Project Manual
Volume 1 of 1

Abbey Road
Drainage Improvements

Town of Darien
Darien, Connecticut

August 31, 2015

Tighe&Bond
1000 Bridgeport Avenue, Suite 320
Shelton, Connecticut 06484

Town of Darien

Abbey Road Drainage Improvements

August 31, 2015

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SECTION 00100

INVITATION TO BID

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TOWN OF DARIEN
BID NO. 2015-16

Sealed bids for providing and installing storm drainage piping, catch basins, manholes and associated work will be received and opened in the Office of the First Selectman, Town Hall, 2 Renshaw Road, Darien, CT 06820 on Monday, September 21, 2015 at 3:00pm which time and place all bids will be publicly opened and read aloud for supplying the Town of Darien with the following:

Abbey Road Drainage Improvements
Bid No. 2015-16

Bid documents are on file in the office of the Department of Public Works at Town Hall. Copies may be obtained upon request. A $50, non-refundable bid deposit payable to the Town of Darien will be required to obtain the bid documents. The Town of Darien reserves the right to reject any and all bids.

The attached bid form shall be completed and enclosed in envelopes (outer and inner) both of which shall be sealed. The following shall be printed on each envelope: **Abbey Road Drainage Improvements, Bid No. 2015-16.**

Bids shall be mailed or delivered to:

Office of the First Selectman
Darien Town Hall
2 Renshaw Road
Darien, CT 06820

The following information shall be submitted with each bid.

A certified check or bank draft, payable to the Town of Darien, or a satisfactory bid bond executed by the bidder in an amount equal to 5% of the bid amount.

SECTION 00200

INSTRUCTIONS TO BIDDERS

Town of Darien
Abbey Road Drainage Improvements
Bid No. 2015-16

Instructions to Bidders

Section 1 - Defined Terms:

1. **Town** shall refer to the Town of Darien Department of Public Works, Its agents, representatives, or employees or other Town of Darien agency having jurisdiction relative to the subject matter.

2. **Town** shall also be used interchangeably with and carry the same meaning as the **Owner, Issuing Office, or Engineer**.

3. **Police** shall refer to the Darien Police Department, Its agents, representatives, officers, or employees.

4. **State** shall refer to the State of Connecticut entity having jurisdiction over the subject matter and its agents, representatives, or employees.

5. The State of Connecticut Department of Transportation Standard Specifications for Roads, Bridges and Incidental Construction, Form 816, 2004 is incorporated herein and made a part of this Bid document and project by reference and is abbreviated as **CTDOT Form 816**.

6. **CTDOT** shall refer to the State of Connecticut Department of Transportation, its agents, representatives, or employees.

7. **The Work** or **Work** shall refer to all of the project components, labor, material, plant work, permit fees, safety apparatus, personnel, or any other necessary implement to cause the complete, timely and proper completion of the project contemplated herein.

8. **Contractor** shall refer to the entity or party engaged in completing The Work contemplated herein.

9. **Subcontractor** shall refer to any entity or party engaged by the Contractor to cause the necessary and proper completion of The Work or part thereof.

10. **Successful Bidder** shall refer to the lowest responsible Bidder submitting a responsive Bid to whom Owner makes an award.

Section 2 – Copies of Bidding Documents:

1. Complete sets of Bidding Documents in the number and for the deposit sum, if any, stated in the Advertisement or Invitation to Bid may be obtained from the Issuing Office. The

deposit will be refunded to each document holder of record who returns a complete set of Bidding Documents in good condition within 30 days after opening of Bids.

2. Complete sets of Bidding Documents must be used in preparing Bids; Owner assumes no responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

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

Section 3 – Qualifications of Bidders:

1. To demonstrate Bidder's qualifications to perform the Work, within five days of Owner's request Bidder shall submit written evidence such as financial data, previous experience, present commitments, and such other data as may be called for by the Owner. Information called for herein and provided by Bidder shall not preclude the Owner from requiring additional pertinent information.

2. No Bidder shall submit a Bid unless bona fide and prepared without collusion. The submission of a signed Bid shall be the Contractor's certification that said Bid is genuine and prepared without collusion.

Section 4 – Examination of Bidding Documents, Other Related Data, and Site:

1. The Owner has not used and is not aware of any reports of explorations or tests of subsurface conditions at or contiguous to the Site.

2. The Contractor shall bear the sole responsibility for determining the extent of underground facilities and holding same harmless and there will be no increase in the contract price for such work, if any. The Contractor shall "Call Before You Dig" at the following statewide toll free telephone number in Connecticut; 1-800-922-4455. Connecticut State Law mandates that Contractor's safety procedures include notifying "Call Before You Dig" in advance of excavation. The Contractor is hereby directed to comply.

3. No reports regarding Hazardous Environmental Conditions have been prepared or referenced in the preparation of these Bidding Documents, therefore no such reports are available or included herewith.

4. Responsibility for Hazardous Environmental Conditions encountered during construction shall be as described in Section 4.06 of the Standard General Conditions of the Construction Contract.

5. On request, Owner will provide Bidder access to site to conduct such examinations, investigations, explorations, tests, and studies, as Bidder deems necessary for the submission of a Bid. Bidder shall restore Site to its former condition upon completion of such examinations, investigations, explorations, tests, and studies.

6. No work is contemplated to be performed by the Owner, which would interfere with the accessibility or operations of the Contractor.

7. It is the responsibility of each Bidder before submitting a Bid to: examine and carefully

study the Bidding Documents, including all Addenda and the other related data identified in the Bidding Documents; and, visit the site and become familiar with and satisfy Bidder as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.

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

9. If the Contractor observes that the specifications or drawings violate any laws or regulations, The Contractor shall give the Town written notice thereof so that any necessary changes may be evaluated by the Town.

Section 5 – Pre-Bid Conference and Pre Construction Conference:

1. No Pre-Bid Conference is planned at this time.

2. Prior to the start of construction, a joint meeting shall be held with representatives of all prime contractors, the Owner, and other invited parties of governmental agencies, or utilities which may be affected by or have jurisdiction over some aspect of the project.

Section 6 – Site, Scope and Other Areas:

1. The Site is identified in the Bidding Documents. All additional lands and access thereto required for temporary construction facilities, construction equipment, or storage of materials and equipment to be incorporated in the Work are to be obtained and paid for by the Contractor.

2. The Contractor is responsible for the removal and disposal of all materials excavated as a result of The Work. No separate payment will be made for disposal fees. The Owner will not provide Contractor with facilities to dispose of waste materials.

3. The scope of The Work is described in the bidding documents. The actual scope of work will depend upon available funds budgeted for sidewalk replacement and Town of Darien priorities. Locations of sidewalk replacement may be added or deleted in whole or in part, to fit budget or at discretion of Town of Darien, following bid opening and examination of unit costs.

4. Upon award of project Contractor shall submit to Owner for approval, schedule of work.

5. Owner shall have authority to prioritize work and shall stipulate order of sidewalk replacement and limits of construction.

6. Contractor shall not be paid for any work outside of scope as determined and directed by

Town.

7. Upon completion of Work in areas deemed priority by Owner, remaining work may be eliminated in whole or part.

8. Contractor shall not prioritize, eliminate or add Work.

9. Work on private property shall not be allowed without expressed written consent of property owner and the Director of Public Works.

10. Access to all private property via driveways, walkways, private roads, or similar avenues, shall be maintained throughout construction by steel road plates, alternating construction of panels, or other approved means.

11. Contractor shall be responsible for coordinating access with affected residents.

12. Contractor is advised that no use of private property is allowed on this project without written permission of property owner (including use of water, use of garden hose, storage of materials or equipment, trespass or other use).

Section 7 – Interpretations and Addenda:

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

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

3. Questions, if any, shall be directed to:

Darren Oustafine, P.E.
Assistant Director of Public Works
2 Renshaw Rd, Town Hall
Darien, CT 06820
(203) 656-7365 Phone
(203) 656-7485 Facsimile
DOustafine@darienct.gov E-Mail

Section 8 – Contract Times:

1. The number of days within which, or the dates by which, the Work is to be: Substantially Complete; and, ready for final payment are set forth in the Agreement.

Section 9 – Liquidated Damages:

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

Section 10 – Substitutes and "Or-Equal" Items:

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

Section 11 – Subcontractors, Suppliers, And Others:

1. The identity of all Subcontractors planned to perform any portion of the Work associated with this project shall be submitted to Owner within five days after the Bid opening. Such list shall be accompanied by an experience statement with the pertinent information regarding similar projects and other evidence of qualifications of said Subcontractor. Owner reserves the right to reject any or all Subcontractors for any or no reason whatsoever.

2. The Contractor shall not sublet, sell, transfer, assign or otherwise dispose of The Work, or any portion thereof, or of his right, title or interest therein, to any person without written approval of the Town.

3. The Contractor shall agree to comply with the requirements of State of Connecticut Executive Order No. 3 promulgated to promote equal employment opportunity and non-discrimination throughout the labor force in Connecticut.

4. Town shall not be prevented by this bid or any contract expressed or implied by it or purchases made pursuant to it from purchasing the items referred to herein from another Contractor or vendor. This bid shall not establish an exclusive contract for the Contractor selected hereby.

Section 12 – Preparation of Bid:

1. The Bid form is included with the Bidding Documents. Additional copies may be obtained from Owner.

2. All blanks on the Bid form shall be complete by printing in ink or by typewriter and the Bid signed. Ink or typewriter used in filling out the Bid form must be reproducible by photocopy machine. A Bid price shall be indicated for each Unit Price and Bid Item listed therein. If a Bid Item is deleted by Addenda, the words "Not Applicable" shall be entered therein.

3. A Bid by a corporation shall be executed in the Corporate name by the president or the vice-president or other corporate officer accompanied by evidence of authority to sign.

The corporate seal shall be affixed and attested by the secretary or assistant secretary. The corporate address and state of incorporation shall be shown below the signature.

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

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

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

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

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

9. The Bid shall contain an acknowledgement of receipt of all Addenda, the numbers of which shall be filled in on the Bid form.

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

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

Section 13 – Basis of Bid; Evaluation of Bids:

1. Please note:

   a) Bidder shall submit a Bid on a unit price basis for each item of Work listed in the Bid Schedule.

   b) The total estimated price shall be determined as the sum of the products of the estimated quantity of each item and the unit price Bid for the item. The final quantities and Contract Price shall be determined in accordance with paragraph 11.03 of the Standard General Conditions of the Construction Contract.

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

2. The Bid price shall include such amounts as the Bidder deems proper for overhead and profit on account of cash allowances, if any, named in the Contract Documents as

provided in paragraph 11.02 of the Standard General Conditions of the Construction Contract.

Section 14 – Submittal of Bid:

1. Each prospective Bidder is furnished one copy of the Bidding Documents with one separate unbound copy each of the Bid form, and, if required, the Bid Bond. The unbound copy of the Bid form is to be completed and submitted with the Bid security.

2. A bid shall be submitted by U.S. Mail or other delivery system, and shall be as prescribed and indicated in the Advertisement or Invitation to Bid.

Section 15 – Bid Security:

1. A Bid must be accompanied by Bid security made payable to Owner in an amount of 5% of the Bidders maximum Bid price and in the form of a certified or bank check or a Bid Bond on form attached, issued by a surety meeting the requirements of paragraphs 5.01 and 5.02 of the Standard General Conditions of the Construction Contract.

2. The Bid security of the Successful Bidder will be retained until such Bidder has executed the Contract Documents, furnished the required contract security and met the other conditions of the Notice of Award, whereupon the Bid security will be returned. If the Successful Bidder fails to execute and deliver the Contract documents and furnish the required contract security within 15 days after Notice of Award, Owner may annul the Notice of Award and the Bid security of that Bidder will be forfeited.

3. The Bid security of the other Bidders whom Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of the seven days after the Effective Date of the Agreement or 61 days after the Bid opening, whereupon Bid security furnished by such Bidders will be returned. Bid security of other Bidders whom Owner believes do not have a reasonable chance of receiving the award will be returned within seven days after the Bid opening.

Section 16 – Modification and Withdraw of Bid:

1. A Bid may be withdrawn or modified by an appropriate document duly executed in the manner that a Bid must be executed and delivered to a place where Bids are to be submitted prior to the Date and Time for opening of Bids. For modifications, a previously submitted Bid must be withdrawn in its entirety and replaced with the modified version so that only one Bid resides in the possession of Town at time of Bid opening.

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

Section 17 – Opening of Bids:

1. Bids will be opened at the time and place and as indicated in the Advertisement or Invitation to Bid. An abstract of the amounts of the base Bids will be made available after

the Bid opening.

Section 18 – Bids Remain Subject to Acceptance:

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

Section 19 – Award of Contract:

1. Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, non-responsive, unbalanced, or conditional Bids. Owner further reserves the right to reject the Bid of any Bidder whom it finds, after reasonable inquiry and evaluation, to be non-responsible. Owner may also reject the Bid of any Bidder if Owner believes that it would not be in the best interest of the Project to make an Award to that Bidder. Owner also reserves the right to waive all informalities not involving price, time, or changes in the Work and to negotiate contract terms with the Successful Bidder.

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

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

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

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

6. If the Contract is to be awarded, the Owner will award the Contract to the Bidder whose Bid is in the best interest of the Project or Owner.

Section 20 – Contract Security and Insurance:

1. Article 5 of the Standard General Conditions of the Construction Contract, as may be modified by the Supplementary Conditions, sets forth Owner's requirements as to performance and payment bonds and insurance. When the successful Bidder delivers the executed Agreement to the Owner, it must be accompanied by such Bonds and insurance certificates.

2. Performance and Payment Bonds shall be executed upon forms supplied by the Owner.

3. Two (2) copies of Insurance Certificates covering limits as set for these specifications, will be required. Failure of any bidder to supply these documents within the time specified in the Notice of Award, may result in the disqualification of the bid and the contract award may be made to the next lowest qualified bidder.

Section 21 – Signing of Agreement:

1. If or when the Owner gives a Notice of Award to the Successful Bidder, it shall be accompanied by the required number of unsigned counterparts of the Agreement with the other Contract Documents which are identified in the Agreement and attached thereto. Within the time specified in the Notice of Award, Successful Bidder shall sign and deliver the required number of counterparts of the Agreement and attached documents to Owner. Within the time stated in the Notice of Award, Owner shall deliver one fully signed counterpart to the Successful Bidder.

2. Owner, upon executing Agreement, will fill in the date on the signature page of the Agreement in order to indicate when Agreement becomes effective.

Section 22 – Sales and Use Tax:

1. Owner is exempt from state sales tax on materials and equipment to be incorporated in the Work. Said taxes shall not be included in the Bid. Tax exempt status statement on Town of Darien letterhead will be provided upon request.

Section 23 – Retainage and Basis of Payment:

1. Provisions concerning Contractor's rights to deposit securities in lieu of retainage are set forth in the Agreement.

2. Retainage, interest, and payment procedures are set forth in the Agreement.

3. Contractor shall make application for payment using pay request form as provided by Owner.

Section 24 – Traffic Control During Construction:

1. Darien Police have first right of refusal for traffic control assignments on public roads within the Town of Darien. Darien Police will also decide how many officers will be necessary for an assignment.

2. Contractor is advised that an integral part of this project shall be scheduling traffic control through the Darien Police Department at 1-203-656-5311.

3. Contractor is advised that 8 hour advanced notice for cancellation of scheduled services is required by the Darien Police.

4. Owner will pay police charges directly. Contractor shall not pass through invoices to Owner and no markup will apply.

5. Owner will <u>not</u> pay for any cancellation fees. Contractor shall be responsible for all cancellation fees incurred by Owner relative to this project.

6. Should the Darien Police Department fail to provide personnel for traffic control, Contractor shall provide trained Flagmen in numbers sufficient to control traffic and satisfy Darien Police Department, and at unit price set forth in Bid.

7. Owner shall not compensate contractor for Flagmen that are not trained and certified and dedicated full time to detail of traffic control.

8. Contractor shall open roadway through overnight hours with full lanes of traffic restored and proper lighting, barricades, signs, warning devices, or other as required for safe passage of vehicular and pedestrian traffic.

9. Darien Police shall determine if traffic control officers are necessary overnight based upon site conditions and if so, Owner will not compensate Contractor for police charges due to Contractors negligence in leaving site in unsafe manner.

10. Contractor shall prepare traffic control plan for review and approval by Darien Police prior to scheduling offices for traffic control.

Section 25 – Miscellaneous Requirements:

1. The Contractor offers and agrees to assign to the public purchasing body all right, title and interest in all causes of action it may have under Section 4 of the Clayton Act, 15 U.S.C. or under Chapter 624 of the General Statutes of Connecticut, arising out of the purchase of services, property, or intangibles of any kind pursuant to a public purchasing contract of subcontracting. This assignment shall be made and become effective at the time the public purchasing body awards or accepts such contracts without further acknowledgment by the parties.

2. The Contractor is to keep a competent superintendent on the work site at all times during construction. All Work shall be done by experienced qualified personnel. Any Work not in accordance with these specifications shall be corrected at the Contractor's expense.

3. Town shall not be prevented by this bid or any contract expressed or implied by it or purchases made pursuant to it from purchasing the items referred to herein from another Contractor or vendor. This bid shall not establish an exclusive contract for the Contractor selected hereby.

4. The Contractor shall give all notices and comply with all laws and regulations applicable to furnishing and performing The Work. Except where otherwise expressly required by law or regulation, Town shall not be responsible for monitoring Contractor's compliance with laws and regulations.

5. The Contractor shall provide, erect and maintain all necessary precautions for the protection of The Work and the safety of the public.

Section 27 – Town of Darien, General Terms and Conditions of Bid:

1. **BID PROPOSALS**

Bid proposals are to be submitted in a sealed envelope and clearly marked with the bid number and title of bid. All prices and notations must be printed in ink or typewritten.

No erasures are permitted. Bid proposals are to be in the Office of the First Selectman, 2 Renshaw Road, Darien, Connecticut 06820 prior to the date and time specified at which time they will be publicly opened.

2. **WAIVER OF DEFECTS**

The Town of Darien reserves the right to waive defects in any and all bids or any part thereof deemed to be in the best interest of the Town.

3. **QUESTIONS**

Questions concerning conditions and specifications should be directed in writing to the individual described in the Invitation to Bid. Inquires must reference date of bid opening, requisition or contract number, and must be received no later than seven (7) calendar days prior to the date of bid opening. Failure to comply with these conditions will result in the bidder waiving the right to dispute the bid specifications and conditions.

4. **PRICES**

Prices quoted must be firm, for acceptance by the Town of Darien, for a period of sixty (60) days. Bidders are required to deliver awarded items at prices quotes in their original bid.

5. **F.O.B. DESTINATION**

Prices quoted shall be Net-Delivered to location. Bids quoting other than F.O.B. destination may be rejected.

6. **PERMITS**

The VENDOR will be responsible for securing all necessary permits, state and local, as required by the Town of Darien. The Town will waive its application and permit fees for Town of Darien projects.

7. **PAYMENT PROCEDURES**

No voucher, claim or charge against the Town shall be paid without approval for correctness and legality. Appropriate checks shall be drawn by the Finance Department for approved claims or charges and they shall be valid without countersignature unless prescribed otherwise.

8. **PAYMENT PERIOD**

The Town of Darien shall put forth its best effort to make payment within thirty (30) days after delivery of the item, acceptance of the work, or receipt of a properly completed invoice, which ever is later.

9. **THE VENDOR**

The Vendor for the awarded work shall be thoroughly familiar with the requirements of all specifications. The submission of a proposal shall be construed as evidence that the Vendor has examined the actual job conditions, requirements, and specifications. Any claim for labor, equipment or materials required, or difficulties encountered, which could have been foreseen had such an examination been carefully made, will not be recognized.

10. **ASSIGNMENT OF CONTRACT**

No contract may be assigned or transferred without the written consent of the Town of Darien.

11. **AWARD OF BIDS**

Contracts and purchases will be made or entered into with the lowest, responsive and responsible bidder meeting the specifications, except as otherwise specified in the invitation. If more than one item is specified in the invitation, the Town of Darien reserves the right to determine the lowest responsive and responsible bidder on an individual basis or on the basis of all items included in the Invitation for Bids, unless otherwise expressed by the Town.

12. **GUARANTEE**

Equipment, materials and/or work executed shall be guaranteed for a minimum of one (1) year against defective material and workmanship. The cost of all labor, materials, shipping charges and other expenses in conjunction with the replacement of defective equipment, and/or unsatisfactory work, shall be born by the Vendor.

13. **CATALOGUE REFERENCE**

Unless expressly stated otherwise, any and all reference to commercial types, sales, trade names and catalogues are intended to be descriptive only and not restrictive; the intent is to indicate the kind and quality of the articles that will be acceptable. Bids on other equivalent makes, or with reference to other catalogue items will be considered.

The Town in its sole discretion will judge the equivalency of other makes. The bidder is to clearly state exactly what will be furnished. Where possible and feasible, submit an illustration, descriptive material and/or product sample.

14. **INSURANCE**

The successful bidder will be required to furnish a Certificate of Insurance naming the Town of Darien as an additional insured. The Town reserves the right to require the submission of the insurance coverage policy document.

The insurance is to be suitable Contractor's Liability and Workers' Compensation, thereby making the Town of Darien harmless from all eventualities that may occur relative to this Bid and the resulting purchase order or contract.

Insurance limits are covered under Insurance Requirements in the project manual.

15. **INDEMNIFICATION**

To the fullest extent permitted by law, the bidder shall indemnify and hold harmless the Town and its consultants, agents, public officials and employees from and against all claims, damages, losses and expenses, direct, indirect or consequential (including but not limited to fees and charges of engineers, attorneys and other professionals and court and arbitration costs) arising out of or resulting from the performance of the bidder's work, provided that such claim, damage, loss or expense is caused in whole or in part by any negligent act or omission by the bidder, any person or organization directly or indirectly employed or engaged by the bidder to perform or furnish either of the services, or anyone for whose acts the bidder may be liable, regardless of whether or not it is cause in part by a party indemnified hereunder.

16. **FEDERAL, STATE AND LOCAL LAWS**

All applicable Federal, State and local laws, rules and regulations of all authorities having jurisdiction over the locality of the project shall apply to the contract and are deemed to be included herein.

17. **SCOPE OF WORK/SITE INSPECTIONS**

The bidder declares that the scope of work has been thoroughly reviewed and any questions resolved. If applicable, the bidder further declares that the site has been inspected as called for in the qualification.

18. **EXCEPTION TO SPECIFICATIONS**

No protest regarding the validity or appropriateness of the specifications or of the Invitation for Bids will be considered, unless the protest is filed in writing with the Purchasing Agent for the Town (First Selectman), prior to the closing date for the bids.

All bid proposals rendered shall be considered to meet the attached specifications unless exceptions are noted on a separate page dated and signed by the bidder.

19. **UNLESS OTHERWISE NOTED**

It will be assumed that all the terms and conditions and specifications will be complied with and will be considered as part of the Bid Proposal.

20. **TAX EXEMPT**

The Town of Darien is exempt from sales tax. No exemption certificates are required and none will be issued.

21. **BID BOND**

The bid bond furnished, as bid security, must be duly executed by the bidder as principal. It must be in the amount equal to five percent (5%) of the total estimated bid, as guarantee that, in case the contract is awarded to the bidder, the bidder will, within ten (10) business days thereafter, execute such contract and furnish a Performance and Payment Bond. An irrevocable letter of credit or cashier's check in lieu of a bid bond will also be accepted. Such surety must also be in an amount equal to five percent (5%) of the total estimated bid.

22. **PERFORMANCE AND LABOR AND MATERIALS BOND**

The successful bidder, within seven (7) business days after notification of award, will be required to furnish Performance and Labor and Material (Payment) Bonds provided by a company authorized to issue such bonds in the State of Connecticut equal to one hundred percent (100%) of the award.

In the event that a supplier is required to provide evidence of insurance and a performance bond does not do so before beginning work, the Town of Darien reserves the right to withhold payment from such vendor until the evidence of insurance and performance bond has been received by the Town

23. **MBE/WBE/SBE BUSINESS ENTERPRISES**

Minority-owned, woman-owned, and small business enterprises will be afforded full opportunity to submit bids and are encouraged to do so. The Town of Darien is an Affirmative Action/Equal Opportunity Employer.

24. **DISCLAIMER**

In the event that this Section 27 is contradictory in any way with other parts of bidding documents, the instruction, clause, or specification that most benefits the Town of Darien, shall be used. The benefit to the Town of Darien shall be wholly interpreted by the Town of Darien.

Section 28 – Prevailing Wage Rates, Payment and Reporting per State of Connecticut Department of Labor:

1. This project is registered with the Connecticut Department of Labor as it is anticipated to exceed $100,000 in cost and as such is subject to the requirements of the State of Connecticut Department of Labor. Prevailing Wager Rates shall be paid to all workers involved with the prosecution of the work and Contractor shall be responsible for reporting of wage rate information. All reporting, wages, or other requirements of the Connecticut Department of Labor shall be included in the Contractors bid costs. No extra payments or claims shall be made relative to Contractor's compliance with the Connecticut Department of Labor.

SECTION 00400

CONTRACTOR'S QUALIFICATION STATEMENT

The Owner requires all prospective contractors to complete this statement in advance of consideration of application to bid or as a qualification statement in advance of award of contract.

The undersigned certifies under oath the truth and correctness of all statement and of all answers to questions made hereinafter.

SUBMITTED TO:

Darren Oustafine, P.E.
Assistant Director of Public Works
2 Renshaw Rd, Town Hall
Darien, CT 06820
(203) 656-7365 Phone
(203) 656-7459 Facsimile
DOustafine@darienct.gov E-Mail

SUBMITTED BY: _____
(name)

_____
(street address)

_____
(city, state, ZIP)

1. Type of Organization (check one):

- ❑ Corporation
- ❑ Individual
- ❑ Partnership
- ❑ Joint Venture
- ❑ Other, please explain _____

2. How long has the Organization been in business as a General Contractor?

3. How many years has the Organization been in business under its present business name?

4. Under what other or former name(s) has the organization operated?

5. If a corporation, answer the following:

   a) Date of Incorporation.

   b) State of Incorporation.

   c) President's name.

   d) Vice-President's name.

   e) Secretary's name.

   f) Treasurer's name.

6. If an individual or partnership, answer the following:

   a) Date of organization.

   b) Name and addresses of all Partners.

7. If other than corporation or partnership, describe organization and identify Principals.

8. What geographical area does the organization normally do business in?

9. List experience with project the size and nature of the proposed Work.

Contract Sum	Class of Work / Percentage Complete	Name and Address of Owner	Name and Phone Number of Contact at Owner

10. What similar projects does the Organization currently have underway?

Contract Sum	Class of Work / Percentage Complete	Name and Address of Owner	Name and Phone Number of Contact at Owner

11. List similar projects completed during the past three to five years.

12. Have you ever failed to complete any work awarded? If so, why?

13. How many Owners have contracted with the firm for repeat business?

14. Has any officer or partner of your Organization ever been an officer or partner of another Organization that failed to complete a construction contract?

- ❑ Yes
- ❑ No

If so, state circumstances:

15. What percentage of work is done with your workforce? _____%
List trades below.

16. What is the size of your staff?

17. Does the firm have special in-house experts such as trained personnel in estimating, purchasing and computer services?

18. How are work crews organized?

19. How are your employees trained to perform their duties?

20. Trade references:

21. Bank references:

22. Name of Bonding Company and name and address of agent:

23. Provide two copies of certificates of insurance that evidences protection from claims under Workmen's Compensation and claims for damage which may arise from operations under the Organization's control.

24. Attach Statement of Financial Condition, including Contractor's latest regularly dated financial statement as balance sheet.

Name and address of firm preparing qualifications statement:

_____

_____

_____

Signature: _____

Title: _____

Date: _____

SECTION 00410

BID FORM

This Bid is submitted to:

Town of Darien, Connecticut
Office of First Selectman,
2 Renshaw Road, Town Hall
Darien, CT 06820

By: Bidders Name and Address:

_____

_____

_____

Telephone: _____

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

2.01 Bidder accepts all of the terms and conditions of the Advertisement or Invitation to Bid and Instruction to Bidders, including without limitation those dealing with the disposition of Bid security. The Bid will remain subject to acceptance for forty-five (45) days after the Bid opening.

3.01 In submitting this Bid, Bidder represents, as set forth in the Agreement, that:

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

Addendum No. Addendum Date

_____ _____
_____ _____
_____ _____

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

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

D) Bidder has carefully studied all available reports and drawings, if any regarding subsurface or environmentally hazardous conditions.

E) Bidder assumes responsibility for having obtained all necessary data relative to site conditions which will affect cost, progress, performance, means, methods, safety, sequencing, techniques, procedures, etcetera, incidental thereto.

F) Bidder does not consider that any further examinations, investigations, explorations, tests, studies, or data, are necessary for the determination of this Bid for performance of Work at prices or times specified herein.

G) Bidder is aware of the general nature of the Work to be performed by the Owner or others at the Site, if any, that relates to the Work.

H) Bidder has correlated the information known to Bidder, information and observations obtained from visits to the Site, and other Data identified in the Bidding Documents.

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

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

K) Bidder is aware that Owner may add, delete or change quantities and locations of project components represented herein and that no adjustment in unit quantity cost shall be considered relative to change in unit quantities.

4.01 Bidder further represents that this Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any agreement or rules of any group, association, organization, or corporation; Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; Bidder has not solicited or induced any individual or entity to refrain from bidding; and, Bidder has not sought by collusion to obtain for itself any advantage over other Bidder or over Owner.

5.01 A) Bidder will perform the Work in accordance with the Contract Documents for the price entered in the Schedule of Bid Items which follows. Individual Bid Items are more fully defined in the Bid Item Description pages.

B) Bidder acknowledges that Bidder's price(s) constitute Bidder's sole compensation for performing all Work required by the Contract Documents, and if a particular part of the Work is not listed in the Bid Item Descriptions, Bidder has included that part of the Work in the Bid Item Description which it most logically belongs.

C) Unit Prices have been computed in accordance with paragraph 11.03 of the Standard General Conditions of the Construction Contract. Bidder acknowledges that quantities are not guaranteed and final payment will be based on actual quantities determined as provided in the Contract Documents.

Item Number	Item Name and Unit Bid Prices Written in Words and Figures	Units	Quantity	Total Amount of Item (in figures)
1	Mobilization (5%)	LS	1	$ _____
	($ _____)			
2	Maintenance and Protection of Traffic	LS	1	$ _____
	($ _____)			
3	Construction Layout	LS	1	$ _____
	($ _____)			
4	Clearing & Grubbing	LS	1	$ _____
	($ _____)			
5	Sediment and Erosion Control	LS	1	$ _____
	($ _____)			

Item Number	Item Name and Unit Bid Prices Written in Words and Figures	Units	Quantity	Total Amount of Item (in figures)
6	Remove & Reset Exist. Chain Link Fence	LF	25	$ _____
	($ _____)			
7	Extra Excavation	CY	400	$ _____
	($ _____)			
8	Borrow	CY	400	$ _____
	($ _____)			
9	Remove & Reset Exist. Vinyl Fence	LF	30	$ _____
	($ _____)			
10	Test Pits	CY	192	$ _____
	($ _____)			

Item Number	Item Name and Unit Bid Prices Written in Words and Figures	Units	Quantity	Total Amount of Item (in figures)
11	Videotape Existing Conditions ($)	LS	1	$
12	Trench Excavation in Rock ($)	CY	1,354	$
13	Plug Exist. Pipe ($)	Each	14	$
14	2' x 6' Box Culvert ($)	LF	292	$
15	12" Reinforced Concrete Pipe ($)	LF	484	$

Item Number	Item Name and Unit Bid Prices Written in Words and Figures	Units	Quantity	Total Amount of Item (in figures)
16	15" Reinforced Concrete Pipe	LF	1,711	$ _____
	($ _____)			
17	18" Reinforced Concrete Pipe	LF	312	$ _____
	($ _____)			
18	24" Reinforced Concrete Pipe	LF	129	$ _____
	($ _____)			
19	30" Reinforced Concrete Pipe	LF	827	$ _____
	($ _____)			
20	36" Reinforced Concrete Pipe	LF	164	$ _____
	($ _____)			

Item Number	Item Name and Unit Bid Prices Written in Words and Figures	Units	Quantity	Total Amount of Item (in figures)
21	42" Reinforced Concrete Pipe	LF	222	$ _____
	($ _____)			
22	48" Reinforced Concrete Pipe	LF	423	$ _____
	($ _____)			
23	Concrete Endwall	Each	1	$ _____
	($ _____)			
24	Junction Chamber 1	Each	1	$ _____
	($ _____)			
25	Junction Chamber 2	Each	1	$ _____
	($ _____)			

Item Number	Item Name and Unit Bid Prices Written in Words and Figures	Units	Quantity	Total Amount of Item (in figures)
26	Type 'CL' Catch Basin Top	Each	1	$ _____
	($ _____)			
27	Type 'C' Catch Basin	Each	10	$ _____
	($ _____)			
28	Type 'CL' Catch Basin	Each	4	$ _____
	($ _____)			
29	Double Type I, Type 'C' Catch Basin	Each	8	$ _____
	($ _____)			
30	Double Type I Type 'CL' Catch Basin	Each	5	$ _____
	($ _____)			

Item Number	Item Name and Unit Bid Prices Written in Words and Figures	Units	Quantity	Total Amount of Item (in figures)
31	Special Double Type I, Type 'C' Catch Basin	Each	2	$ _____
	($ _____)			
32	Special Double Type I, Type 'CL' Catch Basin	Each	4	$ _____
	($ _____)			
33	Double Type II, Type 'C' Catch Basin	Each	6	$ _____
	($ _____)			
34	Block Catch Basin	VF	8	$ _____
	($ _____)			
35	48" Diameter Flat Top Manhole	Each	4	$ _____
	($ _____)			

Item Number	Item Name and Unit Bid Prices Written in Words and Figures	Units	Quantity	Total Amount of Item (in figures)
36	60" Diameter Flat Top Manhole	Each	3	$ _____
	($ _____)			
37	72" Diameter Flat Top Manhole	Each	1	$ _____
	($ _____)			
38	96" Diameter Flat Top Manhole	Each	0	$ _____
	($ _____)			
39	Block Manhole	VF	8	$ _____
	($ _____)			
40	Riprap	CY	30	$ _____
	($ _____)			

Item Number	Item Name and Unit Bid Prices Written in Words and Figures	Units	Quantity	Total Amount of Item (in figures)
41	Relocate Exist. Water Main ($)	LF	80	$
42	Relocate Exist. Water Service ($)	Each	25	$
43	Relocate Exist. Gas Service ($)	Each	12	$
44	Relocate Exist. Sanitary Sewer Lateral ($)	Each	23	$
45	Subgrade Preparation ($)	SY	2,756	$

Item Number	Item Name and Unit Bid Prices Written in Words and Figures	Units	Quantity	Total Amount of Item (in figures)
46	Roadway Subbase	CY	1,847	$ _____
	($ _____)			
47	Bituminous Concrete, Class 1	Ton	520	$ _____
	($ _____)			
48	Mill Existing Pavement	SY	10,258	$ _____
	($ _____)			
49	Bituminous Concrete, Class 1 Overlay	Ton	1,159	$ _____
	($ _____)			
50	Reconstruct Existing Driveway Apron	SY	22	$ _____
	($ _____)			

Item Number	Item Name and Unit Bid Prices Written in Words and Figures	Units	Quantity	Total Amount of Item (in figures)
51	Temporary Pavement	SY	1,300	$ _____
	($ _____)			
52	Pavement Markings - Arrows, Legends and Markings	SF	96	$ _____
	($ _____)			
53	Pavement Markings - 4" Double Yellow	LF	798	$ _____
	($ _____)			
54	Bituminous Concrete Lip Curb	LF	20	$ _____
	($ _____)			
55	Belgium Block Curbing	LF	15	$ _____
	($ _____)			

Item Number	Item Name and Unit Bid Prices Written in Words and Figures	Units	Quantity	Total Amount of Item (in figures)
56	Topsoiling & Seeding	SY	4,103	$ _____
	($ _____)			
57	Plantings	LS	1	$ _____
	($ _____)			

TOTAL BASE BID:

In words: _____

_____

In figures: _____

6.01 Bidder agrees that the Work will be Substantially completed and ready for final payment in accordance with paragraph 14.07.B of the Standard General Conditions of the Construction Contract on or before the dates or within the number of calendar days indicated in the Agreement.

