars and arrangement of concrete reinforcement, including special reinforcement at structure openings.
- D. Samples: Submit samples of materials specified or as otherwise requested by the Engineer. Include product names, sources and descriptions.
- E. Material Certificates: Provide material certificates in lieu of laboratory test reports when permitted by the Engineer. Material certificates shall be signed by the manufacturer and Contractor, certifying that each material meets, or exceeds, specified requirements.

## PART 2 - PRODUCTS

### 2.01 FORM MATERIALS

- A. Forms for Exposed-Finish Concrete: Construct formwork in accordance with ACI 347 "Recommended Practice for Concrete Formwork". For exposed concrete surfaces with plywood, metal or other acceptable panel type form materials, provide continuous, straight, smooth surfaces. Minimize the number or conform to joint systems shown on the Drawings.
- B. Forms for Unexposed Finish Concrete: Form concrete surfaces which will not be exposed with plywood, lumber, metal or other acceptable material.
- C. Form Coatings: Provide commercially formulated form-coating compounds that will not bond with, stain or physically change concrete surfaces, nor impair subsequent concrete surface treatments.
- D. Form Ties: Removable or Snap-off type, galvanized metal, fixed or adjustable length, with waterproofing washer, free of defects capable of leaving holes larger than 1 inch.
- E. Spreaders: Standard, non-corrosive metal form clamp assembly, of type acting as spreaders and leaving no metal within 1 inch of concrete face. Wire ties, wood spreaders or through bolts are not permitted.

F. Form Anchors and Hangers:

1. Do not use anchors and hangers leaving exposed metal at concrete surface.
2. Symmetrically arrange hangers supporting forms from structural steel members to minimize twisting or rotation of member. Penetration of structural steel members is not permitted.

G. Form Release Agent: Colorless mineral oil which will not stain concrete, or absorb moisture, or impair natural bonding or color characteristics of coating intended for use on concrete. Accepted products include:

1. "Arcal-80"; Arcal Chemical Corporation.
2. "Synthex"; Industrial Synthetics Company.
3. "Nox-Crete Form Coating"; Nox-Crete Company.
4. Substitutions; Section 01600 - Product Requirements.

H. Corners: Fillet or Chamfer, rigid plastic or wood strip.

I. Bituminous Joint Filler: ASTM D 1751.

J. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Size, strength, and character to maintain formwork in place while placing concrete.

K. Waterstops: Polyvinyl chloride, as shown on the plans or NHDOT Standard Specifications.

2.02 REINFORCING MATERIALS

A. All concrete reinforcement materials shall be new, free from rust.

B. Welded Wire Fabric: ANSI/ASTM A185 and AASHTO M55, welded steel wire fabric in the sizes and gages shown on the Drawings.

C. Bar Reinforcement: ASTM A615 and AASHTO M31, Grade 60, new deformed billet steel bars in the sizes shown on the Drawings.

D. Fiber Reinforcement: The fibers shall be discontinuous discrete fibers made from plastic, glass, and other acceptable materials. Material and applications shall conform to ACI 544.1R.

E. Supports: Provide supports for reinforcement including bolsters, chairs, spacers, and other required devices for spacing, supporting, or fastening wire fabric in place.

F. All other materials not specifically described but required for a complete and proper installation of concrete reinforcement shall be as selected by the Contractor subject to the approval of the Engineer.

2.03 CONCRETE MATERIALS

A. Portland Cement: ANSI/ASTM C150, AASHTO M85, Type II, unless directed otherwise by the Engineer. Use a single cement manufacturer and type throughout

the Project, unless otherwise permitted by the Engineer.

- B. Normal Weight Aggregates: ANSI/ASTM C33 and as specified herein. Provide aggregates from a single source for exposed concrete.
1. Local aggregates not complying with ASTM C33 but which have shown by test and historical use to produce concrete of adequate strength and durability may be used when acceptable to the Engineer.
- C. Water: Potable.
- D. Air-Entraining Admixture: ANSI/ASTM C260.
- E. Water-Reducing Admixture: ANSI/ASTM C494, Type A with not more than one percent chloride ions.
- F. High-Range Water-Reducing (HRWR) Agent (Super-Plasticizer): ASTM C494 Type F or G with not more than one percent chloride ions.
- G. Calcium Chloride: Not permitted.
- H. General Concrete Joint Filler: Where used with caulking or sealants, the joint filler shall be non-extruding, self-expanding filler strips conforming to ASTM D1752, Type III, and ASHTO M153, Type III, as manufactured by Celotex Corporation, W.R. Meadows, Inc., W.R. Grace and Company, or equal approved by the Owner. Where no sealant or caulking is required, strips may be non-extruding bituminous type in accordance with ASTM D1751.

## 2.04 PROPORTIONING AND DESIGN OF MIXES

- A. Design concrete mixes to provide normal weight concrete with the following properties:
1. Headwalls:
- |                                      |                                  |
|--------------------------------------|----------------------------------|
| Minimum 28 day compressive strength: | 4000 psi                         |
| Maximum water/cement ratio:          | 0.40                             |
| Minimum cement content:              | 660 lbs./cubic yard              |
| Slump: General use concrete:         | 2 inch minimum<br>4 inch maximum |
| Foundations/slabs:                   | 1 inch minimum<br>3 inch maximum |
| Concrete<br>w/HRWR admixture:        | 8 inch maximum                   |
| Maximum coarse aggregate size:       | $\frac{3}{4}$ inch               |
| Air content:                         | 6% plus or minus 1% by volume.   |

2. Concrete Fill and Other Concrete:

Minimum 28 day compressive strength:	3000 psi
Maximum water/cement ratio:	0.49
Minimum cement content:	564 lbs./cubic yard
Slump: General use concrete:	1 inch minimum 4 inch maximum
Concrete w/HRWR admixture:	8 inch maximum
Maximum coarse aggregate size:	¾ inch
Air content:	5.0% plus or minus 1% by volume.

- B. Adjustment to Concrete Mixes: Mix design adjustments may be requested by the Contractor when material characteristics, job requirements, weather, test results or other circumstances dictate; adjustments submitted and accepted by the Owner shall be accomplished at no additional cost to the Owner. Laboratory test results of adjusted mixes must be submitted to, and accepted by, the Owner before use in the Work.

2.05 CONCRETE MIXES

- A. Ready-mixed concrete: Truck-mixed concrete shall be batched, mixed and transported in accordance with ASTM C94.
- B. Truck mixes shall be capable of combining the ingredients into a thoroughly mixed, uniform mass within industry-specified times or revolutions per load. Concrete shall be centrally dry-batched with final truck mixing at the job site. Provide batch ticket with each batch discharged and accepted in the work. Indicate project name; job number; date; mix type and volume of water introduced. Batches not placed within one hour of batching time shall be rejected for placement.
- C. Job-site mixing: Mix materials for concrete in an appropriate drum-type batch machine mixer. Minimum mixing times for 1 cubic yard, or smaller shall be 1½ minutes after initial mixing has become homogenous. For mixers of capacity greater than 1 cubic yard increase mixing beyond homogeneity by 15 seconds per fraction over 1 cubic yard.

PART 3 - EXECUTION

3.01 FORMS

- A. Design and fabricate formwork to withstand the weight of concrete during preliminary curing period.
- B. Tolerances for Formed Surfaces: Maintain formwork tolerances as required by ACI 347, Recommended Practice for Concrete Formwork.

- C. Place formwork for thrust blocks to assure the proper surface bearing for the soil encountered. Refer to the "Thrust Block Bearing Area" schedule shown on the Drawings.
- D. Earth forms are not permitted.
- E. General:
  - 1. Provide top form for sloped surfaces steeper than 1.5 horizontal to 1 vertical to hold shape of concrete during placement, unless it can be demonstrated that top forms can be omitted.
  - 2. Construct forms to correct shape and dimensions, mortar-tight, braced, and of sufficient strength to maintain shape and position under imposed loads from construction operations.
  - 3. Camber forms where necessary to produce level finished soffits unless otherwise shown on Drawings.
  - 4. Carefully verify horizontal and vertical positions of forms. Correct misaligned or misplaced forms before placing concrete.
  - 5. Complete wedging and bracing before placing concrete.
- F. Forms for "Smooth Finish" Concrete:
  - 1. Use steel, plywood or lined board forms.
  - 2. Use clean and smooth plywood and form liners, uniform in size, and free from surface and edge damage capable of affecting resulting concrete finish.
  - 3. Install form lining with close-fitting square joints between separate sheets without springing into place.
  - 4. Use full size sheets of form lines and plywood wherever possible.
  - 5. Tape joints to prevent protrusions in concrete.
  - 6. Use care in forming and stripping wood forms to protect corners and edges.
  - 7. Level and continue horizontal joints.
  - 8. Keep wood forms wet until stripped.
- G. Forms for Surfaces to Receive Membrane Waterproofing: Use plywood or steel forms. After erection of forms, tape form joints to prevent protrusions in concrete.
- H. Erect formwork, shoring, and bracing to achieve design requirements.
- I. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.
- J. Obtain Contractor's/Engineer's approval before framing openings in structural members that are not indicated on Drawings.
- K. Install fillet and chamfer strips on external corners of all exposed concrete components.
- L. Install void forms in accordance with manufacturer's recommendations.
- M. Do not reuse wood formwork more than three times for concrete surfaces to be exposed to view. Do not patch formwork.

N. Application of Form Release Agent:

- a. Apply form release agent on formwork in accordance with manufacturer's recommendations.
2. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.
3. Do not apply form release agent where concrete surfaces are indicated to receive special finishes or applied coverings that are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.
4. Reuse and Coating of Forms: Thoroughly clean forms and reapply form coating before each reuse. For exposed work, do not reuse forms with damaged faces or edges. Apply form coating to forms in accordance with manufacturer's specifications. Do not coat forms for concrete indicated to receive "scored finish." Apply form coatings before placing reinforcing steel.

O. Inserts, Embedded Parts, and Openings:

1. Provide formed openings where required for items to be embedded in passing through concrete work.
2. Locate and set in place items required to be cast directly into concrete.
3. Coordinate with Work of other sections in forming and placing openings, slots, recesses, sleeves, bolts, anchors, other inserts, and components of other Work.
4. Install waterstops continuous without displacing reinforcement.
5. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.
6. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.
7. Form Ties:
  - a. Use sufficient strength and sufficient quantity to prevent spreading of forms.
  - b. Place ties at least one inch away from finished surface of concrete.
  - c. Leave inner rods in concrete when forms are stripped.
  - d. Space form ties equidistant, symmetrical and aligned vertically and horizontally unless otherwise shown on Drawings.
8. Arrange formwork to allow proper erection sequence and to permit form removal without damage to concrete.
9. Construction Joints:
  - a. Install surfaced pouring strip where construction joints intersect exposed surfaces to provide straight line at joints.
  - b. Just prior to subsequent concrete placement, remove strip and tighten forms to conceal shrinkage.
  - c. Show no overlapping of construction joints. Construct joints to present same appearance as butted plywood joints.
  - d. Arrange joints in continuous line straight, true and sharp.
10. Embedded Items:
  - a. Make provisions for pipes, sleeves, anchors, inserts, reglets, anchor

- slots, nailers, waterstops, and other features.
  - b. Do not embed wood or uncoated aluminum in concrete.
  - c. Obtain installation and setting information for embedded items furnished under other Specification sections, or as directed.
  - d. Securely anchor embedded items in correct location and alignment prior to placing concrete.
  - e. Verify conduits and pipes, including those made of coated aluminum, meet requirements of ACI 318.
  - f. Install accessories straight, level, and plumb. Ensure items are not disturbed during concrete placement.
11. Openings for Items Passing Through Concrete:
- a. Frame openings in concrete where shown on Drawings. Establish exact locations, sizes, and other conditions required for openings and attachment of work specified under other sections.
  - b. Coordinate work to avoid cutting and patching of concrete after placement.
  - c. Perform cutting and repairing of concrete required as result of failure to provide required openings. Use a core drilling process or sawing process which produces clean, sharp edges and the minimum hole size which accommodates the piping, conduit, or equipment requiring the opening. Locations of holes and payment for this work will be by other trades and must be approved by the Engineer.
12. Screeds:
- a. Set screeds and establish levels for tops of concrete slabs and levels for finish on slabs.
  - b. Slope slabs to drain where required or as shown on Drawings.
  - c. Before depositing concrete, remove debris from space to be occupied by concrete and thoroughly wet forms. Remove freestanding water.
13. Screed Supports:
- a. For concrete over waterproof membranes and vapor barrier membranes, use cradle, pad or base type screed supports which will not puncture membrane.
  - b. Staking through membrane is not permitted.
14. Cleanouts and Access Panels:
- a. Provide removable cleanout sections or access panels at bottoms of forms to permit inspection and effective cleaning of loose dirt, debris and waste material.
  - b. Clean forms and surfaces against which concrete is to be placed. Remove chips, saw dust, and other debris. Thoroughly blow out forms with compressed air just before concrete is placed.

P. Form Cleaning:

- 1. Clean forms as erection proceeds, to remove foreign matter within forms.
- 2. Clean formed cavities of debris prior to placing concrete.
- 3. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean-out ports.
- 4. During cold weather, remove ice and snow from within forms. Do not use



de-icing salts. Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure. Use compressed air or other means to remove foreign matter.

Q. Form Removal:

- a. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads and removal has been approved by Engineer. Apply curing compound immediately after removing forms.
- b. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.
- c. Store removed forms in a manner such that surfaces to be in contact with fresh concrete will not be damaged. Discard damaged forms.
- d. Leave forms in place for minimum number of days as specified in ACI 347 or minimum of 7 days if no curing is to be done.

3.02 PLACING REINFORCEMENT

- A. Comply with CRSI recommended practice for placing reinforcing steel, supports, and details.
- B. Clean reinforcement of loose rust, mill scale, earth, ice, and any other materials which effect the bond with concrete.
- C. Accurately position, support or secure reinforcing steel against displacement by formwork, construction procedures or concrete placement operations. Secure reinforcement with appropriate ties, metal chairs, bolsters, hangers, or spacers as required.
- D. Position reinforcement to obtain required coverages. Set wire ties with ends directed inward away from exterior concrete surfaces.
- E. Install welded wire fabric in lengths as long as practicable and lap adjoining pieces a minimum of two full meshes. Lace splices with wire. Support welded wire fabric on 1½ inch with cement brick. Offset end laps in adjacent widths to prevent continuous laps in any direction.
- F. Fiber reinforcement shall be furnished in conjunction with of welded wire fabric for sidewalks and other applications approved by the Owner. The fiber reinforcement per volume of concrete shall be 1.5 pounds per cubic yard.
- G. Bending:
  1. Fabricate all reinforcement in strict accordance with the approved Shop Drawings.
  2. Do not use bars with kinks or bends not shown on the Drawings or on the approved Shop Drawings.
  3. Do not bend or straighten steel in a manner that will injure the material.
- H. Placing: No concrete shall be placed before the placing and tying of reinforcement

has been inspected and approved by the Engineer. Contractor shall notify the Engineer not less than 48 hours prior to placing of concrete.

I. Splicing:

1. Horizontal Bars:

- a. Place bars in horizontal members with minimum laps at splices sufficient to develop the strength of the bars.
- b. Lapped ends of bars may be placed in contact and securely wired or may be separated sufficiently to permit the embedment of the entire surface of each bar in concrete.
- c. Wherever possible, stagger the splices of adjacent bars.
- d. Splice 40 bar diameters minimum.

2. Wire Fabric: Make all splices in wire fabric at least two squares.

3. Other Splices: Make only those other splices that are indicated on the approved Shop Drawings or specifically approved by the Engineer.

4. Dowels: Place all required steel dowels and securely anchor them into position before the concrete is placed.

5. Obstructions: In the event conduits, piping, inserts, sleeves, or any other items interfere with placing reinforcement as indicated on the Drawings or as otherwise required, immediately consult the Engineer and obtain approval of new procedure before placing concrete.

3.03 CONCRETE PLACEMENT

- A. Consolidate concrete by rodding, spading, and vibrating to prevent voids forming between concrete and undisturbed soils or fitting.
- B. Wrap fitting glands and bolts with roofing paper or polyfilm to prevent concrete from adhering.

3.04 CONCRETE CURING AND PROTECTION

- A. Comply with ACI 308. Protect freshly placed concrete from excessive cold or hot temperatures.
- B. Provide curing of thrust block concrete by prompt backfill after initial curing period or as directed by the Owner.
- C. Protect from destruction by vehicle and pedestrian traffic or vandals until concrete has set-up.

3.05 DEFECTIVE WORK AND REMEDIES

- A. Deficient work shall be removed and replaced at the Contractor's expense.

END OF SECTION 03 30 53

SECTION 03 60 00

PRESSURE GROUTING

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

- A. Attention is directed to the CONTRACT and CONTRACT DRAWINGS.
- B. Related Sections:
  - 31 23 00 Excavation and Fill
  - 33 01 00.10 Existing Utilities and Underground Structures
  - 33 41 00 Storm Utility Drainage Piping
  - 33 44 00 Storm Utility Water Drains

1.02 DESCRIPTION OF WORK

- A. Work Included: Provide labor, materials and equipment necessary to complete the work of this section, including but not limited to the following:
  - 1. Design, furnish, and inject grout into existing pipe sections and manholes shown on the Drawings in order to fill existing pipes and structures with a mixture that will form a hard insoluble mass to prevent future collapse.

1.03 MEASUREMENT AND BASIS OF PAYMENT

- A. Payment for Section 03 60 00 Pressure Grouting shall be made on a lump sum basis in accordance with Section 01 15 00. The price will be full compensation for the removal of any existing material within the pipe, cleaning, grouting, plugging, capping, and abandoning all pipe and of disposal of all materials following completion of the work.

1.04 REFERENCES

- A. The following additional reference materials may be provided for the Contractor's review:
  - 1. Report titled "Report of Project Results: Town of Hanover Pre Measure Inspections, *Sanitary Sewer Rehabilitation Project*" prepared by Green Mountain Pipeline Services (GMPS) and dated October, 2017.
  - 2. Complete digital video pipe inspection files (3) prepared by GMPS.
  - 3. "Report – Exploration and Geotechnical Engineering Services – Storm Drain Pipe Collapse at Athletic Field – Hanover High School", by S.W. Cole Engineering, Inc. Dated February 8, 2018.

1.05 QUALIFICATIONS

- A. Grouting contractor and field supervisor shall have a minimum of 3 years recent experience in grouting for trenchless or tunnel pipeline installation on at least 5 similar projects.

The grouting engineer shall be a Professional Engineer registered in the State of New Hampshire. Experience shall include five projects within the last five years performing similar pressure grouting calculations.

1.06 QUALITY ASSURANCE

- A. Inspect all materials upon receipt. Remove damaged or unusable material from site.
- B. All work must be completed in accordance with the applicable Federal, State, and local standards.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Schedule delivery to coincide with related work.
- B. Store equipment in dry enclosed area, off the ground.

1.08 SUBMITTALS

- A. Not less than two (2) weeks prior to beginning the grouting operation, the Contractor shall submit the following for review:
  - 1. A complete description of projects for which similar work was performed by the Contractor. This list is to include project locations, dates of projects, owner, owner's construction representative, owner's construction representative's current phone number, type of equipment utilized, type and size of pipe, contract or subcontract amount, description of all litigation and/or unresolved claims in connection with these projects, and any other information relevant to the issue of the successful completion of the projects. Include projects where the grouting contractor was prime contractor or subcontractor.
  - 2. Resumes of proposed project supervisor(s) and engineer that demonstrate the minimum qualifications and experience described above.
  - 3. Working plans and method statements, which shall include the following:
    - a. Means and methods for proportioning, mixing, batching, measuring volume of, and delivering grout, including the storage of raw materials;
    - b. Descriptions of labor, equipment, and supplies required to perform the work;
    - c. Details for transporting grout to placement areas, and, if batched on site, layout of surface facilities for storing materials and batching;
    - d. Details of pumping pressures and rates, placement sequences and volumes, and lift thicknesses (if used), including the theoretical quantity for each placement;
    - e. Provide calculations for each lift planned to place backfill showing maximum safe backfilling pressure for bulkheads. Calculations shall be stamped by a qualified Professional Engineer registered in the State of New Hampshire;
    - f. Methods for controlling heat of hydration temperature increases;
    - g. Detail drawings of proposed bulkheads and vents, caps and/or plugs; and
    - h. Procedure for disposing of unused grout and flushing lines.

4. Grout mix design meeting the requirements specified herein. The submittal shall include:
  - a. Type, brand, source, and amounts of cement, Pozzolans, and admixtures;
  - b. Source and amount of water;
  - c. Representative samples of materials for materials testing and mix proportion testing;
  - d. Combined grading of each mix design;
  - e. Specific gravity of all materials;
  - f. Results of laboratory tests including unit weight, compressive strength, and initial set time;
  - g. Material specifications and instructions for use of admixtures; and
  - h. All material certifications of compliance. Submit mill test reports for cement.
5. Detailed drawing of one-way injection valve, if used.
6. Certificate, dated within the last six (6) months, from an independent laboratory that the pressure calibration gauge is accurate to 1 psi. In addition, the Contractor shall submit daily logs listing placement number, volume pumped and rate, maximum pressure, grout mix, and crew for following workday by 10:00 am. The Contractor shall notify the Engineer at least 24 hours in advance of starting the grouting work.
7. Contractor's Health and Safety Plan (HASP), including confined space entry guidelines in accordance with OSHA requirements.

## PART 2 - DESIGN CRITERIA

### 2.01 GROUT

- A. Grout mix (water-cement) ratios shall be expressed in cubic feet of water per cubic foot of cement (94 pound bag). The water-cement ratio by volume shall be varied as needed to completely fill the pipe to be grouted. The range of water-cement ratios shall be between 1:1 and 2:1 by volume.
- B. Grout shall consist of Portland cement, not more than 2 percent bentonite by weight of cement, fluidizer as necessary, and water in the proportions specified herein or acceptable to the Engineer. Sand may be added to the grout mix in instances of very high grout takes as approved by the Engineer, but in no case shall the grout mix contain less than six sacks of cement per cubic yard of grout. The addition of sand may require the addition of water or fluidizer to the grout mix.
- C. Grout shall have a minimum unconfined compressive strength (UCS) of 100 pounds per square inch (psi) in 24 hours, and 500 psi in 28 days.
- D. Fluidizers shall hold the solid constituents of the grout in a colloidal suspension and possess such characteristics that will inhibit early stiffening of the pumpable grout, be compatible with the cement and water used in the grouting work, contain an expansive shrinkage compensator, and comply with the requirements of ASTM C937.

## PART 3 - EQUIPMENT

### 3.01 GENERAL

- A. The grouting equipment shall be provided with a flow meter to measure the volume of grout injected. The meter shall be calibrated in cubic feet to the nearest 0.1 cubic foot.
- B. Grouting hoses shall be capable of withstanding the maximum water and grout pressures to be used.
- C. The injection system should be equipped with a recirculation hose. The grout pump shall be of sufficient size and power to maintain a constant grout pressure at variable delivery volumes.
- D. Grout injection valves shall be one-way valves.

## PART 4 - EXECUTION

### 4.01 GENERAL

- A. Inject grout through the grout injection valves in such a manner as to completely fill the pipe. The Contractor shall change to a different approved grout mix as needed to completely fill the pipe. The pipe shall be considered completely filled when grout emerges from upstream bulkhead vents.
- B. Volume of Grout measured shall be within +/- 10% of the theoretical calculated volume of grout needed to fill pipes.
- C. Grout pressure shall be sufficient to overcome friction and controlled so as to avoid movement of the surrounding ground or existing utilities or other site features.
- D. Any free-standing water or other deleterious material shall be removed from the pipe prior to grouting.
- E. Monitor effluent from existing pipe for grout migration into surface waters. Contain and dispose of grout contaminated surface waters and dispose in an approved manner.
- F. Coordinate with earthwork Contractor on-site as necessary to facilitate the grouting operation, ensure that pipes that are to remain in service are sufficiently protected from the grouting operation, and sequence earthwork construction as required for completion of the work.
- G. Bulkheads should be erected vertically to the full height of the pipe and installed such that tight contact is made between the bulkhead and the existing pipe. An opening in the crown shall be included on bulkheads for venting. Bulkheads shall be constructed such that they are permanent and shall be constructed of concrete, masonry, or other material approved by the Engineer.

4.02 FIELD QUALITY CONTROL

- A. Measure and record the volume of grout placed. Compare actual volume placed for each length of pipe being grouted with the theoretical volume for that length of pipe.
- B. Prepare and test grout samples for 24-hour and 28-day compressive strength test according to ASTM D4832. Grout for the cylinders or cubes shall be taken from the nozzle of the grout injection line. Provide at least one set of four (4) samples for each 100 cubic yards of grout injected, but not less than one set per day.
- C. Measure compressive strength of grout in accordance with ASTM D4832. If a test cylinder does not meet one or more of the compressive strength requirements specified herein, the Engineer may require additional testing, or removal and replacement with new grout at no additional cost to the Owner.
- D. One pressure gauge shall be provided at the grout pump and one pressure gauge shall be provided at the grout injection point. The accuracy of the gauges shall be checked daily with an accurately calibrated pressure gauge.

END OF SECTION 03 60 00





SECTION 31 23 00  
EXCAVATION AND FILL

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

- A. Attention is directed to the CONTRACT and GENERAL CONDITIONS and all sections within DIVISION 01 – GENERAL REQUIREMENTS which are hereby made a part of this Section of the specifications.

1.02 DESCRIPTION OF WORK

- A. Work Included: Provide labor, materials and equipment necessary to complete the work of this section, including but not limited to the following.
  - 1. Clearing, grubbing, and stripping of Work areas as shown or noted on the Drawings.
  - 2. Excavating, stockpiling, and handling of common fill materials.
  - 3. Disposal and handling of unsuitable materials.
  - 4. Placing, shaping, and compacting of fill areas.
  - 5. Grading and fine grading of subbase.
  - 6. Placement, fine grading, and compacting of crushed gravel surface, slopes, and shoulders in roadways and parking areas.
  - 7. Excavating, shaping and compacting of drainage ditches.

1.03 QUALITY ASSURANCE

- A. Compaction testing shall be conducted as indicated required by the contract. Aggregate gradation analyses shall be paid for by the Owner. Moisture maximum density tests and compaction test fees shall be paid by the Owner. Retesting for any failed tests shall be paid by the Contractor.
- B. Surfaces under paved areas shall be shaped to grade, line and cross-section within ½-inch positive or negative tolerance relative to subgrade elevations.
- C. Source Quality Control: Where materials are specified by reference to a specific standard, test and analyze samples for compliance before delivery to the site. If tests indicate materials do not meet specified requirements, change material and retest.

1.04 REFERENCE STANDARDS

- A. Reference Standard shall be the New Hampshire Department of Transportation, Standard Specifications for Road and Bridge Construction, hereinafter called NHDOT Standard Specifications.
- B. AASHTO T 180 - Standard Specification for Moisture - Density Relations of Soils Using a 10-lb Rammer and a 18 in. Drop; American Association of State Highway and Transportation Officials; 2001 (2004).
- C. ASTM C 136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates; 2005.
- D. ASTM D 698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft<sup>3</sup>); 2000a.

- E. ASTM D 2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth); 2004.
- F. ASTM D 3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth); 2004.
- G. ASTM D 4318 - Standard Test Methods for Liquid Limit; Plastic Limit; and Plasticity Index of Soils; 2000.

#### 1.05 SUBMITTALS

- A. Submittals shall be provided to the Engineer for approval prior to delivering materials to the site.
- B. Test reports of results of material gradations.
- C. Compaction test reports.

#### 1.06 JOB CONDITIONS

- A. Site information data on subsurface conditions are not intended as representations or warranties of accuracy or continuity between borings or test pits. It is expressly understood that the Owner will not be responsible for interpretations or conclusions drawn there from by the Contractor. Additional test borings or test pits may be made by the Contractor with prior approval of the Engineer. Payment for exploratory excavations approved by the Engineer shall be paid for under the contract unit price.
- B. Exploratory test pits shall be excavated where shown on the Drawings or as directed by the Engineer. Comply with the requirements for backfilling and compacting under this Section.
- C. Dust control shall be practiced in work areas and adjacent off-site stockpile areas. Dust shall be controlled by water or calcium chloride.
- D. Traffic control shall be maintained by the use of approved barricades, lights and signs to protect life and property until work areas are filled and graded to a condition acceptable, to the Engineer, for traffic.
- E. Provide sufficient quantities of fill to meet the project schedule and requirements. When necessary, store materials on site in advance of need.
- F. When fill materials need to be stored on site, locate stockpiles where indicated.
  - 1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
  - 2. Prevent contamination.
  - 3. Protect stockpiles from erosion and deterioration of materials.
- G. Verify that survey benchmarks and intended elevations for the work are as indicated.

### PART 2 - MATERIALS

#### 2.01 DEFINITIONS

- A. Common Excavation or Fill shall consist of all excavation other than rock excavation, which is not specifically classified. Common Fill shall be free of trees, roots, frozen matter or rubble where the greatest stone size does not exceed six

inches (6") in greatest dimension. It shall be capable of being readily spread and compacted.

- B. Subgrade soils made unstable by error or negligence of the Contractor shall be removed and replaced by Select Backfill at the Contractor's expense.
- C. Unsuitable Material shall consist of deposits of saturated or unsaturated mixtures of soils and organic matter not suitable for foundation material regardless of moisture content. Unsuitable material shall also consist of any material containing excessive plastic silt, vegetation, debris, pavement, stones, or boulders over six inches (6") in greatest dimension, which, in the opinion of the Engineer, will not provide a suitable foundation or subgrade.
- D. Base course materials shall consist of hard, durable particles or fragments of stone or gravel. Materials that break up when alternately frozen and thawed or wetted and dried shall not be used for aggregate base course materials. Fine particles shall consist of natural or processed sand. The materials shall be free of harmful amounts of organic material. Unless otherwise specified, the percent wear of base course material shall not exceed 50 percent as determined by AASHTO T 96, Grading A.
- E. Crushed stone shall be processed material obtained from a source that has been stripped of all overburden. The processed material shall consist of clean, durable fragments of ledge rock of uniform quality and reasonably free of thin or elongated pieces. Acceptable sand may be blended as necessary to obtain the proper gradation for the fine aggregate portion.
- F. Gravel (NHDOT Item 304.2): The maximum size of stone particles shall not exceed three-fourths of the compacted thickness of the layer being placed but in no case larger than 6 inches. Gravel is characterized as hard, durable stone with coarse to fine sand. Sieve analysis by weight as follows:
- | <u>Sieve Size</u> | <u>% Passing by Weight</u> |
|-------------------|----------------------------|
| 6"                | 100%                       |
| No. 4             | 25-70%                     |
| *No. 200          | 0-12%                      |
- \*(Based on the fraction passing No. 4)
- G. Sand (NHDOT Item 304.1): The maximum size of any stone or fragment shall not exceed three-fourths of the compacted depth of the layer being placed but in no case larger than 6 inches. Sand shall consist of clean, sharp mineral particles free of organic matter. Sieve analysis by weight as follows:
- | <u>Sieve Size</u> | <u>% Passing by Weight</u> |
|-------------------|----------------------------|
| 6"                | 100%                       |
| No. 4             | 70-100%                    |
| *No. 200          | 0-12%                      |
- \*(Based on the fraction passing No. 4)
- H. Crushed Gravel (NHDOT Item 304.3): At least 50 percent of the material retained on the 1 inch sieve shall have a fractured face. Sieve analysis by weight as follows:
- | <u>Sieve Size</u> | <u>% Passing by Weight</u> |
|-------------------|----------------------------|
| 3"                | 100%                       |
| 2"                | 95-100%                    |

1"	55-85%
No. 4	27-52%
*No. 200	0-12%
*(Based on fraction passing No. 4)	

- I. Crushed Aggregate for Shoulders (NHDOT Item 304.33): Sieve analysis by weight as follows:

<u>Sieve Size</u>	<u>% Passing by Weight</u>
1 1/2"	100%
1"	90-100%
No. 4	30-65%
*No. 200	0-10%
*(Based on fraction passing No. 4)	

- J. Coarse Crushed Stone (NHDOT Item 304.5) and Fine Crushed Stone (NHDOT Item 304.4): Shall be clean angular rock fragments obtained by breaking and crushing rock material. Sieve analysis by weight as follows:

<u>Sieve Size</u>	<u>% Passing by Weight</u>	
	<u>Fine Stone (304.4)</u>	<u>Coarse Stone (304.5)</u>
3 1/2"	--	100%
3"	--	85-100%
2"	100%	--
1 1/2"	85-100%	60-90%
1"	--	--
3/4"	45-75%	40-70%
#4	10-45%	15-40%
#200	0-5%	0-5%

- K. Pea Stone: Shall be naturally round aggregate, 1/4" nominal size. Sieve analysis by weight:

<u>Sieve Size</u>	<u>% Passing by Weight</u>
1/2"	100%
3/8"	90-100%
No. 4	20-55%
No. 8	5-30%
No. 16	0-10%
No. 50	0-5%

- L. All material not herein specified, but necessary for completion of the Work shall conform to the requirements of the NHDOT Standards and Specifications for Roadway and Bridge Construction.
- M. Refill material for excavation below grade in ledge shall be crushed gravel or as shown on the Drawings or approved by the Engineer. For refill of unsuitable material removed at the direction of the Engineer, Common, or Select Backfill shall be used as directed by the Engineer.
- N. Select Backfill, where required, shall be crushed gravel as specified above, unless directed otherwise by the Engineer.

## PART 3 - EXECUTION

### 3.01 EXCAVATION

- A. Common excavation to subgrade shall be done so that the subgrade material does not become saturated with water or contaminated with organic matter to a degree that subgrade is unstable.
- B. Subgrade surfaces shall be dry and firm before placing granular surface materials. Subgrade material disturbed during excavation shall be thoroughly compacted in accordance with section 31 23 23.23.

### 3.02 FILL

- A. Scarify subgrade surface to a depth of 6 inches to identify soft spots.
- B. Fill to contours and elevations indicated using unfrozen materials.
- C. Fill up to subgrade elevations unless otherwise indicated.
- D. Employ a placement method that does not disturb or damage other work.
- E. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet frozen, or spongy subgrade surfaces.
- F. Maintain optimum moisture content in fill materials to attain required compaction density.
- G. Correct areas that are over-excavated; use common fill, flush to required elevation, compacted to minimum 95 percent of maximum dry density.
- H. Compaction density unless otherwise specified or indicated.
- I. Reshape and re-compact fills subjected to vehicular traffic.

### 3.03 PLACING EMBANKMENTS

- A. Fill material shall be placed as specified by the NHDOT Standard Specifications. Lifts shall be thoroughly compacted to the required density prior to placing the next lift. Continuous grading and shaping shall be done simultaneously with compaction procedures to ensure uniform density throughout fill areas.
- B. Embankments shall be graded to ensure run-off of water. Areas saturated by water shall be corrected as indicated in 3.01B.
- C. No embankments shall be constructed on frozen earth materials. Fill materials shall be free of ice and frozen particles. When fill is free of frost and subgrade is frozen, the frozen layer may be removed prior to placement of the suitable layer.
- D. Sustained freezing temperatures shall result in the suspension of all embankment work, unless directed otherwise by the Engineer.

3.04 FINE GRADING

- A. Fine grading shall consist of the final grading required to level the subgrade, base and surface course to limits within the specified tolerances indicated in paragraph 1.02B.
- B. Gravel base courses shall be placed in 8 inch maximum lifts and thoroughly compacted as required prior to successive lifts. Care shall be taken to prevent separation of granular materials during placement. Segregated materials shall be removed and replaced using methods calculated to reduce the separation of aggregates.

3.05 DISPOSAL OF EXCESS MATERIAL

- A. Disposal of surplus materials shall be at the express direction of the Engineer. Surplus excavated materials shall be stockpiled at an approved location.
  - 1. Unsuitable excavated materials such as boulders, rock, muck, and fill contaminated with stumps, roots, and organic debris shall be disposed of at the direction of the Engineer.
  - 2. Disposal, stockpiling, and re-use of excavated material shall be considered a cost incidental to Common Excavation.

END OF SECTION 312300

SECTION 31 23 16.13

TRENCHING

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

- A. Attention is directed to the CONTRACT and GENERAL CONDITIONS and all sections within DIVISION 01 – GENERAL REQUIREMENTS which are hereby made a part of this Section of the specifications.

1.02 DESCRIPTION OF WORK

- A. Work Included: Provide labor, materials and equipment necessary to complete the work of this section, including but not limited to the following.
1. Work covered by this Section includes excavating, trenching and backfilling for the installation of underground lines, piping, structures and foundations as related to the site work.

B. Definitions:

1. Trench Common Excavation or Fill: Consists of all excavation other than rock excavation that is not specifically classified. Common Fill shall be free of trees, roots, frozen matter, or rubble where the greatest stone size does not exceed six inches (6") in greatest dimension. It shall be capable of being readily spread and compacted.
2. Crushed Stone: Approved, imported aggregate, ASTM C33, Size 67 (¾" A No. 4).