6.02 Bidder accepts the provisions for liquidated damages, if any, in the event of failure to complete the Work by the dates or within the number of calendar days indicated in the Agreement.

7.01 Bidder and its surety, where appropriate, have completed and executed the required Bid security which are attached to and made a condition of this Bid.

8.01 The terms used in this Bid with initial capital letters have the meanings indicated in the Instructions to Bidders, The Standard General Conditions of the Construction Contract, and the Supplementary Conditions.

Submitted on _____.

State Contractor License No. _____ (if applicable)

_____
Company Name

_____
Address

_____

_____ _____
Phone Number Fax Number

By: _____ _____
Signature Date

_____
Printed Name and Title

Indicate whether: An Individual; A Partnership; A Corporation; or, A Joint Venture.

Attach Bid Security as described herein.

SECTION 00500

SAMPLE AGREEMENT

Agreement Between Owner and Contractor

This Agreement is by and between The Town of Darien (hereinafter called Owner), and _____ (hereinafter called Contractor). Owner and Contractor, in consideration of mutual covenants hereinafter set forth, agree as follows:

Article 1 – Work:

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

Contractor shall complete all Work as generally described and specified or indicated in the Contract Documents under *Abbey Road Drainage Improvements, Bid No. 2015-16*, and other material as may be incorporated or included by reference.

Article 2 - The Project: Not Used

Article 3 – Engineer:

3.01 This project has been designed by Tighe & Bond. Owner and Engineer shall be considered synonymous and used interchangeable herein.

Article 4 – Contract Times:

Time is of the essence. All time limits for milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the Essence of the Contract. Days to Achieve Substantial Completion and Final Payment. The Work will be substantially completed and completed and ready for final payment in accordance with paragraph 14.07 of the Standard General Conditions of the Construction Contract within 243 calendar days after the date when the Contract Times commence to run as provided in paragraph 2.03 of the Standard General Conditions of the Construction Contract.

4.01 Time is of the essence. All time limits for milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the Essence of the Contract.

4.02 Days to Achieve Substantial Completion and Final Payment. The Work will be substantially completed and completed and ready for final payment in accordance with paragraph 14.07 of the Standard General Conditions of the Construction Contract within 243 calendar days after the date when the Contract Times commence to run as provided in paragraph 2.03 of the Standard General Conditions of the Construction Contract.

4.03 Liquidated Damages. Contractor and Owner recognize that time is of the essence of this Agreement and that Owner will suffer loss if Work is not completed within the times

specified in Article 4.02 above, plus any extensions thereof allowed in accordance with Article 12 of the Standard General Conditions of the Construction Contract. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner in the Work is not completed on time. Accordingly, instead of requiring and such proof, Owner and Contractor agree that as liquidated damages for delay (but not as penalty), Contractor shall pay Owner $100 for each calendar day that expires after the time specified in Article 4.02 of this Agreement for Substantial Completion until the Work is Substantially Complete. After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Time or at any proper extension thereof granted by the Owner, Contractor shall pay Owner $100 for each day that expires after the time specified in Article 4.02 of this Agreement for the completion and readiness for final payment until the Work is completed and ready for final payment.

Article 5 – Contract Price:

5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contractor for completion of the Work in accordance with the Contract Document an amount in current fund equal to the sum of the amounts determined pursuant to Articles 5.01.A, and 5.01.B, and 5.01.C below:

A. For all Work other than Unit Price Work, the Cost of the Work plus a Contractor's fee for overhead and profit, both of which shall be determined as provided in Article 6 and 7 below, subject to additions and deletions as provided in the Contract Documents and subject to the limitations set forth in Article 8 below.

B. For all Unit Price Work, an amount equal to the sum of the established unit price for each separately identified item of Unit Price Work times the estimated quantity of that item as indicated in this Article 5.01.B:

C. Summary of Unit Prices

(Bid Numbers, Item Descriptions, Units, Estimated Quantities, Bidders Unit Costs, and Extended Totals, shall be included herein upon award of Contract and based upon successful bidders bid proposal).

As provided in paragraph 11.03 of the Standard General Conditions of the Construction Contract, estimated quantities are not guaranteed, and determinations of actual quantities and classifications are to be made by Owner as provided in paragraph 9.08 of the Standard General Conditions of the Construction Contract. Unit Prices have been computed as provided in paragraph 11.03 of the Standard General Conditions of the Construction Contract.

Article 6 – Cost of the Work:

6.01 Cost of the Work shall be determined as provided in paragraph 11.01 of the Standard General Conditions of the Construction Contract, but, in addition to any limitations

therein set forth, it shall not include costs in excess of any Guaranteed Maximum Price as set forth in Article 8 hereof.

Article 7 – Contractor's Fee: Not Used.

Article 8 – Guaranteed Maximum Price: Not Used.

Article 9- Changes in Contract Price:

9.01 A change in contract price may result from a Change Order which will usually result from an addition or deletion of Work.

Article 10 – Payment Procedures:

10.01 Submittal and Processing of Payments.

A. Contractor shall submit Application for Payment in accordance with Article 14 of the Standard General Conditions of the Construction Contract. Applications for Payment will indicate the amount of the Contractor's fee then payable. Applications for Payment will be processed by Engineer as provided in the Standard General Conditions of the Construction Contract.

10.02 Progress Payments; Retainage:

A Owner shall make progress payments on account of Contract Price on the basis of Contractor's Application for Payment as recommended by Engineer (Owner) on or about the 15th day o each month during construction as provided in Article 10.02.A.1 and 10.02.A.2 below. All such payments will be measured by the schedule of values established in paragraph 2.07.A of the Standard General Conditions of the Construction Contract, and in the case of Unit Price Work based on the number of units completed, and in the event there is no schedule of values, as provided in the General Requirement. Owner shall pay Contractor 95% of Work completed to date or material suitably stored on site and accepted by Owner, with the balance being retained.

10.03 Final Payment.

A Upon final completion and acceptance of the Work in accordance with paragraph 14.07 of the Standard General Conditions of the Construction Contract, Owner shall pay the remainder of the Contract Price as recommended by Engineer (Owner) as provided in said paragraph 14.07.

Article 11 – Interest: Not Used

Article 12 – Contractors Representation:

12.01 In order to induce the Owner to enter into this Agreement Contractor makes the representation that it has carefully considered all aspects of the Work and has obtained and fully understands all information available as it relates to said Work, or takes responsibility for have done so.

Article 13 – Accounting Records: Not Used.

Article 14 – Contract Documents:

14.01 The Contract Documents consist of: This Agreement (pages 1 to 6, inclusive); Performance Bond (pages 1 to 2, inclusive); Payment Bond (pages 1 to 2, inclusive); Insurance Certificates (pages __ to__, inclusive); the Instruction to Bidders (pages 1 to 15); Advertisement or Invitation to Bid (page 1 to 1); Bid Proposal(pages 1 to 11), inclusive); or other sketches, if any, which define the limits of work; The Standard General Conditions of the Construction Contract (pages 1 to 46, inclusive); Supplementary Conditions (pages 1 to 4 inclusive); Any and all specifications as contained, referenced, or inferred herein; Addenda (numbers 0 to 0, inclusive); Notice to Proceed; Documentation submitted by the Contractor prior to the Notice of Award (pages N/A to, inclusive); Change Orders, Work Directives, or Written Amendments as may be approved by the Owner.

Article 15 – Miscellaneous:

15.01 No assignment by a party hereto of any rights under or interests in Contract will be Binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will be released or discharge the assignor from any duty or responsibility under the Contract Documents.

15.02 Owner and Contractor each binds itself, its partners, successors, assigns, and legal representatives to the other party hereto, its partners, successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

15.03 Any provisions or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon Owner and Contractor, who agree that the Contract Documents shall be reformed to replace such stricken provisions or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

In Witness Whereof, Owner and Contractor have signed this Agreement in duplicate. One counterpart each has been delivered to Owner and Contractor. All portions of the Contract Documents have been signed or identified by Owner and Contractor or on their behalf.

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

Owner	**Contractor**
Town of Darien	_____
By:_____ Jayme Stevenson, First Selectman And Purchasing Agent	By :_____
Attest_____	Attest _____
Address for giving notices:	Address for giving notices:
Town of Darien, First Selectman	_____
2 Renshaw Road – Town Hall	_____
Darien, CT 06820	_____
Designated Representative	Designated Representative
Darren Oustafine	_____
Ass't Director of Public Works	_____
2 Renshaw Road – Town Hall	_____
Darien, CT 06820	_____
Phone (203) 656*7365	Phone:_____
Facsimile (203) 656*7485	Facsimile: _____
E: DOustafine@darienct.gov	E: _____

Acknowledgement of Contractor, If A Corporation

State of Connecticut

County of Fairfield

On this _____ day of _(Month)_, 2015, before me personally came and appeared _____, to me known, who, being duly sworn, did depose and say that he/she is the title of __(company)_____, the corporation described in and which executed the foregoing instrument; that he/she knows the seal of said corporation; that one of the impressions affixed to

said instrument in an impression of such seal; that it was so affixed by order of the directors of said corporation, and that he/she signed his/her name thereto by like order.

_____

(Seal) Notary Public

Acknowledgement of Officer of Owner

State of Connecticut

County of Fairfield

On this _____ day of _____, 2016
, before me personally came and appeared Jayme J. Stevenson, to me known, who, being duly sworn, did depose and say that she is the First Selectman and Purchasing Agent of the Town of Darien , described in and which executed the foregoing instrument; that he knows the seal of said Owner; that one of the impressions appearing on said instrument is a true and correct impression of such seal; and that he affixed it thereto and attested the same over his signature by virtue of authority in him vested.

_____

(Seal) Notary Public

SECTION 00605

BID BOND

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

CONTRACTOR:
(Name and Address)

SURETY
(Name and Address of Principal Place of Business)

OWNER: Town of Darien
2 Renshaw Road
Darien, Connecticut 06820

BID

Bid Due Date:
Description: Abbey Road Drainage Improvements

BOND

Date:
Penal Sum: _____ _____
(words) (figures)

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

BIDDER		SURETY	
Company:	(Corp. Seal)	Company:	(Corp. Seal)
Signature: _____		Signature: _____	
Name and Title:		Name and Title: (Attach Power of Attorney)	
ATTEST:			
Signature: _____		Signature: _____	
Name and Title:		Name and Title:	

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to pay Owner upon default of Bidder any difference between the total amount of Bidder's Bid and the total amount of the Bid of the next lowest, responsible Bigger who submitted a responsive Bid as determined by Owner for the work required by the Contract Documents, provided that:

    1.1 If there is no such next Bidder, and Owner does not abandon the Project, then Bidder and Surety shall pay to Owner the penal sum set forth on the face of this Bond, and

    1.2 In no event shall Bidder's and Surety's obligation hereunder exceed the penal sum set forth on the face of this Bond.

    1.3 Recovery under the terms of this Bond shall be the Owner's sole and exclusive remedy upon default of Bidder.

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

3. This obligation shall be null and void if:

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

    3.2 All bids are rejected by Owner, or

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

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

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

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

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

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

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

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

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

SECTION 00610

PERFORMANCE BOND

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

CONTRACTOR:
(Name and Address)

SURETY
(Name and Address of Principal Place of Business)

OWNER: Town of Darien
2 Renshaw Road
Darien, Connecticut 06820

CONTRACT

Date:
Amount:
Description: Abbey Road Drainage Improvements

BOND

Date:
Amount:

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

CONTRACTOR AS PRINCIPAL
Company: (Corp. Seal)

SURETY
Company: (Corp. Seal)

Signature: _____
Name and Title:

Signature: _____
Name and Title:
(Attach Power of Attorney)

(Space is provided below for signatures of additional parties, if required.)

Signature: _____
Name and Title:

Signature: _____
Name and Title:
(Attach Power of Attorney)

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

1. If Contractor performs the Contract, Surety and Contractor have no obligation under this Bond, except to participate in conferences as provided in Paragraph 2.1.

2. If there is no Owner Default, Surety's obligation under this Bond shall arise after:

   2.1 Owner has notified Contractor and Surety, at the addresses described in Paragraph 9 below, that Owner is considering declaring a Contractor Default and has requested and attempted to arrange a conference with Contractor and Surety to be held not later than 15 days after receipt of such notice to discuss methods of performing the Contract. If Owner, Contractor, and Surety agree, Contractor shall be allowed a reasonable time to perform the Contract, but such an agreement shall not waive Owner's right, if any, subsequently to declare a Contractor Default; and

   2.2 Owner has declared a Contractor Default and formally terminated Contractor's right to complete the Contract. Such Contractor Default shall not be declared earlier than 20 days after Contractor and Surety have received notice as provided in Paragraph 2.1; and

   2.3 Owner has agreed to pay the Balance of the Contract Price to:

      1. Surety in accordance with the terms of the Contract; or
      2. Another contractor selected pursuant to Paragraph 3.3 to perform the Contract.

3. When Owner has satisfied the conditions of Paragraph 2, Surety shall promptly, and at Surety's expense, take one of the following actions:

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

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

   3.3 Obtain bids or negotiated proposals from qualified contractors acceptable to Owner for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by Owner and contractor selected with Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Contract, and pay to Owner the amount of damages as described in Paragraph 5 in excess of the Balance of the Contract Price incurred by Owner resulting from Contractor Default; or

   3.4 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 Owner and,

as soon as practicable after the amount is determined, tender payment therefor to Owner; or

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

4. If Surety does not proceed as provided in Paragraph 3 with reasonable promptness, Surety shall be deemed to be in default on this Bond 15 days after receipt of an additional written notice from Owner to Surety demanding that Surety perform its obligations under this Bond, and Owner shall be entitled to enforce any remedy available to Owner. If Surety proceeds as provided in Paragraph 3.4, and Owner refuses the payment tendered or Surety has denied liability, in whole or in part, without further notice Owner shall be entitled to enforce any remedy available to Owner.

5. After Owner has terminated Contractor's right to complete the Contract, and if Surety elects to act under Paragraph 3.1, 3.2, or 3.3 above, then the responsibilities of Surety to Owner shall not be greater than those of Contractor under the Contract, and the responsibilities of Owner to Surety shall not be greater than those of Owner under the Contract. To the limit of the amount of this Bond, but subject to commitment by Owner of the Balance of the Contract Price to mitigation of costs and damages on the Contract, Surety is obligated without duplication for:

   5.1 The responsibilities of Contractor for correction of defective Work and completion of the Contract;

   5.2 Additional legal, design professional, and delay costs resulting from Contractor's Default, and resulting from the actions of or failure to act of Surety under Paragraph 3; and

   5.3 Liquidated damages, or if no liquidated damages are specified in the Contract, actual damages caused by delayed performance or non-performance of Contractor.

6. Surety shall not be liable to Owner or others for obligations of Contractor that are unrelated to the 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 Owner or its heirs, executors, administrators, or successors.

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

8. 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 Contractor ceased working or within two years after 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.

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

10. When this Bond has been furnished to comply with a statutory requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory requirement shall be deemed deleted herefrom and provisions conforming to such statutory 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.

11. Definitions.

    11.1 Balance of the Contract Price: The total amount payable by Owner to Contractor under the Contract after all proper adjustments have been made, including allowance to Contractor of any amounts received or to be received by Owner in settlement of insurance or other Claims for damages to which Contractor is entitled, reduced by all valid and proper payments made to or on behalf of Contractor under the Contract.

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

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

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

FOR INFORMATION ONLY – (*Name, Address and Telephone*) Surety Agency or Broker: Owner's Representative (*Engineer or other party*):

SECTION 00615

LABOR AND MATERIAL PAYMENT BOND

BOND NO. _____

KNOW ALL MEN BY THESE PRESENTS:

That _____ of _____, as Principal ("Contractor"), and _____, as Surety ("Surety"), are held and firmly bound unto the Town of Darien, as Obligee, hereinafter called the Owner, in the amount of:

_____ Dollars ($_____)

for the payment whereof the Contractor and the Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Contractor has by written agreement dated _____, entered into a contract with the Owner for the Abbey Road Drainage Improvements ("Contract"), which Contract as hereinafter may be modified, altered, or amended, is incorporated in, and made a part of, this Bond as though fully set forth herein.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION of this Bond is that if Contractor:

1. Makes prompt payment to all claimants for all labor, subcontracts, materials, and specially fabricated materials, used, directly or indirectly, by Contractor, or any of its subcontractors or suppliers, in the prosecution of the performance of the Contract; and

2. Pays Owner all losses, damages, expenses, cost and attorneys' fees that Owner sustains because of default by Contractor under Paragraph 1 of this Bond, then this Bond is void; otherwise it remains in full force.

Any changes, alterations, or additions in or under the Contract documents or extension of time for the performance of the Contract or any other forbearance on the part of either the Owner or the Contractor shall not in any way release the Contractor or the Surety or either of them, their representatives, heirs, executors, administrators, successors or assigns from liability hereunder; notice to the Surety or Sureties of any such alteration, addition, extension or forbearance being hereby specifically and absolutely waived.

SIGNED AND SEALED this _____ day of _____, _____.

_____
(Signature of Contractor)

By

_____ _____
(Witness) (Name & Title)

_____
(Company Name & Address)

_____
(Signature of Surety)

By

_____ _____
(Witness) (Name & Title)

_____
(Surety Name & Address)

STANDARD
GENERAL CONDITIONS
OF THE
CONSTRUCTION CONTRACT

Prepared by

ENGINEERS JOINT CONTRACT DOCUMENTS COMMITTEE

and

Issued and Published Jointly By

ACEC
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National Society of Professional Engineers
Professional Engineers in Private Practice

ASCE American Society of Civil Engineers

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Knowledge for Creating and Sustaining the Built Environment

Construction Specifications Institute

EJCDC C-700 Standard General Conditions of the Construction Contract.
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GENERAL CONDITIONS

ARTICLE 1 - DEFINITIONS AND TERMINOLOGY

1.01 *Defined Terms*

A. Wherever used in the Bidding Requirements or Contract Documents and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified articles and paragraphs, and the titles of other documents or forms.

1. *Addenda*--Written or graphic instruments issued prior to the opening of Bids which clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.

2. *Agreement*--The written instrument which is evidence of the agreement between Owner and Contractor covering the Work.

3. *Application for Payment*--The form acceptable to Engineer which is to be used by Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.

4. *Asbestos*--Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.

5. *Bid*--The offer or proposal of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.

6. *Bidder*--The individual or entity who submits a Bid directly to Owner.

7. *Bidding Documents*--The Bidding Requirements and the proposed Contract Documents (including all Addenda).

8. *Bidding Requirements*--The Advertisement or Invitation to Bid, Instructions to Bidders, bid security of acceptable form, if any, and the Bid Form with any supplements.

9. *Change Order*--A document recommended by Engineer which is signed by Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.

10. *Claim*--A demand or assertion by Owner or Contractor seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.

11. *Contract*--The entire and integrated written agreement between the Owner and Contractor concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.

12. *Contract Documents*-- Those items so designated in the Agreement. Only printed or hard copies of the items listed in the Agreement are Contract Documents. Approved Shop Drawings, other Contractor's submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.

13. *Contract Price*--The moneys payable by Owner to Contractor for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of Paragraph 11.03 in the case of Unit Price Work).

14. *Contract Times*--The number of days or the dates stated in the Agreement to: (i) achieve Milestones, if any, (ii) achieve Substantial Completion; and (iii) complete the Work so that it is ready for final payment as evidenced by Engineer's written recommendation of final payment.

15. *Contractor*--The individual or entity with whom Owner has entered into the Agreement.

16. *Cost of the Work*--See Paragraph 11.01.A for definition.

17. *Drawings*--That part of the Contract Documents prepared or approved by Engineer which graphically shows the scope, extent, and character of the Work to be performed by Contractor. Shop Drawings and other Contractor submittals are not Drawings as so defined.

18. *Effective Date of the Agreement*--The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.

19. *Engineer*--The individual or entity named as such in the Agreement.

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20. *Field Order*--A written order issued by Engineer which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.

21. *General Requirements*--Sections of Division 1 of the Specifications. The General Requirements pertain to all sections of the Specifications.

22. *Hazardous Environmental Condition*--The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto in connection with the Work.

23. *Hazardous Waste*--The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.

24. *Laws and Regulations; Laws or Regulations*--Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.

25. *Liens*--Charges, security interests, or encumbrances upon Project funds, real property, or personal property.

26. *Milestone*--A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.

27. *Notice of Award*--The written notice by Owner to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, Owner will sign and deliver the Agreement.

28. *Notice to Proceed*--A written notice given by Owner to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work under the Contract Documents.

29. *Owner*--The individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed.

30. *PCBs*--Polychlorinated biphenyls.

31. *Petroleum*--Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.

32. *Progress Schedule*--A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.

33. *Project*--The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.

34. *Project Manual*--The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.

35. *Radioactive Material*--Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.

36. *Related Entity* -- An officer, director, partner, employee, agent, consultant, or subcontractor.

37. *Resident Project Representative*--The authorized representative of Engineer who may be assigned to the Site or any part thereof.

38. *Samples*--Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.

39. *Schedule of Submittals*--A schedule, prepared and maintained by Contractor, of required submittals and the time requirements to support scheduled performance of related construction activities.

40. *Schedule of Values*--A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

41. *Shop Drawings*--All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.

42. *Site*--Lands or areas indicated in the Contract Documents as being furnished by Owner upon which the Work is to be performed, including rights-of-way and easements for access thereto, and such other lands furnished by Owner which are designated for the use of Contractor.

43. *Specifications*--That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards and workmanship as applied to the Work, and certain

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administrative requirements and procedural matters applicable thereto.

44. *Subcontractor*--An individual or entity having a direct contract with Contractor or with any other Subcontractor for the performance of a part of the Work at the Site.

45. *Substantial Completion*--The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of Engineer, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms "substantially complete" and "substantially completed" as applied to all or part of the Work refer to Substantial Completion thereof.

46. *Successful Bidder*--The Bidder submitting a responsive Bid to whom Owner makes an award.

47. *Supplementary Conditions*--That part of the Contract Documents which amends or supplements these General Conditions.

48. *Supplier*--A manufacturer, fabricator, supplier, distributor, materialman, or vendor having a direct contract with Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by Contractor or any Subcontractor.

49. *Underground Facilities*--All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.

50. *Unit Price Work*--Work to be paid for on the basis of unit prices.

51. *Work*--The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.

52. *Work Change Directive*--A written statement to Contractor issued on or after the Effective Date of the Agreement and signed by Owner and recommended by Engineer ordering an addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.

1.02 *Terminology*

A. The following words or terms are not defined but, when used in the Bidding Requirements or Contract Documents, have the following meaning.

B. *Intent of Certain Terms or Adjectives*

1. The Contract Documents include the terms "as allowed," "as approved," "as ordered", "as directed" or terms of like effect or import to authorize an exercise of professional judgment by Engineer. In addition, the adjectives "reasonable," "suitable," "acceptable," "proper," "satisfactory," or adjectives of like effect or import are used to describe an action or determination of Engineer as to the Work. It is intended that such exercise of professional judgment, action or determination will be solely to evaluate, in general, the Work for compliance with the requirements of and information in the Contract Documents and conformance with the design concept of the completed Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to Engineer any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.09 or any other provision of the Contract Documents.

C. *Day*

1. The word "day" means a calendar day of 24 hours measured from midnight to the next midnight.

D. *Defective*

1. The word "defective," when modifying the word "Work," refers to Work that is unsatisfactory, faulty, or deficient in that it:

a. does not conform to the Contract Documents, or

b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents, or

c. has been damaged prior to Engineer's - recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 14.04 or 14.05).

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E. *Furnish, Install, Perform, Provide*

1. The word "furnish," when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.

2. The word "install," when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.

3. The words "perform" or "provide," when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.

4. When "furnish," "install," "perform," or "provide" is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of Contractor, "provide" is implied.

F. Unless stated otherwise in the Contract Documents, words or phrases which have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

ARTICLE 2 - PRELIMINARY MATTERS

2.01 *Delivery of Bonds and Evidence of Insurance*

A. When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.

B. *Evidence of Insurance:* Before any Work at the Site is started, Contractor and Owner shall each deliver to the other, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which Contractor and Owner respectively are required to purchase and maintain in accordance with Article 5.

2.02 *Copies of Documents*

A. Owner shall furnish to Contractor up to ten printed or hard copies of the Drawings and Project Manual. Additional copies will be furnished upon request at the cost of reproduction.

2.03 *Commencement of Contract Times; Notice to Proceed*

A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Agreement or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Agreement. In no event will the Contract Times commence to run later than the sixtieth day after the day of Bid opening or the thirtieth day after the Effective Date of the Agreement, whichever date is earlier.

2.04 *Starting the Work*

A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to the date on which the Contract Times commence to run.

2.05 *Before Starting Construction*

A. *Preliminary Schedules:* Within 10 days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), Contractor shall submit to Engineer for timely review**:**

1. a preliminary Progress Schedule; indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents;

2. a preliminary Schedule of Submittals; and

3. a preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

2.06 *Preconstruction Conference*

A. Before any Work at the Site is started, a conference attended by Owner, Contractor, Engineer, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.05.A, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.

2.07 *Initial Acceptance of Schedules*

A. At least 10 days before submission of the first Application for Payment a conference attended by Contractor, Engineer, and others as appropriate will be held to review for acceptability to Engineer as provided below the schedules submitted in accordance with Paragraph 2.05.A. Contractor shall have an additional 10 days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to Engineer.

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1. The Progress Schedule will be acceptable to Engineer if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on Engineer responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work nor interfere with or relieve Contractor from Contractor's full responsibility therefor.

2. Contractor's Schedule of Submittals will be acceptable to Engineer if it provides a workable arrangement for reviewing and processing the required submittals.

3. Contractor's Schedule of Values will be acceptable to Engineer as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the Work.

ARTICLE 3 - CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.01 *Intent*

A. The Contract Documents are complementary; what is required by one is as binding as if required by all.

B. It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended result will be provided whether or not specifically called for at no additional cost to Owner.

C. Clarifications and interpretations of the Contract Documents shall be issued by Engineer as provided in Article 9.

3.02 *Reference Standards*

A. Standards, Specifications, Codes, Laws, and Regulations

1. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific or by implication, shall mean the standard, specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

2. No provision of any such standard, specification, manual or code, or any instruction of a Supplier shall be effective to change the duties or responsibilities of Owner, Contractor, or Engineer, or any of their subcontractors, consultants, agents, or employees from those set forth in the Contract Documents. No such provision or instruction shall be effective to assign to Owner, or Engineer, or any of, their Related Entities, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

3.03 *Reporting and Resolving Discrepancies*

A. Reporting Discrepancies

1. *Contractor's Review of Contract Documents Before Starting Work*: Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Contractor shall promptly report in writing to Engineer any conflict, error, ambiguity, or discrepancy which Contractor may discover and shall obtain a written interpretation or clarification from Engineer before proceeding with any Work affected thereby.

2. *Contractor's Review of Contract Documents During Performance of Work*: If, during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents or between the Contract Documents and any provision of any Law or Regulation applicable to the performance of the Work or of any standard, specification, manual or code, or of any instruction of any Supplier, Contractor shall promptly report it to Engineer in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in Paragraph 3.04.

3. Contractor shall not be liable to Owner or Engineer for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor knew or reasonably should have known thereof.

B. Resolving Discrepancies

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:

a. the provisions of any standard, specification, manual, code, or instruction (whether or not specifically incorporated by reference in the Contract Documents); or

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b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

3.04 *Amending and Supplementing Contract Documents*

A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof by either a Change Order or a Work Change Directive.

B. The requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, by one or more of the following ways:

1. A Field Order;

2. Engineer's approval of a Shop Drawing or Sample; (Subject to the provisions of Paragraph 6.17.D.3); or

3. Engineer's written interpretation or clarification.

3.05 *Reuse of Documents*

A. Contractor and any Subcontractor or Supplier or other individual or entity performing or furnishing all of the Work under a direct or indirect contract with Contractor, shall not:

1. have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer or Engineer's consultants, including electronic media editions; or

2. reuse any of such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Engineer and specific written verification or adaption by Engineer.

B. The prohibition of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

3.06 *Electronic Data*

A. Copies of data furnished by Owner or Engineer to Contractor or Contractor to Owner or Engineer that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.

B. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the transferring party..

C. When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

ARTICLE 4 - AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS

4.01 *Availability of Lands*

A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work. Owner will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If Contractor and Owner are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of any delay in Owner's furnishing the Site or a part thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which the Work is to be performed and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.

C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

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4.02 *Subsurface and Physical Conditions*

A. *Reports and Drawings:* The Supplementary Conditions identify:

1. those reports of explorations and tests of subsurface conditions at or contiguous to the Site that Engineer has used in preparing the Contract Documents; and

2. those drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) that Engineer has used in preparing the Contract Documents.

B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their Related Entities with respect to:

1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions, or information.

4.03 *Differing Subsurface or Physical Conditions*

A. *Notice:* If Contractor believes that any subsurface or physical condition at or contiguous to the Site that is uncovered or revealed either:

1. is of such a nature as to establish that any "technical data" on which Contractor is entitled to rely as provided in Paragraph 4.02 is materially inaccurate; or

2. is of such a nature as to require a change in the Contract Documents; or

3. differs materially from that shown or indicated in the Contract Documents; or

4. is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents;

then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), notify Owner and Engineer in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.

B. *Engineer's Review*: After receipt of written notice as required by Paragraph 4.03.A, Engineer will promptly review the pertinent condition, determine the necessity of Owner's obtaining additional exploration or tests with respect thereto, and advise Owner in writing (with a copy to Contractor) of Engineer's findings and conclusions.

C. Possible Price and Times Adjustments

1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

a. such condition must meet any one or more of the categories described in Paragraph 4.03.A; and

b. with respect to Work that is paid for on a Unit Price Basis, any adjustment in Contract Price will be subject to the provisions of Paragraphs 9.07 and 11.03.

2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times if:

a. Contractor knew of the existence of such conditions at the time Contractor made a final commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or

b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such final commitment; or

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c. Contractor failed to give the written notice as required by Paragraph 4.03.A.

3. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in Paragraph 10.05. However, Owner and Engineer, and any of their Related Entities shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

4.04 *Underground Facilities*

A. *Shown or Indicated:* The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Site is based on information and data furnished to Owner or Engineer by the owners of such Underground Facilities, including Owner, or by others. Unless it is otherwise expressly provided in the Supplementary Conditions:

1. Owner and Engineer shall not be responsible for the accuracy or completeness of any such information or data; and

2. the cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:

a. reviewing and checking all such information and data,

b. locating all Underground Facilities shown or indicated in the Contract Documents,

c. coordination of the Work with the owners of such Underground Facilities, including Owner, during construction, and

d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.

B. *Not Shown or Indicated*

1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to Owner and Engineer. Engineer will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence or location of the Underground Facility. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.

2. If Engineer concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price or Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents and that Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price or Contract Times, Owner or Contractor may make a Claim therefor as provided in Paragraph 10.05.

4.05 *Reference Points*

A. Owner shall provide engineering surveys to establish reference points for construction which in Engineer's judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to Engineer whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

4.06 *Hazardous Environmental Condition at Site*

A. *Reports and Drawings:* Reference is made to the Supplementary Conditions for the identification of those reports and drawings relating to a Hazardous Environmental Condition identified at the Site, if any, that have been utilized by the Engineer in the preparation of the Contract Documents.

B. *Limited Reliance by Contractor on Technical Data Authorized:* Contractor may rely upon the general accuracy of the "technical data" contained in such reports and drawings, but such reports and drawings are not Contract Documents. Such "technical data" is identified in the Supplementary Conditions. Except for such reliance on such "technical data," Contractor may not rely upon or make any claim against Owner or Engineer, or any of their Related Entities with respect to:

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1. the completeness of such reports and drawings for Contractor's purposes, including, but not limited to, any aspects of the means, methods, techniques, sequences and procedures of construction to be employed by Contractor and safety precautions and programs incident thereto; or

2. other data, interpretations, opinions and information contained in such reports or shown or indicated in such drawings; or

3. any Contractor interpretation of or conclusion drawn from any "technical data" or any such other data, interpretations, opinions or information.