<u>Gradation:</u>	<u>% Passing by Weight</u>
1" Sieve	100%
¾" Sieve	90 - 100%
⅜" Sieve	20 - 55%
No. 4 Sieve	0 - 18%
No. 8 Sieve	0 - 5%

3. Select Fill: Consists of imported sand or other granular materials as approved by Engineer.
4. Sand Bedding and Blanket: Sand conforming to ASTM C33, fine aggregate. Material shall be obtained from approved sources, and shall consist of satisfactorily graded, free draining material. Reasonably free from Loam, Silt, Clay, and Organic Material.

<u>Gradation:</u>	<u>% Passing by Weight</u>
No. 4 Sieve	100%
*No. 200 Sieve	0 - 12%
*(Based on Fraction Passing No. 4)	

5. Earth Overburden: Earth overlying solid rock and in place during blasting operations or earth not classified as Common Earth.

6. Unstable Material: Debris, frozen materials, topsoil, quicksand, and all wet, soft, or loose material which does not provide sufficient bearing capacity to satisfactorily support pipes or other work.
7. Unsuitable Material: Excavated material which does not meet requirements for backfilling purposes and includes solid and loose rock, earth overburden, and unstable material.
8. Topsoil: Surface layer of soil and sod suitable for use in seeding and planting and not containing debris, subsoil, stumps, roots, brush, stones, clay lumps, and similar objects greater than 2" in largest dimension and material toxic to plant growth.
9. Paved Areas: The area which lies directly under a paved surface whether it be asphalt, concrete, or other paving material.
10. Class "A" and Class "B" Stone Fill: Refer to Section 31 23 23.53 Stone Fill.
11. Definitions not found herein may be found in Section 31 23 00 Excavation and Fill.

#### 1.03 QUALITY ASSURANCE

- A. All fill material shall be subject to the approval of the Engineer.
- B. If trench widths are exceeded, redesign with stronger pipe, concrete cradles or other special installation procedures may be required. All additional costs, including the cost of redesigns, shall be borne by Contractor.
- C. Moisten or dry backfill to the proper moisture content as determined in accordance with ASTM D1557, Method C (Modified Proctor).
- D. Do not restrict access to any private road or driveway for more than one (1) hour. Provide and maintain suitable temporary crossings over open ditches where required to meet this condition.
- E. When excavating in or adjacent to the traveled portion of highways, take whatever measures are necessary to protect the road surfaces.

#### 1.04 SUBMITTALS

- A. Submittals shall be approved by the Engineer prior to delivering materials to the site.
- B. Test Reports of all results of moisture-density tests and field compaction density tests.
- C. Gradations of all materials proposed for use in the Work.
- D. Results of grain size analyses, as required in these Specifications or as required by the Engineer.

#### 1.05 DELIVERY, STORAGE, AND HANDLING

- A. Store topsoil separately from all other excavated materials on the site and preserve for reuse.
- B. Store excavated materials meeting the requirements for backfill in an orderly manner at a sufficient distance away from banks of 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 away from the site.

- C. Promptly remove materials not specified to be stored or reused.
- D. Obstruction of roads, driveways, sidewalks, or interference's with drainage along gutters, ditches, or drainage channels with stored material is not permitted. If materials cannot be stored at the site to avoid such obstructions and interference's, they shall be stored away from the site and brought back when and as needed.
- E. Contactor shall protect all stock pile areas with required erosion prevention and sediment control measures.
- F. No construction activity, access, storage, or other use shall take place beyond the construction easement boundaries. The Engineer may require the Contractor to install and maintain snow-type fences along the boundaries, where such boundaries could be violated.

#### 1.06 JOB CONDITIONS

- A. Maintain excavations and trenches free of groundwater, sewage, storm water, ice and snow during the progress of the Work and until the finished Work is safe from injury.
- B. Protect subgrades against freezing by means of insulated blankets, hay, or other methods.
- C. Backfilling with frozen materials or when materials already in place are frozen is not permitted.

#### 1.07 SCHEDULING AND SEQUENCING

- A. Do not backfill until the following conditions are met:
  - 1. Manholes: Manholes are to be given and to pass leakage tests prior to backfilling.
  - 2. Concrete: Concrete has had adequate time to cure, as specified in Division 03 Concrete.
  - 3. Mortar Plaster and Masonry: Mortar has set, but no sooner than three (3) days after the mortar was applied.
  - 4. Damp-proofed, Waterproofed, and Coated Surfaces: Only after materials have properly cured.
  - 5. Work in General: Engineer and testing laboratory have completed all inspections and tests.
- B. Except as noted above, or required by other Sections, or when approved or directed by the Engineer, backfill pipe and cable excavations within one day after installation. Backfill other excavations as soon as possible after all inspections and tests have been completed.

## PART 2 - PRODUCTS

### 2.01 MATERIALS

- A. Wood Sheeting and Bracing: Sound timber, free from defects which might impair its strength and effectiveness.
- B. Steel Sheeting and Bracing: ASTM A328.
- C. 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.
- D. Backfill - Trenches: Select Fill from pipe bedding material up to a minimum of 12" over the top of pipe or top of sand encasement; suitable Common Earth or Select Fill for the remainder of the trench. Backfill materials shown on the Drawings and on the Drawing details take precedence over this paragraph.
- E. 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 and on the Drawing details take precedence over this paragraph.

## PART 3 - EXECUTION

### 3.01 PREPARATION

- A. Prior to Work of this Section, become thoroughly familiar with the site conditions and all portions of the Work covered by this Section.
- B. Verify that topsoil has been stripped to its full depth and stockpiled for subsequent reuse.
- C. Ascertain and verify the locations and character of structures, underground lines and subsurface conditions and verify that the work will not adversely affect them.

### 3.02 TRENCHING

- A. Excavate to the widths and depths shown on the Drawings, specified or directed by the Engineer. Trenches of narrower widths are permitted provided that the smaller widths do not adversely affect the proper installation of the Work.
- 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. Compact each layer in accordance with Section 31 23 23.23 Compaction. Carry fill up to an elevation at least two feet above the elevation of the top of the pipe to be laid and then excavate the trench.
- C. Limit each day's trench excavation to the length of pipe that will be installed that day, and then to no more than 100' ahead of the pipe laying.

### 3.03 TRENCH BOTTOMS

The bedding required for each type of pipe is detailed on the Drawings.

### 3.04 EXCAVATING

Excavate for structures to the elevations indicated on the Drawings and extend a sufficient distance from foundation walls, piers, and footings to provide adequate clearances for

construction operations, including sheeting and bracing, if required, and for inspection purposes.

### 3.05 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. The Engineer may, at his discretion, order sheeting and bracing to be cutoff and left in place. Where, in the opinion of 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 not less than 12" over 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.

### 3.06 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 or trench as required, with Granular Fill, Stone Fill, or concrete.
- B. Whenever the material encountered is, in the Contractor's opinion, incapable of providing adequate support, he shall immediately notify the Engineer.

### 3.07 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 applicable. Remove excess excavated materials and dispose of off-site.
- B. The storing or stockpiling of unsuitable material on-site is not permitted.

### 3.08 PREPARATION FOR BACKFILLING

Immediately prior to backfilling, remove all rubbish, debris, forms, and similar materials from the excavation.

### 3.09 BACKFILLING TRENCHES

- A. 12" Over Pipes - Provide 12" of sand bedding over the top of the pipe as detailed on the Drawings. Place fill by hand in not greater than 6" layers. Bring sand bedding up evenly on both sides of pipes and carefully and thoroughly compact under the pipe haunches. Do not displace pipe.
- B. 12" Over Sand Bedding - Provide 12" of Select Fill over the top of the sand. Place fill by hand in not greater than 6" compacted layers.
- C. Remainder of Trench - Paved Areas - Select Fill or Common Earth placed in not greater than 12" compacted layers.
- D. Remainder of Trench - Other Areas - Select Fill or Common Earth, placed in not greater than 12" compacted layers.

3.10 BACKFILLING AROUND STRUCTURES

- A. Uniformly spread and deposit backfill in horizontal layers, not over 8" 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 or Common Earth.

3.11 GRANULAR FILL UNDER SLABS & FOOTINGS

- A. Prior to placing granular fill, all organic material, topsoil, debris, and any other deleterious material shall be removed.
- B. Place material in maximum 8" lifts and compacted to 95% of maximum density at optimum moisture content, as determined by ASTM D1557 Method C (Modified Proctor).

3.12 GRANULAR FILL AS EMBANKMENTS

- A. Remove organic material, topsoil, and other deleterious material prior to placing granular fill.
- B. Place materials in maximum one (1) foot lifts compacted to 95% of maximum density at optimum moisture content as determined by ASTM D1557, Modified Proctor.

3.13 TOP OF BACKFILL

- A. Paved Areas: Carry backfill up to pavement subgrade ready to receive pavement. If paving is to be done at a later date, carry backfill up so as to provide a slightly mounded surface with edges flush with the existing pavement surface.
- B. Concrete Sidewalks: Carry backfill up to concrete subgrade.
- C. Unpaved Areas: Carry backfill up to adjacent finished grade, minus the depth of any required topsoil or topsoil and sod finish, and so as to provide a finished surface slightly mounded over the trench.
- D. Cover Over Pipe: Immediately notify the Engineer when the depth of cover over any pipe is less than 5 feet 6 inches

3.14 COMPACTION REQUIREMENTS

See Section 31 23 23.23 Compaction.

3.15 ADJUST AND CLEAN

- A. Any trenches or excavations which have been backfilled and show any evidence of settlement or being improperly backfilled, or have been tested and failed, shall be re-excavated to the depth required for proper compaction and then properly refilled and compacted.
- B. Replace or repair any pipe or structure which has been damaged or displaced.

END OF SECTION 31 23 16.13

## SECTION 31 23 19

### DEWATERING

#### PART 1 – GENERAL

##### 1.01 GENERAL PROVISIONS

- A. Attention is directed to the CONTRACT and GENERAL CONDITIONS and all sections within DIVISION 01 – GENERAL REQUIREMENTS which are hereby made a part of this Section of the specifications.

##### 1.02 DESCRIPTION OF WORK

- A. Work Included: Provide labor, materials and equipment necessary to complete the work of this section, including but not limited to the following.
  - 1. Work covered by this section includes the maintenance of trenches and excavations free of water, snow, ice, and other liquids. Liquids, as used in this section, means sewage, water, stormwater, groundwater, or other liquid or fluid material.

##### 1.03 QUALITY ASSURANCE

- A. Conduct operations in a manner which will keep the work free of standing and flowing liquids, snow, and ice, and dispose of these materials in an approved manner so as not to damage or create a nuisance to the Work, the public, surface and ground waters, and adjacent properties.
- B. The accumulation of liquids, ice and snow in excavations, trenches, areas to be graded and adjacent areas during construction is not permitted.
- C. Unless otherwise noted or approved by engineer, the placement of work in a liquid is not permitted.
- D. The use of installed pipes, or pipes under construction, to drain excavations, trenches, and adjacent areas is prohibited, except in the case of drainage pipes where it is necessary to maintain flow from watercourses.
- E. Obtain all discharge and water quality permits from the State of New Hampshire applicable agencies. Fines resulting from noncompliance with the statutes, regulations and permit conditions set by the State of New Hampshire will be the sole responsibility of the Contractor.
- F. Prior to excavation in areas where dewatering may be required, submit the dewatering methods which are to be utilized to the Owner's representative for review.
- G. All dewatering activities shall be in accordance with the requirements included in

Section 312500 Erosion and Sedimentation Controls, and must comply with all permits.

## PART 2 - PRODUCTS

### 2.01 GENERAL

Provide, operate and maintain a dewatering system to remove all water from excavations and trenches containing pumps, drains, wellpoints, piping, and any other facilities necessary to keep the excavations and trenches free of water, including spare units available for immediate use in the event of equipment breakdowns.

## PART 3 - EXECUTION

### 3.01 PERFORMANCE

#### A. General:

1. Perform all ditching, diking, pumping, well pointing and bailing, and construct all drains and channels necessary to keep all work areas clear of liquids, ice and snow during the progress of the work and until the finished work is safe from injury.
2. Do not permit any liquid to rise over any work in place until such work is adequately protected.
3. Locate noise producing dewatering equipment as far from residences, businesses, and the public in general, so as to minimize noise pollution. When required, or directed by Engineer, provide acoustical enclosures or barriers to reduce noise to an acceptable level.

#### B. Dewatering Practices:

1. Discharging accumulated groundwater or storm water removed from excavations, trenches, foundations, vaults, or other similar points of accumulation are prohibited unless waters are first managed by appropriate controls. These include sediment basins, sediment traps, sediment socks, dewatering tanks, tube settlers, weir tanks, filtration systems (e.g., bag or sand filter) or other measures designed to remove sediment.
2. Uncontaminated, non-turbid dewatering flows can be discharged without being routed to a control.
3. Discharge shall not include visible floating solids or foam.
4. If dewatering flow is found to contain oil, grease, or other products, an oil-water separator or suitable filtration device specifically designed to remove the contaminate must be used.
5. Vegetated upland areas should be used to infiltrate dewatering flows prior to discharge, to the extent feasible. Surface waters shall not be considered part of the treatment area.
6. Velocity dissipation devices, such as check dams, sediment traps, riprap, grouted riprap, diversion ditches and berms, must be used at all points where

dewatering flows are discharged.

7. Backwash water must be hauled away for disposal or returned to the beginning of the treatment process.
8. The filter media used in dewatering devices must be cleaned and/or replaced when the pressure differential equals or exceeds the manufacturer's specifications.
9. Dispose of water pumped or drained 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 the work completed or in progress.
10. Do not allow ground or surface water to enter piped utilities.
11. The Contractor shall secure all permits and/or obtain written permission from landowners and appropriate government agencies prior to the disposal of any liquids.

C. Erosion and Sediment Control: All dewatering activities should be discharged on-site to the designated constructed sediment basins, or other approved measures. The use of silt bags is recommended during dewatering operations to reduce silt transportation to the sediment basin areas. The following are some additional considerations for dewatering practices:

1. Only "clean" water, free of sediment or contaminants, shall be allowed to flow downstream.
2. All contaminated water flow will be collected and treated using an approved treatment method at the outlet end of the discharge.
3. Regardless of whether water quality treatment is required, the discharge points for pumped or diverted water shall be stabilized with stone and/or check dams to prevent scouring and to decrease the velocity of the water downstream.
4. Locate sediment basins or other treatment devices on the upland, away from wetlands or jurisdictional areas.
5. Locate away from areas where water flow could impact vehicular or pedestrian travel, or flow onto adjacent properties outside the right-of-way or project area.
6. Line treatment area with stone fill, geo-textile material or other scouring protection.
7. Contain area with adequate perimeter controls, such as hay bales, silt fence, stone check dams, or other acceptable sediment trapping measures.
8. Set back as far as possible from wetlands and surface waters, and in all cases, with a minimum of 20 feet of undisturbed vegetated buffer from discharge point to downstream water bodies or wetlands.

D. Damage:

1. All damage resulting from the 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.
2. Take all necessary precautions to protect new work from flooding during storms or from other causes.
3. Thoroughly brace or otherwise protect all pipelines and structures which are not stable, against flotation when necessary.

E. Disposal:

1. DO NOT permit liquids containing sewage, sludge, gas, oil, sediments, and other deleterious, poisonous, toxic, or oxygen demanding substances to enter streams, lakes, other surface waters or into the groundwater.
2. Dispose of all liquid, ice, and snow in a manner which will not create a hazard to public health, nor cause injury to public or private property, lives, work installed or in progress, or public streets, nor cause any interference in the use of streets and roads by the public, nor cause erosion
3. Secure written permission from the appropriate agency before utilizing a storm drain for the disposal of liquids. Do not overload sewers. Terminate the use of storm drains during any storm where the combined runoff and dewater will result in flooding.

3.02 PROTECTION

- A. Provide adequate protection from the effect of possible uplift due to storm or groundwater where buoyancy might lift installed work or cause joint or structure failure during construction.
- B. Protect the interior of installed work from the entering and accumulation of liquids, ice and snow. Immediately remove and dispose any accumulation which may occur.

3.03 REMOVAL OF TEMPORARY WORKS

- A. After the temporary works have served their purposes, remove them, or level and grade them to the extent required to present a slightly 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. Adjust, repair, replace, or clean all surfaces and property which may have been damaged as a result of any dewatering operation.

END OF SECTION 31 23 19



SECTION 312323.23

SOIL COMPACTION

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

- A. Attention is directed to the CONTRACT and GENERAL CONDITIONS and all sections within DIVISION 01 – GENERAL REQUIREMENTS which are hereby made a part of this Section of the specifications.

1.02 DESCRIPTION OF WORK

- A. Work Included: Provide labor, materials and equipment necessary to complete the work of this section, including but not limited to the following.

- 1. This Section covers the requirements for soils compaction.

1.03 QUALITY ASSURANCE

- A. The taking of samples and the performing of field compaction density tests shall be done by an independent testing laboratory.
- B. Provide at least one qualified person who shall be present at all times during the soil compaction operations and who shall be thoroughly familiar with the various types of compaction equipment, proper compacting techniques and methods, and soils behavior, and who shall direct the compaction operations.

1.04 SUBMITTALS

- A. Submittals shall be in accordance with the contract.
- B. List and description of proposed compaction equipment.
- C. Copies of the results of the laboratory sieve analyses and moisture density tests, certified by the Testing Laboratory.

1.05 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.
- C. Protect pipes, structures and all other subsurface work from displacement or injury during compaction operations.

PART 2 - PRODUCTS

2.01 COMPACTION

Utilize the proper compaction methods and equipment to suit the soils and conditions encountered.

## 2.02 LABORATORY TEST REPORTS

- A. As a minimum, the laboratory moisture-density 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. Moisture - Density Curve plotted on graph paper to as large a scale as is practical with all points used to derive the curve being clearly visible.
  4. Designation of the test method used.
  5. The optimum density and moisture content.
  6. A description of the sample.
  7. The date the test was performed and the person who performed the test.
  8. The Project name, identification, and Contractor's name.
  9. The signature of a responsible officer of the Testing Laboratory certifying to the information contained in the report.
- B. As a minimum, the field compaction density testing reports shall contain the following:
1. Laboratory's name.
  2. Date, time, depth, and specific location at which the test was made and the person's name who performed the test.
  3. Designation of the test method used.
  4. Designation of the material being tested.
  5. Test number.
  6. In place dry density and moisture content.
  7. Optimum density and moisture content.
  8. Percentage of optimum density achieved.
  9. The Project name, identification and Contractor's name.
  10. The signature of a responsible officer of the Testing Laboratory certifying to the information contained in the report.

## 2.03 OTHER MATERIALS

All other materials which are required to achieve adequate compaction shall be as selected by Contractor subject to approval of the Engineer.

## PART 3 - EXECUTION

### 3.01 INSPECTION

- A. Verify that layers of material are no thicker than the maximum thickness specified in other Sections.
- B. Verify that moisture content is nearly optimum.
- C. Do not begin compaction operations until conditions are satisfactory.

### 3.02 PERFORMANCE

- A. Compaction densities shown are percentages of the maximum density obtainable at optimum moisture content as determined by ASTM D1557, Method C (Modified Proctor).

- B. Moisten or dry each layer of material to achieve optimum moisture content. Unless otherwise specified or directed by Owner, 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%
Paved Areas	95%
All Other Areas	95%
Remainder of Trench	95%
Bedding around pipes	95%

### 3.03 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 (Modified Proctor).
- B. Engineer will designate the time, date and exact location of all field compaction density tests. Field density tests may be ordered by the Engineer in accordance with the following average frequencies. However, the Engineer may require that the testing laboratory perform tests at a greater or less frequency than the stated averages.
1. Under Structures: One test for every 400 square foot area of each layer of compacted granular fill.
  2. Outside of Structure: One test for each foot of backfill at intervals of approximately 50' around the structure.
  3. Trenches: One test for two feet of backfill at intervals of approximately 200' along the trench.
  4. Embankment: Three tests for each foot of compacted fill.
  5. Roads: One test for each layer of compacted fill and base material at intervals of approximately 200' along the roadway.
  6. Parking Areas and Sidewalks: One test for every 750 square foot area at parking areas and one test at intervals of 100' along sidewalks.
- C. Testing frequency indicated in Paragraph 3.03 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.

### 3.04 COMPACTION REQUIREMENTS

- A. Compaction of base course gravel shall be done with an approved vibratory roller, producing a dynamic force of at least 20,000 pounds in an 8 inch lift.

- B. Compaction of base course crushed stone shall be done with an approved vibratory roller producing a dynamic force of 27,000 pounds in a 12 inch lift.
- C. Rolling and shaping of successive gravel base lifts shall be done parallel to roadway centerline and continue until each layer conforms to the required grade and cross-section.
- D. Material Density requirements shall be field determined in accordance with AASHTO T191 (Sand Cone) or ASTM D2922/AASHTO T238-239 (nuclear method). Maximum density shall be determined by ASTM D1557 Modified Proctor. Compaction of backfill material below foundations, above the bottom of foundations, and below pavement and building slabs shall be 95% of the maximum density.
- E. Material Density tests which indicate deficient material or insufficient compaction following a first failure shall be paid for by the Contractor. Density tests resulting from a materials change by the Contractor or repeated failures shall be paid for by the Contractor.
- F. Material which does not meet the minimum density requirements shall be reworked in accordance with the NHDOT Spec. or removed and replaced, at the Contractor's expense, with acceptable material.

3.05 COORDINATION

- A. Provide all assistance and cooperation during testing and coordinate operations to allow ample time for the required sampling and testing.

3.06 ADJUST AND CLEAN

- A. Replace or repair any pipe, structure or other work which has been displaced, damaged, or injured.
- B. Compacted soils not meeting compaction densities shall be re-excavated, re-compacted, and re-tested at the Contractor's expense until all requirements are met.

END OF SECTION 31 23 23.23

SECTION 32 12 00

32 12 00 FLEXIBLE PAVING

PART 1.00 - GENERAL

1.01 DESCRIPTION

- A. Work covered by this Section includes the furnishing and installation of asphalt concrete paving. Required pavement sections are shown on the Drawings.
- B. Definitions:  
NHDOT Spec. - New Hampshire Department of Transportation, Standard Specifications for Road and Bridge Construction including all addenda.

1.02 QUALITY ASSURANCE

- A. 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.
- B. Use only personnel thoroughly trained and experienced in the skills required for installing and finishing asphalt concrete pavements and in operating the required equipment.
- C. All testing shall be performed by the approved testing laboratory. Engineer may use the testing laboratory for inspection services.
- D. Use only the materials and job-mix formula(s) approved by the Engineer.

1.03 SOURCE QUALITY ASSURANCE

All materials and the asphalt plant will be subject to observation and tests by Engineer and by the approved testing laboratory. Provide all equipment, materials, facilities and labor as specified in NHDOT Spec. Section 401.

1.04 JOB-MIX FORMULA

Do not commence paving until job-mix formula(s) has been submitted and approved by the Engineer. The required job-mix formula(s) shall comply with NHDOT Spec. Section 401. Provide all testing as required to clearly show that materials meet Specification requirements.

1.05 SUBMITTALS

- A. All submittals shall conform to Section 01 33 00 Submittal Procedures.
- B. Proposed job-mix formula(s) and certified materials tests.
- C. Name, address, and telephone number of the asphalt plant proposed for use and a certification that the plant conforms to the requirements of these Specifications.

1.06 SCHEDULING

- A. Coordinate work with the work of other Sections to avoid delays and damage.
- B. Notify the Engineer at least 48 hours in advance of the placing of any materials under this Section.

- C. Schedule work and operations to allow ample time for testing and observation. Cooperate with Engineer and the testing laboratory and provide access to all phases of the Work.
- D. Place temporary pavement within 21 days after backfilling and compaction has been completed.

#### 1.07 JOB CONDITIONS

- A. Comply with the requirements concerning weather limitations as specified in NHDOT Spec. Section 401.
- B. Install permanent asphalt pavements between April 15th and November 15th, and then only when environmental conditions are satisfactory.

### PART 2.00 - PRODUCTS

#### 2.01 MATERIALS

- A. Binder Mix (Base Course) - Bituminous Concrete, ¾" Binder Mix, NHDOT Spec. Sections 401 and 403. (Minimum thickness 2 inch)
- B. Wearing Mix 1 (Wearing Course) - Bituminous Concrete, ½" Wearing Mix, NHDOT Spec. Sections 401 and 403. (Minimum thickness depth 1 ½ inch)
- C. Wearing Mix 2 (Wearing Course) - Bituminous Concrete, 3/8" Wearing Mix, NHDOT Spec. Sections 401 and 403. (Minimum thickness depth 1-inch)
- C. Temporary Pavement - Bituminous Concrete, ½" Wearing Mix, NHDOT Spec. Section 403; two 1½ inch courses to provide a 3 inch total thickness.
- D. Shoulders – As specified on the Drawings. Comply with the applicable section of NHDOT Spec.
- E. Other Materials - Materials not specifically described but required for complete and proper installation of pavements and shoulders, shall be as selected by Contractor, subject to the approval of the Engineer.
- F. Sidewalk Wearing Course - Bituminous Concrete, 3/8" Wearing Mix, NHDOT Spec. Section 401 and 403.

#### 2.02 MIXES

All bituminous concrete shall be mixed at the approved asphalt mixing plant in accordance with NHDOT Spec. Section 401.

#### 2.03 TACK COAT

- A. Material for tack coat shall conform to NHDOT Spec. Division 400.
- B. A tack coat shall be applied immediately prior to placement of pavement. The rate of application of emulsified asphalt shall be between 0.02 and 0.05 gal/sy as determined by the Engineer depending on the relative absorbance and texture of the pavement surface.
- C. Bituminous material shall be uniformly applied with an approved applicator. When ordered, a pressure distributor shall be used. The tack coat shall be applied in such a

manner as to offer the least inconvenience to traffic and to permit one-way traffic without pickup or tracking of the bituminous material.

- D. The existing surface shall be patched and shall be free of irregularities to provide a reasonably smooth and uniform surface to receive the treatment. Unstable corrugated areas shall be removed and replaced with suitable patching materials. The edges of existing pavements that are to be adjacent to new pavement shall be cleaned to permit the adhesion of bituminous materials.
- E. All abutting edges and joints within trench patching must have tack coat applied.
- F. Any bituminous material splashed or sprayed onto exposed surfaces of curbs, sidewalks, or other masonry structures shall be removed by sandblasting at the Contractor's expense.

#### 2.04 HOT POURED CRACK SEALANT

- A. This work shall consist of filling the major cracks in the pavement with an approved sealant material. The cracks to be filled will be those designated by the Engineer.
- B. Material shall be of the hot-poured type and be a product as included on the NHDOT Qualified Products List.
- C. Material not covered by an asphalt pavement overlay shall meet the requirements of AASHTO M324 (ASTM D6690) Type II.
- D. Material covered by an asphalt pavement overlay shall be low modulus conforming to AASHTO M324 (ASTM D6690) Type IV except cone penetration shall be 110-150.
- E. All work must be in accordance with NHDOT Spec. Division 411.

### PART 3.00 - EXECUTION

#### 3.01 INSPECTION

- A. Prior to the work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete, tested and approved by Engineer and to the point where this installation may be properly performed. Particular attention shall be given to items such as pipelines to avoid excavating pavements at a later date.
- B. Verify that subgrades have been properly prepared.
- C. Do not proceed with installations until conditions are satisfactory.

#### 3.02 INSTALLATION OF GRAVEL BASE COURSE

- A. Install base courses in accordance with Section 31 23 16 Excavating and Section 31 23 16.13 Trenching.
- B. Compact to a minimum density of 95%.

#### 3.03 FIELD QUALITY CONTROL

- A. Except where otherwise specified, Engineer will select the date, time, location, number and type of tests required. Coordinate all testing as required in Section 01

40 00 Quality Requirements and provide full cooperation and assistance. All sampling and testing shall be done in the presence of Engineer.

- B. Run gradations of gravel base and gravel shoulders and for all other materials which may be proposed. Provide additional gradations when previous gradations do not meet Specification requirements and when a new source of material is proposed.
- C. Laboratory maximum density tests and field compaction density tests will be made in accordance with Section 31 23 23.23 Compaction.
- D. When directed by Engineer, conduct thickness tests on the base, binder, and wearing courses. Hand dig holes not less than 3 inches in diameter through the base course at locations designated by Engineer. Engineer will measure the thickness and, if it is found deficient, the base course must be removed, the subbase lowered, and refilled and compacted to the required thickness. These tests may be conducted on an average of one test every 250 feet.
- E. Traffic shall be limited to access on newly paved surfaces until surface temperatures are a maximum of 140 degrees. The Contractor is responsible for control of all traffic and preventing any damage, marking, cracking, or deformation caused by traffic. If damaged is observed the Contractor is responsible for repair at there own expense.

#### 3.04 ADJUST AND CLEAN

- A. When specified conditions and tolerances are not met, do all work required to correct the deficiencies in a manner approved by Engineer.
- B. If any irregularities or defects remain after compaction is completed, the entire affected area of the surface course shall be promptly removed and sufficient new material placed to form a true and even surface. Roll all minor surface projections, joints and minor honeycombed areas to a smooth finish. The final surface shall be of uniform texture conforming to the line, grade and cross section shown on the Drawings.
- C. If settlement occurs, do all work required to eliminate the settlement.
- D. Replace all asphaltic concrete where cores and samples were taken and blend in with surrounding pavement.
- E. Clean all paved surfaces of dirt, stones, and other debris and remove and dispose of off-site all discarded mix, boards, trash, and all other debris.

#### 3.05 GUARANTEE

- A. The Contractor shall maintain pavement under this Contract during the guarantee period of one year.
- B. If settlement holes or defects appear in the pavement, the Contractor shall have one week after notification by the Engineer, or owner to make satisfactory repairs. If repairs made are unsatisfactory to the Engineer and the owner, the owner may do the work or have the work done by others and the cost of such repairs will be charges to the Contractor. In the case of unsatisfactory repairs, the Contractor will be given one week notice to correct work before the owner completes the repairs.



HANOVER HIGH SCHOOL  
TURF FIELD DRAINAGE IMPROVEMENT PROJECT  
SAU #70/DRESDEN SCHOOL DISTRICT  
FLEXIBLE PAVING  
SECTION 32 12 00

END OF SECTION 32 12 00



SECTION 32 92 00

LAWNS AND GRASSES

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

- A. Attention is directed to the CONTRACT and GENERAL CONDITIONS and all sections within DIVISION 01 – GENERAL REQUIREMENTS which are hereby made a part of this Section of the specifications.

1.02 DESCRIPTION OF WORK

- A. Work Included: Provide labor, materials and equipment necessary to complete the work of this section, including but not limited to the following:
  - 1. Fine grading and preparing lawn areas.
  - 2. Furnishing and applying new topsoil.
  - 3. Furnishing and applying soil amendments.
  - 4. Furnishing and applying fertilizers.
  - 5. Seeding new lawns.
  - 6. Reconditioning existing lawn areas.
  - 7. Replanting unsatisfactory or damaged lawns.

1.03 SUBMITTALS

- A. General: Submit each item in this Article to the Engineer and Owner according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product data for the following:
  - 1. Aluminum sulfate
  - 2. Fertilizers
- C. Certification of grass seed from seed vendor for each grass-seed mixture stating the botanical and common name and percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.
  - 1. Certification of each seed mixture for sod, identifying sod source, including name and telephone number of supplier.
- D. Certification by product manufacturer that the following products supplied comply with requirements:
  - 1. Limestone.
  - 2. Fertilizers.
- E. Qualification data for firms and persons specified in the “Quality Assurance” Article to demonstrate their capabilities and experience. Include lists of completed projects

with project names and addresses, names and address of Engineer and Owner's, and other information specified.

- F. Material test reports from qualified independent testing agency indicating and interpreting test results relative to compliance of the following materials with requirements indicated.
  - 1. Analysis of existing surface soil.
  - 2. Analysis of imported topsoil (including testing for herbicide contamination).
- G. Planting schedule indicating anticipated dates and locations for each type of planting.

#### 1.04 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced Installer who has completed landscaping work similar in material, design, and extent to that indicated for this Project and with a record of successful grass establishment.
  - 1. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on the Project site during times that grass planting is in progress.
  - 2. Pesticide application shall be made by experienced workmen under supervision of a licensed applicator approved by the local Regulator. Coordinate all pesticide application activities.
- B. Testing Agency Qualifications: To qualify for acceptance, an independent testing agency must demonstrate to the satisfaction of the Engineer, based on evaluation of agency-submitted criteria conforming to ASTM E 699, that it has the experience and capability to satisfactorily conduct the testing indicated without delaying the Work.
- C. Topsoil Analysis: Furnish a soil analysis made by a qualified independent soil-testing agency stating percentages of organic matter, inorganic matter (silt, clay, and sand), deleterious material, pH, sieve analysis for range outlined in Article 2.2, Paragraph A of this Specification Section and mineral and plant-nutrient content of topsoil. Also test for herbicide contamination and provide report certifying that no herbicides are present.
  - 1. Report suitability of topsoil for lawn growth. State recommended quantities of nitrogen, phosphorus, and potash nutrients and any limestone, aluminum sulfate, or other soil amendments to be added to produce a satisfactory topsoil.

#### 1.05 DELIVERY, STORAGE AND HANDLING

- A. Seed: Deliver seed in original sealed, labeled, and undamaged containers.

#### 1.06 COORDINATION AND SCHEDULING

- A. Planting Season: Sow lawn seed during normal planting seasons for type of lawn work required. Correlate planting with specified maintenance periods to provide

required maintenance from date of Acceptance.

- B. Weather Limitations: Proceed with planting only when existing and forecast weather conditions are suitable for work.

#### 1.07 MAINTENANCE

- A. Begin maintenance of lawns immediately after each area is planted and continue until acceptable lawn is established, but for not less than the following periods:
  - 1. Seeded Lawns: The Contractor is responsible for maintenance of lawns until vegetation establishment is accepted and taken over by the Owner.
- B. Maintain and establish lawns by watering, fertilizing, weeding, mowing, trimming, replanting, and other operations. Roll, regrade, and replant bare or eroded areas and re-mulch to produce a uniformly smooth lawn. Landscape Contractor shall contact the Engineer and Owner to review all necessary maintenance operations during maintenance period. Maintain temporary protection fences as necessary to establish healthy lawns.
  - 1. Replant bare areas with same materials specified for lawns.
  - 2. Add new mulch in areas where mulch has been disturbed by wind or maintenance operations sufficiently to nullify its purpose. Anchor as required to prevent displacement.
- C. Watering: Provide and maintain temporary piping, hoses, and lawn-watering equipment to convey water from sources and to keep lawns uniformly moist to a depth of 4". Landscape Contractor shall contact the Engineer and Owner to review water source(s) availability and coordinate access to those source(s). If there are no water source(s) available, Landscape Contractor shall provide water as required.
  - 1. Lay out temporary lawn-watering system and arrange watering schedule to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly seeded, plugged, or sprigged areas.
  - 2. Water lawn at the minimum rate of 1" per week.
- D. Mow lawns as soon as there is enough top growth to cut with mower set at specified height for principal species planted. Repeat mowing as required to maintain specified height without cutting more than 30 percent of the grass height. Remove no more than 30 percent of grass-leaf growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet.
- E. Post fertilization: Apply fertilizer to lawn after first mowing and when grass is dry.
  - 1. Use fertilizer that will provide actual nitrogen of at least 1 lb per 1000 sq. ft. of lawn area. Submit Manufacturers' product certification to the Engineer for approval prior to application.

#### 1.08 ACCEPTANCE

- A. Owner's Representative will make field review to consider acceptance of seeded areas upon Contractor's request.
  - 1. Areas will be acceptable providing present conditions of lawns meet establishment requirements and have received required maintenance.
  - 2. Where acceptance review is being requested for a larger site area, no individual plot within it will be considered for acceptance if it has spots which are bare or does not meet other requirements totaling more than 2% of that plot.

## PART 2 - PRODUCTS

### 2.01 SEED (Landscape Architect or Engineer approved general purpose lawn mixes)

- A. Grass Seed: Fresh, clean, dry, new-crop seed complying with the Association of Official Seed Analysts' "Rules for Testing Seeds" for purity and germination tolerances.
  - 1. Seed Mixture: Seed mixture as specified in Section 3.10 Seed Mixtures Schedule.

### 2.02 TOPSOIL

- A. Topsoil: ASTM D 5268, fertile, friable, naturally loamy, pH range of 5.5 to 7, 4 percent organic material minimum, 20 percent organic matter maximum, free of stones ½ inch or larger in any dimension, and other extraneous materials harmful to plant growth and meeting the following sieve analysis criteria: 100% by weight will pass ½" mesh sieve and 97% - 100% will pass ¼" mesh sieve. In material passing ¼" mesh sieve there will not be less than 20% or more than 65% passing No. 200 mesh sieve as determined by wash test made in accordance with standard ASTM D1140.
  - 1. Topsoil Source: Reuse surface soil stockpiled on the site. Verify suitability of surface soil to produce topsoil meeting requirements and amend when necessary. Supplement with imported topsoil when quantities are insufficient. Clean topsoil of roots, plants, sods, stones, clay lumps, and other extraneous materials harmful to plant growth.
  - 2. Topsoil Source: If required, import topsoil from off-site sources. Obtain topsoil from naturally well-drained sites where topsoil occurs at least 4" deep; do not obtain from bogs or marshes.