C. Contractor shall not be responsible for any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work. Contractor shall be responsible for a Hazardous Environmental Condition created with any materials brought to the Site by Contractor, Subcontractors, Suppliers, or anyone else for whom Contractor is responsible.

D. If Contractor encounters a Hazardous Environmental Condition or if Contractor or anyone for whom Contractor is responsible creates a Hazardous Environmental Condition, Contractor shall immediately: (i) secure or otherwise isolate such condition; (ii) stop all Work in connection with such condition and in any area affected thereby (except in an emergency as required by Paragraph 6.16.A); and (iii) notify Owner and Engineer (and promptly thereafter confirm such notice in writing). Owner shall promptly consult with Engineer concerning the necessity for Owner to retain a qualified expert to evaluate such condition or take corrective action, if any.

E. Contractor shall not be required to resume Work in connection with such condition or in any affected area until after Owner has obtained any required permits related thereto and delivered to Contractor written notice: (i) specifying that such condition and any affected area is or has been rendered safe for the resumption of Work; or (ii) specifying any special conditions under which such Work may be resumed safely. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of any adjustment in Contract Price or Contract Times, or both, as a result of such Work stoppage or such special conditions under which Work is agreed to be resumed by Contractor, either party may make a Claim therefor as provided in Paragraph 10.05.

F. If after receipt of such written notice Contractor does not agree to resume such Work based on a reasonable belief it is unsafe, or does not agree to resume such Work under such special conditions, then Owner may order the portion of the Work that is in the area affected by such condition to be deleted from the Work. If Owner and Contractor cannot agree as to entitlement to or on the amount or extent, if any, of an adjustment in Contract Price or Contract Times as a result of deleting such portion of the Work, then either party may make a Claim therefor as provided in Paragraph 10.05. Owner may have such deleted portion of the Work performed by Owner's own forces or others in accordance with Article 7.

G. To the fullest extent permitted by Laws and Regulations, Owner shall indemnify and hold harmless Contractor, Subcontractors, and Engineer, and the officers, directors, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition, provided that such Hazardous Environmental Condition: (i) was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be included within the scope of the Work, and (ii) was not created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06. G shall obligate Owner to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

H. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants, and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to a Hazardous Environmental Condition created by Contractor or by anyone for whom Contractor is responsible. Nothing in this Paragraph 4.06.H shall obligate Contractor to indemnify any individual or entity from and against the consequences of that individual's or entity's own negligence.

I. The provisions of Paragraphs 4.02, 4.03, and 4.04 do not apply to a Hazardous Environmental Condition uncovered or revealed at the Site.

ARTICLE 5 - BONDS AND INSURANCE

5.01 *Performance, Payment, and Other Bonds*

A. Contractor shall furnish performance and payment bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all of Contractor's obligations under the Contract Documents. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified

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in Paragraph 13.07, whichever is later, except as provided otherwise by Laws or Regulations or by the Contract Documents. Contractor shall also furnish such other bonds as are required by the Contract Documents.

B. All bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All bonds signed by an agent must be accompanied by a certified copy of the agent's authority to act.

C. If the surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of Paragraph 5.01.B, Contractor shall promptly notify Owner and Engineer and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the requirements of Paragraphs 5.01.B and 5.02.

5.02 *Licensed Sureties and Insurers*

A. All bonds and insurance required by the Contract Documents to be purchased and maintained by Owner or Contractor shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also meet such additional requirements and qualifications as may be provided in the Supplementary Conditions.

5.03 *Certificates of Insurance*

A. Contractor shall deliver to Owner, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Owner or any other additional insured) which Contractor is required to purchase and maintain.

B. Owner shall deliver to Contractor, with copies to each additional insured identified in the Supplementary Conditions, certificates of insurance (and other evidence of insurance requested by Contractor or any other additional insured) which Owner is required to purchase and maintain.

5.04 *Contractor's Liability Insurance*

A. Contractor shall purchase and maintain such liability and other insurance as is appropriate for the Work being performed and as will provide protection from claims set forth below which may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable:

1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;

2. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;

3. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;

4. claims for damages insured by reasonably available personal injury liability coverage which are sustained:

   a. by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or

   b. by any other person for any other reason;

5. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and

6. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.

B. The policies of insurance required by this Paragraph 5.04 shall:

1. with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.6 inclusive, include as additional insured (subject to any customary exclusion regarding professional liability) Owner and Engineer, and any other individuals or entities identified in the Supplementary Conditions, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, partners, employees, agents, consultants and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;

2. include at least the specific coverages and be written for not less than the limits of liability provided in the Supplementary Conditions or required by Laws or Regulations, whichever is greater;

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3. include completed operations insurance;

4. include contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 6.11 and 6.20;

5. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured identified in the Supplementary Conditions to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the Contractor pursuant to Paragraph 5.03 will so provide);

6. remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work in accordance with Paragraph 13.07; and

7. with respect to completed operations insurance, and any insurance coverage written on a claims-made basis, remain in effect for at least two years after final payment.

a. Contractor shall furnish Owner and each other additional insured identified in the Supplementary Conditions, to whom a certificate of insurance has been issued, evidence satisfactory to Owner and any such additional insured of continuation of such insurance at final payment and one year thereafter.

5.05 *Owner's Liability Insurance*

A. In addition to the insurance required to be provided by Contractor under Paragraph 5.04, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.

5.06 *Property Insurance*

A. Unless otherwise provided in the Supplementary Conditions, Owner shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof (subject to such deductible amounts as may be provided in the Supplementary Conditions or required by Laws and Regulations). This insurance shall:

1. include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured;

2. be written on a Builder's Risk "all-risk" or open peril or special causes of loss policy form that shall at least include insurance for physical loss or damage to the Work, temporary buildings, false work, and materials and equipment in transit, and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage, (other than caused by flood) and such other perils or causes of loss as may be specifically required by the Supplementary Conditions;

3. include expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);

4. cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by Engineer;

5. allow for partial utilization of the Work by Owner;

6. include testing and startup; and

7. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor, and Engineer with 30 days written notice to each other additional insured to whom a certificate of insurance has been issued.

B. Owner shall purchase and maintain such boiler and machinery insurance or additional property insurance as may be required by the Supplementary Conditions or Laws and Regulations which will include the interests of Owner, Contractor, Subcontractors, and Engineer, and any other individuals or entities identified in the Supplementary Conditions, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured.

C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with Paragraph 5.06 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least 30 days prior written notice has been given to Owner and Contractor and to each other additional insured to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with Paragraph 5.07.

D. Owner shall not be responsible for purchasing and maintaining any property insurance specified in this Paragraph 5.06 to protect the interests of Contractor, Subcontractors, or others in the Work to the extent of any

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deductible amounts that are identified in the Supplementary Conditions. The risk of loss within such identified deductible amount will be borne by Contractor, Subcontractors, or others suffering any such loss, and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

E. If Contractor requests in writing that other special insurance be included in the property insurance policies provided under Paragraph 5.06, Owner shall, if possible, include such insurance, and the cost thereof will be charged to Contractor by appropriate Change Order. Prior to commencement of the Work at the Site, Owner shall in writing advise Contractor whether or not such other insurance has been procured by Owner.

5.07 *Waiver of Rights*

A. Owner and Contractor intend that all policies purchased in accordance with Paragraph 5.06 will protect Owner, Contractor, Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or additional insureds thereunder. Owner and Contractor waive all rights against each other and their respective officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors, and Engineer, and all other individuals or entities identified in the Supplementary Conditions to be listed as insured or additional insured (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner as trustee or otherwise payable under any policy so issued.

B. Owner waives all rights against Contractor, Subcontractors, and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them for:

1. loss due to business interruption, loss of use, or other consequential loss extending beyond direct physical loss or damage to Owner's property or the Work caused by, arising out of, or resulting from fire or other perils whether or not insured by Owner; and

2. loss or damage to the completed Project or part thereof caused by, arising out of, or resulting from fire or other insured peril or cause of loss covered by any property insurance maintained on the completed Project or part thereof by Owner during partial utilization pursuant to Paragraph 14.05, after Substantial Completion pursuant to Paragraph 14.04, or after final payment pursuant to Paragraph 14.07.

C. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 5.07.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them.

5.08 *Receipt and Application of Insurance Proceeds*

A. Any insured loss under the policies of insurance required by Paragraph 5.06 will be adjusted with Owner and made payable to Owner as fiduciary for the insureds, as their interests may appear, subject to the requirements of any applicable mortgage clause and of Paragraph 5.08.B. Owner shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so received applied on account thereof, and the Work and the cost thereof covered by an appropriate Change Order .

B. Owner as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within 15 days after the occurrence of loss to Owner's exercise of this power. If such objection be made, Owner as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, Owner as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, Owner as fiduciary shall give bond for the proper performance of such duties.

5.09 *Acceptance of Bonds and Insurance; Option to Replace*

A. If either Owner or Contractor has any objection to the coverage afforded by or other provisions of the bonds or insurance required to be purchased and maintained by the other party in accordance with Article 5 on the basis of non-conformance with the Contract

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Documents, the objecting party shall so notify the other party in writing within 10 days after receipt of the certificates (or other evidence requested) required by Paragraph 2.01.B. Owner and Contractor shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the bonds and insurance required of such party by the Contract Documents, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent bonds or insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

5.10 *Partial Utilization, Acknowledgment of Property Insurer*

A. If Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 14.05, no such use or occupancy shall commence before the insurers providing the property insurance pursuant to Paragraph 5.06 have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.

ARTICLE 6 - CONTRACTOR'S RESPONSIBILITIES

6.01 *Supervision and Superintendence*

A. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. Contractor shall not be responsible for the negligence of Owner or Engineer in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents.

B. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and Engineer except under extraordinary circumstances. The superintendent will be Contractor's representative at the Site and shall have authority to act on behalf of Contractor. All communications given to or received from the superintendent shall be binding on Contractor.

6.02 *Labor; Working Hours*

A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.

B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed during regular working hours. Contractor will not permit the performance of Work on a Saturday, Sunday, or any legal holiday without Owner's written consent (which will not be unreasonably withheld) given after prior written notice to Engineer.

6.03 *Services, Materials, and Equipment*

A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, start-up, and completion of the Work.

B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by Engineer, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.

C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

6.04 *Progress Schedule*

A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.07 as it may be adjusted from time to time as provided below.

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1. Contractor shall submit to Engineer for acceptance (to the extent indicated in Paragraph 2.07) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.

2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Article 12. Adjustments in Contract Times may only be made by a Change Order.

6.05 *Substitutes and "Or-Equals"*

A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to Engineer for review under the circumstances described below.

1. *"Or-Equal" Items:* If in Engineer's sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Engineer as an "or-equal" item, in which case review and approval of the proposed item may, in Engineer's sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this Paragraph 6.05.A.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:

a. in the exercise of reasonable judgment Engineer determines that:

1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;

2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole,

3) it has a proven record of performance and availability of responsive service; and

b. Contractor certifies that, if approved and incorporated into the Work:

1) there will be no increase in cost to the Owner or increase in Contract Times, and

2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.

2. Substitute Items

a. If in Engineer's sole discretion an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item under Paragraph 6.05.A.1, it will be considered a proposed substitute item.

b. Contractor shall submit sufficient information as provided below to allow Engineer to determine that the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by Engineer from anyone other than Contractor.

c. The requirements for review by Engineer will be as set forth in Paragraph 6.05.A.2.d, as supplemented in the General Requirements and as Engineer may decide is appropriate under the circumstances.

d. Contractor shall make written application to Engineer for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:

1) shall certify that the proposed substitute item will:

a) perform adequately the functions and achieve the results called for by the general design,

b) be similar in substance to that specified, and

c) be suited to the same use as that specified;

2) will state:

a) the extent, if any, to which the use of the proposed substitute item will prejudice Contractor's achievement of Substantial Completion on time;

b) whether or not use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item; and

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c) whether or not incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;

3) will identify:

a) all variations of the proposed substitute item from that specified , and

b) available engineering, sales, maintenance, repair, and replacement services;

4) and shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change,

B. *Substitute Construction Methods or Procedures:* If a specific means, method, technique, sequence, or procedure of construction is expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by Engineer. Contractor shall submit sufficient information to allow Engineer, in Engineer's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The requirements for review by Engineer will be similar to those provided in Paragraph 6.05.A.2.

C. *Engineer's Evaluation:* Engineer will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to Paragraphs 6.05.A and 6.05.B. Engineer may require Contractor to furnish additional data about the proposed substitute item. Engineer will be the sole judge of acceptability. No "or equal" or substitute will be ordered, installed or utilized until Engineer's review is complete, which will be evidenced by either a Change Order for a substitute or an approved Shop Drawing for an "or equal." Engineer will advise Contractor in writing of any negative determination.

D. *Special Guarantee:* Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.

E. *Engineer's Cost Reimbursement*: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor pursuant to Paragraphs 6.05.A.2 and 6.05.B Whether or not Engineer approves a substitute item so proposed or submitted by Contractor, Contractor shall reimburse Owner for the charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

F. *Contractor's Expense*: Contractor shall provide all data in support of any proposed substitute or "or-equal" at Contractor's expense.

6.06 *Concerning Subcontractors, Suppliers, and Others*

A. Contractor shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to Owner as indicated in Paragraph 6.06.B), whether initially or as a replacement, against whom Owner may have reasonable objection. Contractor shall not be required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom Contractor has reasonable objection.

B. If the Supplementary Conditions require the identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to Owner in advance for acceptance by Owner by a specified date prior to the Effective Date of the Agreement, and if Contractor has submitted a list thereof in accordance with the Supplementary Conditions, Owner's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued . No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of any right of Owner or Engineer to reject defective Work.

C. Contractor shall be fully responsible to Owner and Engineer for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions. Nothing in the Contract Documents:

1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or Engineer and any such Subcontractor, Supplier or other individual or entity, nor

2. shall anything in the Contract Documents create any obligation on the part of Owner or Engineer to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual

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or entity except as may otherwise be required by Laws and Regulations.

D. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with Contractor.

E. Contractor shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with Engineer through Contractor.

F. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.

G. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Engineer. Whenever any such agreement is with a Subcontractor or Supplier who is listed as an additional insured on the property insurance provided in Paragraph 5.06, the agreement between the Contractor and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against Owner, Contractor, and Engineer,, and all other individuals or entities identified in the Supplementary Conditions to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same.

6.07 *Patent Fees and Royalties*

A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if to the actual knowledge of Owner or Engineer its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.

B. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

6.08 *Permits*

A. Unless otherwise provided in the Supplementary Conditions, Contractor shall obtain and pay for all construction permits and licenses. Owner shall assist Contractor, when necessary, in obtaining such permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the prosecution of the Work which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement. Owner shall pay all charges of utility owners for connections for providing permanent service to the Work.

6.09 *Laws and Regulations*

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

B. If Contractor performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work. However, it shall not be Contractor's primary responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.

C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work shall be the subject of an adjustment in Contract Price or Contract Times. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

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6.10 *Taxes*

A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

6.11 *Use of Site and Other Areas*

A. Limitation on Use of Site and Other Areas

1. Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.

2. Should any claim be made by any such owner or occupant because of the performance of the Work, Contractor shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.

3. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by any such owner or occupant against Owner, Engineer, or any other party indemnified hereunder to the extent caused by or based upon Contractor's performance of the Work.

B. *Removal of Debris During Performance of the Work:* During the progress of the Work Contractor shall keep the Site and other areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.

C. *Cleaning:* Prior to Substantial Completion of the Work Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work Contractor shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.

D. *Loading Structures:* Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

6.12 *Record Documents*

A. Contractor shall maintain in a safe place at the Site one record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, and written interpretations and clarifications in good order and annotated to show changes made during construction. These record documents together with all approved Samples and a counterpart of all approved Shop Drawings will be available to Engineer for reference. Upon completion of the Work, these record documents, Samples, and Shop Drawings will be delivered to Engineer for Owner.

6.13 *Safety and Protection*

A. Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:

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

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

3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.

B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.

C. All damage, injury, or loss to any property referred to in Paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor (except damage or loss attributable to the fault of Draw-

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ings or Specifications or to the acts or omissions of Owner or Engineer or , or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).

D. Contractor's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and Engineer has issued a notice to Owner and Contractor in accordance with Paragraph 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

6.14 *Safety Representative*

A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

6.15 *Hazard Communication Programs*

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

6.16 *Emergencies*

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

6.17 *Shop Drawings and Samples*

A. Contractor shall submit Shop Drawings and Samples to Engineer for review and approval in accordance with the acceptable Schedule of Submittals (as required by Paragraph 2.07). Each submittal will be identified as Engineer may require.

1. Shop Drawings

a. Submit number of copies specified in the General Requirements.

b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Engineer the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 6.17.D.

2. *Samples:* Contractor shall also submit Samples to Engineer for review and approval in accordance with the acceptable schedule of Shop Drawings and Sample submittals.

a. Submit number of Samples specified in the Specifications.

b. Clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Engineer may require to enable Engineer to review the submittal for the limited purposes required by Paragraph 6.17.D.

B. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals , any related Work performed prior to Engineer's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.

C. Submittal Procedures

1. Before submitting each Shop Drawing or Sample, Contractor shall have determined and verified:

a. all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;

b. the suitability of all materials with respect to intended use, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work;

c. all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto; and

d. shall also have reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents.

2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents

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with respect to Contractor's review and approval of that submittal.

3. With each submittal, Contractor shall give Engineer specific written notice of any variations, that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be both a written communication separate from the Shop Drawing's or Sample Submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to Engineer for review and approval of each such variation.

D. *Engineer's Review*

1. Engineer will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Engineer. Engineer's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

2. Engineer's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.

3. Engineer's review and approval shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 6.17.C.3 and Engineer has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Engineer's review and approval shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 6.17.C.1.

E. *Resubmittal Procedures*

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

6.18 *Continuing the Work*

A. Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as permitted by Paragraph 15.04 or as Owner and Contractor may otherwise agree in writing.

6.19 *Contractor's General Warranty and Guarantee*

A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Engineer and its Related Entities shall be entitled to rely on representation of Contractor's warranty and guarantee.

B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:

1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or

2. normal wear and tear under normal usage.

C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:

1. observations by Engineer;

2. recommendation by Engineer or payment by Owner of any progress or final payment;

3. the issuance of a certificate of Substantial Completion by Engineer or any payment related thereto by Owner;

4. use or occupancy of the Work or any part thereof by Owner;

5. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by Engineer;

6. any inspection, test, or approval by others; or

7. any correction of defective Work by Owner.

6.20 *Indemnification*

A. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Engineer, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or

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arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable .

B. In any and all claims against Owner or Engineer or any of their respective consultants, agents, officers, directors, partners, or employees by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 6.20.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.

C. The indemnification obligations of Contractor under Paragraph 6.20.A shall not extend to the liability of Engineer and Engineer's officers, directors, partners, employees, agents, consultants and subcontractors arising out of:

1. the preparation or approval of, or the failure to prepare or approve, maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or

2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

6.21 *Delegation of Professional Design Services*

A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable law.

B. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of Contractor by the Contract Documents, Owner and Engineer will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to Engineer.

C. Owner and Engineer shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals, provided Owner and Engineer have specified to Contractor all performance and design criteria that such services must satisfy.

D. Pursuant to this Paragraph 6.21, Engineer's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Engineer's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 6.17.D.1.

E. Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

ARTICLE 7 - OTHER WORK AT THE SITE

7.01 *Related Work at Site*

A. Owner may perform other work related to the Project at the Site with Owner's employees, or via other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents, then:

1. written notice thereof will be given to Contractor prior to starting any such other work; and

2. if Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times that should be allowed as a result of such other work, a Claim may be made therefor as provided in Paragraph 10.05.

B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and shall properly coordinate the Work with theirs. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and

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properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering their work and will only cut or alter their work with the written consent of Engineer and the others whose work will be affected. The duties and responsibilities of Contractor under this Paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between Owner and such utility owners and other contractors.

C. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Article 7, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

7.02 *Coordination*

A. If Owner intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth in Supplementary Conditions:

1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;

2. the specific matters to be covered by such authority and responsibility will be itemized; and

3. the extent of such authority and responsibilities will be provided.

B. Unless otherwise provided in the Supplementary Conditions, Owner shall have sole authority and responsibility for such coordination.

7.03 *Legal Relationships*

A. Paragraphs 7.01.A and 7.02 are not applicable for utilities not under the control of Owner.

B. Each other direct contract of Owner under Paragraph 7.01.A shall provide that the other contractor is liable to Owner and Contractor for the reasonable direct delay and disruption costs incurred by Contractor as a result of the other contractor's actions or inactions.

C. Contractor shall be liable to Owner and any other contractor for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor's action or inactions.

ARTICLE 8 - OWNER'S RESPONSIBILITIES

8.01 *Communications to Contractor*

A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through Engineer.

8.02 *Replacement of Engineer*

A. In case of termination of the employment of Engineer, Owner shall appoint an engineer to whom Contractor makes no reasonable objection, whose status under the Contract Documents shall be that of the former Engineer.

8.03 *Furnish Data*

A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

8.04 *Pay When Due*

A. Owner shall make payments to Contractor when they are due as provided in Paragraphs 14.02.C and 14.07.C.

8.05 *Lands and Easements; Reports and Tests*

A. Owner's duties in respect of providing lands and easements and providing engineering surveys to establish reference points are set forth in Paragraphs 4.01 and 4.05. Paragraph 4.02 refers to Owner's identifying and making available to Contractor copies of reports of explorations and tests of subsurface conditions and drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site that have been utilized by Engineer in preparing the Contract Documents.

8.06 *Insurance*

A. Owner's responsibilities, if any, in respect to purchasing and maintaining liability and property insurance are set forth in Article 5.

8.07 *Change Orders*

A. Owner is obligated to execute Change Orders as indicated in Paragraph 10.03.

8.08 *Inspections, Tests, and Approvals*

A. Owner's responsibility in respect to certain inspections, tests, and approvals is set forth in Paragraph 13.03.B.

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8.09 *Limitations on Owner's Responsibilities*

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

8.10 *Undisclosed Hazardous Environmental Condition*

A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 4.06.

8.11 *Evidence of Financial Arrangements*

A. If and to the extent Owner has agreed to furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents, Owner's responsibility in respect thereof will be as set forth in the Supplementary Conditions.

ARTICLE 9 - ENGINEER'S STATUS DURING CONSTRUCTION

9.01 *Owner's Representative*

A. Engineer will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Engineer as Owner's representative during construction are set forth in the Contract Documents and will not be changed without written consent of Owner and Engineer.

9.02 *Visits to Site*

A. Engineer will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Engineer, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Engineer will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Engineer's efforts will be directed toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Engineer will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

B. Engineer's visits and observations are subject to all the limitations on Engineer's authority and responsibility set forth in Paragraph 9.09. Particularly, but without limitation, during or as a result of Engineer's visits or observations of Contractor's Work Engineer will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

9.03 *Project Representative*

A. If Owner and Engineer agree, Engineer will furnish a Resident Project Representative to assist Engineer in providing more extensive observation of the Work. The authority and responsibilities of any such Resident Project Representative and assistants will be as provided in the Supplementary Conditions, and limitations on the responsibilities thereof will be as provided in Paragraph 9.09. If Owner designates another representative or agent to represent Owner at the Site who is not Engineer's consultant, agent or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in the Supplementary Conditions.

9.04 *Authorized Variations in Work*

A. Engineer may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on Owner and also on Contractor, who shall perform the Work involved promptly. If Owner or Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment , a Claim may be made therefor as provided in Paragraph 10.05.

9.05 *Rejecting Defective Work*

A. Engineer will have authority to reject Work which Engineer believes to be defective, or that Engineer believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Engineer will also have authority to require special inspection or testing of the Work as provided in Paragraph 13.04, whether or not the Work is fabricated, installed, or completed.

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9.06 *Shop Drawings, Change Orders and Payments*

A. In connection with Engineer's authority, and limitations thereof, as to Shop Drawings and Samples, see Paragraph 6.17.

B. In connection with Engineer's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, see Paragraph 6.21.

C. In connection with Engineer's authority as to Change Orders, see Articles 10, 11, and 12.

D. In connection with Engineer's authority as to Applications for Payment, see Article 14.

9.07 *Determinations for Unit Price Work*

A. Engineer will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Engineer will review with Contractor the Engineer's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Engineer's written decision thereon will be final and binding (except as modified by Engineer to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of Paragraph 10.05.

9.08 *Decisions on Requirements of Contract Documents and Acceptability of Work*

A. Engineer will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. All matters in question and other matters between Owner and Contractor arising prior to the date final payment is due relating to the acceptability of the Work, and the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, will be referred initially to Engineer in writing within 30 days of the event giving rise to the question

B. Engineer will, with reasonable promptness, render a written decision on the issue referred. If Owner or Contractor believe that any such decision entitles them to an adjustment in the Contract Price or Contract Times or both, a Claim may be made under Paragraph 10.05. The date of Engineer's decision shall be the date of the event giving rise to the issues referenced for the purposes of Paragraph 10.05.B.

C. Engineer's written decision on the issue referred will be final and binding on Owner and Contractor, subject to the provisions of Paragraph 10.05.

D. When functioning as interpreter and judge under this Paragraph 9.08, Engineer will not show partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.

9.09 *Limitations on Engineer's Authority and Responsibilities*

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

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

C. Engineer will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.

D. Engineer's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 14.07.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with the Contract Documents.

E. The limitations upon authority and responsibility set forth in this Paragraph 9.09 shall also apply to, the Resident Project Representative, if any, and assistants, if any.

ARTICLE 10 - CHANGES IN THE WORK; CLAIMS

10.01 *Authorized Changes in the Work*

A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work by a Change Order, or a Work Change Directive. Upon receipt of any such document, Contractor shall

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promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).

B. If Owner and Contractor are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefor as provided in Paragraph 10.05.

10.02 *Unauthorized Changes in the Work*

A.Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented as provided in Paragraph 3.04, except in the case of an emergency as provided in Paragraph 6.16 or in the case of uncovering Work as provided in Paragraph 13.04.B.

10.03 *Execution of Change Orders*

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

1. changes in the Work which are: (i) ordered by Owner pursuant to Paragraph 10.01.A, (ii) required because of acceptance of defective Work under Paragraph 13.08.A or Owner's correction of defective Work under Paragraph 13.09, or (iii) agreed to by the parties;

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

3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by Engineer pursuant to Paragraph 10.05; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the Progress Schedule as provided in Paragraph 6.18.A.

10.04 *Notification to Surety*

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

10.05 *Claims*

A. *Engineer's Decision Required*: All Claims, except those waived pursuant to Paragraph 14.09, shall be referred to the Engineer for decision. A decision by Engineer shall be required as a condition precedent to any exercise by Owner or Contractor of any rights or remedies either may otherwise have under the Contract Documents or by Laws and Regulations in respect of such Claims.

B. *Notice:* Written notice stating the general nature of each Claim, shall be delivered by the claimant to Engineer and the other party to the Contract promptly (but in no event later than 30 days) after the start of the event giving rise thereto. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with supporting data shall be delivered to the Engineer and the other party to the Contract within 60 days after the start of such event (unless Engineer allows additional time for claimant to submit additional or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Time shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to Engineer and the claimant within 30 days after receipt of the claimant's last submittal (unless Engineer allows additional time).

C. *Engineer's Action*: Engineer will review each Claim and, within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any, take one of the following actions in writing:

1. deny the Claim in whole or in part,

2. approve the Claim, or

3. notify the parties that the Engineer is unable to resolve the Claim if, in the Engineer's sole discretion, it would be inappropriate for the Engineer to do so. For purposes of further resolution of the Claim, such notice shall be deemed a denial.

D. In the event that Engineer does not take action on a Claim within said 30 days, the Claim shall be deemed denied.

E. Engineer's written action under Paragraph 10.05.C or denial pursuant to Paragraphs 10.05.C.3 or 10.05.D will be final and binding upon Owner and Contractor, unless Owner or Contractor invoke the dispute resolution procedure set forth in Article 16 within 30 days of such action or denial.

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F. No Claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Paragraph 10.05.

ARTICLE 11 - COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK

11.01 *Cost of the Work*

A. *Costs Included:* The term Cost of the Work means the sum of all costs, except those excluded in Paragraph 11.01.B, necessarily incurred and paid by Contractor in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to Contractor will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by Owner, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall include only the following items, and shall not include any of the costs itemized in Paragraph 11.01.B.

1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time at the Site. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.

2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.

3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Engineer, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 11.01.

4. Costs of special consultants (including but not limited to Engineers, architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.

5. Supplemental costs including the following:

a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.

b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.

c. Rentals of all construction equipment and machinery, and the parts thereof whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Engineer, and the costs of transportation, loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, imposed by Laws and Regulations.

e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.

f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph

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5.06.D), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.

g. The cost of utilities, fuel, and sanitary facilities at the Site.

h. Minor expenses such as telegrams, long distance telephone calls, telephone service at the Site, expresses, and similar petty cash items in connection with the Work.

i. The costs of premiums for all bonds and insurance Contractor is required by the Contract Documents to purchase and maintain.

B. *Costs Excluded:* The term Cost of the Work shall not include any of the following items:

1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expediters, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 11.01.A.1 or specifically covered by Paragraph 11.01.A.4, all of which are to be considered administrative costs covered by the Contractor's fee.

2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.

3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.

4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongly supplied, and making good any damage to property.

5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraphs 11.01.A and 11.01.B.

C. *Contractor's Fee:* When all the Work is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 12.01.C.

D. *Documentation:* Whenever the Cost of the Work for any purpose is to be determined pursuant to Paragraphs 11.01.A and 11.01.B, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

11.02 *Allowances*

A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Engineer.

B. *Cash Allowances*

1. Contractor agrees that:

a. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and

b. Contractor's costs for unloading and handling on the Site, labor, installation , overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.

C. Contingency Allowance

1. Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.

D. Prior to final payment, an appropriate Change Order will be issued as recommended by Engineer to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

11.03 *Unit Price Work*

A. Where the Contract Documents provide that all or part of the Work is to be Unit Price Work, initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work

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times the estimated quantity of each item as indicated in the Agreement.

B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made by Engineer subject to the provisions of Paragraph 9.07.

C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.

D. Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Paragraph 10.05 if:

1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and

2. there is no corresponding adjustment with respect any other item of Work; and

3. Contractor believes that Contractor is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

ARTICLE 12 - CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES

12.01 *Change of Contract Price*

A. The Contract Price may only be changed by a Change Order. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.

B. The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:

1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or

2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or

3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under Paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in Paragraph 11.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 12.01.C).

C. *Contractor's Fee:* The Contractor's fee for overhead and profit shall be determined as follows:

1. a mutually acceptable fixed fee; or

2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:

a. for costs incurred under Paragraphs 11.01.A.1 and 11.01.A.2, the Contractor's fee shall be 15 percent;

b. for costs incurred under Paragraph 11.01.A.3, the Contractor's fee shall be five percent;

c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraph 12.01.C.2.a is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and Contractor will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;

d. no fee shall be payable on the basis of costs itemized under Paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;

e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and

f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 12.01.C.2.a through 12.01.C.2.e, inclusive.

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12.02 *Change of Contract Times*

A. The Contract Times may only be changed by a Change Order. Any Claim for an adjustment in the Contract Times shall be based on written notice submitted by the party making the Claim to the Engineer and the other party to the Contract in accordance with the provisions of Paragraph 10.05.

B. Any adjustment of the Contract Times covered by a Change Order or any Claim for an adjustment in the Contract Times will be determined in accordance with the provisions of this Article 12.

12.03 *Delays*

A. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in Paragraph 12.02.A. Delays beyond the control of Contractor shall include, but not be limited to, acts or neglect by Owner, acts or neglect of utility owners or other contractors performing other work as contemplated by Article 7, fires, floods, epidemics, abnormal weather conditions, or acts of God.

B. If Owner, Engineer, or other contractors or utility owners performing other work for Owner as contemplated by Article 7, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times , or both. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.

C If Contractor is delayed in the performance or progress of the Work by fire, flood, epidemic, abnormal weather conditions, acts of God, acts or failures to act of utility owners not under the control of Owner, or other causes not the fault of and beyond control of Owner and Contractor, then Contractor shall be entitled to an equitable adjustment in Contract Times, if such adjustment is essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays described in this Paragraph 12.03.C.

D. Owner, Engineer and the Related Entities of each of them shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of Engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

E. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delays within the control of Contractor. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of Contractor.

ARTICLE 13 - TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

13.01 *Notice of Defects*

A. Prompt notice of all defective Work of which Owner or Engineer has actual knowledge will be given to Contractor. All defective Work may be rejected, corrected, or accepted as provided in this Article 13.

13.02 *Access to Work*

A. Owner, Engineer, their consultants and other representatives and personnel of Owner, independent testing laboratories, and governmental agencies with jurisdictional interests will have access to the Site and the Work at reasonable times for their observation, inspecting, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's Site safety procedures and programs so that they may comply therewith as applicable.

13.03 *Tests and Inspections*

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

B. Owner shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents except:

1. for inspections, tests, or approvals covered by Paragraphs 13.03.C and 13.03.D below;

2. that costs incurred in connection with tests or inspections conducted pursuant to Paragraph 13.04.B shall be paid as provided in said Paragraph 13.04.C; and

3. as otherwise specifically provided in the Contract Documents.

C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all

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costs in connection therewith, and furnish Engineer the required certificates of inspection or approval.

D. Contractor shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Engineer's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by organizations acceptable to Owner and Engineer.

E. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Engineer, it must, if requested by Engineer, be uncovered for observation.

F. Uncovering Work as provided in Paragraph 13.03.E shall be at Contractor's expense unless Contractor has given Engineer timely notice of Contractor's intention to cover the same and Engineer has not acted with reasonable promptness in response to such notice.

13.04 *Uncovering Work*

A. If any Work is covered contrary to the written request of Engineer, it must, if requested by Engineer, be uncovered for Engineer's observation and replaced at Contractor's expense.