### 2.03 SOIL AMENDMENTS

- A. Lime: ASTM C 602, Class T, agricultural limestone containing a minimum 80 percent calcium carbonate equivalent, with a minimum 99 percent passing a No. 8 sieve and a minimum 75 percent passing a No. 60 sieve.
  - 1. Provide lime in the form of dolomitic limestone.
- B. Aluminum Sulfate: Commercial grade, unadulterated.
- C. Sand: Clean, washed, natural or manufactured sand, free of toxic materials.

- D. Perlite: Horticultural perlite, soil amendment grade.
- E. Peat Humus: Finely divided or granular texture, with a pH range of 6 to 7.5, composed of partially decomposed moss peat (other than sphagnum), peat humus, or reed-sedge peat.
- F. Sawdust or Ground-Bark Humus: Decomposed, nitrogen-treated, of uniform texture, free of chips, stones, sticks, soil, or toxic materials.
  - 1. When site treated, mix with at least 0.15 lb of ammonium nitrate or 0.25 lb of ammonium sulfate per cu. ft. (cu. m) of loose sawdust or ground bark.
- G. Manure: Well-rotted, unleached stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, and material harmful to plant growth.
- H. Herbicides: EPA registered and approved, of type recommended by manufacturer.
- I. Water: Potable.

#### 2.04 FERTILIZER

- A. Bonemeal: Commercial, raw, finely ground; minimum of 4 percent nitrogen and 20 percent phosphoric acid.
- B. Superphosphate: Commercial, phosphate mixture, soluble; minimum of 20 percent available phosphoric acid.
- C. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea-form, phosphorous, and potassium in the following composition:
  - 1. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing agency.
- D. Slow-Release Fertilizer: Granular fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:
  - 1. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing agency.

#### 2.05 MULCHES

- A. Straw Mulch: Provide air-dry, clean, mildew- and seed-free, salt hay or threshed straw of wheat, rye, oats, or barley.
- B. Fiber Mulch: Biodegradable dyed-wood cellulose-fiber mulch, nontoxic, free of plant growth- or germination-inhibitors, with maximum moisture content of 15 percent and a pH range of 4.5 to 6.5.

- C. Nonasphaltic Tackifier: Colloidal tackifier recommended by fiber-mulch manufacturer for slurry application, nontoxic and free of plant growth- or germination-inhibitors.

## 2.06 EROSION CONTROL MATERIALS

- A. Blankets: Biodegradable wood excelsior, straw, or coconut fiber mat enclosed in a photodegradable plastic mesh. Include Manufacturer's recommended steel wire staples, 6 inches (150 mm) long.
- B. Fiber Mesh: Biodegradable twisted jute or spun coir mesh, 0.92 lb. per sq. yd. (0.5 kg per sq. m.) minimum, with 50 to 65 percent open area. Include Manufacturer's recommended steel wire staples, 6 inches (150 mm) long.

## PART 3 - EXECUTION

### 3.01 EXAMINATION

- A. Examine areas to receive lawns and grass for compliance with requirements and for conditions affecting performance of work of this Section. Do not proceed with installation until unsatisfactory conditions have been corrected.

### 3.02 PREPARATION

- A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations.
  - 1. Protect adjacent and adjoining areas from hydroseed overspraying.
- B. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

### 3.03 PLANTING SOIL PREPARATION

- A. Limit subgrade preparation to areas that will be planted in the immediate future.
- B. Loosen subgrade to a minimum depth of 4". Remove stones larger than ½" in any dimension and sticks, roots, rubbish, and other extraneous matter.
- C. Mix soil amendments and fertilizers with topsoil at rates recommended in soil reports from a qualified soil-testing agency indicated. Delay mixing fertilizer if planting does not follow placing of planting soil within a few days. Either mix soil before spreading or apply soil amendments on surface of spread topsoil and mix thoroughly into top 4" of topsoil before planting.
  - 1. Mix lime with dry soil prior to mixing fertilizer.
  - 2. Apply superphosphate fertilizer directly to subgrade before tilling, at the rate indicated.
- D. Spread planting soil mixture to a depth of 6" thick and to meet thickness, grades, and



elevations shown, after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen.

1. Place approximately  $\frac{1}{2}$  the thickness of planting soil mixture required. Work into top of loosened subgrade to create a transition layer and then place remainder of planting soil mixture.
- E. Preparation of Unchanged Grades: Where lawns are to be planted in areas unaltered or undisturbed by excavating, grading, or surface soil stripping operations, prepare soil as follows:
1. Remove and dispose of existing grass, vegetation, and turf. Do not turn over into soil being prepared for lawns.
  2. Till surface soil to a depth of at least 6" (except in root zones of existing trees to remain). Apply required soil amendments and initial fertilizers and mix thoroughly into top 4" of soil. Trim high areas and fill in depressions. Till soil to a homogenous mixture of fine texture.
  3. Clean surface soil of roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth.
  4. Remove waste material, including grass, vegetation, and turf, and legally dispose of it off the Owner's property.
- F. Grade lawn and grass areas to a smooth, even surface with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit fine grading to areas that can be planted in the immediate future. Remove trash, debris, stones larger than  $\frac{1}{2}$ " in any dimension, and other objects that may interfere with planting or maintenance operations.
- G. Moisten prepared lawn areas before planting when soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.
- H. Restore prepared areas if eroded or otherwise disturbed after fine grading (due to bulb planting activities, etc.) and before planting.

### 3.04 SEEDING NEW LAWNS AND EMBANKMENTS

- A. Sow seed with a spreader or a seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph. Evenly distribute seed by sowing equal quantities in 2 directions at right angles to each other.
1. Do not use wet seed or seed that is moldy or otherwise damaged in transit or storage.
- B. Sow seed at the following rates:
1. Seeding Rate: 130 lbs/acre of approved mix or at rates specified by the Landscape Architect, Engineer and/or Seed Supplier. All mixes shall be adjusted by their pure live seed percentage. All seeding rates shall meet the seeding rate requirements for 100% pure live seed as described below.

Pure Live Seed (PLS) = %Germination x %Purity

For example, a 1-pound bag of grass seed might contain the following information: purity = 85%, germination = 75%. The PLS formula for this bag of grass seed would be:  $0.85 \times 0.75 = 0.64$  PLS.

In other words, the 1-pound bag of Bermuda grass seed actually contains 64% (or 0.64 pounds), of pure, live seed. It also means that 36% or 0.36 pounds is unneeded material.

In order to get one pound of pure live seed, it's best to set up a basic proportion equation which says ".64 pounds pure live seed is to one pound, as one pound is to x pounds pure live seed." The equation would look like this:  $0.64:1 = 1:x$

Solving the equation you would find,  $0.64x = 1$  and then,  $x = 1/.64 = 1.56$  (lbs. bulk) Therefore in our example, you would need to purchase 1.56 pounds of bulk seed in order to get 1.0 pound of pure live seed.

- D. Rake seed lightly into top  $\frac{1}{8}$ " of topsoil, roll lightly and water with fine spray.
- D. Protect seeded slopes exceeding 1:4 against erosion with erosion-control blankets installed and stapled according to manufacturer's recommendations.
- E. Protect seeded slopes exceeding 1:6 against erosion with jute or coir-fiber erosion-control mesh installed and stapled according to manufacturer's recommendations.
- F. Protect seeded areas with slopes less than 1:6 against erosion by spreading straw mulch after completion of seeding operations. Spread uniformly at a minimum rate of 2 tons per acre to form a continuous blanket  $1\frac{1}{2}$ " loose depth over seeded areas. Spread by hand, blower, or other suitable equipment.
  - 1. Anchor straw mulch by spraying with asphalt-emulsion tackifier at the rate of 10 to 13 gal. per 1000 sq. ft. Take precautions to prevent damage or staining of structures or other plantings adjacent to mulched areas. Immediately clean damaged or stained areas.
- G. Protect seeded areas against hot, dry weather or drying winds by applying peat mulch within 24 hours after completion of seeding operations. Soak and scatter uniformly to a depth of  $\frac{3}{16}$ " thick and roll to a smooth surface.

### 3.05 HYDROSEEDING NEW LAWNS AND EMBANKMENTS

- A. Hydroseeding: Mix specified seed, fertilizer, and fiber mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogenous slurry suitable for hydraulic application.
  - 1. Mix slurry with nonasphaltic tackifier.
  - 2. Apply slurry uniformly to all areas to be seeded in a 1-step process. Apply mulch at the minimum rate of 1500 lb per acre dry weight but not less than the rate required to obtain specified seed-sowing rate.
  - 3. Apply slurry uniformly to all areas to be seeded in a 2-step process. Apply

first slurry application at the minimum rate of 500 lb per acre dry weight but not less than the rate required to obtain specified seed-sowing rate. Apply slurry cover coat of fiber mulch at a rate of 1000 lb per acre.

### 3.06 RECONDITIONING LAWNS AND EMBANKMENTS

- A. Recondition existing lawn areas damaged by Contractor's operations, including storage of materials or equipment and movement of vehicles. Also recondition lawn areas where settlement or washouts occur or where minor regrading is required.
  - 1. Recondition other existing lawn areas.
- B. Remove sod and vegetation from diseased or unsatisfactory lawn areas; do not bury into soil. Remove topsoil containing foreign materials resulting from Contractor's operations, including oil drippings, fuel spills, stone, gravel, and other construction materials, and replace with new topsoil.
- C. Where substantial lawn remains, mow, dethatch, core aerate, and rake. Remove weeds before seeding. Where weeds are extensive, apply selective herbicides as required. Do not use pre-emergence herbicides.
- D. Remove waste and foreign materials, including weeds, soil cores, grass, vegetation, and turf, and legally dispose of it off the Owner's property.
- E. Till stripped, bare, and compacted areas thoroughly to a depth of 6" (except in root zones of existing trees to remain).
- F. Apply required soil amendments and initial fertilizers and mix thoroughly into top 4" of soil. Provide new planting soil as required to fill low spots and meet new finish grades.
- G. Apply seed and protect with straw mulch or hydroseed as required for new lawns.
- H. Water newly planted areas and keep moist until new grass is established.

### 3.07 SATISFACTORY LAWN AND EMBANKMENT

- A. Seeded lawns and embankments will be satisfactory provided requirements, including maintenance, have been met and a healthy, uniform, close stand of grass is established, free of weeds, bare spots exceeding 5" by 5", and surface irregularities.
- B. Replant lawns and embankments that do not meet requirements and continue maintenance until lawns are satisfactory.
- C. The Contractor shall guarantee to establish lawns and embankments in accordance with these Satisfactory Lawn and Embankment Specifications within 18 months from completion of work.

### 3.08 CLEANUP AND PROTECTION

- A. Promptly remove soil and debris created by lawn work from paved areas. Clean

wheels of vehicles before leaving site to avoid tracking soil onto surface of roads, walks, or other paved areas.

- B. Erect barricades and warning signs as required to protect newly planted areas from traffic. Maintain barricades throughout maintenance period until lawn is established.

### 3.09 PLANTING SOIL AMENDMENTS SCHEDULE

- A. Lawns and Embankments: Provide soil amendments as recommended in soil reports from a qualified soil-testing agency.

### 3.10 SEED MIXTURES SCHEDULE

- A. Provide certified grass-seed blends or mixes, proportioned by weight, as follows for maintained lawn areas:

- 1. Sun: Loft standard general purpose mix or Owner approved equivalent.

<u>Proportion</u>	<u>Name</u>
40 pct	Baron or Nassau Kentucky Bluegrass
35 pct	Fine textured perennial Rye
25 pct	Boreal Creeping Red Fescue

- B. For slope repair on the south side of the athletic field and areas that are not to be mowed or maintained, provide NHDOT conservation mix.

END OF SECTION 32 92 00

SECTION 33 44 40

STONE MASONRY HEADWALLS

PART 1.- GENERAL

1.01 DESCRIPTION OF WORK

Provide stone masonry headwalls complete and in place at the locations shown on the Drawings.

1.02 QUALITY ASSURANCE

Reference standards for work in this Section shall be the New Hampshire Department of Transportation "Standard Specifications".

1.03 SUBMITTALS

Submit samples of stone to be used in the work.

PART 2 - PRODUCTS

2.01 STONE

A. Stone for stone masonry headwalls shall be sound, durable units of natural cobble, uniformly stratified field stone, or broken ledge.

1. Stone Size: 8" to 12" in greatest dimension.

2.02 PORTLAND CEMENT MORTAR

A. Cement: Type II, ASTM C150.

B. Lime: Type S, hydrated, ASTM C6.

C. Sand: Washed, natural sand with hard, angular grains conforming to New Hampshire Department of Transportation "Standard Specifications", Section 707.2.3.

D. Proportions: 1 part Portland cement, 1/2 part lime, 3 1/2 parts sand.

PART 3 - EXECUTION

A. Laying Stone:

1. Place starter courses on a thoroughly compacted even foundation of fine crushed gravel.
2. Vertical joints: staggered, of uniform width.
3. Horizontal joints: level and of uniform width.
4. Exposed stone face shall be vertically plumb with individual stones true to

line in each direction.

5. Stone shall be of uniform appearance and color.
6. Mortar joints shall be pointed, stone surfaces left free of clinging mortar and brushed clean.
7. Headwall dimensions shall conform to those shown on the Drawings.
8. Annular spaces between drain pipe and stonework shall be thoroughly closed with mortar and stone spalls.
9. Pipe shall be recessed with stone facing covering the pipe plain-end.

B. Curing and Backfilling

1. Stone masonry shall be cured by covering with wetted burlap to prevent rapid hydration of mortar.
2. Backfill around headwalls only after proper curing has been completed.

C. Cleaning

1. Mortar particles and laitance shall be removed.
2. Stone work shall be brushed-cleaned with a mild solution of water and muriatic acid.

END OF SECTION 33 44 40

SECTION 33 01 00.10

EXISTING UTILITIES AND UNDERGROUND STRUCTURES

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

- A. Attention is directed to the CONTRACT and GENERAL CONDITIONS and all sections within DIVISION 01 – GENERAL REQUIREMENTS which are hereby made a part of this Section of the specifications.

1.02 JOB CONDITIONS

- A. Locations of existing utility installation and underground structures shown on the Contract Drawings are only approximate. It shall be the Contractor's responsibility to locate all utilities within the construction area prior to proceeding with construction.
- B. Wherever culverts, sewers, drains, manholes, catch basins, catch basin connections, water mains, valve chambers, electric conduits, telephone conduits, or any other underground constructions are encountered by the Contractor during construction they shall be protected and firmly supported 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. The authority having charge of any particular underground structure shall be notified promptly of injury to its structure.

No additional compensation will be allowed for any delays, inconvenience, or damage sustained by the Contractor due to any interference from said utility appurtenances or the operation of moving them by the utility companies.

- C. Whenever the Engineer may require, pipe or other underground structures encountered in excavating or trenching, shall be permanently supported with suitable supports across the excavation or trench.
- D. The restoration of existing property or structures shall be done as promptly as practicable and shall not be left until the end of the construction period.
- E. Cooperation with Utilities: 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.

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- F. Temporary provisions shall be made by Contractor to ensure proper functioning of all gutters, sewer inlets, and drainage ditches, which shall not be obstructed except as approved by the Engineer.

END OF SECTION 330100.10



SECTION 33 41 00

STORM UTILITY DRAINAGE PIPING

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

- A. Attention is directed to the CONTRACT and GENERAL CONDITIONS and all sections within DIVISION 01 – GENERAL REQUIREMENTS which are hereby made a part of this Section of the specifications.
- B. Related Sections:
  - 31 23 16.13 Trenching
  - 31 23 19 Dewatering
  - 31 23 23.23 Soil Compaction
  - 33 44 00 Storm Utility Water Drains

1.02 DESCRIPTION OF WORK

- A. Work Included: Provide labor, materials and equipment necessary to complete the work of this section, including but not limited to the following:
  - 1. Storm drain pipe and fittings as shown on the Drawings.

1.03 QUALITY ASSURANCE

- A. Materials must be provided in accordance with the specification.
- B. Inspect all pipe upon receipt. Remove damaged pipe from the work site.
- C. All work must be completed in accordance with the applicable Federal, State, and local standards.

1.04 DELIVERY, STORAGE, AND HANDLING

- A. Schedule delivery to coincide with related work.
- B. Verify compliance with the Specifications at time of delivery.
- C. Store equipment in dry enclosed area, off the ground.
- D. Submit pipe material certificates of compliance with deliveries.

1.05 SUBMITTALS

- A. Submit manufacturer's product data and installation guide.
- B. Certified copies of test results on pipe units.
- C. Record Drawings showing depth and location of:
  - Structures
  - Pipe elevations
  - Pipe sizes
  - Pipe types
  - Repair to existing utilities

Record in a permanently bound notebook. Provide access to records for the project superintendent, Engineer, and Owner at all times. Submit records at substantial completion.

## PART 2 - PRODUCTS

### 2.01 PIPE AND FITTINGS

- A. Provide fittings of a standard type and class of materials.
- B. PVC Drain Pipe (Perforated and Solid): (4" - 27") ASTM D3034 and F679; strength requirement, SDR-35; push-on joints, ASTM 3212; gaskets ASTM F-477.
- C. HDPE Drain Pipe (Perforated and Solid): (4" - 36") Corrugated smoothbore; ASTM F-2648 and AASHTO M-294; locking joint system.
- D. HDPE Drain Pipe (Perforated and Solid): (48"-60") Must be ADS HP N12 Pipe per manufacturer requirements. Pipes to be supplied in 20' lengths.
- E. Concrete (RCP) Drain Pipe: shall comply with NHDOT Section 603 of the 2010 Specifications for Road and Bridge Construction. All concrete pipe shall be class 3000D minimum.

### 2.02 MISCELLANEOUS

Flexible adaptors-Non-pressure pipe: Neoprene full circle sleeve with stainless steel strap, equal to those manufactured by Fernco. Use only in connecting new service to existing service pipe.