B. If Engineer considers it necessary or advisable that covered Work be observed by Engineer or inspected or tested by others, Contractor, at Engineer's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Engineer may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment.

C. If it is found that the uncovered Work is defective, Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05.

D. If, the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

13.05 *Owner May Stop the Work*

A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

13.06 *Correction or Removal of Defective Work*

A. Promptly after receipt of notice, Contractor shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by Engineer, remove it from the Project and replace it with Work that is not defective. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).

B. When correcting defective Work under the terms of this Paragraph 13.06 or Paragraph 13.07, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

13.07 *Correction Period*

A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents) or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for Contractor's use by Owner or permitted by Laws and Regulations as contemplated in Paragraph 6.11.A is found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. repair such defective land or areas; or

2. correct such defective Work; or

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3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and

4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom.

B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by Contractor.

C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications .

D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this Paragraph 13.07, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.

E. Contractor's obligations under this Paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this Paragraph 13.07 shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitation or repose.

13.08 *Acceptance of Defective Work*

A. If, instead of requiring correction or removal and replacement of defective Work, Owner (and, prior to Engineer's recommendation of final payment, Engineer) prefers to accept it, Owner may do so. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Engineer as to reasonableness) and the diminished value of the Work to the extent not otherwise paid by Contractor pursuant to this sentence. If any such acceptance occurs prior to Engineer's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and Owner shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner.

13.09 *Owner May Correct Defective Work*

A. If Contractor fails within a reasonable time after written notice from Engineer to correct defective Work or to remove and replace rejected Work as required by Engineer in accordance with Paragraph 13.06.A, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, Owner may, after seven days written notice to Contractor, correct or remedy any such deficiency.

B. In exercising the rights and remedies under this Paragraph 13.09, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Engineer and Engineer's consultants access to the Site to enable Owner to exercise the rights and remedies under this Paragraph.

C. All claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 13.09 will be charged against Contractor, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, Owner may make a Claim therefor as provided in Paragraph 10.05. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.

D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 13.09.

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ARTICLE 14 - PAYMENTS TO CONTRACTOR AND COMPLETION

14.01 *Schedule of Values*

A. The Schedule of Values established as provided in Paragraph 2.07.A will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to Engineer. Progress payments on account of Unit Price Work will be based on the number of units completed.

14.02 *Progress Payments*

A. Applications for Payments

1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to Engineer for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.

3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

B. *Review of Applications*

1. Engineer will, within 10 days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to Owner or return the Application to Contractor indicating in writing Engineer's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.

2. Engineer's recommendation of any payment requested in an Application for Payment will constitute a representation by Engineer to Owner, based on Engineer's observations on the Site of the executed Work as an experienced and qualified design professional and on Engineer's review of the Application for Payment and the accompanying data and schedules, that to the best of Engineer's knowledge, information and belief:

a. the Work has progressed to the point indicated;

b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for Unit Price Work under Paragraph 9.07, and to any other qualifications stated in the recommendation); and

c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Engineer's responsibility to observe the Work.

3. By recommending any such payment Engineer will not thereby be deemed to have represented that:

a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Engineer in the Contract Documents; or

b. that there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

4. Neither Engineer's review of Contractor's Work for the purposes of recommending payments nor Engineer's recommendation of any payment, including final payment, will impose responsibility on Engineer:

a. to supervise, direct, or control the Work, or

b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or

c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or

d. to make any examination to ascertain how or for what purposes Contractor has used the moneys paid on account of the Contract Price, or

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e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.

5. Engineer may refuse to recommend the whole or any part of any payment if, in Engineer's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 14.02.B.2. Engineer may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in Engineer's opinion to protect Owner from loss because:

a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;

b. the Contract Price has been reduced by Change Orders;

c. Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or

d. Engineer has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.

C. *Payment Becomes Due*

1. Ten days after presentation of the Application for Payment to Owner with Engineer's recommendation, the amount recommended will (subject to the provisions of Paragraph 14.02.D) become due, and when due will be paid by Owner to Contractor.

D. *Reduction in Payment*

1. Owner may refuse to make payment of the full amount recommended by Engineer because:

a. claims have been made against Owner on account of Contractor's performance or furnishing of the Work;

b. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;

c. there are other items entitling Owner to a set-off against the amount recommended; or

d. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A.

2. If Owner refuses to make payment of the full amount recommended by Engineer, Owner will give Contractor immediate written notice (with a copy to Engineer) stating the reasons for such action and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, when Contractor corrects to Owner's satisfaction the reasons for such action.

3. If it is subsequently determined that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 14.02.C.1.

14.03 *Contractor's Warranty of Title*

A. Contractor warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to Owner no later than the time of payment free and clear of all Liens.

14.04 *Substantial Completion*

A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete (except for items specifically listed by Contractor as incomplete) and request that Engineer issue a certificate of Substantial Completion.

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

C. If Engineer considers the Work substantially complete, Engineer will deliver to Owner a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. Owner shall have seven days after receipt of the tentative certificate during which to make written objection to Engineer as to any provisions of the certificate or attached list. If, after considering such objections, Engineer concludes that the Work is not substantially complete, Engineer will within 14 days after submission of the tentative certificate to Owner notify Contractor in writing, stating the reasons therefor. If, after consideration of Owner's objections, Engineer considers the Work substantially complete, Engineer will within said 14 days execute and deliver to Owner and Contractor a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as Engineer believes justified after consideration of any objections from Owner.

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D. At the time of delivery of the tentative certificate of Substantial Completion, Engineer will deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless Owner and Contractor agree otherwise in writing and so inform Engineer in writing prior to Engineer's issuing the definitive certificate of Substantial Completion, Engineer's aforesaid recommendation will be binding on Owner and Contractor until final payment.

E. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to complete or correct items on the tentative list.

14.05 *Partial Utilization*

A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Engineer, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions.

1. Owner at any time may request Contractor in writing to permit Owner to use or occupy any such part of the Work which Owner believes to be ready for its intended use and substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor will certify to Owner and Engineer that such part of the Work is substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

2. Contractor at any time may notify Owner and Engineer in writing that Contractor considers any such part of the Work ready for its intended use and substantially complete and request Engineer to issue a certificate of Substantial Completion for that part of the Work.

3. Within a reasonable time after either such request, Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion. If Engineer does not consider that part of the Work to be substantially complete, Engineer will notify Owner and Contractor in writing giving the reasons therefor. If Engineer considers that part of the Work to be substantially complete, the provisions of Paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.

4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 5.10 regarding property insurance.

14.06 *Final Inspection*

A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Engineer will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

14.07 *Final Payment*

A. Application for Payment

1. After Contractor has, in the opinion of Engineer, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance certificates of inspection, marked-up record documents (as provided in Paragraph 6.12), and other documents, Contractor may make application for final payment following the procedure for progress payments.

2. The final Application for Payment shall be accompanied (except as previously delivered) by:

a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Paragraph 5.04.B.7;

b. consent of the surety, if any, to final payment;

c. a list of all Claims against Owner that Contractor believes are unsettled; and

d. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of or Liens filed in connection with the Work.

3. In lieu of the releases or waivers of Liens specified in Paragraph 14.07.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner or Owner's property might in any way be responsible have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral

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satisfactory to Owner to indemnify Owner against any Lien.

B. *Engineer's Review of Application and Acceptance*

1. If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract Documents have been fulfilled, Engineer will, within ten days after receipt of the final Application for Payment, indicate in writing Engineer's recommendation of payment and present the Application for Payment to Owner for payment. At the same time Engineer will also give written notice to Owner and Contractor that the Work is acceptable subject to the provisions of Paragraph 14.09. Otherwise, Engineer will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

C. Payment Becomes Due

1. Thirty days after the presentation to Owner of the Application for Payment and accompanying documentation, the amount recommended by Engineer, less any sum Owner is entitled to set off against Engineer's recommendation, including but not limited to liquidated damages, will become due and , will be paid by Owner to Contractor.

14.08 *Final Completion Delayed*

A. If, through no fault of Contractor, final completion of the Work is significantly delayed, and if Engineer so confirms, Owner shall, upon receipt of Contractor's final Application for Payment (for Work fully completed and accepted) and recommendation of Engineer, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in the Agreement, and if bonds have been furnished as required in Paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by Contractor to Engineer with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

14.09 *Waiver of Claims*

A. The making and acceptance of final payment will constitute:

1. a waiver of all Claims by Owner against Contractor, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from Contractor's continuing obligations under the Contract Documents; and

2. a waiver of all Claims by Contractor against Owner other than those previously made in accordance with the requirements herein and expressly acknowledged by Owner in writing as still unsettled.

ARTICLE 15 - SUSPENSION OF WORK AND TERMINATION

15.01 *Owner May Suspend Work*

A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by notice in writing to Contractor and Engineer which will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be granted an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if Contractor makes a Claim therefor as provided in Paragraph 10.05.

15.02 *Owner May Terminate for Cause*

A. The occurrence of any one or more of the following events will justify termination for cause:

1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);

2. Contractor's disregard of Laws or Regulations of any public body having jurisdiction;

3. Contractor's disregard of the authority of Engineer; or

4. Contractor's violation in any substantial way of any provisions of the Contract Documents.

B. If one or more of the events identified in Paragraph 15.02.A occur, Owner may, after giving Contractor (and surety) seven days written notice of its intent to terminate the services of Contractor:

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1. exclude Contractor from the Site, and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion),

2. incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and

3. complete the Work as Owner may deem expedient.

C. If Owner proceeds as provided in Paragraph 15.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by Engineer as to their reasonableness and, when so approved by Engineer, incorporated in a Change Order. When exercising any rights or remedies under this Paragraph Owner shall not be required to obtain the lowest price for the Work performed.

D. Notwithstanding Paragraphs 15.02.B and 15.02.C, Contractor's services will not be terminated if Contractor begins within seven days of receipt of notice of intent to terminate to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt of said notice.

E. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue. Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.

F. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 5.01.A, the termination procedures of that bond shall supersede the provisions of Paragraphs 15.02.B, and 15.02.C.

15.03 *Owner May Terminate For Convenience*

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

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

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

3. all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and

4. reasonable expenses directly attributable to termination.

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

15.04 *Contractor May Stop Work or Terminate*

A. If, through no act or fault of Contractor, (i) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (ii) Engineer fails to act on any Application for Payment within 30 days after it is submitted, or (iii) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven days written notice to Owner and Engineer, and provided Owner or Engineer do not remedy such suspension or failure within that time, terminate the Contract and recover from Owner payment on the same terms as provided in Paragraph 15.03.

B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Engineer has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven days after written notice to Owner and Engineer, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this Paragraph 15.04 are not intended to preclude Contractor from making a Claim under Paragraph 10.05 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this Paragraph.

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ARTICLE 16 - DISPUTE RESOLUTION

16.01 *Methods and Procedures*

A. Either Owner or Contractor may request mediation of any Claim submitted to Engineer for a decision under Paragraph 10.05 before such decision becomes final and binding. The mediation will be governed by the Construction Industry Mediation Rules of the American Arbitration Association in effect as of the Effective Date of the Agreement. The request for mediation shall be submitted in writing to the American Arbitration Association and the other party to the Contract. Timely submission of the request shall stay the effect of Paragraph 10.05.E.

B. Owner and Contractor shall participate in the mediation process in good faith. The process shall be concluded within 60 days of filing of the request. The date of termination of the mediation shall be determined by application of the mediation rules referenced above.

C. If the Claim is not resolved by mediation, Engineer's action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become final and binding 30 days after termination of the mediation unless, within that time period, Owner or Contractor:

1. elects in writing to invoke any dispute resolution process provided for in the Supplementary Conditions, or

2. agrees with the other party to submit the Claim to another dispute resolution process, or

3. gives written notice to the other party of their intent to submit the Claim to a court of competent jurisdiction.

ARTICLE 17 - MISCELLANEOUS

17.01 *Giving Notice*

A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:

1. delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or

2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

17.02 *Computation of Times*

A. When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

17.03 *Cumulative Remedies*

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

17.04 *Survival of Obligations*

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

17.05 *Controlling Law*

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

17.06 *Headings*

A. Article and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

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SECTION 00800

SUPPLEMENTARY CONDITIONS

PART 1 AMENDMENTS TO GENERAL CONDITIONS

These Supplementary Conditions amend or supplement the Standard General Conditions of the Construction Contract (EJCDC C-700, 2007 Edition) and other provisions of the Contract Documents as indicated below. All provisions which are not so amended or supplemented remain in full force and effect.

The terms used in these Supplementary Conditions will have the meanings indicated in the General Conditions. Additional terms used in these Supplementary Conditions have the meanings indicated below, which are applicable to both the singular and plural thereof.

ARTICLE 2 – PRELIMINARY MATTERS

SC-2.01.B Delete paragraph 2.01.B in its entirety and insert the following in its place:

2.01.B Within 10 calendar days from the date of the Notice of Award, Contractor shall deliver to Owner, with a copy to Engineer, certificates of insurance (and other evidence requested by Owner) which Contractor is required to purchase and maintain in accordance with the requirements of Article 5.

SC-2.03 Delete paragraph 2.03 in its entirety and insert the following in its place:

2.03 Contract Time will commence to run on the date specified in the Notice to Proceed.

ARTICLE 3 – CONTRACT DOCUMENTS

SC-3.01.B Add the following new paragraph immediately after paragraph 3.01.B:

3.01.B.1 Each and every provision of law and clause required by law to be inserted in these Contract Documents shall be deemed to be inserted herein, and they shall be read and enforced as though it were included herein, and if through mistake or otherwise, any such provision is not inserted, or if not correctly inserted, then upon the application of either party, the Contract Documents shall forthwith be physically amended to make such insertion.

ARTICLE 4 – AVAILABILITY OF LAND

SC-4.03.B Amend paragraph 4.03.B by striking out the following:

(with a copy to Contractor)

ARTICLE 5 - BONDS AND INSURANCE

SC-5.02.A Add the following at the end of paragraph 5.02.A:

Surety and insurance companies shall be rated B+ or higher at the time of contract award by A. M. Best.

SC-5.03.B Add the following new paragraph immediately after paragraph 5.03.B:

5.03.C Insurance certificate(s) shall also contain the following:

Additional requirements as specified in Specification Section 00810.

SC-5.04.B Delete paragraph 5.04.B.7 in its entirety and insert the following in its place:

5.04.B.7 be written on an occurrence basis, and not on a claims-made basis.

SC-5.04.B Add the following new paragraph immediately after paragraph 5.04.B.7

5.04.C The limits of liability for the insurance required by paragraph 5.04 shall provide coverage for not less than the or greater where required by law as prescribed by Section 00810.

Additional Insured

a. Tighe & Bond, Inc.
53 Southampton Rd.
Westfield, MA 01085

SC-5.06 Delete Section 5.06 in its entirety.

SC-5.08 Delete paragraph 5.08 in its entirety.

ARTICLE 6 - CONTRACTOR'S RESPONSIBILITIES

SC-6.01.B Add the following new paragraph immediately after paragraph 6.01.B.

6.01.C Whenever Owner shall notify Contractor, in writing, that any person on the Work appears to be incompetent, disorderly, or otherwise unsatisfactory, such person shall be removed from the Project and shall not again be employed on it except with the consent of Owner.

SC-6.06 Delete paragraphs 6.06.A and 6.06.B in their entirety and insert the following in their place.

6.06.A Contractor shall not employ any Subcontractor, Supplier or other person or organization, (including those who are to furnish the principal items of materials or equipment), whether initially or as a substitute,

against whom Owner may have reasonable objection. Acceptance of any Subcontractor, other person or organization by Owner shall not constitute a waiver of any right of Owner to reject defective Work. Contractor shall not be required to employ any Subcontractor, other person or organization against whom Contractor has reasonable objection.

SC-6.06.C Add the following new paragraph immediately after paragraph 6.06.C.2:

6.06.C.3 Owner or Engineer may furnish to any such Subcontractor, Supplier or other person or organization, to the extent practicable, information about amounts paid on their behalf to Contractor in accordance with Contractor's Applications for Payment.

SC-6.08 Delete the word "Owner" in the last sentence and replace with the word "Contractor".

SC-6.10 Add the following sentence at the end of paragraph 6.10.A.

All materials incorporated into the Work under this Contract are exempt from the Sales and Use Taxes of the State of Connecticut. The tax exemption number will be provided to the Contractor.

SC-6.20.C Add the following new paragraph immediately after paragraph 6.20.C.

6.20.D If, through acts of neglect on the part of Contractor, any other Contractor or any Subcontractor shall suffer loss or damage on the Work, Contractor shall settle with such other Contractor or Subcontractor by agreement or arbitration if such other Contractor or Subcontractor will so settle. If such other Contractor or Subcontractor shall assert any claim against Owner on account of any such damage alleged to have been sustained, Owner shall notify Contractor, who shall indemnify, defend, and save harmless Owner against any such claim.

ARTICLE 10 - CHANGES IN THE WORK; CLAIMS

SC-10.05 Amend the first sentence of paragraph 10.05.B by replacing "30 days" with "15 days".

Amend the second sentence of paragraph 10.05.B by replacing "60 days" with "30 days".

ARTICLE 11 - COST OF THE WORK; CASH ALLOWANCES; UNIT PRICE WORK

SC-11.01 Delete paragraph 11.01.A.5.c in its entirety and replace with the following:

11.01.A.5.c The fair rental of all machinery and equipment used on the extra work for the period of such use. The fair rental for all

machinery and equipment shall be based upon the most recent edition of "Rental Rate Bluebook for Construction Equipment" (the "Bluebook"), published by Nielson/Dataquest, or a similar publication approved by Engineer. Reasonable rental periods shall be used. If a piece of equipment used on extra work for a short period of time (hours or days) is on the job, or has previously been rented for a long period of time (months), then the long-term rental rate shall be used in determining costs.

SC-11.01.B.1 Insert in the first sentence after the word "architects" the word "superintendents".

SC-11.01.B.5 Add the following new paragraph immediately after paragraph 11.01.B.5:

11.01.B.6 Costs of or rental of small tools; costs of or rental of buildings.

ARTICLE 13 - TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK

SC-13.03 Insert after the word "notice" the words "(minimum 24 hours)" in paragraph 13.03.A.

SC-13.04 Insert in the first sentence of paragraph 13.04.B after the word "others" the words "following prior written concurrence of Engineer to cover such work".

SC-13.05 Add the following new paragraph immediately after paragraph 13.05.A.

13.05.B If Owner stops work under Paragraph 13.05, Contractor shall not be entitled to an extension of Contract Time nor to an increase in Contract Price.

SC-13.06 Add the following new paragraph immediately after Paragraph 13.06.B.

13.06.C At any time during the progress of the Work, Engineer shall have the right to reject any work which does not conform to the requirements of the Contract Documents, even though such work has been previously inspected and paid for.

ARTICLE 14 - PAYMENTS TO CONTRACTOR AND COMPLETION

SC-14.02 Add the following language at the end of paragraph 14.02.A.3:

No payments will be made that would deplete the retainage, place in escrow any funds that are required for retainage, or invest the retainage for the benefit of the Contractor.

SC-14.02 Add the following new paragraph immediately after paragraph 14.02.B.5.d.

14.02.B.5.e Owner is required to pay Engineer additional compensation because of Contractor delays or rejection of defective Work.

SC-14.02 Delete Paragraph 14.02.C.1 in its entirety and insert the following in its place:

1. The Application for Payment with Engineer's recommendations will be presented to the Owner and Agency for consideration. If both the Owner and Agency find the Application for Payment acceptable, the recommended amount less any reduction under the provisions of Paragraph 14.02.D will become due thirty days after the Application for Payment is presented to the Owner, and the Owner will make payment to the Contractor.

SC-14.04 Delete paragraphs 14.04.A through 14.04.D in their entirety and insert the following in its place:

14.04.A When Contractor considers the entire Work ready for its intended use, Contractor shall notify Owner and Engineer in writing that the entire Work is substantially complete (except for items specifically listed by Contractor as incomplete) and request that Engineer issue a Certificate of Substantial Completion. Within a reasonable time thereafter, Owner, Contractor and Engineer shall make an inspection of the Work to determine the status of completion. If, after consultation with Owner, Engineer does not consider the Work substantially complete, Engineer will notify Contractor in writing giving the reasons therefore. If, after consultation with Owner, Engineer considers and the Owner agrees that the Work is substantially complete, Engineer will prepare and deliver to Contractor, in a form approved by Owner, a Certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be included in the certificate a list of items to be completed or corrected before final payment.

SC-14.05 Add the following new paragraph immediately after paragraph 14.05.A.3:

14.05.A.4 Owner may at any time request Contractor in writing to permit Owner to take over operation of any part of the Work although it is not substantially complete. A copy of such request will be sent to Engineer, and within a reasonable time thereafter Owner, Contractor, and Engineer shall make an inspection of that part of the Work to determine its status of completion and will prepare a list of the items remaining to be completed or corrected thereon before final payment. If Contractor does not object in writing to Owner and Engineer that such part of the Work is not ready for separate operation by Owner, Engineer will finalize the list of items to be completed or corrected and will deliver such lists to Owner and Contractor together with a written recommendation as to the division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, maintenance, utilities, insurance, warranties, and guarantees for that part of the Work which will become binding upon Owner and Contractor at the time when Owner takes over such

operation (unless they shall have otherwise agreed in writing and so informed Engineer). During such operation and prior to Substantial Completion of such part of the Work, Owner shall allow Contractor reasonable access to complete or correct items on said list and to complete other related Work.

Paragraph 14.05.A.4 shall be renumbered to 14.05.A.5

SC-14.07 Delete paragraphs 14.07.B. and 14.07.C in their entirety and insert the following in their place:

14.07.B If, on the basis of Engineer's observation of the Work during construction and final inspection, and Engineer's review of the final Application for Payment and accompanying documentation, all as required by the Contract Documents, Engineer is satisfied that the Work has been completed and Contractor's other obligations under the Contract Documents have been fulfilled, Engineer will indicate in writing his/her recommendation of payment and present the Application to Owner for payment. Thereupon Engineer will give written notice to Owner and Contractor that the Work is acceptable subject to the provisions of paragraph 14.09. Otherwise, Engineer will return the Application to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application. If the Application and accompanying documentation are appropriate as to form and substance, Owner shall in accordance with the applicable Law, pay Contractor the amount recommended by Engineer.

ARTICLE 15 - SUSPENSION OF WORK AND TERMINATION

SC- 15.02 Add the following new paragraph immediately after paragraph 15.02.A.4:

15.02.A.5. If Contractor abandons the Work, or sublets this Contract or any part thereof, without the previous written consent of Owner, or if the Contract or any claim thereunder shall be assigned by Contractor otherwise than as herein specified.

ARTICLE 17 - MISCELLANEOUS

SC-17.06 Add the following new paragraphs immediately after paragraph 17.06.

17.07 Wage Rates

A. The requirements and provisions of all applicable laws and any amendments thereof or additions thereto as to the employment of labor, and to the schedule of prevailing wage rates established in compliance with laws shall be a part of these Contract Documents. Copies of the wage schedules are included in Part II of these Supplementary Conditions. If it becomes necessary to

employ any person in a trade or occupation not classified in the wage determinations, such person shall be paid at not less than such rates as shall be determined by the officials administrating the laws mentioned above. Such approved prevailing rate shall be retroactive to the time of the initial employment of such person in such trade or occupation.

B. The schedules of wages referred to above are prevailing rates only, and Owner will not consider any claims for additional compensation made by Contractor because of payment by Contractor of any wage rate in excess of the applicable rate contained in these Contract Documents. All disputes in regard to the payment of wages in excess of those specified in the schedules shall be resolved by Contractor.

C. The said schedules of wages shall continue to be the prevailingrates to be paid during the life of this Agreement and a legible copy of said schedules shall be kept posted in a conspicuous place at the site of the work.

D. Both Federal and State schedules of prevailing wage rates are included in Part II of these Supplementary Conditions. Where rates differ, the higher rates shall apply for that trade.

17.08 US EPA Phase II Storm Water Program

Comply with requirement of the US EPA Phase II Storm Water Program for Construction Activities Greater than 1 Acre.

PART II – FEDERAL AND STATE GOVERNMENT PROVISIONS

Federal and State Government Provisions included herein, have been selected from those to which specific references have been made elsewhere in the Contract Documents. Each and every other provision of law or clause required by law to be inserted in this Contract shall be deemed to be also inserted herein in accordance with paragraph 3.01.B.1 of the Supplementary Conditions.

1. State Wage Rates

END OF SECTION

Project: Abbey Road Drainage Improvements

Minimum Rates and Classifications for Heavy/Highway Construction

ID#: **H** 21160

Connecticut Department of Labor
Wage and Workplace Standards Division

By virtue of the authority vested in the Labor Commissioner under provisions of Section 31-53 of the General Statutes of Connecticut, as amended, the following are declared to be the prevailing rates and welfare payments and will apply only where the contract is advertised for bid within 20 days of the date on which the rates are established. Any contractor or subcontractor not obligated by agreement to pay to the welfare and pension fund shall pay this amount to each employee as part of his/her hourly wages.

Project Number: 2015-16

Project Town: Darien

FAP Number:

State Number:

Project: Abbey Road Drainage Improvements

CLASSIFICATION	Hourly Rate	Benefits
01) Asbestos/Toxic Waste Removal Laborers: Asbestos removal and encapsulation (except its removal from mechanical systems which are not to be scrapped), toxic waste removers, blasters. **See Laborers Group 5 and 7**		
1) Boilermaker	33.79	34% + 8.96
1a) Bricklayer, Cement Masons, Cement Finishers, Plasterers, Stone Masons	32.50	28.34
2) Carpenters, Piledrivermen	31.45	23.54

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2a) Diver Tenders	31.45	23.54
3) Divers	39.91	23.54
03a) Millwrights	31.84	23.99
4) Painters: (Bridge Construction) Brush, Roller, Blasting (Sand, Water, etc.), Spray	45.95	19.35
4a) Painters: Brush and Roller	31.52	19.35
4b) Painters: Spray Only	34.52	19.35
4c) Painters: Steel Only	33.02	18.55

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4d) Painters: Blast and Spray	34.52	19.35
4e) Painters: Tanks, Tower and Swing	33.52	19.35
5) Electrician (Trade License required: E-1,2 L-5,6 C-5,6 T-1,2 L-1,2 V-1,2,7,8,9)	34.50	28.78
6) Ironworkers: Ornamental, Reinforcing, Structural, and Precast Concrete Erection	34.47	31.09 + a
7) Plumbers (Trade License required: (P-1,2,6,7,8,9 J-1,2,3,4 SP-1,2) and Pipefitters (Including HVAC Work) (Trade License required: S-1,2,3,4,5,6,7,8 B-1,2,3,4 D-1,2,3,4 G-1, G-2, G-8, G-9)	40.62	28.91
----LABORERS---- -		
8) Group 1: Laborer (Unskilled), Common or General, acetylene burner, concrete specialist	27.85	18.30

9) Group 2: Chain saw operators, fence and guard rail erectors, pneumatic tool operators, powdermen	28.10	18.30
10) Group 3: Pipelayers	28.35	18.30
11) Group 4: Jackhammer/Pavement breaker (handheld); mason tenders (cement/concrete), catch basin builders, asphalt rakers, air track operators, block paver, curb setter and forklift operators	28.35	18.30
12) Group 5: Toxic waste removal (non-mechanical systems)	29.85	18.30
13) Group 6: Blasters	29.60	18.30
Group 7: Asbestos/lead removal, non-mechanical systems (does not include leaded joint pipe)	28.85	18.30
Group 8: Traffic control signalmen	16.00	18.30

Group 9: Hydraulic Drills	28.60	18.30
----LABORERS (TUNNEL CONSTRUCTION, FREE AIR). Shield Drive and Liner Plate Tunnels in Free Air.----		
13a) Miners, Motormen, Mucking Machine Operators, Nozzle Men, Grout Men, Shaft & Tunnel Steel & Rodmen, Shield & Erector, Arm Operator, Cable Tenders	32.22	18.30 + a
13b) Brakemen, Trackmen	31.28	18.30 + a
----CLEANING, CONCRETE AND CAULKING TUNNEL----		
14) Concrete Workers, Form Movers, and Strippers	31.28	18.30 + a
15) Form Erectors	31.60	18.30 + a

Project: Abbey Road Drainage Improvements

----ROCK SHAFT LINING, CONCRETE, LINING OF SAME AND TUNNEL IN FREE AIR:----		
16) Brakemen, Trackmen, Tunnel Laborers, Shaft Laborers	31.28	18.30 + a
17) Laborers Topside, Cage Tenders, Bellman	31.17	18.30 + a
18) Miners	32.22	18.30 + a
----TUNNELS, CAISSON AND CYLINDER WORK IN COMPRESSED AIR: ----		
18a) Blaster	38.53	18.30 + a
19) Brakemen, Trackmen, Groutman, Laborers, Outside Lock Tender, Gauge Tenders	38.34	18.30 + a

20) Change House Attendants, Powder Watchmen, Top on Iron Bolts	36.41	18.30 + a
21) Mucking Machine Operator	39.11	18.30 + a
----TRUCK DRIVERS----(*see note below)		
Two axle trucks	28.58	20.24 + a
Three axle trucks; two axle ready mix	28.68	20.24 + a
Three axle ready mix	28.73	20.24 + a
Four axle trucks, heavy duty trailer (up to 40 tons)	28.78	20.24 + a

Four axle ready-mix	28.83	20.24 + a
Heavy duty trailer (40 tons and over)	29.03	20.24 + a
Specialized earth moving equipment other than conventional type on-the road trucks and semi-trailer (including Euclids)	28.83	20.24 + a
----POWER EQUIPMENT OPERATORS----		
Group 1: Crane handling or erecting structural steel or stone, hoisting engineer (2 drums or over), front end loader (7 cubic yards or over), Work Boat 26 ft. & Over. (Trade License Required)	37.55	23.05 + a
Group 2: Cranes (100 ton rate capacity and over); Excavator over 2 cubic yards; Piledriver ($3.00 premium when operator controls hammer); Bauer Drill/Caisson. (Trade License Required)	37.23	23.05 + a
Group 3: Excavator/Backhoe under 2 cubic yards; Cranes (under 100 ton rated capacity), Gradall; Master Mechanic; Hoisting Engineer (all types of equipment where a drum and cable are used to hoist or drag material regardless of motive power of operation), Rubber Tire Excavator (Drott-1085 or similar);Grader Operator; Bulldozer Fine Grade (slopes, shaping, laser or GPS, etc.). (Trade License Required)	36.49	23.05 + a

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Group 4: Trenching Machines; Lighter Derrick; Concrete Finishing Machine; CMI Machine or Similar; Koehring Loader (Skooper)	36.10	23.05 + a
Group 5: Specialty Railroad Equipment; Asphalt Paver; Asphalt Spreader; Asphalt Reclaiming Machine; Line Grinder; Concrete Pumps; Drills with Self Contained Power Units; Boring Machine; Post Hole Digger; Auger; Pounder; Well Digger; Milling Machine (over 24" Mandrell)	35.51	23.05 + a
Group 5 continued: Side Boom; Combination Hoe and Loader; Directional Driller.	35.51	23.05 + a
Group 6: Front End Loader (3 up to 7 cubic yards); Bulldozer (rough grade dozer).	35.20	23.05 + a
Group 7: Asphalt Roller; Concrete Saws and Cutters (ride on types); Vermeer Concrete Cutter; Stump Grinder; Scraper; Snooper; Skidder; Milling Machine (24" and Under Mandrel).	34.86	23.05 + a
Group 8: Mechanic, Grease Truck Operator, Hydroblaster, Barrier Mover, Power Stone Spreader; Welder; Work Boat under 26 ft.; Transfer Machine.	34.46	23.05 + a
Group 9: Front End Loader (under 3 cubic yards), Skid Steer Loader regardless of attachments (Bobcat or Similar); Fork Lift, Power Chipper; Landscape Equipment (including hydroseeder).	34.03	23.05 + a

Group 10: Vibratory Hammer, Ice Machine, Diesel and Air Hammer, etc.	31.99	23.05 + a
Group 11: Conveyor, Earth Roller; Power Pavement Breaker (whiphammer), Robot Demolition Equipment.	31.99	23.05 + a
Group 12: Wellpoint Operator.	31.93	23.05 + a
Group 13: Compressor Battery Operator.	31.35	23.05 + a
Group 14: Elevator Operator; Tow Motor Operator (Solid Tire No Rough Terrain).	30.21	23.05 + a
Group 15: Generator Operator; Compressor Operator; Pump Operator; Welding Machine Operator; Heater Operator.	29.80	23.05 + a
Group 16: Maintenance Engineer/Oiler	29.15	23.05 + a

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Group 17: Portable asphalt plant operator; portable crusher plant operator; portable concrete plant operator.	33.46	23.05 + a
Group 18: Power Safety Boat; Vacuum Truck; Zim Mixer; Sweeper; (minimum for any job requiring CDL license).	31.04	23.05 + a
**NOTE: SEE BELOW		
----LINE CONSTRUCTION----(Railroad Construction and Maintenance)----		
20) Lineman, Cable Splicer, Technician	45.43	6.25%+19.20
21) Heavy Equipment Operator	40.89	6.25%+17.18
22) Equipment Operator, Tractor Trailer Driver, Material Men	38.62	6.25%+16.68

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23) Driver Groundmen	24.99	6.25%+10.87
23a) Truck Driver	34.07	6.25%+15.41
----LINE CONSTRUCTION----		
24) Driver Groundmen	30.92	6.5% + 9.70
25) Groundmen	22.67	6.5% + 6.20
26) Heavy Equipment Operators	37.10	6.5% + 10.70
27) Linemen, Cable Splicers, Dynamite Men	41.22	6.5% + 12.20

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28) Material Men, Tractor Trailer Drivers, Equipment Operators	35.04	6.5% + 10.45

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Welders: Rate for craft to which welding is incidental.