## PART 3 - EXECUTION

### 3.01 INSTALLATION OF GRAVITY PIPE AND FITTINGS

- A. Methods: Install pipe and fittings in accordance with manufacturer's recommendations and NHDOT guidelines. Control line and grade with a laser beam unless otherwise authorized by the Engineer. Bed and secure each length of pipe before placing the next length. Wheel-load PVC pipe only after 30 inch minimum backfill cushion is in place.
- B. Line and Grade: Lay pipe to the line and grade shown on the Drawings. Lay pipe to uniform grade between manholes. Line and grade may be adjusted from plan by the Engineer as conditions require.
- C. Laying Conditions: Lay pipe in a dry trench. When pipe-laying is not in progress, the open ends of pipe shall be closed by a watertight plug or other means as specified. The plug shall be fitted with a means for venting. When practical, the plug shall remain in place until the trench is pumped completely dry. Care must be taken to prevent pipe flotation if the trench fills with water. Prior to removal of the plug for extending the line or for any other reason, air and water pressure in the line shall be released. No trench water shall be allowed to enter pipe.
- D. Bedding Material shall be in accordance with the manufacturer's requirements.
- E. From 1-foot above the top of the pipe to grade or to the subgrade of the pavement, material containing stones up to 8 in. in their greatest dimension may be used, unless otherwise specified. Backfilling shall be completed in accordance with specification section 31 23 16.13, "Trenching." All backfill material shall be free from cinders,

ashes, refuse, vegetable or organic material, boulders, rocks or stones, large pieces of concrete or masonry, frozen soil, or other unsuitable material that may be detrimental or cause damage to the pipe, fittings, valves. The excavated material shall be used as backfill unless otherwise stated on the approved plans within these documents, provided that this material consists of loam, clay, sand, gravel, or other suitable materials. Backfill material must be capable of meeting the compaction requirements listed within these documents.

- F. Flush all pipe of dirt and debris using a method approved by the Engineer. Gravity flushing of lines is not acceptable.
- G. Flexible joints at manholes and catch basins: Provide 8 foot maximum stub from inside face of manhole to flexible joint.

### 3.02 TESTING OF GRAVITY DRAINS

- A. Deflection test 100% of pipe thirty (30) days or more after backfilling.
  - 1. Use a rigid ball or mandrel with diameter equal to 95% of PVC pipe I.D. Do not use mechanical pulling units.
  - 2. Pipe deflection shall not exceed 5% in any section of pipe installed.
  - 3. Pipe sections failing the deflection test shall be removed and relaid as directed by the Engineer. Any associated cost of relaying the pipe shall be at the Contractor's expense.

END OF SECTION 33 41 00



SECTION 33 44 00

STORM UTILITY WATER DRAINS

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

- A. Attention is directed to the CONTRACT and GENERAL CONDITIONS and all sections within DIVISION 01 – GENERAL REQUIREMENTS which are hereby made a part of this Section of the specifications.
- B. Related Sections:
  - 312316.13 Trenching
  - 312319 Dewatering
  - 312323.23 Soil Compaction
  - 334100 Storm Utility Drainage Piping

1.02 DESCRIPTION OF WORK

Provide precast concrete units complete and in place as shown on the Drawings including:

- Yard Drains
- Catch Basins
- Drain Manholes
- Frames and Grates
- Brick Inverts for Drain Manholes

1.03 QUALITY ASSURANCE

- A. Provide precast units and structures as indicated.
  - 1. Precast units shall be capable of supporting AASHTO H-20 loading.
  - 2. Precast units shall comply with ASTM C913 Standard Specifications for Precast Concrete Water and Wastewater Structures and ASTM C478.
- B. Inspect structures upon receipt. Remove damaged structures from the work site.
- C. All work must be completed in accordance with the applicable federal, state, and local standards.

1.04 SUBMITTALS

- A. Submit Shop Drawings for precast concrete items. Detail components to be used, thickness dimensions, reinforcing, elevations at tops of precast sections, base and pipe inverts, and location of pipe penetrations. Submit copies of manhole schedule indicating all of the above.
- B. Product data shall be submitted showing installation instructions and details for grates, precast items, manhole sleeves, and joint sealants.

## PART 2 - PRODUCTS

### 2.01 CATCH BASINS

- A. Base Sections: Precast monolithic construction. Sump depths as shown on the Drawings.
- B. Barrel: Precast with cored or formed pipe openings.
- C. Top Sections: Shall be precast eccentric cone. Flat top slabs shall be used when manhole depth is less than five feet (5'). Flat top slabs shall withstand H-20 loading.
- D. Pipe to Catch Basin Connections: Manhole connections at pipe penetrations shall be KOR-N-SEAL, CP series or LOCK-JOINT flexible rubber manhole sleeve sized to fit the diameter and type of pipe. Ribbed Pipe will require the use of special gaskets in accordance with the manufacturer's requirements. Pipes larger than 18" diameter maybe brick and mortared per NHDOT specifications to be water tight. Finishes shall be smooth on interior with no brick penetrating into structure. Mortar shall be non-shrink hydraulic type.
- E. Joints Between Sections: Horizontal joints between sections of precast concrete barrels shall be of an overlapping type, sealed for water-tightness using a single row of an elastomeric or mastic type sealant.
- F. Steps: Not required.
- G. Exterior Coating: Not required.

### 2.02 DRAIN MANHOLES

- A. Base Sections: Precast monolithic construction. Sump depths as shown on the Drawings.
- B. Barrel: Precast with cored or formed pipe openings.
- C. Top Sections: Top sections shall be precast eccentric cone. Flat top slabs shall be used when manhole depth is less than five feet (5'). Flat top slabs shall withstand H-20 loading. Rough opening shall be thirty inch (30") diameter.
- D. Pipe to Catch Basin Connections: Manhole connections at pipe penetrations shall be KOR-N-SEAL, CP series or LOCK-JOINT flexible rubber manhole sleeve sized to fit the diameter and type of pipe. Ribbed Pipe will require the use of special gaskets in accordance with the manufacturer's requirements. Pipes larger than 18" diameter maybe brick and mortared per NHDOT specifications to be water tight. Finishes shall be smooth on interior with no brick penetrating into structure. Mortar shall be non-shrink hydraulic type.
- E. Joints Between Sections: Horizontal joints between sections of precast concrete barrels shall be of an overlapping type, sealed for water-tightness using a single row of an elastomeric or mastic type sealant.

- F. Steps: Not required.
- G. Exterior Coating: Not required.
- H. Brick Inverts: Required in all drain manhole structures.

## 2.04 FRAMES AND GRATES

- A. Coatings: Not Required.
- B. Cast iron: ASTM A48, Class 30, H20 Rated.
- C. Catch Basin/Yard Drain Frames and Grates:
  - 1. Square Grate: Neenah Foundry Company Catalog (14th Edition) No. R-3570 or approved equal. Bicycle safe as required. This type of grate shall be used for all catch basins, and yard drains of this specification, unless otherwise noted.
  - 2. Pedestrian Grate: Neenah R-2569 or approved equal.
- D. Drain Manhole Frames and Covers: Manhole frames and covers shall be Vermont Standard with three inch (3") high raised letters cast on the cover, labeled "DRAIN". Standard frames with thirty inch (30") diameter opening shall be LeBaron Foundry #LC-328, or approved equal.
- E. Drain cover castings shall be of even-grained cast iron, smooth, and free from scale, lumps, blisters, sand holes, and defects.

## 2.05 MASONRY MATERIALS FOR DRAIN MANHOLE INSTALLATION

- A. Brick masonry for shelf, invert and grade adjustment shall comply with ASTM C32-05, clay or shale, for grade SS hard brick.
- B. Mortar shall be composed of portland cement and sand with or without hydrated lime addition. Proportions of mortar of parts by volumes shall be 4.5 parts sand and 1.5 parts cement, or 4.5 parts sand, one part cement and 0.5 part hydrated lime.
- C. Cement shall be type II portland cement conforming to ASTM C150-05.
- D. Hydrated lime shall be type S conforming to ASTM C207-06 "Standard Specifications for Hydrated Lime for Masonry Purposes."
- E. Sand shall consist of inert natural sand conforming to the ASTM C33-03. "Standard Specifications for Concrete, Fine Aggregates."
- F. In the flow channel, a drop of at least 0.1 feet shall be provided between incoming and outgoing sewers on all manholes.

PART 3 - EXECUTION

3.01 INSTALLATION

- A. Placement: Place bases on compacted, level bedding material so that pipe inverts are at proper elevations. Align drains so that grates are in proper relationship to gutters or curbs.
- B. Joints: Install Butyl mastic on joints as specified. Plug lift holes inside and out.
- C. Frames and Grates: Set to grade as shown on the Drawings or as directed by the Engineer.

END OF SECTION 33 44 00



# REPORT

17-1518 S

February 8, 2018

## Explorations and Geotechnical Engineering Services

Storm Drain Pipe Collapse at Athletic Field  
Hanover High School  
41 Lebanon Street  
Hanover, New Hampshire

**Prepared For:**

SAU 70

Attention: Anthony Daigle

41 Lebanon Street

Hanover, NH 03755

**Prepared By:**

S. W. Cole Engineering, Inc.

P.O. Box 1272

White River Junction, VT 05001

T: (802) 281-4559



**S.W.COLE**  
ENGINEERING, INC.

- *Geotechnical Engineering*
- *Construction Materials Testing and Special Inspections*
- *GeoEnvironmental Services*
- *Test Boring Explorations*

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17-1518 S

February 8, 2018

SAU 70  
Attention: Anthony Daigle  
41 Lebanon Street  
Hanover, NH 03755

Subject: Explorations and Geotechnical Engineering Services  
Storm Drain Pipe Collapse at Athletic Field  
Hanover High School  
41 Lebanon Street  
Hanover, New Hampshire

Dear Tony:

In accordance with our Proposal dated December 21, 2017, the following presents results of our geotechnical evaluation for the Storm Drain Pipe Collapse at Athletic Field, at the Hanover High School in Hanover, New Hampshire. This report summarizes our findings and geotechnical assessment, and its contents are subject to the limitations set forth in Appendix A.

## **1.0 INTRODUCTION**

### **1.1 Scope and Purpose**

The purpose of our services was to explore subsurface conditions at the site in order to explore and evaluate whether or not subgrade soils below the pipe contributed to the pipe collapse. Our scope of services included test boring explorations, soils laboratory testing, geotechnical evaluation of the findings, and preparation of this report.

### **1.2 Project Understanding**

We understand a synthetic turf athletic field was constructed at the high school in about 2005-2006. Prior to the construction, a grass athletic field occupied the area and the construction required placement of tapered deep fills, estimated on the order of 15 to 30 feet deep, in a natural drainage ravine to achieve the field grade. The 2005-2006 project

included raising the grass field grade by 7 to 10 feet across the existing field and extension of the top of the embankment slope to the southwest to accommodate a larger playing surface, requiring up to 30 feet of fill to create a 2H:1V slope. A 42-inch diameter corrugated metal storm drain pipe was located below the pre-2005 field, oriented and flowing in a northeast-southwest direction. During the 2005-2006 construction, the storm drain pipe was extended further southwest using a 42-inch corrugated plastic pipe flowing to a manhole at the top of slope and flowing to an outlet at a concrete headwall outfall near the toe of the extended slope. The storm drain pipe invert is on the order of 30 feet below the field surface.

A depression at the ground surface on the southwest end of the field was observed by facility personnel, measuring about 6 by 6 feet and 6 inches deep in early 2017. After a heavy rain event in July 2017, we understand the depression became about 6 inches deeper. In November 2017, SAU 70 facility personnel contracted a video survey of the overall pipe run below the field, which measures nearly 400 feet in length. The video survey determined the plastic storm drain pipe had collapsed near the southwest end of the run, corresponding to an area beneath the sink hole. The video survey was terminated at the collapse and did not continue further toward the outfall. Our visual observation of the pipe viewed from the outfall indicates the plastic pipe is deformed and compressing.

During our site walk we looked for evidence of soil/sediment transport at the outfall and in the streambed further downstream. We did not observe evidence of sediment transport from the outfall. The headwall at the outlet was observed to be leaning slightly out of plumb toward the downstream direction.

It is our understanding that SAU 70 is preparing to resurface the synthetic turf field, but prior to this work wants to repair the storm drain and understand the reasons for the observed collapse of the drain.

Existing site features are shown on the "Exploration Location Plan" included in Appendix B.

## **2.0 EXPLORATION AND TESTING**

### **2.1 Explorations**

Two test borings (B-2 and B-2A) were made at the site on January 22, 2018 by S.W.COLE Explorations, LLC, a subsidiary of S. W. Cole Engineering, Inc. (S.W.COLE). The test borings were selected and established in the field by S.W.COLE using taped measurements from existing site features. Two other borings (B-1 and B-3) were planned, however omitted by the owner due to uncertainty associated with existing utilities.

The approximate test boring locations are shown on the "Exploration Location Plan," included in Appendix B. Test boring logs and a key to the notes and symbols used on the logs are included in Appendix C.

### **2.2 Field Testing**

Boring B-2 was drilled using hollow stem augers and carried to a depth of 33.5 feet. B-2A was advanced using cased wash rotary drilling techniques and carried to a depth of 62 feet. The soils were sampled where shown on the logs using a split spoon sampler and Standard Penetration Testing (SPT) procedures. SPT blow counts are shown on the logs.

### **2.3 Laboratory Testing**

Soil samples retrieved from the test borings were visually classified in our laboratory. We performed four laboratory gradation tests, two atterberg limit tests, and fourteen moisture content tests on a selected soil samples to assist in our geotechnical evaluation. We have attached results from gradation and atterberg limit tests in Appendix D. Results of moisture contents are shown on their respective boring logs.

## **3.0 SUBSURFACE CONDITIONS**

### **3.1 Soils**

Test boring B-2 encountered a surficial 2 inches of grassed topsoil overlying fill generally consisting of loose to medium dense, gray gravelly silt and fine sand to a depth of 33.5 feet below ground surface (bgs) where a refusal surface (probable boulder) was encountered. Decomposing organics, and occasional debris such as rubber, coal, and brick were observed in split spoon samples obtained within the fill.

Test boring B-2A was offset from B-2 approximately 10 feet in the northwest direction and encountered a subsurface boulder from 28 to 29.9 feet bgs. We infer the boulder to be at the borrom of the fill, overlying native fine grain soils generally consisting of loose gray silt and fine sand with varying portions of clay to a depth of 62 feet bgs where the test boring was terminated.

Please refer to the attached logs for more detailed subsurface information.

### **3.2 Groundwater**

Perched groundwater was encountered in test boring B-2 from 7 to 12 feet. Soils appeared saturated below 30 feet in test boring B-2A. Groundwater observations were made at the time of exploration work. Long term groundwater information is not available at this time. Groundwater levels will fluctuate seasonally and in response to precipitation and snowmelt.

## **4.0 EVALUATION**

### **4.1 General Findings**

Based on our observations, testing and evaluation, we offer the following relative to the pipe support and stability of the fill embankment.

- The native soils below the pipe subgrade consist of stable deposits of silt with varying proportions of fine sand and clay and in our opinion provide adequate bearing support for the existing pipe.
- It is our opinion the pipe collapse is a result of inadequate pipe strength compared to the load applied to the pipe from the fill thickness. Consequently, it is our opinion the sinkhole was formed by the collapse of the pipe and the fill settling into the void created by the crushed pipe.
- The fill soils consist of a mixture of silt, sand and gravel with occasional decomposing organics and debris based on sampling. However, the frequency of the organics and debris are difficult to determine from a small diameter test borings and may reveal to be more frequent in an open excavation. The moisture content of the fill soils is higher than what we typically experience for an optimum moisture content for this type of soil as determined by modified proctor (ASTM D-1557) indicating that the fill was likely compacted to less than an industry standard of 92

to 95 percent compaction. However, the SAU reports that they have not had issues regarding the surface grading or performance of the playing field, indicating that if settlement of fill has occurred, it apparently has not been detrimental to the field use or performance.

- We developed a subsurface cross-section of the existing slope utilizing surficial grading and subsurface information from the borings. We performed a static slope stability using the computer program Slope /W and developed empirically correlated soil strength and unit weight. The results of the slope stability analysis indicate a safety factor on the order of 1.3. Typically a factor of safety of 1.3 or greater is considered stable for an embankment not supporting traffic or a building.
- It is our opinion that the leaning of the headwall is a result of the lateral pressures applied by the nearly 30-foot tall slope above the wall. This is a typical reaction if the wall has an inadequately sized footing or if the wall backfill was not properly reinforced in the form of Mechanically Stabilized Earth to reduce the lateral pressures applied to the wall. Although overturning of the wall does not appear imminent, if the wall were to overturn, a surficial slough/failure of the soils behind the wall is likely.
- Although the slope is stable from a static standpoint, the compromised pipe does run the risk of introducing water flow from the pipe into the embankment and foundation soils if there is a disconnection in the continuity of the pipe. Water flow outside of the pipe has the potential to erode and transport soils to the outlet, resulting in possible formation of additional sinkholes, settlement and embankment instability. Further, sections of the pipe are deformed, but not completely collapsed. If further pipe collapses occur, additional sinkhole should be expected.
- For these reasons, it is advisable to close the southwest portion of the field where the plastic stormdrain pipe is present until the stormdrain can be repaired.

**5.0 CLOSURE**

It has been a pleasure to be of assistance to you with this phase of your project. We look forward to working with you during the next phase of the project.

Sincerely,

**S. W. Cole Engineering, Inc.**

Chad B. Michaud, P.E.  
Senior Geotechnical Engineer

TSD:cbm

DRAFT



## **APPENDIX A**

### **Limitations**

DRAFT

This report has been prepared for the exclusive use of SAU 70 for specific application to the Storm Drain Pipe Collapse at Athletic Field at the Hanover High School in Hanover, New Hampshire. S. W. Cole Engineering, Inc. (S.W.COLE) has endeavored to conduct our services in accordance with generally accepted soil and foundation engineering practices. No warranty, expressed or implied, is made.

The soil profiles described in the report are intended to convey general trends in subsurface conditions. The boundaries between strata are approximate and are based upon interpretation of exploration data and samples.

The analyses performed during this investigation and recommendations presented in this report are based in part upon the data obtained from subsurface explorations made at the site. Variations in subsurface conditions may occur between explorations and may not become evident until construction. If variations in subsurface conditions become evident after submission of this report, it will be necessary to evaluate their nature and to review the recommendations of this report.