**Note: Hazardous waste removal work receives additional $1.25 per hour for truck drivers.*

***Note: Hazardous waste premium $3.00 per hour over classified rate*

ALL Cranes: When crane operator is operating equipment that requires a fully licensed crane operator to operate he receives an extra $2.00 premium in addition to the hourly wage rate and benefit contributions:

1) Crane handling or erecting structural steel or stone; hoisting engineer (2 drums or over)

2) Cranes (100 ton rate capacity and over) Bauer Drill/Caisson

3) Cranes (under 100 ton rated capacity)

Crane with 150 ft. boom (including jib) - $1.50 extra
Crane with 200 ft. boom (including jib) - $2.50 extra
Crane with 250 ft. boom (including jib) - $5.00 extra
Crane with 300 ft. boom (including jib) - $7.00 extra
Crane with 400 ft. boom (including jib) - $10.00 extra

All classifications that indicate a percentage of the fringe benefits must be calculated at the percentage rate times the "base hourly rate".

Apprentices duly registered under the Commissioner of Labor's regulations on "Work Training Standards for Apprenticeship and Training Programs" Section 31-51-d-1 to 12, are allowed to be paid the appropriate percentage of the prevailing journeymen hourly base and the full fringe benefit rate, providing the work site ratio shall not be less than one full-time journeyperson instructing and supervising the work of each apprentice in a specific trade.

~~Connecticut General Statute Section 31-55a: Annual Adjustments to wage rates by contractors doing state work ~~

The Prevailing wage rates applicable to this project are subject to annual adjustments each July 1st for the duration of the project.

Each contractor shall pay the annual adjusted prevailing wage rate that is in effect each July 1st, as posted by the Department of Labor.

It is the contractor's responsibility to obtain the annual adjusted prevailing wage rate increases directly from the Department of Labor's website.

The annual adjustments will be posted on the Department of Labor's Web page: www.ct.gov/dol.

The Department of Labor will continue to issue the initial prevailing wage rate schedule to the Contracting Agency for the project.

All subsequent annual adjustments will be posted on our Web Site for contractor access.

Contracting Agencies are under no obligation pursuant to State labor law to pay any increase due to the annual adjustment provision.

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Effective October 1, 2005 - Public Act 05-50: any person performing the work of any mechanic, laborer, or worker shall be paid prevailing wage

All Person who perform work ON SITE must be paid prevailing wage for the appropriate mechanic, laborer, or worker classification.

All certified payrolls must list the hours worked and wages paid to All Persons who perform work ON SITE regardless of their ownership i.e.: (Owners, Corporate Officers, LLC Members, Independent Contractors, et. al)

Reporting and payment of wages is required regardless of any contractual relationship alleged to exist between the contractor and such person.

~~Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clause (29 CFR 5.5 (a) (1) (ii)).

Please direct any questions which you may have pertaining to classification of work and payment of prevailing wages to the Wage and Workplace Standards Division, telephone (860)263-6790.

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SECTION 00810

INSURANCE REQUIREMENTS FOR CONTRACTORS

BIDDER'S ATTENTION IS DIRECTED TO THE INSURANCE REQUIREMENTS BELOW. IT IS HIGHLY RECOMMENDED THE BIDDERS CONFER WITH THEIR RESPECTIVE INSURANCE CARRIERS OR BROKERS TO DETERMINE IN ADVANCE OF BID SUBMISSION THE AVAILABILITY OF INSURANCE CERTIFICATES AND ENDORSEMENTS AS PRESCRIBED AND PROVIDED HEREIN. IF AN APPARENT LOW BIDDER FAILS TO COMPLY STRICTLY WITH THE INSURANCE REQUIREMENTS, THAT BIDDER MAY BE DISQUALIFIED FROM THE AWARD OF THE CONTRACT.

A. Minimum Limits of Insurance

Contractor shall maintain minimum limits of insurance as follows:

1. General liability: $1,000,000 combined single limit per occurrence for bodily injury, personal injury and property damage. If Commercial General Liability Insurance or other form with a general aggregate limit is used, either the general aggregate limit shall apply separately to this project location or the general aggregate limit shall be twice the required occurrence limit.

2. Automobile liability: $1,000,000 combined single limit per accident for bodily injury and property damage.

3. Workers' Compensation and Employers liability: Workers compensation limits as required by the labor code of the State of Connecticut and Employees liability limits of $500,000 per accident.

4. Contractual Liability: $1,000,000 combined single limit per occurrence and aggregate for bodily injury personal injury and property damage applying to the indemnity agreement which is part of the written contract.

5. Umbrella; $2,000,000.

B. Deductibles and Self Insurance Retentions

1. Any deductibles or self-insured retentions must be declared to and approved by Town. At the option of Town, either: the insurer may reduce or eliminate such deductibles or self-insured retentions as respects Town, its officers, officials, employees and volunteers; or the Contractors shall procure a bond guaranteeing payment of losses and related investigations, claim administration and defense expenses.

C. The policies are to contain, or be endorsed to contain the following provisions:

1. General Liability Coverages

a. Town, its officials, employees and volunteers are to be covered as insured as respects: liability arising out of activities performed by or on the behalf of the Contractor, including the insured's general supervision of the Contractor; products and completed operations of the Contractor; premises owned, occupied or used by the Contractor. The coverage shall contain no special limitations on the scope of protection afforded to Town, its officers, officials, employees or volunteers.

b. Comprehensive Auto Liability Coverage applies to all automobiles owned, leased, hired or borrowed by the Contractor.

c. The Contractor's insurance coverage shall be primary insurance as respects Town, its officers, officials, employees or volunteers. Any insurance or self-insurance maintained by Town, its officers, officials, employees or volunteers shall be excess of the Contractor's insurance and shall not contribute with it.

d. Any failure to comply with reporting provisions of the policies shall not affect coverage provided to Town, its officers, officials, employees or volunteers.

e. The Contractor's insurance shall apply separately to each insured against whom claim is made or suit is brought, except to the limits of the insurer's liability.

2. Workers Compensation and Employers Liability Coverage.

The insurer shall agree to waive all rights of subrogation against Town, its officers, officials, employees or volunteers for losses arising from Work performed by the Contractor for the Town.

3. All Coverages.

Each insurance policy required by the clause shall be endorsed to state that coverage shall not be suspended, voided, canceled, reduced in coverage or in limits except after thirty (30) days prior written notice by certified mail, return receipt requested, has been given to the Town.

D. Acceptability of Insurers.

Insurance is to be placed with insurers with a Best's rating of no less then A:VII.

E. Verification of Coverage

Contractor shall furnish Town with certificates of insurance and with original endorsements effecting coverage required by this clause. The certificates and endorsements for each insurance policy are to be signed by a person authorized by that insurer to bind coverage on its behalf. All certificates and endorsements are to be received

and approved by Town before The Work commences. Town reserves the right to require complete, certified copies of all required insurance policies, at any time.

F. Subcontractors

Contractor shall include all Subcontractors as insureds under its policies and shall furnish separate certificates and endorsements for each Subcontractor. All coverages for Subcontractors shall be subject to all of the requirements stated herein.

G. Hold Harmless

The Contractor shall save, keep, and hold harmless Town its officers, agents, employees and volunteers from all damages, costs or expenses in law or equity that shall at any time arise or be set up because of damages to property or personal injury received by reason of or in the course of performing The Work which may be occasioned by any willful or negligent act or omission of the Contractor, any of the Contractor's employees, or any Subcontractor. Town will not be held liable for any accident, loss or damage to The Work prior to its completion and acceptance. Contractual liability insurance shall be required in accordance with the limits to be established by Town.

H. Indemnification

Upon failure of the Contractor to furnish, deliver and maintain such insurance as above provided, this contract at the election of the Town, may be forthwith declared suspended, discontinued or terminated. Failure of the Contractor to take out and/or to maintain the taking out and/or maintenance of any required insurance, shall not relieve the Contractor from any required insurance, shall not relieve the Contractor from any liability under the contract, nor shall the insurance requirements be construed to conflict with the obligations of the Contractor concerning indemnification.

SECTION 00900

SPECIAL CONDITIONS

1. Coordination and Work by Others

1. The Contractor shall coordinate his/her work with work conducted by others in the area.

2. The Contractor's attention is directed to the fact that work by utility companies, such as Aquarion Water Company of Connecticut, may be on going during the duration of this contract. It is essential that all interested parties in the project cooperate to the end that the entire project will be brought to a successful conclusion as rapidly as possible, but the Owner cannot guarantee that no interference or delay will be caused thereby. Interference and delay resulting from such cooperation shall not be the basis of claims against the Owner.

3. No additional payment will be made to the Contractor for coordination or cooperation of such work.

2. Streets to be Kept Open

1. The contractor shall keep the street in which he/she may be working open at all times to pedestrian and vehicular traffic. Maintain alternating traffic throughout the Work area for the duration of the Project. No detours will be permitted. If, in the opinion of the Engineer, the interest of abutters and the public requires it, the contractor shall bridge or construct steel plate crossings over trenches at street crossings, roads or driveways. The Contractor shall conduct his work for this project in such a manner as the Engineer may direct from time to time. No additional payment will be made to the contractor for such work.

2. The Contractor shall be responsible for taking all steps necessary to minimize dust emanating from the project and for keeping the streets free of the accumulation of sand and other similar materials. No additional payment will be made to the contractor for such work.

3. The Contractor shall be responsible for backfilling open trenches every night. Plating will only be permitted with permission of the Town. If backfilling is not possible, the Contractor shall pay for Police protection of the open trench overnight. No additional payment will be made to the contractor for such work.

4. Provide emergency vehicle access to the Work area throughout the duration of the Project. No additional payment will be made to the contractor for such work.

3. Payment of Wages

Pursuant to General Statutes, Section 31-53, of the State of Connecticut, the following provision is hereby made part of these Contract Documents:

1. The wages paid on an hourly basis to any mechanic, contractor employees upon the work herein contracted to be done and the amount of payment or contribution paid or payable on behalf of each such employee to any employee welfare fund, as defined in Section 31-53 of the General Statutes, shall be at a rate equal to the rate (of wages) customary or prevailing for the same work in the same trade or occupation in the town in which such public works are being constructed. Any Contractor who is not obligated by agreement to make payment or contribution on behalf of such employees to any such employee welfare fund shall pay to each employee as part of his wages the amount of payment or contribution for his classification on each pay day.

2. Attached is a copy of the minimum wage rate schedule issued by the State of Connecticut Labor Department. Said wage rate schedules shall be posted at a conspicuous location on the project site.

3. The Contractor is cautioned that wage rates are continually changing and he/she shall insure himself/herself that the enclosed schedules are the latest issue, this being his/her responsibility.

4. Provisions for Flow of Present Drainage

1. Provisions for the flow of all sewers, drains and watercourses that are encountered or altered during construction shall be provided by the Contractor. All connections shall be restored if necessary without extra charge. All offensive matter shall be removed immediately with such precautions as may be necessary. If required, the Contractor shall install temporary bypass connections for surface or pipe drainage facilities in order to provide uninterrupted, continuous service during the time of construction. Wherever, and whenever, a temporary bypass is provided, an alternate means of bypass shall also be provided. The alternate bypass shall insure the continued flow of drainage in case of failure to the initial bypass. Both methods of bypass shall be approved by the Engineer and shall be provided at no additional expense.

5. Unit Costs

1. The Town of Darien reserves the right to delete any items from the Contract without affecting the unit costs of the deleted item or other Contract items.

6. Site Maintenance & Cleanup

1. The Contractor must keep streets and premises free from unnecessary obstructions, debris and all other materials. Provide a full cleanup of the entire Project site on a weekly basis to the satisfaction of the Town and Engineer. Should the Contractor fail to perform this full cleanup to the satisfaction of the Town and Engineer, the Town

may perform this cleanup by others. If cleanup is required to be performed by others, the cost of this cleanup shall be deducted from any monies which may be, or may become, due to the Contractor under the Contract.

2. Provide maintenance of all trenches and temporary paving work on a weekly basis throughout the duration of the Project. Fill any areas of trench or pavement settlement with bituminous concrete to the satisfaction of the Town and Engineer.

3. No separate payments will be made for cleanup or for maintenance of trenches and temporary paving work. Such work shall be considered incidental to the item to which it applies and shall be included in the price for that item.

7. Work in Cold Weather and Snow Removal

1. When the work of this Contract is performed in cold weather, the Contractor shall take all necessary precautions to protect the work from damage and to remove ice, snow or frost from materials. The removal shall include all necessary heating and the additional removal of any resultant water. The Contractor shall also supply any required sand and/or coarse aggregate to prevent slipping on ice.

2. The contractor shall be responsible for snow and ice removal, road sanding and mechanical sweeping within the Work area during the course of the Contract. Snow and ice removal on existing pavements shall be performed by the Town. The Contractor shall be responsible for providing access to the existing paved roadways surrounding the Work area for snow and ice removal by the Town.

END OF SECTION

SECTION 01110

SUMMARY OF WORK

PART 1 GENERAL

1.1 SUMMARY

A. Work of the Contract is shown and described in Drawings and Specifications entitled:

Abbey Road Drainage Improvements

Town of Darien

August 31, 2015

Tighe & Bond, Inc.
Consulting Engineers
Shelton, Connecticut

B. No materials, labor or equipment shall be furnished by the Owner under this Contract.

C. Obtain all local permits and licenses necessary for the contemplated Work.

D. Comply with the requirements of all permits issued for all portions of the Work under this Contract. Copies of permits, order of conditions, etc. appended to the document shall become part of this Contract. .

E. All Work shall be completed within the contract time as set forth in the Agreement.

1.2 PROJECT SUMMARY

A. The Work of this Contract includes but is not limited to the following:

1. Construction of new storm sewers, manholes, catch basins, pavement repairs, surface restoration and appurtenant work.

2. Bituminous concrete pavement repair and overlay.

3. Restoration of other items within the project limits disturbed by construction activities.

4. Installation and maintenance of sedimentation and erosion control measures.

5. Relocation of water sanitary sewer and gas services if necessary due to installation of storm sewers.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION

SECTION 01140

WORK RESTRICTIONS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Project Management
2. Work Hours
3. Coordination
4. Project Meetings

1.2 PROJECT MANAGEMENT

A. Retain on the Site, a competent, full time Superintendent, satisfactory to the Owner. The Superintendent shall not be changed, except with the consent of the Owner and shall be in full charge of the work. All instructions given to this person by the Engineer or the Owner shall be binding.

B. The work must be completed in a continuous uninterrupted operation. Use sufficient personnel and adequate equipment to complete all the necessary work requirements within the period of time required by the Agreement.

1.3 WORK HOURS

A. Unless specifically authorized by the Owner, the Work must be conducted during daylight hours on Monday through Friday, and within the time between 7:00 a.m. and 5:00 p.m. No work is to be done on Owner's holidays, Saturdays, Sundays or outside of the work hours described above, without prior written permission of the Owner.

1.4 COORDINATION

A. Supply to the Owner the telephone number of a responsible person who may be contacted during off-hours for emergencies 24 hours a day, seven days a week.

B. Prepare a contact list of phone numbers for all project personnel. Project list should include the Contractor, Engineer, Owner and local personnel including police, fire and ambulance.

C. All utility shutdowns shall be coordinated with the Owner and the affected utility. No shutdown is to occur without authorization.

D. Advanced notice shall be provided to all homeowners at least 48 hours prior to any interruption of utility service.

1.5 PROJECT MEETINGS

A. Subject to the Owner's discretion, project meetings will be held on a weekly basis.

B. Scheduling shall be discussed with all parties to be affected by upcoming work.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION

SECTION 01270

MEASUREMENT AND PAYMENT

PART 1 GENERAL

1.1 DIVISION 0 AND DIVISION 1 WORK INCIDENTAL TO THE CONTRACT PRICE

A. No separate measurement or payment will be made for work called for in Division 0 or Division 1 of the Contract Specifications, unless specifically covered under the Bid Items listed below. All costs associated with this work shall be considered incidental to the Contract Bid Price.

B. Division 2 through Division 16 work will be measured and paid for at the Contractor's unit bid price or lump sum item cost as indicated on the Bid Form. Those payable work items, and related prices as bid, shall be the basis for all compensation to the Contractor for work performed under this Contract. Work not specifically included as a bid item, but which is required to properly and satisfactorily complete the work is considered ancillary and incidental to the bid item work, and payment for such work is considered to be included in the values as bid for payable items. Compensation for all work shall be made as a measured quantity of work under the appropriate bid items.

1.2 MOBILIZATION AND DEMOBILIZATION (ITEM 1)

A. Measurement

Measurement for payment for the mobilization and demobilization to this project location shall be on a lump sum basis. Prior to construction, the Contractor shall submit a traffic control plan for approval to the Darien Police Department.

B. Payment

Payment of the lump sum bid price shall be paid in two equal installments. The first installment will occur at the time the first pay requisition is submitted when the Contractor has initiated full-time construction activity. The second installation will be paid when the Contractor has completed all construction activity including final cleanup and punch list items. In no case will the total of both installments exceed 5% of the bid price.

1.3 MAINTENANCE AND PROTECTION OF TRAFFIC (ITEM 2)

A. Measurement

1. Measurement for payment for maintenance and protection of traffic shall be on a lump sum basis. Prior to construction, the contractor shall submit a traffic control plan for approval to the Darien Police Department.

B. Payment

1. Payment of the maintenance and protection of traffic shall be full compensation for all labor, equipment, and materials involved in the erection,

maintenance, moving, adjusting, cleaning, relocation, and storing of signs, barricades, drums, traffic cones, and delineators furnished by the Contractor as well as all costs of labor and equipment involved in the maintenance of traffic lanes and detours, except for pavement markings, ordered or included in the approved scheme for maintenance of traffic.

1.4 CONSTRUCTION LAYOUT (ITEM 3)

A. Measurement

1. Measurement for payment for construction layout shall be on a lump sum basis.

B. Payment

1. Payment of the construction layout item shall be full compensation for all labor, equipment, and materials involved in the layout and survey activities necessary for the construction of the proposed pipelines on the grades and alignments shown on the plans, and for the restoration of conditions disturbed by the contractor's actions.

1.5 CLEARING AND GRUBBING (ITEM 4)

A. Measurement

1. Measurement for payment for clearing and grubbing as defined herein shall be on a lump sum basis. The Engineer's approval that the completed item is in conformance with the plans and specifications is required prior to payment under this item.

B. Payment

1. Payment of the lump sum bid price for clearing and grubbing shall be full compensation for all labor, equipment, and materials required for or incidental to the clearing and grubbing work. Clearing and grubbing work shall include clearing the ground of trees, stumps, brush, rubbish, and all objectionable material in conflict with the proposed work.

1.6 SEDIMENT AND EROSION CONTROL (ITEM 5)

A. Measurement

1. Measurement for payment for sediment and erosion control shall be on a lump sum basis.

B. Payment

1. Payment of the lump sum bid price for sediment and erosion control shall be full compensation for all labor, equipment, and materials required for or incidental to furnishing, installing and maintaining sediment and erosion controls on the site.

1.7 REMOVE & RESET EXIST. FENCE (ITEMS 6 AND 9)

A. Measurement

1. The quantity of work performed under this item shall be based on the linear feet of fence, removed, salvaged, stored, protected, and reinstalled as shown on the plans.

B. Payment

1. Payment of the bid price for each linear foot of existing fencing relocated as required. This price shall include the labor, equipment, and tools necessary to remove the existing fencing, protect and store the salvaged fence, and to relocate the fence at the locations shown on the Drawings.

1.8 EXTRA EXCAVATION (ITEM 7)

A. Measurement

1. The quantity of work performed under this item shall be based on the number of cubic yards of additional excavation ordered by the Owner or Engineer beyond the pay limits of the trenching shown on the pipe installation details.

B. Payment

1. Payment of the bid price for each cubic yard of extra earth excavation, as ordered by Owner or Engineer, shall include all labor, equipment and tools necessary to complete the work.

1.9 BORROW (ITEM 8)

A. Measurement

1. The quantity of work performed under this item shall be based on the number of cubic yards of borrow ordered by the Owner or.

B. Payment

1. Payment of the bid price for each cubic yard of borrow, as ordered by Owner or Engineer, shall include all labor, equipment and tools necessary to complete the work.

1.10 TEST PIT EXCAVATION (ITEM 10)

A. Measurement

1. Measurement will be based on the actual size of the test pit authorized by the Engineer.

B. Payment

1. Payment of the bid price for each cubic yard of test pit excavation shall be full compensation for all sawcutting, excavation, backfilling, compaction, surface repairs, required measurements and all labor, equipment, and materials required or incidental to complete the test pits.

1.11 COLOR VIDEO AUDIO EXISTING CONDITIONS SURVEY (ITEM 11)

A. Measurement

1. This is a lump sum item.

B. Payment

1. Payment of the lump sum bid price for Color Video Audio Existing Conditions Survey be full compensation for all labor, equipment, and materials required for or incidental to the work.

1.12 TRENCH EXCAVATION IN ROCK (ITEM 12)

A. Measurement

1. Measurement for rock excavation shall be on a cubic yard basis as measured in the field by the Engineer.

B. Payment

1. Payment of the bid price for rock excavation shall be full compensation for all excavation, backfill, compaction, removing and disposing of material, including all labor, equipment and materials required for or incidental to the work. Boulders less than 0.5 cubic yards will not be measured for payment.

2. Payment for rock excavation shall be at the bid price regardless of the depth at which it is encountered.

1.13 PLUG EXISTING PIPE (ITEM 13)

A. Measurement

1. Measurement plugged pipe shall be a count of the actual number of pipes plugged in the Work.

B. Payment

1. Payment of the bid price for each plugged pipe shall be full compensation for the plugging of the pipe, and all labor, equipment, and materials required for or incidental to the installation of the structure as specified.

1.14 CONCRETE BOX CULVERT (ITEM 14)

A. Measurement

1. Measurement shall be along the ground surface above and parallel to the culvert from and to the inside face of structures for the box culvert specified.

B. Payment

1. Payment of the bid price for each linear foot of concrete box culvert of the specified dimension shall be full compensation for furnishing and placing the piping, and all labor, equipment, and materials required for or incidental to the construction of the reinforced concrete drain lines complete in place as specified.

1.15 REINFORCED CONCRETE PIPE (ITEMS 15 - 22)

A. Measurement

1. Measurement shall be along the ground surface above and parallel to the pipeline from and to the inside face of structures for the diameter and class of pipe specified.

B. Payment

1. Payment of the bid price for each linear foot of reinforced concrete pipe of the specified diameter and type shall be full compensation for cutting the existing pavement, removing the pavement, excavation, support, furnishing and placing the piping and all backfill material, and all labor, equipment, and materials required for or incidental to the construction of the reinforced concrete drain lines complete in place as specified.

2. Rock, over 0.5 cubic yards, where encountered, will be paid for separately.

3. Where existing drainage utilities conflict with proposed drainage, removal of existing drainage shall be included in the price and not measured for payment.

1.16 CONCRETE ENDWALL (ITEM 23)

A. Measurement

1. The quantity of work performed under this item shall be based on the number of concrete endwalls furnished, installed, and accepted by the Engineer.

B. Payment

1. Payment of the bid for each concrete endwall shall be full compensation for each concrete endwall, including all labor, materials, and equipment incidental thereto.

1.17 JUNCTION CHAMBERS (ITEMS 24 AND 25)

A. Measurement

1. Measurement for junction chambers of the type specified shall be a count of the actual number of junction chambers furnished and installed in the Work.

B. Payment

1. Payment of the bid price for each junction chamber of the type specified shall be full compensation for the structural design of the structure, the structure, frame and cover, installation, testing, adjustment of the frame and cover prior to paving, invert construction, and all labor, equipment, and materials required for or incidental to the installation of the structure as specified.

1.18 PRECAST CONCRETE CATCH BASINS (ITEMS 26 - 33)

A. Measurement

1. Measurement for precast concrete catch basins shall be a count of the actual number of catch basins of the specified type furnished and installed in the Work.

B. Payment

1. Payment of the bid price for each precast concrete catch basin of the specified type shall be full compensation for the structure, frame and grate, cast iron hoods, installation, adjustment of the frame and grate prior to paving, piping connections, and all labor, equipment, and materials required for or incidental to the installation of the structure as specified.

1.19 BLOCK CATCH BASIN (ITEM 34)

1. Measurement for block concrete catch basins shall be per vertical foot of catch basin completed in the Work, as measured from top of grade to the top of the base slab.

B. Payment

1. Payment of the bid price for each block catch basin of the specified type shall be full compensation for the structure, frame and grate, cast iron hoods, installation, adjustment of the frame and grate prior to paving, piping connections, and all labor, equipment, and materials required for or incidental to the installation of the structure as specified.

1.20 PRECAST CONCRETE MANHOLE (ITEMS 35 – 38)

A. Measurement

1. Measurement for precast manholes shall be a count of the actual number of manholes furnished and installed in the Work.

B. Payment

1. Payment of the bid price for each precast concrete manhole of the type specified shall be full compensation for the structure, frame and cover, installation, testing, adjustment of the frame and cover prior to paving, invert construction, and all labor, equipment, and materials required for or incidental to the installation of the structure as specified.

1.21 BLOCK MANHOLE (ITEM 39)

A. Measurement

1. Measurement for block concrete manholes shall be per vertical foot of catch basin completed in the Work, as measured from top of grade to the top of the base slab.

B. Payment

1. Payment of the bid price for each block manhole of the specified type shall be full compensation for the structure, frame and grate, cast iron hoods, installation, adjustment of the frame and grate prior to paving, piping connections, and all labor, equipment, and materials required for or incidental to the installation of the structure as specified.

1.22 RIPRAP (ITEM 40)

A. Measurement

1. The quantity of work performed under this item shall be determined by measurements taken in the field by the Engineer. The quantity shall be the cubic yards of riprap placed.

B. Payment

1. Payment of the bid for each cubic yard of riprap shall be full compensation for all placement of riprap, including underlying granular fill and filter fabric, and preparation of such bearing services.

1.23 RELOCATE EXISTING WATER MAIN (ITEM 41)

A. Measurement

1. Measurement shall be along the ground surface above and parallel to the pipe, from the point of beginning to the point of termination. No deductions will be made for the length of valves, fittings and appurtenances in the main line. Allowances for the incremental cost of mainline fittings shall be included in the pipe unit price.

B. Payment

1. Payment of the bid price for each linear foot of water main relocated shall be full compensation for coordinating service interruptions, disconnecting, furnishing, placing, flushing, testing, and disinfecting the pipe and fittings including all dewatering, thrust blocks, restraints, and all labor, equipment, and materials required for or incidental to the construction of the pipelines complete in place as specified herein.

1.24 RELOCATE EXISTING UTILITY SERVICES AND SANITARY SEWER LATERALS (ITEMS 42 – 44)

A. Measurement

1. Measurement shall be for each utility service or sanitary sewer lateral of the type specified relocated, including coordination with owner and utility company.

B. Payment

1. Payment of the bid price for each service or sanitary sewer lateral of the type specified relocated shall be full compensation for coordinating service interruptions, disconnecting, furnishing, placing, flushing, testing, and disinfecting the pipe and fittings including all dewatering, thrust blocks, restraints, and all labor, equipment, and materials required for or incidental to the construction of the pipelines complete in place as specified herein.

1.25 SUBGRADE PREPARATION (ITEM 45)

A. Measurement

1. Measurement for payment for grading and compacting new roadway and sidewalk subgrade areas will be made based on field measurements made by

the Engineer of the actual square yards of subgrade preparation performed and accepted.

B. Payment

1. Payment of the bid price for each square yard of subgrade preparation complete in place and approved shall be full compensation for preparing the subgrade of the roadway and sidewalk areas to within 15 millimeters of the required finished subgrade, compaction of the subgrade to 95% of maximum dry density, compaction testing at a rate of 1 test per 5,000 square feet of roadway subgrade and 1 test per 1,000 square feet of sidewalk subgrade, and all labor, equipment, and other appurtenant work required for, or incidental to, providing a satisfactory subgrade.

1.26 ROADWAY SUBBASE (ITEM 46)

A. Measurement

1. Roadway subbase and processed aggregate base to be paid for under this item shall be measured in place in the completed Work. The depth of subbase or processed aggregate base to be paid for will be the actual depth placed in the completed work, but in no case will this exceed the depth ordered by the Engineer or called for in the Contract documents.

B. Payment

1. Payment of the bid price for each cubic yard of roadway subbase or processed aggregate base shall be full compensation for furnishing, hauling, placing, spreading, compacting, compaction testing, and all labor, equipment, and other appurtenant work involved in providing the subbase or processed aggregate base.

1.27 BITUMINOUS CONCRETE BINDER COURSE, CLASS 1 – PERMANENT (ITEM 47)

A. Measurement

1. Measurement for payment for Bituminous Concrete Binder Course, Class 1 - Permanent will be made based on the actual and verified tonnage complete in place and approved. The tonnage shall be determined only by weight slips that have been properly countersigned by the Engineer at the time of delivery.

B. Payment

1. Payment of the bid price for each ton of Bituminous Concrete Binder Course, Class 1 – Permanent complete in place and approved shall be full compensation for furnishing, hauling, placing, spreading, compacting, and all labor, equipment, and other appurtenant work required for, or incidental to, providing a satisfactory binder course.

1.28 MILL EXISTING PAVEMENT (ITEM 48)

A. Measurement

1. Mill existing pavement shall be measured in place in the completed work by the Engineer in square yards, where ordered to be placed by the Engineer.

B. Payment

1. Payment of the bid price for each square yard of milling of existing pavement shall be full compensation for the milling and subsequent sweeping of existing pavement surface, and all labor, equipment and other appurtenant work required for this item.

1.29 BITUMINOUS CONCRETE, CLASS 1 - OVERLAY (ITEM 49)

A. Measurement

1. Measurement for payment for Bituminous Concrete Surface Course, Class 1 – Overlay, will be made based on the actual and verified tonnage complete in place and approved. The tonnage shall be determined only by weight slips that have been properly countersigned by the Engineer at the time of delivery.

B. Payment

1. Payment of the bid price for each ton of Bituminous Concrete Surface Course, Class 1 – Overlay, complete in place and approved shall be full compensation for furnishing, hauling, placing, spreading, compacting, and all labor, equipment, and other appurtenant work required for, or incidental to, providing a satisfactory top course.

1.30 RECONSTRUCT EXISTING DRIVEWAY APRON (ITEM 50)

A. Measurement

1. Measurement for payment of Reconstruct Existing Driving Apron shall be per square yard of existing driveway reconstructed.

B. Payment

1. Payment of the bid price per square yard of Reconstruct Existing Driveway Apron shall be full compensation for all labor, equipment, tools and materials required for or incidental to providing a reconstructed driveway apron. Removal of existing driveway apron shall be included in the bid price.

1.31 TEMPORARY BITUMINOUS CONCRETE (ITEM 51)

A. Measurement

1. Temporary bituminous concrete shall be measured in place in the completed work by the Engineer in square yards, where ordered to be placed by the Engineer.

B. Payment

1. Payment of the bid price for each square yard of temporary bituminous concrete pavement shall be full compensation for furnishing, hauling, placing, spreading, and compacting the processed gravel subbase and the temporary bituminous concrete repair, the maintenance of the repair, and all labor,

equipment and other appurtenant work required for or incidental to providing satisfactory trench repairs.

1.32 PAVEMENT MARKINGS – ARROWS, MARKINGS AND LEGENGDS (ITEM 52)

A. Measurement

1. Pavement markings – arrows, markings and legends shall be measured in place per square foot of white stop bar permanent pavement markings applied.

B. Payment

1. Payment of the bid price for each square foot of permanent pavement markings – arrows, markings and legends, shall be full compensation for applying permanent pavement markings, and all labor, equipment, and materials incidental to this work.

1.33 PAVEMENT MARKINGS – 4" DOUBLE YELLOW LINE (ITEM 53)

A. Measurement

1. Pavement Markings, 4" Double Yellow Line, shall be measured per linear foot along the center of the double yellow line.

B. Payment

1. Payment of the bid price for Pavement Markings, 4" Double Yellow Line, shall be full compensation for applying permanent pavement markings, and all labor, equipment and materials incidental to this work. Temporary pavement markings shall not be paid under this item, and instead shall be included under the Maintenance and Protection of Traffic item.

1.34 CURBING ITEMS (ITEMS 54 & 55)

A. Measurement

1. The linear foot quantity of curbing of the type specified shall be the actual linear footage of type of curb installed and accepted. The linear footage of curbing of the type specified will be obtained by field measurements made by the Engineer.

B. Payment

1. Payment of the bid price specified for each linear foot of curbing of the type specified shall be full compensation for furnishing and installing the curb in accordance with the plans and specifications including the subbase where applicable, joint filling, and all labor, equipment, and materials required for or incidental to providing satisfactory curb installation.

1.35 TOPSOIL AND SEEDING (ITEM 56)

A. Measurement

1. The square yard quantity of topsoiling and seeding shall be the actual square yardage of the topsoiling and seeding and accepted. The square yardage of topsoiling and seeding will be obtained by field measurements by the Engineer.

B. Payment

1. Payment of the bid price specified for each square yard of topsoiling and seeing shall be full compensation for all labor, equipment, and materials required for or incidental to providing satisfactory topsoil and seed in accordance with the plans and specifications.

2. The bid price per square yard of topsoiling and seeding shall include the cost for furnishing and installing all topsoil and seed in accordance with the project drawings and Town standards.

1.36 WETLAND PLANTINGS

A. Measurement

1. The quantity of wetland plantings shall be a lump sum payment.

B. Payment

1. Payment of the bid price specified for wetland plantings shall be full compensation for all labor, equipment, and materials required for or incidental to providing wetland plantings in accordance with the plans.

2. The lump sum price shall include the cost of furnishing and installing plantings, and required planting preparation and maintenance as specified on the Planting Plan.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01310

COORDINATION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Coordinate progress of the Work to minimize interference with the operation of the existing roadways and other utilities in the roadways.

2. Perform all coordination necessary to complete tie-ins to the existing pipelines and utilities.

1.2 SUBMITTALS

A. Submit to the Owner and Engineer all requests for temporary shutdowns of utilities or interruption of operations at least 7 days prior to the beginning of any shutdown. No shutdown shall occur without the approval of the Owner.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 GENERAL

A. Maintain existing facilities in operation unless otherwise specifically permitted in these Specifications or approved by the Owner.

B. Owner and Engineer shall be kept fully informed at least one week before the beginning of all work by Contractor which may affect Owner's operations.