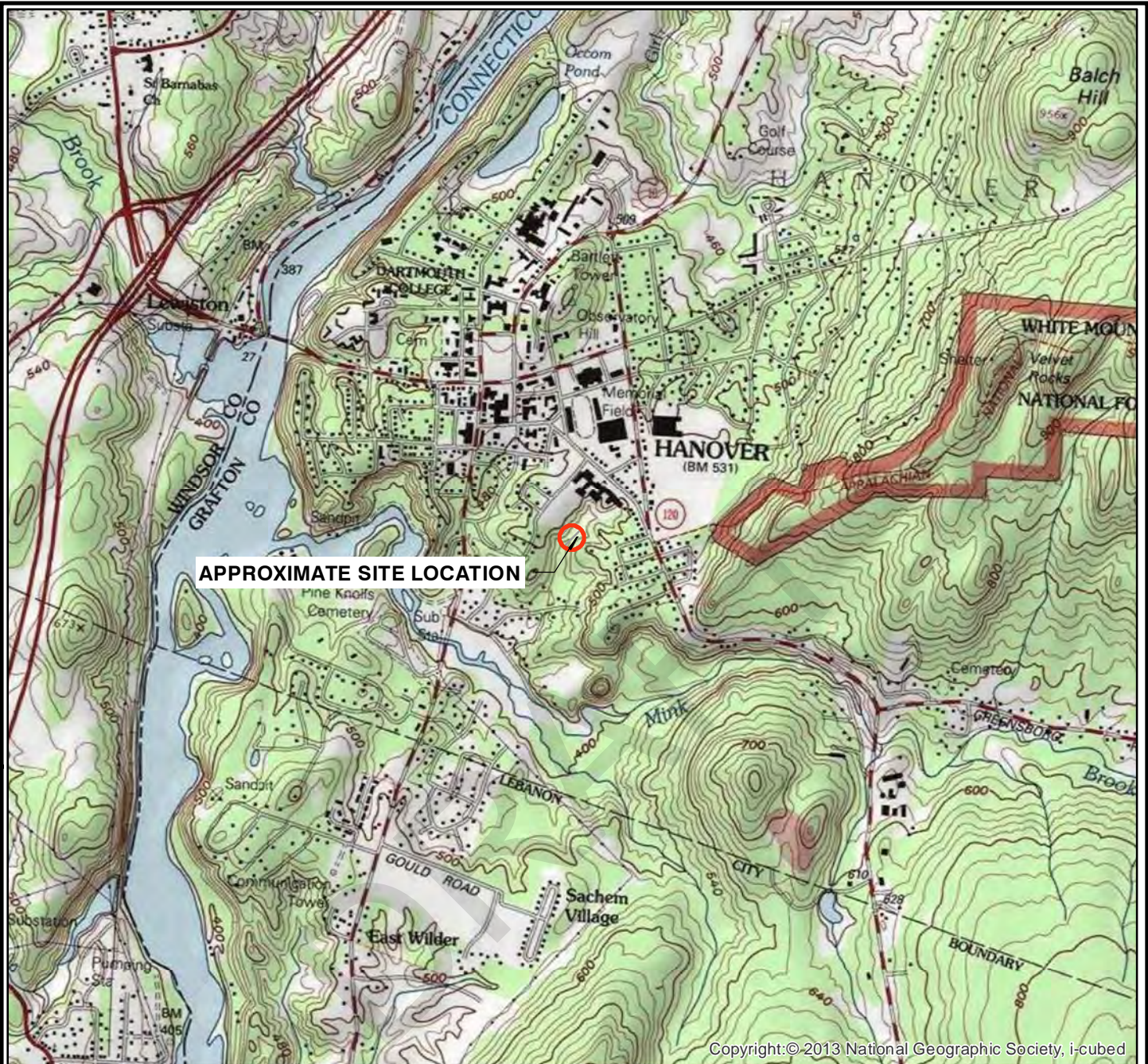
Observations have been made during exploration work to assess site groundwater levels. Fluctuations in water levels will occur due to variations in rainfall, temperature, and other factors.

S.W.COLE's scope of services has not included the investigation, detection, or prevention of any Biological Pollutants at the project site or in any existing or proposed structure at the site. The term "Biological Pollutants" includes, but is not limited to, molds, fungi, spores, bacteria, and viruses, and the byproducts of any such biological organisms.

Recommendations contained in this report are based substantially upon information provided by others regarding the proposed project. In the event that any changes are made in the design, nature, or location of the proposed project, S.W.COLE should review such changes as they relate to analyses associated with this report. Recommendations contained in this report shall not be considered valid unless the changes are reviewed by S.W.COLE.

## **APPENDIX B**

### **Figures**



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SAU 70

## SITE LOCATION MAP

STORM DRAIN PIPE COLLAPSE AT ATHLETIC FIELD  
HANOVER HIGH SCHOOL  
41 LEBANON STREET  
HANOVER, NEW HAMPSHIRE

### NOTE:

SITE LOCATION MAP PREPARED FROM  
ESRI ArcGIS ONLINE AND DATA PARTNERS  
INCLUDING USGS AND © 2007 NATIONAL  
GEOGRAPHIC SOCIETY.

Job No. 17-1518  
Date: 01/29/2018

Scale 1:24000  
Sheet 1





**LEGEND**

 APPROXIMATE BORING LOCATION

**NOTES:**

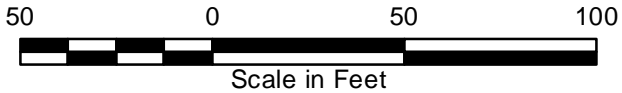
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- 2. THE BORINGS WERE LOCATED IN THE FIELD BY S. W. COLE ENGINEERING, INC. NY MEASUREMENTS FROM EXISTING SITE FEATURES.
- 3. THIS PLAN SHOULD BE USED IN CONJUNCTION WITH THE ASSOCIATED S. W. COLE ENGINEERING, INC. GEOTECHNICAL REPORT.
- 4. THE PURPOSE OF THIS PLAN IS ONLY TO DEPICT THE LOCATION OF THE EXPLORATIONS IN RELATION TO THE EXISTING CONDITIONS AND PROPOSED CONSTRUCTION AND IS NOT TO BE USED FOR CONSTRUCTION.



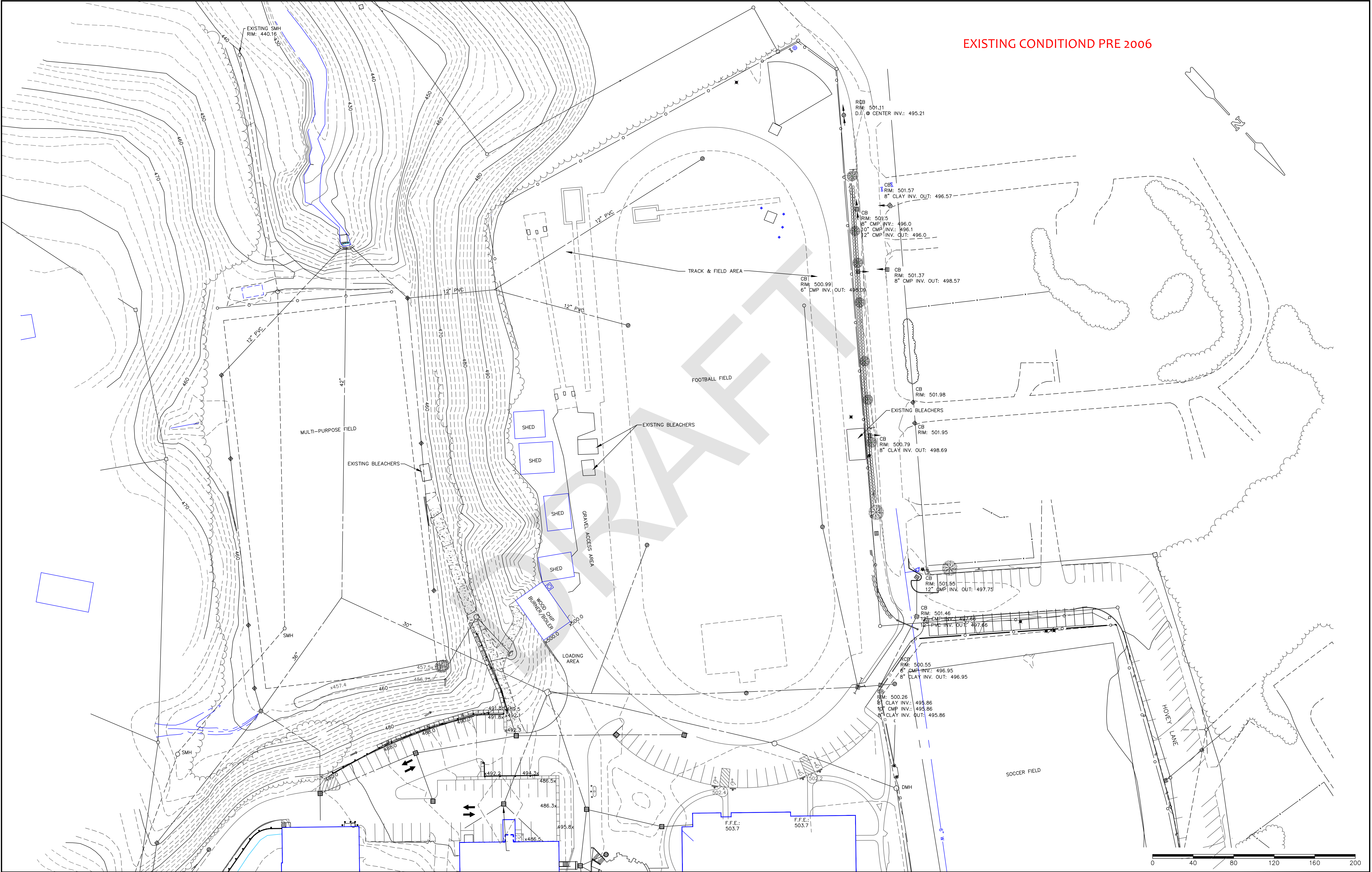
SAU 70

**EXPLORATION LOCATION PLAN**  
STORM DRAIN PIPE COLLAPSE AT ATHLETIC FIELD  
HANOVER HIGH SCHOOL  
41 LEBANON STREET  
HANOVER, NEW HAMPSHIRE

Job No.	17-1518	Scale	1"=50'
Date:	01/29/2018	Sheet	2







EXISTING CONDITIOND PRE 2006



REVISION NO.	DATE	DESCRIPTION	MADE BY	CHECKED BY	APPROVED BY

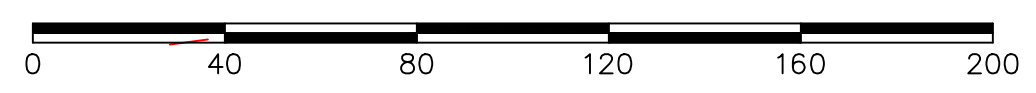
GRADING, DRAINAGE & UTILITY PLAN FOR  
**HANOVER HIGH SCHOOL**  
LEBANON STREET – HANOVER, NEW HAMPSHIRE

**CHRISTIAN C. HUNTRESS**  
HUNTRESS ASSOCIATES, INC.  
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(978) 470-8882

**PATHWAYS CONSULTING, LLC**  
3 SCHOOLHOUSE LANE, P.O. BOX 600  
ETNA, NEW HAMPSHIRE 03750  
(603) 643-3511

SCALE: 1"= 40'	SHEET 4 OF 10
DESIGNED BY: PAB	
DRAWN BY: PAB/JSB	
CHECKED BY: PAB	
DATE: 01/03/06	
PROJ. NO. 10021	



4



## **APPENDIX C**

### **Exploration Logs and Key**





# BORING LOG

CLIENT: SAU 70  
PROJECT: Storm Drain Pipe Collapse at Athletic Field  
LOCATION: 41 Lebanon St, Hanover, NH

BORING NO.: B-2  
SHEET: 1 of 1  
PROJECT NO. 17-1518  
DATE START: 1/22/2018  
DATE FINISH: 1/22/2018

## Drilling Information

LOCATION: See Exploration Location Plan ELEVATION (FT): 465' +/- TOTAL DEPTH (FT): 33.5 LOGGED BY: Tyler Demers  
DRILLING CO.: S. W. Cole Explorations, LLC DRILLER: Scott Hollabaugh DRILLING METHOD: Hollow Stem Auger  
RIG TYPE: Track Mounted Diedrich D-50 AUGER ID/OD: 2 1/4 in / 5 5/8 in SAMPLER: Standard Split-Spoon  
HAMMER TYPE: Automatic HAMMER WEIGHT (lbs): 140 CASING ID/OD: N/A / N/A CORE BARREL: N/A  
HAMMER EFFICIENCY FACTOR: HAMMER DROP (inch): 30  
WATER LEVEL DEPTHS (ft): Perched water from 7 to 12 feet  
GENERAL NOTES: Refusal at 33.5 feet (Probable Boulder). Offset 10 feet Northwest to B-2A

KEY TO NOTES AND SYMBOLS: Water Level  
▽ At time of Drilling  
▽ At Completion of Drilling  
▽ After Drilling  
D = Split Spoon Sample  
U = Thin Walled Tube Sample  
R = Rock Core Sample  
V = Field Vane Shear  
Pen. = Penetration Length  
Rec. = Recovery Length  
bpf = Blows per Foot  
mpf = Minute per Foot  
WOR = Weight of Rods  
WOH = Weight of Hammer  
RQD = Rock Quality Designation  
PID = Photoionization Detector  
S<sub>v</sub> = Field Vane Shear Strength, kips/sq.ft.  
q<sub>u</sub> = Unconfined Compressive Strength, kips/sq.ft.  
N/A = Not Applicable

Elev. (ft)	Depth (ft)	Casing Pen. (bpf)	SAMPLE INFORMATION					Graphic Log	Sample Description & Classification	H <sub>2</sub> O Depth	Remarks
			Sample No.	Type	Depth (ft)	Pen./ Rec. (in)	Blow Count or RQD				
460	5		1D	×	0-2	24/12	2-9-10-10		0.1 2" Grassed Topsoil		
			2D	×	2-4	24/18	11-11-11-9	w = 14.5 %	Medium dense, gray Gravelly SILT and fine SAND with wood and brick (Fill)		
455	10		3D	×	5-7	24/4	4-6-5-4	w = 11.4 %			
			4D	×	7-9	24/18	4-4-7-5	w = 14.1 %	7.0 Medium dense, gray SILT and fine SAND some gravel with some decomposing organics (Fill)		
450	15		5D	×	10-12	24/20	5-4-5-4	w = 14.8 %	becoming loose		
			6D	×	12-14	24/18	4-5-6-6	w = 15.2 %	becoming medium dense		
445	20		7D	×	15-17	24/12	5-5-6-6	w = 12.9 %			
			8D	×	20-22	24/12	4-3-4-3	w = 13.7 %	20.0 Loose, gray SILT and SAND some gravel some decomposing organics (Fill) coal piece in 8D		
440	25		9D	×	25-27	24/18	4-4-5-5	w = 16.8 %	rubber fragments in 9D		
			10D	×	30-32	24/18	4-4-4-4	w = 17.7 %			
435	30							w = 18.2 %	with rootlets in 10D		
33.5									Refusal at 33.5 feet (Probable Boulder)		

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

BORING NO.: B-2



# BORING LOG

CLIENT: SAU 70  
PROJECT: Storm Drain Pipe Collapse at Athletic Field  
LOCATION: 41 Lebanon St, Hanover, NH

BORING NO.: B-2A  
SHEET: 1 of 2  
PROJECT NO. 17-1518  
DATE START: 1/22/2018  
DATE FINISH: 1/22/2018

## Drilling Information

LOCATION: See Exploration Location Plan ELEVATION (FT): 465' +/- TOTAL DEPTH (FT): 62.0 LOGGED BY: Tyler Demers  
DRILLING CO.: S. W. Cole Explorations, LLC DRILLER: Scott Hollabaugh DRILLING METHOD: Cased Boring  
RIG TYPE: Track Mounted Diedrich D-50 AUGER ID/OD: N/A / N/A SAMPLER: Standard Split-Spoon  
HAMMER TYPE: Automatic / Automatic HAMMER WEIGHT (lbs): 140 / 140 CASING ID/OD: 4 in / 4 1/2 in CORE BARREL: N/A  
HAMMER EFFICIENCY FACTOR: HAMMER DROP (inch): 30 / 30  
WATER LEVEL DEPTHS (ft): Soils appear saturated below 30 feet

## GENERAL NOTES:

KEY TO NOTES AND SYMBOLS: Water Level  
▽ At time of Drilling D = Split Spoon Sample Pen. = Penetration Length WOR = Weight of Rods  
▽ At Completion of Drilling U = Thin Walled Tube Sample Rec. = Recovery Length WOH = Weight of Hammer  
▽ After Drilling R = Rock Core Sample bpf = Blows per Foot RQD = Rock Quality Designation S<sub>v</sub> = Field Vane Shear Strength, kips/sq.ft.  
V = Field Vane Shear mpf = Minute per Foot PID = Photoionization Detector q<sub>u</sub> = Unconfined Compressive Strength, kips/sq.ft.  
N/A = Not Applicable

Elev. (ft)	Depth (ft)	Casing Pen. (bpf)	SAMPLE INFORMATION					Graphic Log	Sample Description & Classification	H <sub>2</sub> O Depth	Remarks
			Sample No.	Type	Depth (ft)	Pen./ Rec. (in)	Blow Count or RQD				
460	5								No Sampling (Fill). See B-2		
455	10										
450	15										
445	20										
440	25										
435	30		1D	×	30-32	24/6	5-5-6-6		28.0 Boulder		
							w = 36.3 %		29.9 Medium dense, gray SILT trace fine sand and clay		
430	35		2D	×	35-37	24/14	5-5-4-4		35.0 Loose, gray SILT some clay trace fine sand		
							w = 40.4 %				

Stratification lines represent approximate boundary between soil types, transitions may be gradual. Water level readings have been made at times and under conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the time measurements were made.

(Continued Next Page)

BORING NO.: B-2A



# BORING LOG

CLIENT: SAU 70  
 PROJECT: Storm Drain Pipe Collapse at Athletic Field  
 LOCATION: 41 Lebanon St, Hanover, NH

BORING NO.: **B-2A**  
 SHEET: 2 of 2  
 PROJECT NO. 17-1518  
 DATE START: 1/22/2018  
 DATE FINISH: 1/22/2018

Elev. (ft)	Depth (ft)	Casing Pen. (bpf)	SAMPLE INFORMATION					Graphic Log	Sample Description & Classification	H <sub>2</sub> O Depth	Remarks
			Sample No.	Type	Depth (ft)	Pen./ Rec. (in)	Blow Count or RQD				
			3D	X	40-42	24/12	5-4-3-2		Loose, gray SILT some clay trace and fine sand		
				X				w = 38.9 %			
420	45		4D	X	45-47	24/12	3-3-3-2				
				X							
415	50		5D	X	50-52	24/14	3-3-2-2		Loose, gray SILT and fine SAND some clay		
				X				w = 37.2 %			
410	55		6D	X	55-57	24/16	4-3-3-3				
				X							
405	60		7D	X	60-62	24/2	6-4-4-4				
				X							

62.0 Bottom of Exploration at 62.0 feet

DRAFT



## **KEY TO THE NOTES & SYMBOLS**

### **Test Boring and Test Pit Explorations**

All stratification lines represent the approximate boundary between soil types and the transition may be gradual.