3.2 SEQUENCE OF CONSTRUCTION

A. Constructing the proposed improvements while maintaining existing operations will require a specific sequence of constructing portions of this project. The Contractor will be allowed as much flexibility as possible in scheduling the details of the project. The Contractor shall provide a detailed schedule.

3.3 SHUTDOWNS

A. The existing utilities must be maintained in operation during the period of this Contract. Insofar as possible, the Contractor shall carry out all of his operations so as to limit interference with the operations of the existing utilities.

B. Insofar as possible, all new utilities shall be tested and in operating condition before the final tie-ins are made to connect new utilities to the existing utilities.

C. Water service shutdowns as a result of pipeline activities shall be minimized. In the event that an active main or service must be temporarily shut off, the Contractor shall submit a request to both the Engineer and the applicable Water Company at least three days prior to shut down. An existing main shall not be shut down unless authorized by the Owner. The Contractor shall notify the water system customers about any

interruption in service at least three days in advance. An existing main shall not be shut off for more than 6 hours.

D. Gas service shutdowns as a result of pipeline activities shall be minimized. In the event that an active main or service must be temporarily shut off, the Contractor shall submit a request to both the Engineer and Yankee Gas at least three days prior to shut down. An existing main shall not be shut down unless authorized by the Owner. The Contractor shall notify the gas system customers about any interruption in service at least three days in advance. An existing main shall not be shut off for more than 6 hours.

END OF SECTION

SECTION 01320

COLOR AUDIO-VIDEO DOCUMENTATION SURVEY

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Pre-construction color video recording of existing surface features.

1.2 DEFINITIONS

A. Zone of Influence is defined as any area within the immediate construction site which may be affected by equipment traffic, material stock piles, and temporary staging areas.

1.3 SUBMITTALS

A. Informational Submittals

1. Submit audio-video recording of preconstruction areas in the manner described in this section. Do not commence with construction activities until the recordings are submitted and approved.

1.4 QUALITY ASSURANCE

A. Personnel shall have at least 3 years experience actively engaged in color audio-video recording documentation and survey projects.

B. Documentation shall be performed during times of good visibility when there is no precipitation or snow cover. The Owner is not responsible for the removal of snow, leaves, debris or parked vehicles.

PART 2 PRODUCTS

2.1 FORMAT

A. Audio-video recording shall be in digital versatile/video disc (DVD) format. Video output from camera(s) used must be capable of producing NTSC-500 lines. Resolution in the Y channel, minimum 500 TV lines at center. Geometric Distortion shall not exceed 2% of picture height at any point in picture area.

2.2 RECORDING INFORMATION

A. The audio-video recording shall have the potential to convey 1 video track and 1 audio track. The video and audio tracks shall be recorded simultaneously as original live recordings and shall not be copies of other audio or video recordings. These recordings shall consist of a fixed elevation video record of the Zone of Influence of construction and the commentary of the videographer making the video record.

B. Video recordings shall, by electronic means, display continuously and simultaneously generated transparent digital information to include the date and time of recording, the engineering stationing corresponding to the stationing on the Drawings or as directed by the Engineer, the name of the street, easement or

building being documented, the project name, direction of travel and the viewing side. The date and time shall appear in the upper left hand corner of the picture -- example:

Time 8:35:15

Date 01/22/13

PART 3 EXECUTION

3.1 CONSTRUCTION AUDIO-VIDEO PROCEDURES

A. Perform audio-video documentation as follows:

1. Prior to the start of on-site construction activities to depict pre-construction conditions

B. Audio-video documentation shall commence at Station 0+00 and proceed to 100 feet beyond the end of the proposed pipeline route along the pipeline route viewing side to side along the direction of progress.

C. The average rate of speed in the general direction of the conveyance used during recording shall not exceed 50 feet per minute. Panning and zooming rates shall be controlled sufficiently that playback will produce optimum clarity of the objects being viewed.

D. Coverage shall include, but not be limited to, the entire roadway pipeline route, existing driveways, sidewalks, curbs, ditches, streets (including condition of paving for full width), intersections, landscaping, trees, culverts, catch basins, head walls, fences, mailboxes, retaining walls, visible utilities and all buildings and structures located within the Zone of Influence. Include existing faults, fractures, defects or other imperfections exhibited by the above-mentioned surface features.

E. Houses and buildings shall be identified visually by house or building number, when possible, in such manner that the progress of the taping and proposed construction areas may be located by reference to the houses and buildings.

F. Recordings produced under this Contract shall be turned over to the Engineer on an every other day basis so the Owner may review and monitor quality and progress. Any portion of the recording coverage deemed unacceptable by the Owner or Engineer shall be re-recorded at no additional cost to the Owner.

G. DVDs and cases shall be properly identified by recording number, location, project name, and become the property of the Owner. A record of the contents of each DVD shall be supplied by a run sheet identifying each segment in the tape by location, i.e., roll number, street or easement viewing, disc time, viewing side, starting point, traveling direction and ending point.

END OF SECTION 01 32 00

SECTION 01330

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Product Data
2. Shop Drawings
3. Product Listing and Manufacturers Qualifications
4. Samples
5. Certificates of Compliance
6. Listing of Required Submittals

1.2 SUBMITTALS

A. Product Data

1. Product data as specified in individual Sections, include, but are not necessarily limited to, standard prepared data for manufactured products (catalog data), such as the manufacturer's product specification and installation instructions, availability of colors and patterns, manufacturer's printed statements of compliances and applicability, roughing-in diagrams and templates, catalog cuts, product photographs, standard wiring diagrams, printed performance curves and operational-range diagrams, production or quality control inspection and test reports and certifications, mill reports, product operating and maintenance instructions and recommended spare-parts listing, and printed product warranties, as applicable to the Work.

B. Shop Drawings

1. Shop Drawings include, but are not necessarily limited to, custom-prepared data such as fabrication and erection/installation drawings, schedule information, piece part drawings, actual shopwork manufacturing instructions, special wiring diagrams, coordination drawings, individual system or equipment inspection and test reports including performance curves and certification, as applicable to the Work.

2. Submit Shop Drawings at the proper time so as to prevent delays in delivery of materials. Coordinate submittals for related or interdependent equipment; fragmented submittals will not be accepted for review by the Engineer. Advise the Engineer in writing of any deviations from the requirements of the Contract Documents.

3. Check all Shop Drawings regarding measurements, size of members, materials, and details to determine if they conform to the Contract Documents. Shop Drawings found to be inaccurate, not in compliance, or

otherwise in error shall be returned to the Subcontractors for correction before submission to the Engineer. Drawings that are current shall be marked with the date, name, and approval stamp of the Contractor.

4. All details on Shop Drawings submitted for approval shall show clearly the relation of the various parts to the main members and lines of the structure, and where correct fabrication of the work depends upon field measurements, such measurements shall be made and noted on the Shop Drawings before being submitted for approval.

5. No material or equipment shall be purchased or fabricated until the required Shop Drawings have been submitted and approved. Materials and equipment and the work involved in their installation or incorporation into the Work shall then be as shown in and represented by the Shop Drawings.

6. Until the necessary approval has been given, do not proceed with any portion of the work, the design or details of which are dependent upon the design or details of work, materials, equipment or other features for which approval is required.

7. The Engineer's review and approval of Shop Drawings shall not be construed as a complete check nor does it relieve the Contractor from responsibility for any departures or deviations from the requirements of the Contract Documents unless he has, in writing, called the Engineer's attention to such deviations at the time of submission. The Engineer's review of the shop drawings shall not relieve the Contractor from the responsibility for proper fitting of the Work, or the responsibility of furnishing any work required by the Contract Documents which may not be indicated on the Shop Drawings. The Contractor shall be solely responsible for any quantities shown on the Shop Drawings.

8. Should the Contractor submit for approval equipment that requires modifications to the structures, piping, layout, or other details shown on the Drawings, he shall also submit for approval details of the proposed modifications. If such equipment and modifications are approved, perform all work necessary to make such modifications at no additional cost to the Owner.

C. Product Listing And Manufacturers Qualifications

1. Within 7 calendar days after execution of the Notice to Proceed, submit to the Engineer the names and addresses of the manufacturers and suppliers of materials and equipment to be incorporated into the Work.

2. Within 30 days after Notice to Proceed, submit complete list of major products proposed for use, with specification section number, name of manufacturer, trade name, and model number of each product. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation and reference standards. Specifically identify the products, the anticipated schedule for delivery and storage, and the estimated value thereof for materials which the Contractor intends to request approval for off-site storage.

D. Contractor's Responsibilities

1. Review Shop Drawings, product data, and samples prior to submission and verify and determine:

   a. Field measurements

   b. Conformance with the Contract Documents. Advise the Engineer in writing of any deviations from the requirements of the Contract Documents.

2. Provide submittal identification and information including:

   The date of submission and dates of previous submissions, project title, Contractor identification, Specification section, manufacturer and supplier, identified field dimensions, applicable standards and identification of deviations from Contract Documents.

3. Provide 5 sets of submittals, 2 of which will be retained by the Engineer. A maximum of 3 sets will be returned by the Engineer with notations to the Contractor. **Alternatively, one copy may be submitted to the Engineer electronically in .PDF format.**

4. Apply the Contractor's stamp, initials, or signature certifying that the submission has been thoroughly reviewed for completeness, compliance with the Contract Documents, coordination with adjacent construction and dimensional compatibility. Items submitted without the stamp or that are incomplete will be returned by the Engineer for rework and resubmission.

5. Provide space for the Engineer's review stamps and comments. The Engineer will review Shop Drawings for design, general methods of construction and detailing.

6. Submissions shall be accompanied by a transmittal form referencing the project name and applicable Specification section. Submittals shall be referenced with consecutive numbering. Resubmittals shall bear the same transmittal number with a sequential letter suffix commencing with "A".

7. Revise and resubmit submittals as required, identify all changes made since last submittal.

8. Distribute copies of reviewed submittals to concerned parties with instructions to promptly report any inability to comply with the provisions or integrate the requirements with interfacing work.

1.3 REVIEW OF SHOP DRAWINGS

A. Submittals will be returned under one of the following codes:

1. APP – "Approved" is assigned when there are no notations or comments on the submittal. Equipment or materials may be released for manufacture.

2. AAN – "Approved as Noted" is assigned when there are notations or comments on the submittal, but the equipment or materials may still be

released for manufacture. All notations and comments must be incorporated in the final product.

3. R&R – "Revise and Resubmit" is assigned when there are extensive notations and comments requiring a resubmittal of the package. It may also be assigned when there is a significant amount of missing material required for the Engineer to perform a complete review.

4. NA – "Not Approved" is assigned when the submittal does not meet the requirements of the Contract Documents. The entire package must be resubmitted, revised to bring the submittal into conformance. It may be necessary to resubmit using a different manufacturer/vendor to meet the requirements of the Contract Documents.

5. REV – "Reviewed – No Action Taken" is assigned to submittals that are reviewed but for which there is no approval required by the Engineer. Examples of the type of submittals that receive this stamp include, but are not limited to, design calculations stamped by another Professional Engineer and submittals of the Contractor's means and methods that have not been expressly specified.

1.4 QUALITY ASSURANCE

A. Certificates Of Compliance

1. Provide sworn certificates from the manufacturer or material supplier that the materials and fabrications provided under the Specification section conform with the Contract Documents.

2. Submit Certificates of Compliance in triplicate.

3. Certificates shall be signed by an officer of the manufacturer's corporation and witnessed by a Notary Public.

1.5 SEQUENCING

A. General Procedures For Submission And Resubmission Of Shop Drawings, Product Data, and Samples

1. Coordination

a. Prepare and submit documentation in advance of fabrication and product manufacturer, so that the installation will not be delayed, other related work can be properly coordinated, and there is adequate time for review and resubmission, if required.

b. No extension of time will be authorized due to failure to provide approvable submittals sufficiently in advance of the Work.

2. Resubmission

a. Make corrections and modifications required by the Engineer and resubmit until approved.

b. Clearly identify changes made to Shop Drawings and product data and indicate other changes that have been made other than those requested by the Engineer.

3. Distribution

a. Distribute approved Shop Drawings and approved product data to the Project Site and elsewhere as required to communicate the information to Suppliers, Subcontractors, and field personnel.

B. Samples will be retained by the Engineer on the Site.

1.6 LISTING OF REQUIRED SUBMITTALS

A. Required submittals are summarized below. Additional submittals may be requested.

B. Submittals Required Before Construction

1. Schedule of Values

2. Construction schedule

3. Plans and narratives

a. Traffic control plan (to Town of Darien Police Department)

b. Construction sequencing plan

c. Water handling / dewatering plan

d. Summary of construction equipment and methods to be used for clearing, grubbing, and waste material disposal

e. Summary of construction methods for rock excavation

f. Pre-blast survey

g. Narrative of blasting methods, communication procedures and controls

h. Narrative for ductile pipe installation, service shut downs

i. Narrative for protection and curing of concrete

4. Drawings and Calculations

a. Proposed earth retention systems

b. Junction chambers

5. Performance Data / Quality Control

a. Compaction equipment

b. Ductile Iron compliance certificates

c. Bituminous concrete mix certification

d. Pavement marking equipment

6. Samples
    a. Representative sample of borrow materials
    b. Form ties
    c. Compressible filler
    d. Premolded filler
7. Testing / Analyses
    a. Sieve analysis of borrow materials
    b. Modified proctor analysis for borrow materials
    c. Ductile iron pipe
    d. Sanitary sewer pipe
    e. Topsoil laboratory analysis
    f. Subbase sieve analysis
    g. Pea gravel sieve analysis
    h. Reinforcing steel mill reports
8. Qualifications
    a. Blasting contractor
9. Shop drawings
    a. Temporary fencing system
    b. Geotextile silt fencing
    c. Catch basin sediment capture device
    d. Underground warning tape product data
    e. Ductile iron pipe
        1) Pipe
        2) Fittings
        3) Couplings
        4) Filling rings
        5) Lining
        6) Coating
        7) Location of restrained joints
    f. Sanitary sewer piping
    g. Water services

1) Corporations
2) Curb stops
3) Boxes
4) Unions
5) Couplings
6) Service saddles
7) Copper tubing

h. Drainage structures
1) Precast catch basins
2) Precast manholes
3) Manhole rungs
4) Manhole frames
5) Manhole covers
6) Catch basin grates
7) Junction chambers
a) Location plan
b) Professional Engineer certification
8) Pipe
9) Dampproofing
10) Concrete endwall
11) Riprap
12) Concrete block
13) Box culvert
14) Bedding material
15) Low Strength Concrete Materials
16) Separation fabric
17) Box culvert and pipe installation instructions

i. Bituminous Concrete Pavement
1) Design mixes
2) Design mix additives

j. Pavement Marking Paint

k. Lawns and Grasses

1) Seed mixture

2) Fertilizer/lime application rates

3) Seed tags

l. Concrete

1) Product data on release agent, formwork, inserts

2) Mix design

C. Submittals Required During Construction

1. Field Quality Control Tests
2. Qualifications, experience and certifications of testing services.
3. Calibration certificates for testing equipment
4. Subsurface investigation (test pit) drawings and measurements
5. Seismograph and blasting reports
6. Concrete load tickets
7. Bituminous concrete load tickets

D. Submittals Required After Construction

1. As-built drawing of storm drainage

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION

SECTION 01451

INDEPENDENT TESTING SERVICES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Independent testing services including geotechnical, concrete, and welding inspection and testing

2. Testing laboratory services

B. Related Sections

1. Section 01450, Quality Control

2. Section 02315, Excavation, Backfill, Compaction and Dewatering

3. Section 02320, Borrow Material

4. Section 02740, Bituminous Concrete Pavement

1.2 REFERENCES

A. General

1. ASTM E329 – Standard Specifications for Agencies Engaged in the Testing and/or Inspection of Materials used in Construction

B. Soil Testing

1. American Association of State Highway and Transportation Officials (ASHTO)

C. Concrete Testing

1. Cement and Concrete Reference Laboratory (CCRL)

2. Connecticut DOT testing requirements

D. Welding Inspection

1. AWWA D-100-96 or latest version - AWWA Standard for Welded Steel Tanks for Water Storage

2. American Welding Society (AWS) B1.11 - Guide for the Nondestructive Examination of Welds

3. AWS B5.1 - Specifications for the Qualifications of Welding Inspectors

4. AWS B5.15 - Specifications for the Qualifications of Radiographic Interpreters

5. AWS ARE - 6 Test Methods for Evaluating Welded Joints

6. AWS ARE - 10 Monitoring and Control of Welding and Joining Processes

E. Coating Inspection

1. National Association of Corrosion Engineers (NACE)

2. SSPC – The Society for Protective Coatings

1.3 SUBMITTALS

A. Qualifications, experience, and certifications of each proposed testing service.

B. Certificate of calibration for testing equipment.

1.4 QUALITY ASSURANCE

A. General

1. Comply with the requirements of Section 01450, Quality Control, for testing and inspection requirements.

2. Testing services shall have the following general qualifications:

a. Minimum five years as a firm with the type of testing specified.

b. Ability to provide timely field testing services to minimize the impact of the testing requirements on construction progress.

c. Certification to perform the specified services in the state in which the Work is to be performed.

3. Testing services proposed by the Contractor shall be subject to review by the Owner and Engineer. Any testing firm not acceptable to the Owner or Engineer will be rejected.

B. All testing agencies and laboratories must meet the requirements of ASTM E329.

C. Testing company shall have been in business for a minimum of the last 5 years providing applicable testing services.

D. Testing equipment shall be calibrated at maximum 12 month intervals by devices of accuracy traceable to National Bureau of Standards. Submit copy of certificate of calibration made by accredited calibration agency.

E. Testing shall be in accordance with applicable codes and regulations referenced in individual Specification Sections, and with selected standards of the American Society for Testing and Materials.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.1 TESTING SERVICES – GENERAL

A. Provide testing services meeting the following:

1. Provide qualified personnel promptly on notice.

2. Perform inspections required by the Contract Documents. Sample and test materials and observe methods of construction to determine compliance with applicable standards and with the requirements of the Contract Documents.

3. Take specimens and samples for testing, as required in individual Specification Sections. Provide all sampling equipment and deliver all specimens and Samples.

4. Promptly notify the Owner and the Engineer of irregularities or deficiencies in the Work which are observed during performance of services.

5. Promptly submit 2 copies of reports of inspections and tests to the Owner, and one copy to the Engineer including:

   a. Date issued

   b. Project title and number

   c. Testing laboratory or agency name and address

   d. Name and signature of inspector

   e. Date of inspection or sampling

   f. Record of temperature and weather

   g. Date of test

   h. Identification of product and Specification Section

   i. Location of Project

   j. Type of inspection or test

   k. Results of tests and observations regarding compliance with Contract Documents

B. Perform additional tests and services as required to assure compliance with the Contract Documents.

C. Obtain Owner's approval of testing laboratory before performing testing services.

D. Coordinate with testing laboratory.

3.2 GEOTECHNICAL TESTING

A. Provide field testing and laboratory services for geotechnical soil testing required in Sections 02315 and 02320.

3.3 COORDINATION WITH TESTING LABORATORY

A. Provide testing laboratory personnel access to site and manufacturer's operations.

B. Provide laboratory with representative samples of materials to be tested in required quantities.

C. Furnish labor and facilities:

1. To provide access to Work to be tested.

2. To facilitate inspections and tests.

3. For laboratory's exclusive use for storage and curing of test samples.

4. To provide forms for preparing concrete test beams and cylinders.

D. Notify laboratory sufficiently in advance of operations to allow for assignment of personnel and scheduling of tests.

E. Arrange with laboratory and pay for additional inspections, samples, and tests required for Contractor's convenience.

END OF SECTION

SECTION 01410

REGULATORY REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

A. The Contractor is expected to be bound by all applicable federal, state, and local codes throughout the course of the Work.

B. The Contractor is expected to make himself familiar with the requirements and conditions of the permits that have been issued for this project.

C. Where applicable codes and technical requirements stated in the Construction documents conflict, the more stringent standard applies.

1.2 DARIEN ENVIRONMENTAL PORTECTION COMMISSION PERMIT.

A. This project is subject to an Inland Wetlands Permit from the Darien Environmental Protection Commission.

B. A copy of the Inland Wetlands Permit appears in Attachment A.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION 01410

SECTION 01450

QUALITY CONTROL

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Quality assurance and control of the Work
2. Testing and inspection services
3. Product test reports
4. Manufacturer's field service

B. Related Sections

1. Section 01451, Independent Testing Services
2. Testing requirements are described in various Sections of the Project Manual.

1.2 SUBMITTALS

A. Product test reports

1.3 QUALITY ASSURANCE

A. Monitor quality control over Suppliers, manufacturers, products, services, site conditions, and workmanship to produce Work of specified quality.

B. Comply fully with manufacturer's instructions. Should these instructions conflict with the Specifications, request clarification from the Owner before proceeding.

C. Comply with specified standards as a minimum quality for the Work except when more stringent tolerances, codes, or requirements indicate higher standards or more precise workmanship.

1.4 TESTING SERVICES FURNISHED BY CONTRACTOR

A. Furnish all testing services required for materials and equipment proposed to be used in the Work, and quality control tests made in the field including:

1. Concrete materials and mix designs
2. Concrete in place
3. Concrete rebar testing required by Connecticut DOT
4. Standard proctor analyses for all borrow materials used on the Project
5. Standard proctor analysis of all subgrade material to be compacted during surface preparation and fine grading and compaction work
6. Sieve analyses for all borrow materials used on the Project

7. Soil structure and nutrient analyses for all loam and topsoil used on the Project

8. Compaction tests performed during trench backfilling and compaction, rough grading and site preparation, fine grading and compaction of roadway and sidewalk subgrades, and placement of roadway and sidewalk subbase materials

9. Design of asphalt mixtures

10. Asphalt in place

11. Field welded joints

12. All other tests and engineering data as required in the Contract Documents.

B. Testing agencies must meet the requirements of Section 01451.

C. An independent commercial testing laboratory, with current Connecticut certification, shall perform all tests that require the services of a laboratory to determine compliance with the Contract Documents. Independent testing laboratory requirements are defined under Section 01451.

D. Secure and deliver the required number of samples to the laboratory as required by the Contract Documents.

E. Notify Owner and Engineer of time, location and material being sampled.

F. Schedule necessary testing laboratory services.

G. Furnish written reports of each test within 48 hours of completion of testing.

H. Notify the Engineer 48 hours prior to operations requiring inspections and laboratory testing services so the Engineer may witness testing. All failed test areas shall be re-worked and re-tested until passing results are obtained.

I. The Owner may hire its own independent testing laboratory for quality control tests made in the field or laboratory on materials and equipment during and after their incorporation in the Work. Cooperate with the Owner and independent testing laboratory and furnish samples of materials, design, mix, equipment, tools, storage, and assistance as requested.

J. Re-work all failed test areas until passing results are obtained. All re-tests required as a result of the Contractor's failure to perform the work in accordance with the Contract Documents shall be at the Contractor's expense.

1.5 CODE COMPLIANCE TESTING

A. Provide inspections and tests required by codes or ordinances, or by a legally constituted authority having jurisdiction over the Work.

1.6 PRODUCT TEST REPORTS

A. Submit 2 copies of product test reports where required by the Contract Documents.

1.7 MANUFACTURERS' FIELD SERVICE

A. Provide qualified field service and installation personnel from material and equipment suppliers to observe site conditions, installation techniques, quality of workmanship, equipment start-up, adjustment, and performance test where required by the Contract Documents. Observations are to be reported and incorporated in the Work procedures.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01520

CONSTRUCTION FACILITIES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Temporary sanitary facilities

2. First aid station

1.2 QUALITY ASSURANCE

A. Maintain temporary construction facilities in proper and safe condition throughout the progress of the Work.

1.3 TEMPORARY SANITARY AND FIRST AID FACILITIES

A. Provide suitably enclosed chemical or self-contained toilets for the use of the labor force employed on the Work. Toilets shall be located near the Work sites and secluded from observation insofar as possible. Toilets shall be serviced weekly, kept clean and supplied throughout the course of the Work.

B. Contractor shall enforce proper use of sanitary facilities.

C. Provide a first aid station at the site.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION

SECTION 01550

TRAFFIC REGULATION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Traffic requirements

2. Traffic officers

B. Payment

1. OWNER is responsible for paying for traffic officers, in the event they are required. CONTRACTOR is responsible for scheduling the traffic officers, with OWNER's approval, and for providing all documentation.

2. OWNER will deduct from monies due CONTRACTOR for the following abnormal and unreasonable expenses:

a. CONTRACTOR caused delays in the prosecution of work that results in hiring traffic officers for more hours than would have been required during normal prosecution of work.

b. Reconstruction and/or reinstallation of any portions of the work, as a result of improper initial installation, for which traffic officers are required.

c. Traffic officers required at a site where CONTRACTOR is not working or outside of CONTRACTOR's standard work day as a result of obstructions to traffic that remain in the traveled way.

d. All other incidents resulting from CONTRACTOR'S operations requiring traffic officers that would not normally be encountered during the progress of a well-organized project employing proper construction methods.

e. When traffic officers are requested for the convenience of CONTRACTOR and are not otherwise considered necessary to the work.

1.2 REFERENCES

A. Manual of Uniform Traffic Control Devices, U.S. Department of Transportation

1.3 TRAFFIC REQUIREMENTS

A. Arrange construction activity so that all streets shall remain open to at least one-way traffic during periods of actual work, and to unimpeded, two-way traffic during all other periods.

B. Provide a traffic control plan to ENGINEER for approval showing traffic control signs, barrels, cones, traffic officers, including detour signs, meeting the approval of

ENGINEER, OWNER and local Police Departments in accordance with the Manual of Uniform Traffic Control Devices.

C. Determine the location of each day's work and implement the approved traffic control plan. If the plan requires the use of traffic officers, notify the Police Department.

D. CONTRACTOR shall have no claim of delay if he does not notify the Police Department of his scheduled location in time to arrange for traffic officers.

E. Hand deliver written notice to individual houses affected by driveway and side road closings or detours a minimum 48 hours in advance. A recommended parking area outside the work limits shall be included in the notice.

1.4 TRAFFIC OFFICERS

A. Uniformed traffic officers shall be required at locations deemed necessary by OWNER, working in conjunction with local Police and Fire Departments, for the protection of the public.

B. The Police Chief or his representative, in consultation with OWNER's representative, will determine the number of officers required for the work.

1.5 SUBMITTALS

A. Prior to starting construction, the Contractor shall submit a traffic control plan to the Town of Darien Police Department for review and approval. Work may not commence until such plan is approved.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION – NOT USED

END OF SECTION

SECTION 01560

TEMPORARY BARRIERS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Temporary Fencing System

1.2 SUBMITTALS

A. Submit Shop Drawings for the proposed temporary fencing system, including material of construction, plan layout, spacing of components, and anchorage.

1.3 TEMPORARY FENCING SYSTEM

A. Provide temporary fencing system along the entire length of cross country segments of the proposed pipeline to prevent unauthorized access to the work area. Fencing system shall be installed such that the fence system cannot be moved by hand.

B. Do not move the fence system under any circumstances until the proposed pipeline is installed, the trench backfilled and compacted, and restoration activities complete.

C. The Contractor will retain ownership of the temporary fencing system after the completion of the Work.

PART 2 PRODUCTS

2.1 MATERIALS

A. Temporary fencing shall be orange, 48" high and manufactured from high density polyethylene with 4" x 1" mesh size.

B. Temporary fencing material shall meet the following requirements within +/- 5%:

1.	Machine Direction Breaking Load:	1210 lbs/ft
2.	Machine Direction Yield Strength:	1350 lbs/ft
3.	Machine Direction Breaking Elongation:	33%
4.	Machine Direction Yield Point Elongation:	13%
5.	Tensile Breaking Load:	340 lbs/ft
6.	Tensile Yield Strength:	440 lbs/ft
7.	Tensile Breaking Elongation:	21%
8.	Tensile Yield Point Elongation	8%

PART 3 EXECUTION

3.1 FENCE INSTALLATION

A. Install fence according to manufacturer's instructions at locations specified in Paragraphs 1.3 above.

END OF SECTION

SECTION 01570

TEMPORARY CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Agreement, including General and Supplementary Conditions, and Division 01 of the Project Manual, apply to the Work of this Section.

1.2 SUMMARY

A. This Section includes, but is not limited to the following:

1. Dust control.

2. Drainage and erosion control.

3. Haybales and siltation fence.

4. Sediment trapping devices.

5. Construction Entrance

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Section 02315 – Excavation, Backfill, Compaction and Dewatering

2. Section 02740 – Bituminous Concrete Pavement

3. Section 02920 – Grasses and Lawns

C. General: Provide required erosion and sedimentation controls in accordance with the Contract Documents.

D. Conduct operations at all times in conformity with all federal, state and local permit requirements concerning water, air, or noise pollution.

E. Site Contractor to be responsible for, and hold the General Contractor, Owner and Owner's Consultants harmless from, any penalties or fines which may be assessed by any authority due to Site Contractor’s failure to comply with the terms of all applicable permits and approval requirements.

1.3 COORDINATION

A. Thoroughly coordinate and schedule the work of this Section with all trades involved to prevent interference, and in order to allow adequate time at the proper stage of construction to properly perform all work of this Section.

1.4 REQUIREMENTS AND RESTRICTIONS

A. Control and abate siltation, sedimentation, erosion and pollution of all waters, and underground water systems, throughout the life of the contract.

B. Do not refuel equipment or machinery within twenty-five (25) feet of any watercourse or storm drainage system inlet.

C. When dewatering surface runoff is necessary, do not discharge pumps directly into the site drainage system or the adjacent State drainage system. Provide means of filtration of dewatering wastewaters.

D. Prior to dewatering, submit to the Owner and the Engineer for approval, a written proposal for specific methods and devices to be used, including but not limited to:

1. Pumping the water into a temporary sedimentation bowl

2. Installation of sump pits

3. Providing surge protection at the inlet and outlet of pumps

4. Floating the intake of the pump

5. Other methods to minimize and retain the suspended solids.

D. Do not dump oil, chemicals or other deleterious materials on the ground.

E. Provide a means of catching, retaining, and properly disposing of drained oil, removed oil filters, or other deleterious material. All spills of such materials shall be reported immediately to the Connecticut Department of Energy and Environmental Protection (CTDEEP).

F. Do not apply herbicides or pesticides within twenty-five (25) feet of any storm or drainage inlet.

G. Inspect temporary and permanent erosion and sedimentation controls immediately after each rainfall and at least daily during prolonged rainfall.

H. Maintain all erosion and sedimentation control devices in a functional condition in accordance with the Contract Documents and the 2002 "Connecticut Erosion and Sediment Guidelines", DEEP Bulletin No. 34, as revised. In the event that such devices are not maintained in accordance with these documents, and the failures are not corrected within 48 hours after receipt of written notice, the Owner may proceed to remedy the failures specified in the notice. The cost thereof will be deducted from monies due the Site Contractor under the contract or under any other contract.

I. Maintain effective erosion controls as needed until site is stabilized.

J. All work to be confined to the specified contract limits with no clearing excavation or deposition of fill to take place within regulated areas outside of the project.

1.05 SUBMITTALS

A. Submit, in writing, a construction sequencing plan and a water handling plan, including a contingency plan for flood events, to be reviewed and actioned by the Engineer and Owner prior to the commencement of any construction.

B. Shop drawing for geotextile silt fencing.

C. Shop drawing for catch basin sediment capture device.

D. Water handling plan for dewatering trenches and earth materials.

PART 2 - PRODUCTS

2.01 HAYBALE BARRIERS

A. Haybales required for siltation control shall be wire tied bales of the type normally used for siltation or erosion control or construction projects. Minimum haybale weight is 40 pounds, maximum weight is 120 pounds.

B. Wooden stakes for haybales shall be from hardwood products, and have a minimum dimensions of 1.5 inches square by 36 inches long, with a minimum weight of 0.5 pounds per foot.

2.02 GEOTEXTILE SILT FENCE

A. Geotextile for silt fencing shall be Geotex 2130, as manufactured by Propex Geosynthetics, Chattanooga, Tennessee, or equivalent conforming to following minimum requirements:

1. Filtering efficiency, 75%, per ASTM 5141

2. Grab tensile strength, 100 lbs, per ASTM D4632

3. Elongation at failure, 15%, per ASTM D4632

4. Mullen burst strength, 250 psi, per ASTM D3786

5. Puncture strength, 50 lbs, per ASTM 4833

6. Apparent opening size, no less than 0.60 mm and no greater than 0.90 mm, per ASTM D4751.

7. Flow rate, 0.2 gal/ft^2/min, per ASTM D4491.

8. Permittivity, 0.05 sec^{-1}, per ASTM D4491.

9. Ultraviolet radiation stability, 70% after 500 hours of exposure, per ASTM D4355.

B. Wooden stakes for silt fence shall be from hardwood products, and have a minimum dimensions of 1.5 inches square by 42 inches long, with a minimum weight of 0.5 pounds per foot.

C. Prefabricated geotextile silt fences are acceptable in lieu of a field-assembled geotextile silt fences, provided that the materials of the prefabricated fence conform to subsections 2.02.A and 2.02.B above.

2.03 CATCH BASIN SEDIMENT CAPTURE DEVICE

A. Catch basin sediment capture devices shall be Siltsack® as manufactured by ACF Environmental, Richmond, Virginia, or equivalent conforming to the following:

1. Minimum of two lifting straps to allow removal of the unit.

2. Geotextile minimum requirements

a. Grab tensile strength, 315 lb. x 300 lb., per ASTM D4632.

b. Grab tensile elongation, 15% x 15%, per ASTM D4632.

c. Puncture strength, 125 lbs., per ASTM D4833.

d. Mullen burst strength, 600 psi, per ASTM D3786.

e. Trapezoid tear Strength, 120 lbs. x 150 lbs., per ASTM D4533.

f. Ultraviolet radiation stability, 70%, per ASTM D4355.

g. Apparent opening size, US Standard sieve size 30, per ASTM D4751.

h. Flow rate, 40 gal/min/ft^2, per ASTM D4491.

i. Permittivity, 0.05 sec^{-1}, per ASTM D4491.