#### **Key to Symbols Used:**

w	-	water content, percent (dry weight basis)
q <sub>u</sub>	-	unconfined compressive strength, kips/sq. ft. - based on laboratory unconfined compressive test
S <sub>v</sub>	-	field vane shear strength, kips/sq. ft.
L <sub>v</sub>	-	lab vane shear strength, kips/sq. ft.
q <sub>p</sub>	-	unconfined compressive strength, kips/sq. ft. based on pocket penetrometer test
O	-	organic content, percent (dry weight basis)
W <sub>L</sub>	-	liquid limit - Atterberg test
W <sub>P</sub>	-	plastic limit - Atterberg test
WOH	-	advance by weight of hammer
WOM	-	advance by weight of man
WOR	-	advance by weight of rods
HYD	-	advance by force of hydraulic piston on drill
RQD	-	Rock Quality Designator - an index of the quality of a rock mass. RQD is computed from recovered core samples.
γ <sub>T</sub>	-	total soil weight
γ <sub>B</sub>	-	buoyant soil weight

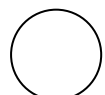
#### **Description of Proportions:**

0 to 5% TRACE  
5 to 12% SOME  
12 to 35% "Y"  
35+% AND

**REFUSAL: Test Boring Explorations** - Refusal depth indicates that depth at which, in the drill foreman's opinion, sufficient resistance to the advance of the casing, auger, probe rod or sampler was encountered to render further advance impossible or impracticable by the procedures and equipment being used.

**REFUSAL: Test Pit Explorations** - Refusal depth indicates that depth at which sufficient resistance to the advance of the backhoe bucket was encountered to render further advance impossible or impracticable by the procedures and equipment being used.

Although refusal may indicate the encountering of the bedrock surface, it may indicate the striking of large cobbles, boulders, very dense or cemented soil, or other buried natural or man-made objects or it may indicate the encountering of a harder zone after penetrating a considerable depth through a weathered or disintegrated zone of the bedrock.



## **APPENDIX D**

### **Laboratory Test Results**

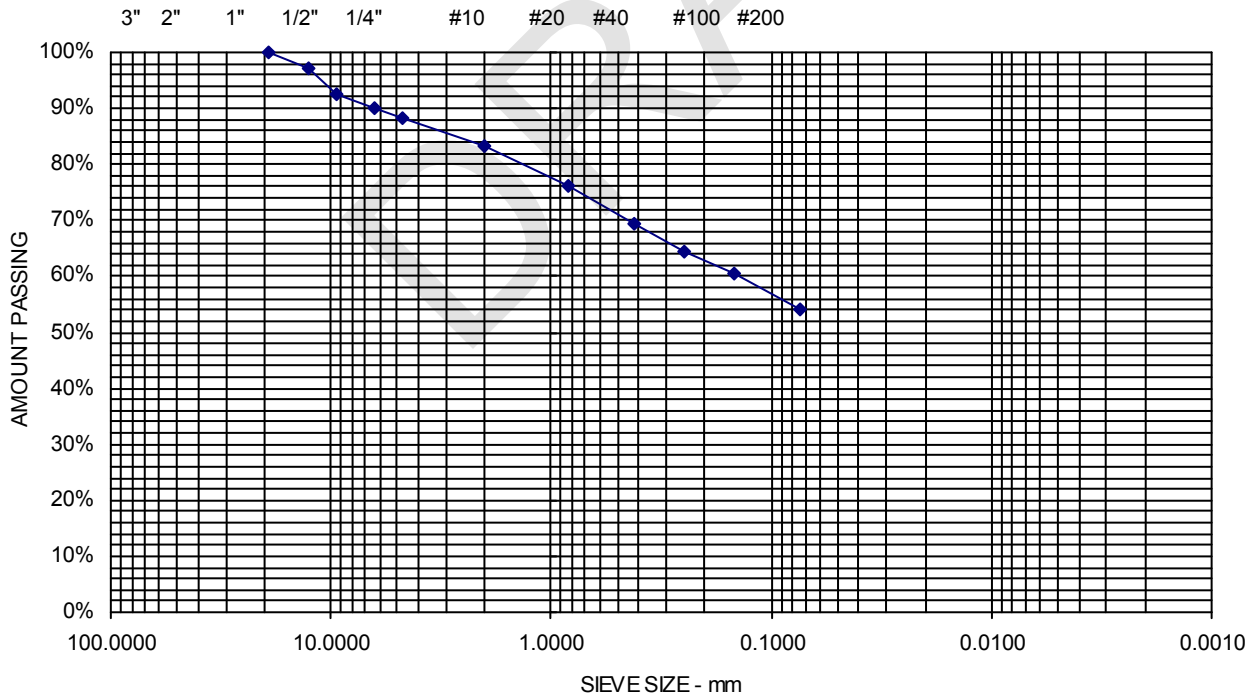
Project Name HANOVER NH - HANOVER HIGH SCHOOL MULTIPURPOSE  
 ATHLETIC FIELD - SLOPE AND DRAINAGE EVALUATION  
 Client SCHOOL ADMINISTRATIVE UNIT 70

Project Number 17-1518  
 Lab ID 16844S  
 Date Received 1/23/2018  
 Date Completed 1/29/2018  
 Tested By BRADLEY GERSCHWILER

Material Source **B-2, 5D, 10.0'-12.0'**

<u>STANDARD DESIGNATION (mm/μm)</u>	<u>SIEVE SIZE</u>	<u>AMOUNT PASSING (%)</u>	
19.0 mm	3/4"	100	
12.5 mm	1/2"	97	
9.5 mm	3/8"	92	
6.3 mm	1/4"	90	
4.75 mm	No. 4	88	11.9% Gravel
2.00 mm	No. 10	83	
850 μm	No. 20	76	
425 μm	No. 40	69	34% Sand
250 μm	No. 60	64	
150 μm	No. 100	60	
75 μm	No. 200	54.1	54.1% Fines

## SILT AND FINE SAND SOME GRAVEL



Comments: Moisture Content = 15.2%

**Sheet**

# Report of Gradation

ASTM C-117 &amp; C-136

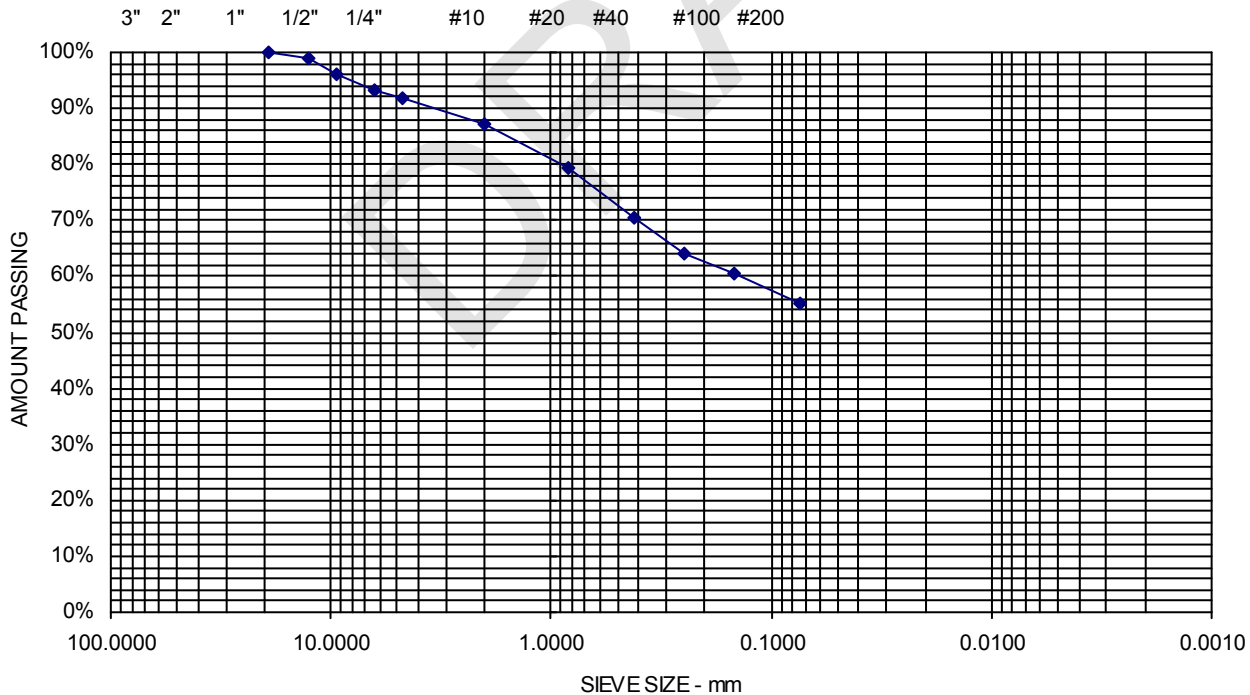
Project Name HANOVER NH - HANOVER HIGH SCHOOL MULTIPURPOSE  
ATHLETIC FIELD - SLOPE AND DRAINAGE EVALUATION  
Client SCHOOL ADMINISTRATIVE UNIT 70

Project Number 17-1518  
Lab ID 16848S  
Date Received 1/23/2018  
Date Completed 1/29/2018  
Tested By BRADLEY GERSCHWILER

Material Source B-2, 9D, 25.0'-27.0'

<u>STANDARD DESIGNATION (mm/μm)</u>	<u>SIEVE SIZE</u>	<u>AMOUNT PASSING (%)</u>	
19.0 mm	3/4"	100	
12.5 mm	1/2"	99	
9.5 mm	3/8"	96	
6.3 mm	1/4"	93	
4.75 mm	No. 4	92	8.2% Gravel
2.00 mm	No. 10	87	
850 μm	No. 20	79	
425 μm	No. 40	70	36.5% Sand
250 μm	No. 60	64	
150 μm	No. 100	61	
75 μm	No. 200	55.3	55.3% Fines

## SILT AND SAND SOME GRAVEL (FILL)



Comments: Moisture Content = 17.7%

**Sheet**

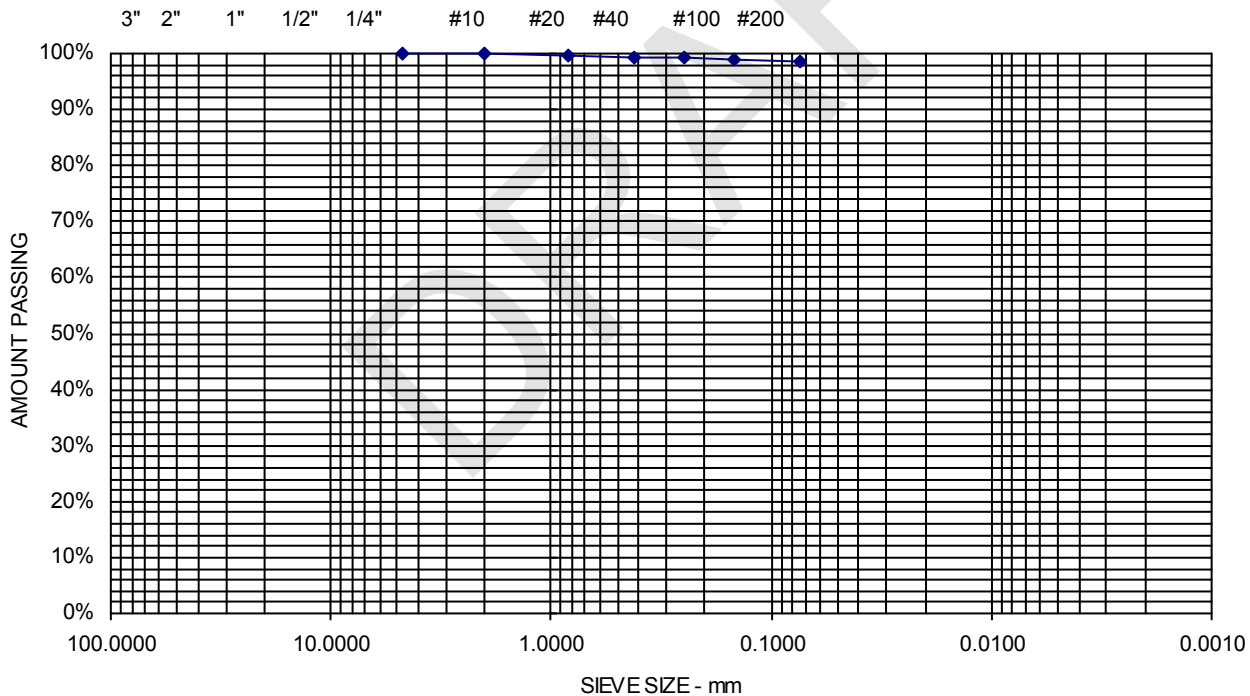
Project Name HANOVER NH - HANOVER HIGH SCHOOL MULTIPURPOSE  
 ATHLETIC FIELD - SLOPE AND DRAINAGE EVALUATION  
 Client SCHOOL ADMINISTRATIVE UNIT 70

Project Number 17-1518  
 Lab ID 16850S  
 Date Received 1/23/2018  
 Date Completed 1/26/2018  
 Tested By BRADLEY GERSCHWILER

Material Source B-2A, 1D, 30.0'-32.0'

<u>STANDARD DESIGNATION (mm/μm)</u>	<u>SIEVE SIZE</u>	<u>AMOUNT PASSING (%)</u>	
4.75 mm	No. 4	100	0% Gravel
2.00 mm	No. 10	100	
850 μm	No. 20	100	
425 μm	No. 40	99	1.3% Sand
250 μm	No. 60	99	
150 μm	No. 100	99	
75 μm	No. 200	98.7	98.7% Fines

## SILT TRACE FINE SAND AND CLAY



Comments: Moisture Content = 36.3%

**Sheet**



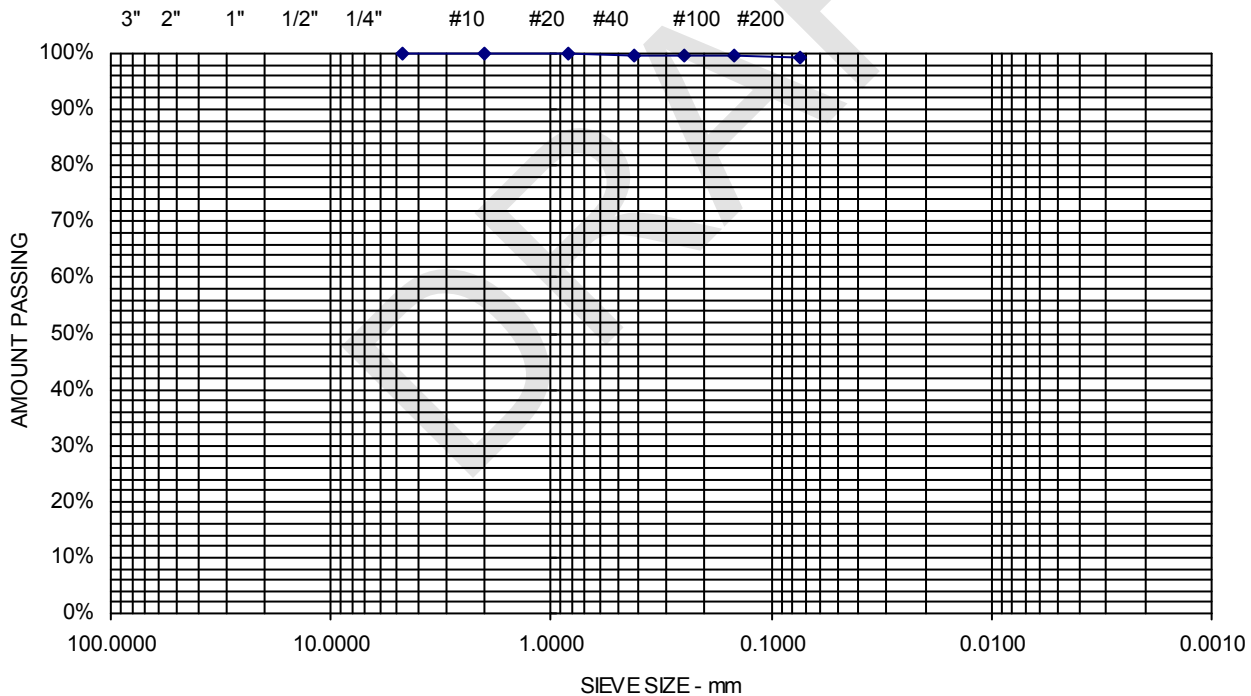
Project Name HANOVER NH - HANOVER HIGH SCHOOL MULTIPURPOSE  
 ATHLETIC FIELD - SLOPE AND DRAINAGE EVALUATION  
 Client SCHOOL ADMINISTRATIVE UNIT 70

Project Number 17-1518  
 Lab ID 16852S  
 Date Received 1/23/2018  
 Date Completed 1/26/2018  
 Tested By BRADLEY GERSCHWILER

Material Source B-2A, 3D, 40.0'-42.0'

<u>STANDARD DESIGNATION (mm/μm)</u>	<u>SIEVE SIZE</u>	<u>AMOUNT PASSING (%)</u>	
4.75 mm	No. 4	100	0% Gravel
2.00 mm	No. 10	100	
850 μm	No. 20	100	
425 μm	No. 40	100	0.7% Sand
250 μm	No. 60	100	
150 μm	No. 100	99	
75 μm	No. 200	99.3	99.3% Fines

**SILT SOME CLAY TRACE FINE SAND**



Comments: Moisture Content = 38.9%

**Sheet**



## Report of Atterberg Limits

ASTM D4318-10 - Method A

**Project Name:** Slope and Drainage Evaluation  
**Project Location:** Hanover High School  
**Client:** SAU 70  
**Material Description:** Silt some clay trace fine sand  
**Material Source:** B-2A, 2D, 35.0'-37.0'

**Project Number:** 17-1518  
**Lab ID:** 16851S  
**Date Received:** 01/23/18  
**Date Completed:** 02/07/18  
**Tested By:** BLG

**Liquid Limit**

**Undetermined**

**Plastic Limit**

**Undertermined**

**Plasticity Index**

**Granular Non-Plastic**

Material Retained On the No. 40 Sieve:

1%

As-received Moisture Content:

40%

Comments:

Reviewed By: \_\_\_\_\_

10 Centre Road, Somersworth, NH 03878-2926 • P: (603) 692.0088 • F: (603) 692.0044 • E: [infosomersworth@swcole.com](mailto:infosomersworth@swcole.com)



## **Report of Atterberg Limits**

ASTM D4318-10 - Method A

**Project Name:** Slope and Drainage Evaluation  
**Project Location:** Hanover High School  
**Client:** SAU 70  
**Material Description:** Silt and fine sand some clay  
**Material Source:** B-2A, 5D, 50.0'-52.0'

**Project Number:** 17-1518  
**Lab ID:** 16853S  
**Date Received:** 01/23/18  
**Date Completed:** 02/07/18  
**Tested By:** BLG

**Liquid Limit**

**Undetermined**

**Plastic Limit**

**Undetermined**

**Plasticity Index**

**Granular Non-Plastic**

Material Retained On the No. 40 Sieve:

30%

As-received Moisture Content:

37%

Comments:

Reviewed By: \_\_\_\_\_

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