2.04 MULCH FOR SEED

A. Mulch for seed, including tackifiers and nettings used to anchor mulch, shall have the following properties:

1. Biodegradable within 2 years, but without substantial degradation over a period of 6 weeks.

2. Free of contaminants that pollute the air or waters of the State when properly applied.

3. Free of foreign material, coarse stems, weeds, rot, mold, and any substance toxic to plant growth, or which interferes with seed germination.

4. Capable of being evenly applied such that it provides 80% to 95% soil coverage and still adheres to the soil surface, does not slip on slopes when it rains or is watered, does not blow off the site, dissipates raindrop splash, holds soil moisture, and moderates soil temperatures.

B. Types of mulch shall include:

1. Hay

a. Dried stems and leafy parts of plants cut and harvested, such as alfalfa, clovers, other forage legumes and finer stemmed leafy grasses.

b. Stem length should not average less than 4 inches.

c. Hay mulch is preferred when seeding occurs outside of the recommended seeding dates.

2. Straw

a. Cut and dried stems of herbaceous plants, such as wheat barley, cereal rye, or broom.

b. Average stem length shall not be less than 4 inches.

3. Cellulose Fiber

a. Fiber origin is either virgin wood, post-industrial/pre-consumer wood, or post-consumer wood fiber and/or paper fiber.

b. Paper fibers shall not contain boron.

c. Cellulose fibers must be manufactured such that after agitation in slurry tanks with water, the fibers in the slurry become uniformly suspended to form a homogenous product.

d. Moisture content of the cellulose fiber mulch shall not exceed 12 percent by weight.

e. Cellulose fiber may contain a nontoxic marking dye.

f. Subsequent to hydraulic spraying on the ground, the mulch shall allow for absorption and percolation of moisture, and shall not form a tough crust that interferes with seed germination or growth.

C. Tackifiers

1. Water soluble materials that cause mulch particles to adhere to each other, consisting of a natural vegetable gum blended with gelling and hardening agents or a blend of hydrophilic polymers, resins, viscosifiers, sticking aids and gums.

2. Emulsified asphalt may not be used as a tackifier.

2.05 CONSTRUCTION ENTRANCE

A. Crushed stone shall conform to CTDOT Form 816, Article M.2.01-1, Gradation No. 3.

B. Geotextile shall be Mirafi 600X or approved equal.

PART 3 – EXECUTION

3.01 GENERAL

A. The Site Contractor to be responsible for all control measures.

B. Install all sedimentation and erosion control measures as defined on the "sedimentation and erosion control plans" and/or as required by the Owner, a Representative of the City of Norwalk or Connecticut Department of Environmental Protection.

C. Provide adequate protection or complete the grading and placement of topsoil, seed or sod as specified without delay on areas that may be potential contributors to pollution of storm drains and or cause damage because of sedimentation. Where areas are seeded or sodded, provide required maintenance and repair until final acceptance.

D. Move all sedimentation and erosion control devices upon completion of construction and approval of the Owner, the City of Norwalk and Connecticut Department of Environmental Protection.

3.02 DUST CONTROL

A. Plan and sequence construction operations to limit the transport of fugitive dust:

1. Limit the amount of exposed soil by phasing construction to reduce the area of land disturbed at any one time, and use, as soon as practicable, stabilization measures for exposed areas.

2. Maintain as much natural vegetation as practicable to act as a buffer.

B. Use a mechanical street sweeper on paved areas where dust and fine materials accumulate. Sweep as needed, or as ordered by the Engineer.

C. During construction, monitor excavated material and open or stripped areas for dust export, and apply control measures as needed, or as ordered by the Engineer.

D. Periodically water exposed soil surfaces.

E. All paved road and driveway surfaces shall be scraped and broomed free of excavated materials on a daily basis. The surfaces shall be hosed down, mechanically swept, or otherwise treated to eliminate active or potential dust conditions, exposing the paved surface.

F. Ensure that the existing equipment, facilities, and occupied space adjacent to or nearby areas of are protected from dust or debris as a result of site work operations.

G. Control dust by the construction of temporary wooden frame/polyethylene sheeting walls and covering enclosures separating adjacent or nearby areas and equipment from the Work site.

3.03 HAY BALES

A. Place hay bales in locations shown on the plans or as directed by the Engineer.

B. Place hay bales lengthwise with ends of adjacent bales tightly abutting one another.

C. Install all bales so that bindings are oriented around the sides, rather than along the tops and bottoms.

D. Entrench bales 4 inches and backfill, with the backfilled soil placed toward the potential silt source.

E. Hold bales in place by two wooden stakes in each bale, with loose straw inserted in voids between the bales.

F. Maintain or replace bales until they are no longer necessary for the purpose intended or are ordered removed by the Engineer.

G. Perform cleanout of accumulated sediment once one-half (1/2) of the original height of the bales as installed becomes filled with sediment or as directed by the Engineer.

3.04 GEOTEXTILE SILT FENCE

A. Install geotextile silt fence so that the bottom six inches of the geotextile is buried by either trenching or by laying the six inch section horizontally on the ground and burying by ramping the soil up to the control fence.

B. Install all geotextile silt fences with at least 30 inches in exposed height, with not less than a 2 degree and not more than a 20 degree inclination toward the potential silt source.

C. Spacing between posts shall not exceed 10 feet, and drive all posts 12 inches into the ground at minimum.

D. When joints between sections of geotextile silt fences are necessary, splice filter fabric together only at a support post, with a minimum 6 inch overlap, and seal securely.

3.05 CATCH BASIN SEDIMENT CAPTURE DEVICE

A. Install devices in catch basins at the locations shown on the plans.

B. Install the device in the catch basin following the manufacturer's instructions.

C. Check the level of sediment accumulation in the device daily.

D. Maintain the device in accordance with manufacturer's instructions, cleaning as necessary.

3.06 CONSTRUCTION ENTRANCE

A. Strip ground beneath the proposed construction entrance to remove organic materials and topsoil.

B. Install filter fabric inside the dimensions to the construction entrance.

C. Place crushed stone on top of the construction entrance to the depth specified on the plans.

END OF SECTION

SECTION 01725

PRESERVATION AND RESTORATION OF PROJECT FEATURES

1.1 SUMMARY

A. Section Includes

1. Protection and replacement of trees, shrubs, signs, property markers, fences, and related project features.

2. Taking precautions, providing programs, and taking actions necessary to protect public and private property and facilities that are outside the demolition scope from damage.

1.2 DEFINITIONS

A. Underground Structures

1. Underground structures are defined to include, but not be limited to, sewer, water, gas, and other piping, and manholes, chambers, electrical and signal conduits, tunnels and other existing subsurface work located within or adjacent to the limits of the Work.

2. Underground structures known to the Engineer are shown on the Drawings to the extent that locations are available. This information is shown for the assistance of the Contractor in accordance with the best information available, but is not guaranteed to be correct or complete. The Contractor shall be responsible for checking on the actual locations of water, sewer, gas electric and telephone service connection lines to avoid potential interferences.

B. Surface Structures

1. Surface structures are defined as existing buildings, structures and other facilities above the ground surface. Included with such structures are their foundation or any extension below the surface. Surface structures include, but are not limited to, buildings, tanks, walls, bridges, roads, dams, channels, open drainage, piping, poles, wires, posts, signs, markers, curbs, walks and all other facilities that are visible above the ground surface.

C. REMOVE AND RESET

1. Items designated to be “removed and reset” shall be removed by the Contractor, and temporarily stored by the Contractor to be reinstalled at such point in time when the removed item is no longer in conflict with construction operations.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.1 REPAIR/RESTORATION

A. Trees, shrubs, and similar items shall not be removed except where indicated on the drawings or as necessary to access the required demolition work, as approved by the Engineer. Items to be removed shall be clearly marked as directed by the Engineer. If objects not to be removed are damaged or removed, they shall be repaired or replaced to their original condition.

B. Trees and shrubs on private property, which are removed or damaged by the Contractor shall be replaced in kind.

C. Signs, fences, property markers, walls, guard rails and other public or private property that are outside the demolition scope shall be replaced in kind if damaged. Supports and protective devices required shall be provided.

D. Underground and Surface Structures

1. In the event of damage, injury or loss to existing utilities and structures that were not indicated to be removed or abandoned, whether shown on the Drawings or not, make all reasonable efforts to facilitate repairs and to mitigate the impact of such events upon the utility or structure owner's normal operations. Restore the existing utility or structure to the condition required by the owner of the utility or structure or at least to the condition found immediately prior to the Work. In the event that the utility owner elects to make the repairs, provide all reasonable access and assistance, and reimburse the utility owner for the cost of repairs. If utility service is interrupted due to damage to facilities, alternate facilities shall be provided.

2. All other existing surface facilities, including but not limited to, guard rails, posts, guard cables, signs, poles, markers and curbs which are temporarily removed to facilitate the Work shall be replaced and restored to their original condition at the Contractor's expense unless otherwise indicated in other sections of these specifications.

3. Wherever water, sewer, gas or petroleum mains, electric or telephone lines, cables or other utilities and structures are encountered and may be in any way interfered with, inform the Engineer and the appropriate utility company. Cooperate with the Engineer and utility company in the protection, removal, relocation, and replacement of structures and facilities.

4. Prior to proceeding with any demolition or construction, notify in writing owners of utilities and structures within the vicinity of the proposed Work.

5. Work affecting water distribution systems, which will take fire hydrants out of service, must be coordinated with the local fire department. The Contractor shall be prepared to restore fire flows in the event of an emergency or to provide for temporary fire flow service in accordance with the requirements of the local fire department.

6. Materials used for relocation or replacement of utilities and structures shall be of an equivalent material, type, class, grade and construction as the existing or as approved by the respective owners thereof, unless otherwise shown or specified.

7. When any survey monument or property marker, whether of stone, concrete, wood or metal, is in the line of any trench or other demolition or construction work and may have to be removed, notify the Engineer in advance of removal. Under no circumstances shall any monument or marker be removed or disturbed by the Contractor or by any of his Subcontractors, employees or agents, without the permission of the Engineer. Monuments or markers removed or disturbed shall be reset by a land surveyor licensed in the State where the Work is located at the Contractor's expense. Should any monuments or markers be destroyed through accident, neglect or as a result of the Work under this Contract, the Contractor shall, at his own expense, employ a land surveyor licensed in the State where the Work is located to re-establish the monument or marker.

E. Replace in-kind any damaged traffic loop detection wiring in a timely fashion. In general, traffic signal wiring damaged by the Contractor shall be replaced and placed in service no later than 24-hours after being taken out of service.

3.2 PROTECTION

A. The construction of certain portions of the project may require excavation within the root systems of trees. Roots with a diameter of 2 inches or more within the excavation shall not be cut. If necessary, excavation shall be made with small powered equipment or by hand to comply with this requirement. It may be necessary to excavate from more than one direction to avoid damage to the roots.

B. The trunks of trees that are to remain and are within the swing radius of the excavating machine bucket when fully extended shall be wrapped with burlap and 2 inch by 4 inch protective wood slats (8 inch spacing maximum) wired around the circumference of the trees to protect them from damage.

C. Tree limbs shall not be cut except upon written approval of the Owner and the Engineer. Tree limbs cut shall be painted with approved forestry paint manufactured specifically for that purpose.

D. Underground and Surface Structures

1. Sustain in their places and protect from direct or indirect injury underground and surface structures designated to remain within or adjacent to the limits of the Work. Such sustaining and supporting shall be done carefully and as required by the party owning or controlling such structure. Before proceeding with the work of sustaining and supporting such structure, satisfy the Engineer that the methods and procedures to be used have been approved by the party owning same.

2. Pay utility service company charges related to the temporary support of utility poles if required to complete the Work.

3. Assume risks associated with the presence of underground and surface structures within or adjacent to the limits of the Work. The Contractor shall be responsible for damage and expense for direct or indirect injury caused by

his Work to any structure. Immediately repair damage caused by the Work to the satisfaction of the owner of the damaged structure.

3.3 REMOVE AND RESET ITEMS

A. Contractor shall remove items designed as such, and shall temporarily store them until such point in time when the removed item is no longer in conflict with construction operations. At that point, the Contractor shall reinstall the item.

B. The Contractor is responsible for the safe removal, storage and reinstallation of these items, and shall be liable for the replacement of these items in kind should these be damaged during the course of the Contractor's operations.

C. Items removed shall be reset in kind, consistent with their existing installation.

END OF SECTION

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SECTION 01770

CLOSEOUT PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Documentation for Completed Work

2. Final Clean-up

1.2 SUBMITTALS

A. Closeout Submittals

1. The closeout submittals include but are not necessarily limited to

a. Evidence of payment and release of liens.

b. As-built survey of completed Work.

1.3 SEQUENCING

A. Substantial Completion

1. Prior to requesting final inspection and project close-out, the Contractor shall assure that the work is completed in accordance with the specified requirements and is ready for the requested inspection.

2. Within a reasonable period of time after receipt of the request, the Engineer will inspect the work to review compliance, completeness, and issue a listing of unsatisfactory work. The Contractor shall remedy the deficiencies and the work will be reinspected.

B. Completion

1. The Contract shall be considered complete and final payment made, only when:

a. All provisions of the Contract Documents have been strictly adhered to.

b. The project and premises have been left in good order, including removal of all temporary construction, Contractor-owned and extraneous materials as required.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.1 CLEANING

A. Where material or debris has washed, flowed or has been placed in existing watercourses, ditches, gutters, drains, pipe, or structures, for work done under the

Contract work limits or elsewhere during the course of the Contractor's operations, such material or debris shall be entirely removed and satisfactorily disposed of during the progress of the Work, and the ditches, channels, drains, pipes, structures, and watercourses shall, upon completion of the Work, be left in a clean and neat condition.

B. Restore or replace, when and as directed, any public or private property damaged or removed by his work, equipment, or employees, to a condition at least equal to that existing immediately prior to the beginning of operations. To this end, complete as required all necessary highway or driveway, walk, and landscaping work. Suitable materials, equipment and methods shall be used for such restoration. The restoration of existing property, signs or structures shall be done as promptly as practicable, as work progresses, and shall not be left until the end of the contract period.

END OF SECTION

SECTION 02200

SITE PREPARATION

PART 1 GENERAL

1.1 SUMMARY

A. Section includes

1. Clearing and grubbing
2. Grading
3. Stripping and stockpiling of soil and sod

1.2 SUBMITTALS

A. Submit construction methods and equipment that will be utilized for the clearing, grubbing, and waste material disposal specified within this Section.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.1 CLEARING AND GRUBBING

A. Except as otherwise directed, cut, grub, remove and dispose of all trees, stumps, brush, shrubs, roots and any other objectionable material within the limits of the Work on the site and where required to construct the work.

B. Protect trees or groups of trees, designated by the Engineer to remain, from damage by all construction operations by erecting suitable barriers, or by other approved means. Conduct clearing operations to prevent falling trees from damaging trees designated to remain.

1. All damage done to the trees by the Contractor's operation shall be trimmed and painted where cut as directed or as necessary to provide adequate vertical clearance for construction activities. The dressing or paint shall be applied no later than two days after the cuts are made.
2. Use all necessary precautions to prevent injury to other desirable growth in all areas. Contractor shall assume full responsibility for any damage.

C. Protect areas outside the limits of clearing from damage. No equipment or materials shall be stored in these areas.

D. No stumps, trees, limbs, or brush shall be buried in fills or embankments.

3.2 DISPOSAL OF MATERIALS

A. Remove all tree trunks, limbs, roots, stumps, brush, foliage, other vegetation and objectionable material from the site and dispose of in a legal manner.

B. Burning or direct burial of cleared and grubbed materials on-site will not be permitted.

3.3 GRADING

A. In preparation for placing loam, paved drives and appurtenances, perform grading to the lines, grades and elevations shown on the Drawings, and otherwise directed by the Engineer and perform in such a manner that the requirements for formation of embankments can be followed. All material encountered, regardless of its nature, within the limits indicated, shall be removed and disposed of as directed. During the process of grading, maintain the subgrade in such condition that it will be well drained at all times. Install temporary drains and drainage ditches to intercept or divert surface water that may affect the work when necessary.

B. If at the time of grading it is not possible to place material in its final location, stockpile material in approved areas for later use. No extra payment will be made for the stockpiling or double handling of excavated material.

C. The right is reserved to make minor adjustments or revisions in lines or grades if found necessary as the work progresses.

D. Stones or rock fragments larger than 4 inches in their greatest dimensions will not be permitted in the top 12 inches of the finished subgrade of all fills or embankments except along the access roadways and rip-rap where shown on the Drawings.

E. In cuts, loose or protruding rocks on the excavated slopes shall be barred loose or otherwise removed to line or finished grade of slope. Cut and fill slopes shall be uniformly dressed to the slope, cross-section and alignment shown on the Drawings or as directed by the Engineer.

END OF SECTION

SECTION 02210

SUBSURFACE INVESTIGATIONS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Pipe and utility subsurface investigations that are required in order to properly locate utilities that may conflict with proposed construction.

2. Work item includes all sawcutting, excavation, backfilling, and restoration. These items will not be paid for under separate bid items..

B. Related Sections

1. Section 02315 - Excavation, Backfill, Compaction, and Dewatering

2. Section 02740 - Bituminous Concrete Pavement

1.2 REFERENCES

A. 29 CFR Part 1926 Subpart P - OSHA Excavation Regulations 1926.560 through 1926.562 including Appendices A through F

1.3 PIPELINE AND UTILITY INVESTIGATIONS

A. The Drawings show available data relative to existing underground pipe and utilities.

B. During the course of the Work, excavate to locate various existing pipelines and utilities, where they are involved in the Work.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 PREPARATORY WORK

A. Obtain all available information on buried structures and utilities in the vicinity of the investigation.

B. Coordinate Work such that all affected property, structure, and utility owners are aware of the Work prior to its commencement.

C. Schedule subsurface investigations such that they do not interfere with other Work or traffic and in advance of other Work in that location.

D. Provide the Engineer with 24-hour notice prior to commencement of subsurface investigations.

3.2 TEST PITS

A. Excavate test pits as indicated, or as requested by the Owner. Expose the top of the utility, and adjacent utilities, at each test pit location.

B. Perform test pits in accordance with the requirements of Section 02315. Excavate the bottom 2 feet of the test pit (or in close proximity to known or anticipated utilities) by hand. Excavate to top of utilities by hand. Test pits shall be braced, sheeted and dewatered or as otherwise required for safe excavation and examination of the structure or utility to be exposed.

C. Measure the depth to the top of the pipeline, as well as to adjacent utilities, from the ground surface, at each test pit location. Record location, depth and size of pipelines and utilities uncovered during the test pits. Record any other pertinent information which is learned as a result of excavating the test pit. Furnish measurements and drawings to Engineer.

D. Prior to test pitting operations, delineate the general scope of the excavation or boring on the paved surface of the ground using white paint, or stakes or other suitable white markings on non-paved surfaces and notify Call Before You Dig. Premarking will not be acceptable if such marks can interfere with traffic or pedestrian control or are misleading to the general public.

E. Excavate test pits of an appropriate size with equipment suitable for the location and character of the pit to be excavated.

F. All subsurface investigations shall be conducted in accordance 29 CFR Part 1926 Subpart P - OSHA Excavation Regulations 1926.650 through 1926.652 including Appendices A through F.

G. After examination by the Engineer, backfill and compact the test pits in accordance with Section 02315.

H. Repair damage to any structure, property or site feature to the satisfaction of the Engineer.

I. Repair paved surfaces in accordance with Section 02740.

J. Repair lawn areas or grass surfaces in accordance with 02920

END OF SECTION

SECTION 02280

PIPELINE AND UNDERGROUND STRUCTURE ABANDONMENT

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Abandonment of pipe

2. Abandonment of manholes and catch basins

B. Related Sections

1. Section 02320, Borrow Material

2. Section 02514, Ductile Iron Pipe and Fittings

1.2 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and methods required for proper performance of the work in this section.

B. Use equipment of adequate size, capacity and quantity to accomplish the work of this Section in a safe timely manner.

C. Comply with the directions of the Engineer and the requirements of governmental agencies having jurisdiction.

PART 2 PRODUCTS

2.1 MATERIALS

A. Gravel borrow shall meet the requirements of Section 02320, Borrow Material.

B. Concrete shall have a 28-day compressive strength of 3000 psi and a maximum stone size of 1½ inches.

PART 3 EXECUTION

3.1 ABANDONING STORM DRAINS

A. Abandon existing pipelines and manholes upon completion of installation and successful testing of the new pipelines, manholes and appurtenances.

B. Seal gravity pipes that are to be abandoned at each end with a concrete plug not less than 1½ times the pipe diameter long in the barrel of the pipeline. For example, a 10-inch diameter pipe will require that a minimum 15-inch long plug be installed. This should be performed at the manhole unless the existing manhole is to be removed. Similarly, open ends of pressure sewers to be abandoned shall be sealed with a concrete plug no less than 1½ times the pipe diameter long in the barrel of the pipeline.

C.

3.2 REPAIR/RESTORATION

A. Match surface repairs to its immediate surrounding area. Complete this work in accordance with the applicable specification section.

END OF SECTION

SECTION 02315

EXCAVATION, BACKFILL, COMPACTION AND DEWATERING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Excavation, backfill and compaction for subsurface utilities
2. Removal, handling and disposal of rock not covered under Section 02410
3. Earth retention systems
4. Excavation, backfill and compaction for the abandonment of existing pipe
5. Temporary dewatering systems

B. Related Sections

1. Section 01570, Temporary Controls
2. Section 02210, Subsurface Investigations
3. Section 02320, Borrow Materials
4. Section 02410, Rock Excavation
5. Section 02740, Bituminous Concrete Pavement

1.2 REFERENCES

A. ASTM D1557-07 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3))

B. ASTM D1556-07 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method

C. ASTM D2487-06e1 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)

D. ASTM D6938-08a - Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

E. 29 CFR Part 1926 Subpart P - OSHA Excavation Regulations 1926.650 through 1926.652 including Appendices A through F

1.3 DEFINITIONS

A. Benching - A method of protecting employees from cave-ins by excavating the sides of an excavation to form one or a series of horizontal levels or steps, usually with vertical or near-vertical surfaces between levels.

B. Earth Retention Systems - Any structural system, such as sheeting and bracing or cofferdams, designed to retain in-situ soils in place and prevent the collapse of the sides of an excavation in order to protect employees and adjacent structures.

C. Excavation - Any man-made cut, cavity, trench, or depression in an earth surface, formed by earth removal.

D. Protective System - A method of protecting employees from cave-ins, from material that could fall or roll from an excavation face or into an excavation, or from the collapse of adjacent structures. Protective systems include earth retention systems, sloping and benching systems, shield systems, and other systems that provide the necessary protection.

E. Registered Professional Engineer - A person who is registered as a professional engineer in the state where the work is to be performed. However, a professional engineer, registered in any state is deemed to be a "registered professional engineer" within the meaning of this standard when approving designs for "manufactured protective systems" or "tabulated data" to be used in interstate commerce.

F. Shield System - A structure that is designed to withstand the forces imposed on it by a cave-in and thereby protects employees within the structure. Shields can be permanent structures or can be designed to be portable and moved along as work progresses. Additionally, shields can be either pre-manufactured or job-built in accordance with 29 CFR 1926.652(c)(3) or (c)(4). Shields used in trenches are usually referred to as "trench boxes" or "trench shields."

G. Sloping - A method of protecting employees from cave-ins by excavating to form sides of an excavation that are inclined away from the excavation so as to prevent cave-ins. The angle of incline required to prevent a cave-in varies with differences in such factors as the soil type, environmental conditions of exposure, and application of surcharge loads.

H. Temporary Dewatering System – A system to lower and control water to maintain stable, undisturbed subgrades at the lowest excavation levels. Dewatering shall be provided for all pipelines, structures and for all other miscellaneous excavations.

I. Trench - A narrow excavation (in relation to its length) made below the surface of the ground, of at least three feet in depth. In general, the depth is greater than the width, but the width of a trench (measured at the bottom) is not greater than 15 feet (4.6 m).

1.4 SUBMITTALS

A. Drawings and calculations for each Earth Retention System required in the Work. The submittal shall be in sufficient detail to disclose the method of operation for each of the various stages of construction required for the completion of the Earth Retention Systems.

1. Submit calculations and drawings for Earth Retention Systems prepared, signed and stamped by a Professional Engineer registered in the state where the work is performed.

B. Performance data for the compaction equipment to be utilized

C. Construction methods that will be utilized for the removal of rock

D. Dewatering plan for the excavation locations.

1.5 QUALITY ASSURANCE

A. All Excavation, Trenching, and related Earth Retention Systems shall comply with the requirements of OSHA excavation safety standards (29 CFR Part 1926 Subpart P), and other State and local requirements. Where conflict between OSHA and State regulations exists, the more stringent requirements shall apply.

B. The following test procedures will be performed by the Owner's inspection agency. Results will be submitted to the Engineer for review.

1. Modified Proctor Test (ASTM D1557) results and soil classification (ASTM D2487) for all proposed backfill materials at the frequency specified below:

a. For suitable soil materials removed during excavation, perform one test for every 1,000 cubic yards of similar soil type. Similarity of soil types will be as determined by the Engineer.

b. For borrow materials; perform tests at frequency specified in Section 02320 - Borrow Materials.

2. Compaction test results (i.e. ASTM D6938 or ASTM D1556) at a frequency of one test for every 100 cubic yards of material backfilled. The Engineer will determine the locations and lifts to be tested.

a. The Engineer may specify additional compaction testing when there is evidence of a change in the quality of moisture control or the effectiveness of compaction.

b. If all compaction test results within the initial 25% of the total anticipated number of tests indicate compacted field densities equal to or greater than 95% of maximum dry density at optimum moisture content, the Engineer may reduce frequency of compaction testing. In no case will the frequency be reduced to less than one test for every 500 cubic yards of material backfilled.

c. The Contractor is cautioned that compaction testing by nuclear methods may not be effective where excavation sidewalls impact the attenuation of the gamma radiation or where oversize particles (i.e. large cobbles or coarse gravels) are present. In these cases, other field density testing methods may be required.

C. Employ the services of a dewatering specialist or firm when well points, deep wells, recharge systems, or equal systems are required. Specialist shall have completed at least 5 successful dewatering projects of equal size and complexity and with equal systems.

1.6 PROJECT CONDITIONS

A. Notify Call Before You Dig (CBYD) at 1-800-922-4455 or 811 and obtain CBYD identification numbers.

B. Notify utility owners in reasonable advance of the work and request the utility owner to stake out on the ground surface the underground facilities and structures. Notify

the Engineer in writing of any refusal or failure to stake out such underground utilities after reasonable notice.

C. Make explorations and Excavations to determine the location of existing underground structures, pipes, house connection services, and other underground facilities in accordance with Paragraph 3.2.D of this Section.

PART 2 PRODUCTS

2.1 SOIL MATERIALS

A. Fill material is subject to the approval of the Engineer and may be either material removed from excavations or borrow from off site. Fill material, whether from the excavations or from borrow, shall be of such nature that after it has been placed and properly compacted, it will make a dense, stable fill.

B. Satisfactory fill materials shall include materials classified by ASTM D 2487 as GW, GP, GM, GP-GM, GW-GM, GC, GP-GC, SW, and SP.

C. Satisfactory fill materials shall not contain trash, refuse, vegetation, masses of roots, individual roots more than 18 inches long or more than 1/2 inch in diameter, or stones over 6 inches in diameter. Unless otherwise stated in the Contract Documents, organic matter shall not exceed minor quantities and shall be well distributed.

D. Satisfactory fill materials shall not contain frozen materials nor shall backfill be placed on frozen material.

E. Excavated surface and/or pavement materials such as gravel or trap rock that are salvaged may be used as a sub-grade material, if processed to the required gradation and compacted to the required degree of compaction. In no case shall salvaged materials be substituted for the required gravel base.

2.2 DEWATERING MATERIALS

A. Provide haybales and silt fence in accordance with Section 01570.

B. Provide silt filter bags (Dandy Dewatering Bag, Dirtbag, JMP Environ-Protection Filter Bag, or equal) of adequate size to match flow rate.

PART 3 EXECUTION

3.1 PREPARATION

A. Public Safety and Convenience

1. Take precautions for preventing injuries to persons or damage to property in or about the Work.

2. Provide safe access for the Owner's and Engineer’s representatives at site during construction.

3. Do not obstruct site drainage, natural watercourses or other provisions made for drainage.

3.2 CONSTRUCTION

A. Earth Retention Systems

1. Provide Earth Retention Systems necessary for safety of personnel and protection of the Work, adjacent work, utilities and structures.

2. Maintain Earth Retention Systems for the duration of the Work.

3. Systems shall be constructed using interlocking corner pieces at the four corners. Running sheet piles by at the corners, in lieu of fabricated corner pieces, will not be allowed.

4. Drive sheeting ahead of and below the advancing trench excavation to avoid loss of materials from below and from in front of the sheeting.

5. Sheeting is to be driven to at least the depth specified by the designer of the earth retention system, but no less than 2 feet below the bottom of the Excavation.

6. Remove sheeting, unless designated to be left in place, in a manner that will not endanger the construction or other structures. Backfill and properly compact all voids left or caused by the withdrawal of sheeting.

7. Remove earth retention systems, which have been designated by the Engineer to be left in place, to a depth of 3 feet below the established grade.

B. Excavation

1. Perform excavation to the lines and grades indicated on the Drawings. Backfill unauthorized over-excavation in accordance with the provisions of this Section, at no additional cost to the Owner.

2. Excavate with equipment selected to minimize damage to existing utilities or other facilities. Hand excavate as necessary to locate utilities or avoid damage.

3. Sawcut the existing pavement in the vicinity of the excavation prior to the start of excavation in paved areas, so as to prevent damage to the paving outside the requirements of construction.

4. During excavation, material satisfactory for backfill shall be stockpiled in an orderly manner at a distance from the sides of the excavation equal to at least one half the depth of the excavation, but in no case closer than 2 feet.

   a. Excavated material not required or not suitable for backfill shall be removed from the site.

   b. Perform grading to prevent surface water from flowing into the excavation.

   c. Pile excavated material in a manner that will endanger neither the safety of personnel in the trench nor the Work itself. Avoid obstructing sidewalks and driveways.

d. Hydrants under pressure, valve pit covers, valve boxes, manholes, curb stop boxes, fire and police call boxes, or other utility controls shall be left unobstructed and accessible until the Work is completed.

5. Make pipe trenches as narrow as practicable and keep the sides of the trenches undisturbed until backfilling has been completed. Provide a clear distance of 12 inches on each side of the pipe.

6. The final 6 inches of excavation and grading of the trench bottom shall be performed by hand so as not to disturb the material below the grade required for setting the pipe or appurtenances.

   a. Where suitable bedding materials will be placed and compacted throughout the length of the trench, hand excavation of the final 6 inches will not be required.

   b. Grade the trench bottom to provide uniform bearing and support for the bottom quadrant of each section of pipe.

   c. Excavate bell holes at each joint to eliminate point bearing.

   d. Remove stones greater than 6 inches in any dimension from the bottom of the trench to avoid point bearing.

7. If satisfactory materials are not encountered at the design subgrade level, excavate unsatisfactory materials to the depth directed by the Engineer and properly dispose of the material. Backfill the resulting extra depth of excavation with satisfactory fill materials and compact in accordance with the provisions of this Section.

8. Where trenching and backfilling for a new pipe in place of an existing pipe along the same route, removal of the existing pipe shall be included under this item.

C. Backfill and Compaction

1. Unless otherwise specified or indicated on the Drawings, use satisfactory material removed during excavation for backfilling trenches. The Engineer may require stockpiling, drying, blending and reuse of materials from sources on the Project.

2. Spread and compact the material promptly after it has been deposited. When, in the Engineer's judgment, equipment is inadequate to spread and compact the material properly, reduce the rate of placing of the fill or employ additional equipment.

3. When excavated material is specified for backfill and there is an insufficient amount of this material at a particular location on the Project due to rejection of a portion thereof, consideration will be given to the use of excess material from one portion of the Project to make up the deficiency existing on other portions of the Project. Moving this excess material from one portion of the Project and placing it in another portion of the Project will be at no additional cost to the Owner.

a. Use borrow material if there is no excess of excavated material available at other portions of the Project.

4. Backfilling and compaction methods shall attain 95% of maximum dry density at optimum moisture content as determined in accordance with ASTM D1557.

5. Do not place stone or rock fragment larger than six inches in greatest dimension in the backfill.

6. Maximum loose lift height for backfilling existing or borrow material shall be 12 inches, unless satisfactory compaction is demonstrated otherwise to the Engineer through field-testing. In no case shall loose lift height for backfilling exceed 3 feet.

7. Do not drop large masses of backfill material into the trench endangering the pipe or adjacent utilities.

8. Install pipe in rock excavated trenches on a dense graded stone bedding with a minimum depth of 6 inches. Shape the stone bedding at the pipe bells to provide uniform support. Encase the pipe in the dense graded crushed stone bedding to a grade 6 inches over the top of the pipe and 12 inches on each side of the pipe.

9. Backfill from the bottom of the trench to the centerline of the pipe with the specified material. This initial backfill is to be placed in layers of no more than 6 inches and thoroughly tamped under and around the pipe. This initial backfilling shall be deposited in the trench for its full width on both sides of the pipe, fittings and appurtenances simultaneously.

10. Electrical conduit not encased in concrete, shall be backfilled with sand borrow conforming to the requirements of Section 02320. The backfill shall be placed in the trench for its full width and shall extend to 12 inches over the pipe.

11. Where excavation is made through permanent pavements, curbs, paved driveways or paved sidewalks, or where such structures are undercut by the excavation, place the entire backfill to sub-grade with granular materials and compact in 6 inch layers. Use approved mechanical tampers for the full depth of the trench. If required, sprinkle the backfill material with water before tamping so as to improve compaction.

12. Place and compact backfill around manholes, vaults, pumping stations, gate boxes or other structures in six inch layers, from a point 1 foot over the pipe. Exercise care to protect and prevent damage to the structures.

13. Install impervious trench dams where stone borrow is used for pipe bedding to prevent groundwater from following along the stone bedding. Install dams every 100 feet.

D. Test Pit Excavation

1. General requirements of test pits are specified in Section 02210.

E. Dewatering

1. Obtain the following construction dewatering permits, as required:

   a. CT DEEP permit titled "Stormwater and Dewatering Wastewaters from Construction Activities (DEP-PERD-GP-015)"

2. Provide, operate and maintain adequate pumping, diversion and drainage facilities in accordance with the approved dewatering plan to maintain the excavated area sufficiently dry from groundwater and/or surface runoff so as not to adversely affect construction procedures nor cause excessive disturbance of underlying natural ground. Locate dewatering system components so that they do not interfere with construction under this or other contracts.

3. Take actions necessary to ensure that dewatering discharges comply with permits applicable to the Project. Dispose of water from the trenches and excavations in such a manner as to avoid public nuisance, injury to public health or the environment, damage to public or private property, or damage to the work completed or in progress.

4. Repair any damage resulting from the failure of the dewatering operations and any damage resulting from the failure to maintain all the areas of work in a suitable dry condition, at no additional cost to the Owner.

5. Exercise care to ensure that water does not collect in the bell or collar holes to sufficient depth to wet the bell or collar of pipes waiting to be jointed.

6. Take precautions to protect new work from flooding during storms or from other causes. Control the grading in the areas surrounding all excavations so that the surface of the ground will be properly sloped to prevent water from running into the excavated area. Where required, provide temporary ditches for drainage. Upon completion of the work, all areas shall be restored to original condition.

7. Brace or otherwise protect pipelines and structures not stable against uplift during construction.

8. Do not excavate until the dewatering system is operational and the excavation may proceed without disturbance to the final subgrade.

9. Unless otherwise specified, continue dewatering uninterrupted until the structures, pipes, and appurtenances to be installed have been completed such that they will not float or be otherwise damaged by an increase in groundwater elevation.

10. If open pumping from sumps and ditches results in "boils", loss of fines, or softening of the ground, submit a modified dewatering plan to the Engineer within 48 hours. Implement the approved modified plan and repair any damage incurred at no additional cost to the Owner.

11. Where subgrade materials are unable to meet the subgrade density requirements due to improper dewatering techniques, remove and replace the materials in accordance with Section 02320 at no additional cost to the Owner.

12. Notify the Engineer immediately if any settlement or movement is detected of survey points adjacent to excavations being dewatered. If settlement is deemed by the Engineer to be related to the dewatering, submit a modified dewatering plan to the Engineer within 24 hours. Implement the approved modified plan and repair any damage incurred to the adjacent structure at no additional cost to the Owner.

13. Dewatering discharge:

    a. Install sand and gravel, or crushed stone, filters in conjunction with sumps, well points, and/or deep wells to prevent the migration of fines from the existing soil during the dewatering operation.

    b. Transport pumped or drained water without interference to other work, damage to pavement, other surfaces, or property. Pump water through a silt filter bag prior to discharge to grade of drainage system.

    c. Do not discharge water into any sanitary sewer system.

    d. Provide separately controllable pumping lines.

    e. The Engineer reserves the right to sample discharge water at any time.

14. Install erosion/sedimentation controls for velocity dissipation at point discharges onto non-paved surfaces.

15. Removal

    a. Do not remove dewatering system without written approval from the Engineer.

    b. Backfill and compact sumps or ditches with screened gravel or crushed rock in accordance with Section 02320.

    c. Remove well points and deep wells. Backfill abandoned well holes with cement grout having a water cement ratio of 1 to 1 by volume.

END OF SECTION

SECTION 02317

UNDERGROUND WARNING TAPE

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Agreement, including General and Supplementary Conditions, and Division 01 of the Project Manual, apply to the Work of this Section.

1.02 SUMMARY

A. Section Includes

1. Underground Warning Tape

1.03 SUBMITTALS

A. Shop Drawing Submittals

1. Product Data

PART 2 - PRODUCTS

2.01 METALLIC WARNING TAPE

A. Metallic warning tape for underground piping shall be polyethylene tape with metallic core for easy detection and location of piping with a metal detector.

B. Tape shall be 6 inches wide.

C. Tape shall be as manufactured by Seton Name Plate Corp., New Haven, Connecticut; Presco Detectable Underground Warning tape, Sherman, Texas; Blackburn Manufacturing, Neligh, Nebraska; Mercotape, Hackensack, New Jersey; or approved equivalent.

D. The tape shall be of the type specifically manufactured for marking and locating utilities.

E. The warning tape shall be heavy gauge 0.004 inch polyethylene and shall be resistant to acids, alkalis and other soil components. It shall be highly visible in the following colors with the associated phrases stamped in black letters and repeated at a maximum interval of 40 inches.

END OF SECTION 02317

SECTION 02320

BORROW MATERIALS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Soil Materials
2. Ordinary Borrow
3. Gravel Subbase
4. Processed Aggregate Borrow for Pavement Subbase
5. Sand Borrow
6. Stone Borrow

1.2 REFERENCES

A. ASTM C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

B. ASTM C117 - Standard Test Method for Materials Finer than 75 µm (No. 200) Sieve in Mineral Aggregates by Washing.

C. ASTM D1557 – Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lb./ft^3).

D. ASTM D2434 - Standard Test Method for Permeability of Granular Soils (Constant Head).

E. ASTM D2487 - Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System).

F. ASTM D2922 - Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

G. ASTM D3017 – Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

H. AASHTO – Standard Specification for Transportation Materials and Methods of Sampling and Testing, 1986 Edition as amended.

I. State of Connecticut Department of Transportation “Standard Specifications for Roads, Bridges, and Incidental Construction Form 816”.

1.3 SUBMITTALS

A. Representative samples of borrow materials taken from the source. Tag, label, and package the samples as requested by Owner’s Project Representative. Provide access to the borrow site for field evaluation and inspection.

B. Sieve analysis (ASTM C136) and permeability analysis (ASTM D2434) from certified soils testing laboratory for all borrow materials. A sample shall be taken and tested (at cost to Contractor) for each 1,500 c.y. of borrow material placed.

C. Modified proctor analysis (ASTM D1557) from certified soils testing laboratory for all borrow materials.

D. The Owner's Project Representative reserves the right to require more frequent testing than that which is specified above should the borrow characteristics change.

E. Prior to the start of work, submit to the Owner's Project Representative performance data for all compaction equipment to be utilized.

1.4 QUALITY ASSURANCE

A. No borrow shall be placed prior to the approval of Owner's Project Representative.

B. Use adequate numbers of skilled workmen who are trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and methods required for proper performance of the work in this Section.

C. Use equipment of adequate size, capacity, and quantity to accomplish the work of this Section in a timely manner.

D. Comply with the directions of Owner's Project Representative and the requirements of governmental agencies having jurisdiction.

1.5 PROJECT/SITE CONDITIONS

A. Existing Conditions

1. The Contractor shall be aware of any environmental requirements and restrictions, and shall comply with strict adherence to them.

2. During hauling operations, all public and private roadway surfaces shall be kept clean, and any borrow or other debris that may be brought upon the surface shall be removed promptly and thoroughly before it becomes compacted by traffic. If necessary, the wheels of all vehicles used for hauling shall be cleaned frequently and kept clean to avoid bringing any dirt upon the paved surfaces.

3. All excavation, hauling and placement of borrow material on site shall be conducted in such a manner so as to insure that no infringement of these specifications shall be violated.

PART 2 PRODUCTS

2.1 SOIL MATERIALS

A. Fill material is subject to the approval of the Owner's Project Representative and may be either material removed from excavations or borrow from off site. Fill material, whether from the excavations or from borrow, shall be of such nature that after it has been placed and properly compacted, it will make a dense, stable fill.

B. Satisfactory materials shall include materials classified by ASTM D 2487 as GW, GP, GM, GP-GM, GW-GM, GC, GP-GC, SW, and SP.

C. Satisfactory materials shall not contain trash, refuse, vegetation, masses of roots, individual roots more than 18 inches long or more than 1/2 inch in diameter, or stones over 6 inches in diameter. Organic matter shall not exceed minor quantities and shall be well distributed.

D. Satisfactory materials shall not contain frozen materials nor shall backfill be placed on frozen material.

E. Excavated surface and/or pavement materials such as gravel or trap rock that are salvaged may be used as a sub-grade material. In no case will salvaged materials be substituted for the required gravel base.

2.2 ORDINARY BORROW

A. Ordinary borrow shall consist of a material satisfactory to Owner's Project Representative and not specified as gravel borrow, sand borrow, special borrow material or other particular kind of borrow. This material shall have the physical characteristics of soils designated as type GW, GP, GM, SW, SP or SM, under USCS. It shall have properties such that it may be readily spread and compacted for the formation of embankments. The borrow shall not include rocks with a major dimension greater than 8 inches.

2.3 GRAVEL SUBBASE

A. Gravel subbase shall consist of inert material that is hard, durable stone and coarse sand, free from loam and clay, surface coatings, and deleterious materials. The coarse aggregate shall have a percentage of wear, by the Los Angeles Abrasion Test, of not more than 50.

B. Gradation requirements shall conform to the M.02.02 of the State of Connecticut Department of Transportation "Standard Specifications for Roads, Bridges, and Incidental Construction Form 816".

2.4 PROCESSED AGGREGATE BORROW FOR PAVEMENT SUBBASE

A. The compacted processed aggregate borrow to be used for pavement subbase shall consist of inert material that is hard, durable stone and coarse sand, free from loam and clay, surface coatings and deleterious materials. The coarse aggregate shall have a percentage of wear, by the Los Angeles Abrasion Test, of not more than 50.

B. Gradation requirements shall conform to the M.05.01 of the State of Connecticut Department of Transportation "Standard Specifications for Roads, Bridges, and Incidental Construction Form 816".

C. Stockpile the processed materials shall be stockpiled in such a manner to minimize segregation of particle sizes. All processed gravel shall come from approved stockpiles.

2.5 SAND BORROW

A. Sand borrow material used for this item shall be supplied from an off-site borrow area, subject to Owner's Project Representative's approval. Testing of the off-site sand borrow shall be at the Contractor's expense.

B. Sand borrow shall consist of clean, inert, hard, durable grains of quartz or other hard, durable, rock, free from loam or clay, surface coatings and deleterious materials. The allowable amount of material passing a No. 200 sieve as determined by ASTM-C117 shall not exceed 10% by weight.

C. Material shall consist of a clean, non-plastic, granular material conforming to the requirements of a SW, SP or SM under the Unified Soil Classification System (USCS) (ASTM D2487).

D. The material shall have the characteristics that when placed and compacted, the soil particles will bind together so as to form a solid, stable surface capable of supporting rubber-tired vehicular traffic during wet weather periods as well as extended dry weather periods. The borrow material shall not contain fines to the extent that the surface layer becomes "greasy" when wet.

E. The material shall not contain stones larger than 3/8 inch in diameter.

F. Material consisting of frozen clogs, ice and snow shall be rejected.

G. All sand borrow material to be used shall be subject to approval by Owner's Project Representative, and Owner's Project Representative reserves the right to reject any borrow material from the job that does not meet the above requirements.

2.6 STONE BORROW

A. Crushed Stone Borrow

1. Crushed stone borrow shall consist of one of the following materials:

a. Durable crushed rock consisting of the angular fragments obtained by breaking and crushing solid or shattered natural rock, and free from a detrimental quality of thin, flat, elongated or other objectionable pieces. A detrimental quality will be considered as any amount in excess of 15% of the total weight. Thin stones shall be considered to be such stones whose average width exceeds 4 times their average thickness. Elongated stones shall be considered to be stones whose average length exceeds 4 times their average width.

b. Durable crushed gravel stone obtained by artificial crushing of gravel boulders or fieldstone with a minimum diameter before crushing of 8 inches.

2. The crushed stone shall be reasonably free from clay, loam or deleterious material and not more than 1.0% of satisfactory material passing a No. 200 sieve will be allowed to adhere to the crushed stone.

3. The crushed stone shall have a maximum percentage of wear as determined by the Los Angeles Abrasion Test (AASHTO-T-96) as follows:

a.	For Class 1 Bit. Conc.	30%**
b.	For Cement Concrete Aggregate	45%***
c.	Crushed Stone for Subbase	45%

** Crushed stone for this use shall consist of crushed or shattered natural rock only. Crushed gravel stone will not be permitted.

*** Except for 5000 psi or greater cement concrete and prestressed concrete which shall be 30%.

4. The crushed stone shall conform to the grading requirements shown in the following grading Table.

Sieve Size	Percent by Weight Passing Through	
	Minimum	Maximum
1½″	100	--
1¼″	85	100
¾″	10	40
½″	0	8

5. Stone gradations shall vary depending on field use and shall be determined by Owner's Project Representative.

B. ½-Inch Crushed Stone Borrow

1. The crushed stone used for pipe bedding and backfill shall be a dense graded mixture and conform to the following gradation requirements.

Sieve Size (Square Openings)	Percent by Weight Passing Through	
	Minimum	Maximum
5/8″	100	100
½″	85	100
3/8″	15	45
#4	0	15
#8	0	5

C. Washed Rounded Stone (Peastone)

1. All stone shall be clean material substantially free from any foreign and deleterious material such that not more than 1% passes the #200 sieve. The maximum particle size shall be 0.75 inches. (2cm).

2. Washed rounded stone shall conform to the following gradation requirements:

Sieve Size	Percent Passing Through by Weight	
	Minimum	Maximum
1″	100	-
¾″	90	100
½”	10	50
3/8”	0	20
No.4	0	5

2.7 EQUIPMENT

A. Use equipment capable of adequately placing, spreading and compacting materials to the depth specified.

PART 3 EXECUTION

3.1 INSTALLATION

A. Prior to the placement of borrow material, site preparation shall be completed as required by the Contract Documents, and approved by the Owner's Project Representative.

B. Ensure that all materials are properly stockpiled on site to prevent contamination by other materials.

C. Borrow material shall be placed over the entire area in uniform lifts and compacted to 95% of maximum dry density.

D. Stockpiled borrow shall be utilized prior to using off-site borrow.

E. Gravel borrow shall be used in all locations where a surface treatment has not been specified but requires a firm finish surface.

F. Processed gravel for pavement subbase is intended to provide a stable foundation for driveways, sidewalk and roadway repair where a gravel base has been specified.

G. Borrow shall be used as a replacement for unsuitable materials where poor soil conditions below the normal depth of the trench are encountered during the progress of the work. Extra excavation and the type of borrow, as determined by Owner's Project Representative, shall be used only in those locations where its use is ordered by Owner's Project Representative. The intent of the borrow is to provide a stable foundation for the pipe as a replacement of unsatisfactory material, not as an aid to dewatering trenches. Its use shall be limited to those areas in which Owner's Project Representative orders its use in writing.

H. Borrow used for pipe foundation material shall be shaped so that it supports the pipe properly and will not damage the pipe, bells, collars, or the pipe fittings.

I. All borrow shall be placed so as to keep it free of other materials and to prevent segregation.

END OF SECTION

SECTION 02515

SANITARY SEWER SERVICES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. PVC Gravity Pipe and Fittings required for relocation of sanitary sewer services.

B. Related Sections

1. Section 02315 – Excavation, Backfill, Compaction & Dewatering

2. Section 02320 - Borrow Material

1.2 REFERENCES

A. ASTM D2241 - Specification for Polyvinyl Chloride (PVC) Plastic Pipe (SDR-PR).

B. ASTM F477 - Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

C. ASTM D3034 - Specification for Type PSM Polyvinyl Chloride (PVC) Sewer Pipe and Fittings.

D. ASTM D2444 - Standard Test Method for Impact Resistance of Thermoplastic Pipe and Fittings by Means of a Tup (Falling Weight).

E. ASTM D2412 - Standard Test Method for External Loading Properties of Plastic Pipe by Parallel-Plate Loading.

F. ASTM D3139 - Standard Specifications for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.

G. ASTM D3212 - Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.

H. ASTM F679 - Specification for Polyvinyl Chloride (PVC) Large-Diameter Plastic Gravity Sewer Pipe and Fittings.

I. ASTM D1869 - Standard Specification for Rubber Rings for Asbestos-Cement Pipe.

J. AWWA A21 - Ductile Iron Pipe and Fittings.

K. AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe, 4 in. through 12 in., For Water Distribution.

1.3 SUBMITTALS

A. Submit specifications and shop drawings for materials and equipment furnished under this Section.

B. Prior to first shipment of pipe, submit certified test reports that the pipe for this Contract was manufactured and tested in accordance with the ASTM Standards specified herein.

1.4 QUALITY ASSURANCE

A. Each type of PVC pipe and fittings shall be from a single manufacturer.

B. Inspection of the pipe will also be made by the Owner after delivery. The pipe shall be subject to rejection at any time on account of failure to meet any of the Specification requirements. Pipe rejected after delivery shall be marked for identification and shall immediately be removed from the job site.

PART 2 PRODUCTS

2.1 MATERIALS

A. Gravity Pipe

1. Polyvinyl chloride (PVC) pipe shall be of the size indicated on the Drawings or as specified and shall conform to the latest revision of ASTM D3034, Type SDR 35 for diameters less than or equal to 15 inch diameter and ASTM F679 for pipe greater than 15 inch diameter. Standard laying lengths shall not exceed 14.0 feet.

2. Joints shall be elastomeric gasket joints and shall provide a watertight seal. Assembly of joints shall be in accordance with ASTM D3212.

3. The minimum "pipe stiffness" (load divided by change in inside diameter in direction of load application) at 5% deflection shall be at least 46 psi for pipe tested in accordance with ASTM D2412.

4. No shattering or splitting shall be evident when 150 ft.-lbs. and 210 ft.-lbs. is impacted on 4 inch and 6 inch diameter pipe, respectively, in accordance with ASTM Method of Test D2444.

5. Pipe lengths and fittings to be used on the project shall be clearly marked on the outside in bold type with the name of the manufacturer, pipe size, pipe material, pipe class, and ASTM designation.

6. Gravity Pipe House Connections

a. Gravity pipe house connections, wyes and tees are to be laid in the run of the main pipeline, the wyes and tees shall be the same material as the main line and shall conform in material, joints and class with the line into which they are to be laid.

b. Eighth and sixteenth bends and end plugs are to be of the same material and class or strength designation as the pipe for the house connection.

c. Unless noted on the Drawings, house service piping shall be 6 inch diameter and shall be of the same material as the main line PVC pipe, or match the existing diameter of the house connection where the lateral is being relocated in part.

PART 3 EXECUTION

3.1 COORDINATION OF WORK

A. Coordinate the relocation of sanitary sewer laterals with the property Owner and the Town.

B. Connection to existing sanitary sewers and laterals to be made in accordance with Town requirements.

3.2 HANDLING PIPE AND FITTINGS

A. Take care in loading, transporting, and unloading to prevent injury to the pipe. Do not drop pipe or fittings. Examine pipe and fittings before installing, and no piece shall be installed that is found to be defective.

B. If any defective pipe is discovered after it has been installed, remove and replace it with a sound pipe in a satisfactory manner. Throughly clean pipe and fittings before installing, keep clean until they are used in the work, and conform to the lines, grades and dimensions required when installed.

C. Pipe ends requiring cutting shall be cut square without damage to the remaining pipe. Bevel cut pipe ends 1/8 inch at approximately 30 degrees to provide proper assembly of the joint. Beveling can be done with a coarse file or portable grinder.

D. Support stored pipe from below at not more than 3 foot intervals to prevent deformation. Do not stack pipe higher than 6 feet. Store pipe and fittings in a manner which will keep them at ambient outdoor temperatures. Provide temporary shading as required to meet this requirement. Simply covering of the pipe and fittings which allows temperature buildup when exposed to direct sunlight will not be permitted.

3.3 INSTALLATION

A. No single piece of pipe shall be laid unless it is generally straight. The centerline of the pipe shall not deviate from a straight line drawn between the centers of the openings at the ends of the pipe by more than 1/16 inch per foot of length. If a piece of pipe fails to meet this required check for straightness, it shall be rejected and removed from the site. Laying instructions of the manufacturer shall be explicitly followed.

B. Install piping and fittings true to alignment and grade. If necessary, each length of pipe shall be cleaned out before installation.

C. Excavation, trenching and back filling procedures shall be in accordance with Section 02315.

D. Dense graded stone bedding for the pipe shall be in accordance with Section 02320.

E. Install PVC pipe on a bed of dense graded stone with a minimum depth of 6 inches. The dense graded stone shall completely encase the pipe and cover the pipe to a grade 6 inches over the top of the pipe for the entire width of the trench. Bell holes shall be made in a dense graded stone such that the pipe shall be uniformly supported throughout the entire length of the barrel section.

F. Deflections in Pipe Alignment.

1. Wherever it is necessary to deflect pipe from a straight line, either in the vertical or horizontal plane, to avoid obstructions or where long-radius curves are permitted, the amount of deflection allowed shall not exceed that required for satisfactory making of the joint, and shall be approved by the Engineer.

2. Prior to deflecting the pipeline, the spigot of the pipeline should be marked flush with the bell end to assure that the spigot is not withdrawn excessively as the result of the deflection. After the pipe is deflected, an adequate depth of jointing material must remain on the side where the spigot is away from home and an adequate width of caulking space must remain on the opposite side of the pipe at the face of the bell.

3. The maximum deflection recommended by the manufacturer when using any pipe system must be observed when deflecting a pipeline.

4. In general, all radius curves called for on the Drawings or permitted at the time of construction are to be made using full lengths of pipe. The use of short lengths of pipe and extra joints in order to make a smaller radius turn will not be allowed without the written approval of Engineer.

G. Unsuitable Laying Conditions

1. No pipe shall be laid in water, in an unsuitable trench or during unsuitable weather conditions.

END OF SECTION

SECTION 02410

ROCK EXCAVATION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Rock excavation for trenches and structures.

B. Related Sections

1. Section 02315 – Excavation, Backfill and Compaction for Utility Systems

1.2 DESCRIPTION

A. Removal of boulders greater than 0.5 cubic yard in volume is included under this Section of work. Removal of boulders under 0.5 cubic yard in volume is not considered part of this work and is considered a part of the work specified under Sections 02315.

B. Rock excavation shall mean solid ledge rock or solid concrete which in the opinion of the Owner's Project Representative requires for its removal, drilling and blasting, wedging, sledging, firing, or breaking up with power operated hand tools.

C. Material removed solely with a power-operated excavator or loose, previously blasted ledge, broken stone, weathered rock, cemented gravel, hardpan, glacial till, concrete, asphalt or masonry which may be encountered during trenching operations will not be considered rock excavation.

1.3 SUBMITTALS

A. Construction methods that will be utilized for the removal of rock on the project.

B. Qualifications of professional blasting Consultant and a pre-blast survey Owner's Project Representative licensed in the State of Connecticut.

C. A description of the proposed method for blasting, prior to beginning any blasting operations, detailing the proposed methods of blasting including the type of information to be included in the blasting monitoring seismograph reports.

1. Seismograph reports shall include plan of drilling, amount and type of loadings, kind and distribution of blasting caps, delays used and amount of explosive per day, order of firing, distance and direction of recording station from blast area, type of ground at recording station, time of readings displacements and frequency, copy or record, and brief discussion on vibratory effects.

2. Communication procedures to confirm that the area is secure prior to blasting, and to alert personnel and the public.

D. Conduct preblast structure survey prior to start of blasting.

1. Conduct preblast structure survey on structures within areas affected by work that may be damaged by blasting. Include aboveground structures within at least 300 feet of areas to be blasted.

2. Contractor is responsible for coordination of activities associated with the preblast survey. This includes, but is not limited to issuing notices, obtaining clearances, and arranging for the presence of the property owner or local officials required to be present, as necessary to complete the survey.

3. The purpose of the survey is to document existing interior and exterior conditions of structures prior to blasting. The survey is intended to be used as evidence in ascertaining whether and to what extent damage may have occurred as a result of blasting.

4. Record information for each structure surveyed:

   a. Age and type of construction

   b. Location and character of cracks

   c. Evidence of settlement and leakage

   d. Other pertinent information

5. Record preblast survey information on forms prepared specifically for preblast surveys.

6. Supplement written records with photographs or videotape recording.

7. Submit copies of written records and photographs or videotapes to respective property owner, as well as to the Owner's Project Representative, prior to the start of blasting.

8. Upon completion of the blasting activities, make a complete postblasting survey of any properties where complaints of damage have been filed.

E. Blasting records - For each blast, document the following:

1. Location and depth of blast hole in relation to Project Stationing or coordinate systems and elevation.

2. Date and times of loading and detonation of blast.

3. Name of person in responsible charge of loading and firing.

4. Details of blast design, as previously specified.

5. Vibration records including location and distance of seismograph geophones to blast and to nearest structure, and measured peak particle velocity. Report peak particle velocity in units of inches per second.

6. Air-blast records. Report peak air blast values in units of pounds per square inch overpressure above atmospheric or in decibels at linear response.

7. Comments by blaster in charge regarding damage to existing facilities, adjacent property, or completed work, misfires, fly rock occurrences, unusual results, or unusual effects.

F. Review by the Owner's Project Representative of the blast design shall not relieve the Contractor of the responsibility for the accuracy, adequacy, safety of the blasting, and proper supervision.

G. All complaints received by the Contractor will be submitted to the Owner within 24 hours of receipt.

PART 2 PRODUCTS, DELIVERY, STORAGE, AND HANDLING

2.1 PRODUCTS

A. Only explosive and initiation devices packaged by federally liscenced explosives manufacturers shall be used in the blasting.

2.2 DELIVERY

A. Deliver all materials related to the blasting in accordance with all federal, state and local regulations.

2.3 STORAGE

A. On-site storage of blasting equipment, including explosives will not be permitted. Only the explosive material required for the days blasting will be allowed at the site. Over night storage is not permitted.

PART 3 EXECUTION

3.1 BLASTING

A. Comply with OSHA, State and Local regulations when blasting and handling explosives.

1. Redding Fire Department approval is required for all blasting operations. A pre-blast survey must be completed. The Fire Chief or his designated representative must witness the survey.

B. Assume full responsibility for the safety of the blasting operations and perform the work in a manner that will ensure the safety of personnel and that of existing structures, adjacent buildings, and completed new construction. The Contractor will be held responsible for claims for damage to property and underground structures. Repair in kind utilities, pipelines or house services damaged while conducting pre-drilling and blasting activities. Repair and maintain roadway and paved surfaces that are cracked or damaged during the course of pre-drilling and blasting. The pay limits for paving repair shall be as noted, regardless of the limits of necessary roadway repairs due to blasting.

C. Comply with current OSHA regulations as well as engage the services of a qualified, professional blasting Consultant who will design, review, evaluate and modify the blasting operations. Design the initial blasts and conduct test blasts (minimum four tests) until regular production controlled blast patterns are developed that produce the desired rate of excavation while meeting the requirements for vibration and air blast control specified. Periodically, or when requested by the Owner's Project Representative, review the blasting operations and make such changes in the blasting operations as are required to produce a controlled blasting operation meeting the requirements of these specifications. Review by the Owner's Project Representative

of the Contractor's blast design shall not relieve the responsibility for obtaining adequate rock breakage.

D. Provide adequate notice to residents that may be affected by the use of explosives. In residential areas, provide the following:

1. Certificate of Insurance to cover a blasting operation.

2. Evidence that residential homes have been reviewed to satisfy all parties that pre-construction conditions are well documented.

E. Blasting Design Criteria

1. Exercise care in the drilling and blasting operations so that the remaining rock remains stable and to reduce overbreak to a minimum.

2. Control blasting by limiting the charge per delay to that which produces limited levels of ground vibrations as herein specified. Hire a qualified testing agency to measure the radial particle velocities using a seismograph. Peak radial particle velocity shall be the measure of the level of vibration.

3. The charge weight per delay used in blasting shall be such that the peak radial particle velocity shall not exceed 2.0 inches per second measured on the foundation material, rock, or overburden at the nearest structure. The Contractor shall modify the size and type of explosives used to meet this criteria or other limiting criteria.

4. For areas where controlled blasting is required, the charge weight per delay shall be such that the peak radial particle velocity shall not exceed 1.0 inch per second.

5. Air blast overpressures from blasting operations shall not exceed 0.02 psi.

6. The maximum depth of lift to be removed at any one time shall not exceed 6 feet.

7. Use blasting mats, chained logs, warning signs, guards, etc., in accordance with the best practice.

8. All blasting operations shall be done by electrical detonation.

9. Restrict blasting to daylight hours. In no case will blasting operations be permitted before 8:00 AM or after 5:00 PM.

10. These criteria may be adjusted by the Owner, if the blasting procedures based on monitoring results or in the opinion of the Owner are likely to be disruptive to nearby businesses, people, or to cause damage to structures. These changes may require the Contractor to revise blast design and reduce the size of charges.

F. The Contractor will provide adequate signage alerting the public that blasting is taking place in the area. Make signage clearly visible.

G. In areas where the Contractor is allowed to pre-drill and blast ledge or rock formations without first removing the over-burden, the Contractor shall be required to firmly establish a profile of the solid ledge or rock that cannot be ripped free by

the excavating machine. The actual pay quantities will be based on the inspector's determination of the actual profile and extent of the rock formations drilled and blasted by the Contractor and his verification of the rock formations once the trench has been opened.

H. Minimum excavation and clearance within rock trenches shall be per Section 02315.

END OF SECTION

SECTION 02514

DUCTILE IRON PIPE AND FITTINGS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Ductile iron pipe and fittings, direct buried or in below grade vaults
2. Restrained joints and fittings
3. Cast-in-place concrete thrust blocks

B. Related Sections

1. Section 02315 – Excavation, Backfill, Compaction and Dewatering
2. Section 02317 – Underground Warning Tape

1.2 REFERENCES

A. Pipe and fittings shall conform to the latest edition of the following standards unless otherwise specified:

1. ANSI/AWWA C104/A21.4, Cement Mortar Lining for Ductile Iron Pipe and Fittings for Water.
2. ANSI/AWWA C105/A21.5, Polyethylene Encasement for Ductile Iron Pipe Systems.
3. ANSI/AWWA C110/A21.10, Ductile Iron and Grey Iron Fittings 3″ through 48″ for Water and Other Liquids.
4. ANSI/AWWA C111/A21.11, Rubber-Gasket Joints for Ductile Iron Pressure Pipe and Fittings.
5. ANSI/AWWA C115/A21.15, Flanged Ductile Iron Pipe with Ductile Iron or Gray-Iron Threaded Flanges.
6. ANSI/AWWA C150/A21.50,Thickness Design of Ductile Iron Pipe.
7. ANSI/AWWA C151/A21.51, Ductile Iron Pipe, Centrifugally Cast, for Water.
8. ANSI/AWWA-C153/A21.53, Ductile Iron Compact Fittings Water Service.
9. ANSI/AWWA C600, Installation of Ductile Iron Water Mains and their Appurtenances.
10. ANSI/AWWA C800, Underground Service Line Valves and Fittings.
11. ANSI/AWWA C651, Disinfecting Water Mains.
12. ASTM A307, Standard Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.

13. ASTM B88, Standard Specification for Seamless Copper Water Tube.

14. ASTM D1248, Standard Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable.

15. Ductile Iron Pipe Research Association, "Thrust Restraint Design for Ductile Iron Pipe" (Third Edition).

1.3 SUBMITTALS

A. Administrative Submittals

1. Detailed description of proposed pipe handling and installation methods along with the manufacturer's approval.

2. Construction details and schedule of operation for each connection to existing piping at least 30 days prior to beginning the Work. Approval must be received before commencement of Work on-site.

B. Shop Drawings

1. Manufacturer's scale drawings, cuts or catalogs including descriptive literature and complete characteristics and specifications and code requirements. Submit shop drawings for ductile iron pipe, types of joint, fittings, couplings, filling rings, lining and coating.

2. Location for each type of restrained joint or device to prevent joint separation along with installation, assembly and disassembly instructions.

3. Where water main is relocated, provide written narrative describing how system will be isolated and shut down for relocation, and describe how disruption to existing utility customers would be minimized.

C. Quality Control Submittals

1. Certificates of compliance on pipe materials.

2. Prior to first shipment of pipe, submit certified test reports that the pipe for this Contract was manufactured and tested in accordance with the ASTM and ANSI/AWWA Standards specified herein.

3. Manufacturers of pipe on the project shall have an established, annually audited and certified, quality control procedure for manufacturing of pipe. Each manufacturer shall be certified by an independent, third party auditor for compliance with all requirements of the AWWA standards. The manufacturer shall submit a current certificate of compliance for the plant facility where the pipe is to be made. Certificate of compliance shall be submitted for each additional year of pipe manufacturing during the duration of the Project. The manufacturer shall not change the plant manufacturing the pipe during the duration of the Work.

1.4 QUALITY ASSURANCE

A. Inspect and test pipe and fittings at the foundry as required by the standard specifications to which the material is manufactured. In addition, the Owner reserves the right to have any or all pipe, fittings, and special castings inspected

and/or tested by an independent service at either the manufacturer's plant or other testing laboratory.

B. Ductile iron pipe shall be from a single manufacturer. Fittings shall be from a single manufacturer, not necessarily the pipe manufacturer.

C. Shop Inspection - Materials are subject to inspection and approval at the manufacturing plant by the Engineer.

D. The Engineer will inspect the pipe and fittings after delivery. The pipe shall be subject to rejection at any time on account of failure to meet any of the Specification requirements. Pipe rejected after delivery or at any point during the progress of the Work, shall be marked for identification and shall immediately be removed from the job site and replaced at no additional cost to the Owner.

E. Test pipe under pressure for defects and leakage in accordance with Section 02502.

1.5 PROJECT CONDITIONS

A. Secure permits and pay fees required to carry out the piping work. Comply with laws, ordinances, codes, rules, and regulations of the local and state authorities having jurisdiction over the Work. Where provisions of the Contract Documents are in conflict with the codes, the code shall govern. The Contract Documents shall govern when in excess of the required or minimum regulations or codes.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. American Cast Iron Pipe Company

B. Griffin Pipe Products

C. U.S. Pipe

D. or equal

2.2 PIPE AND FITTINGS - GENERAL

A. Ductile iron pipe shall be designed in accordance with AWWA C150 and shall be manufactured in accordance with AWWA C151. Fittings and other materials referenced in this section shall conform to the latest edition of the references listed in Paragraph 1.2 of this section.

B. Unless otherwise indicated or specified in the Contract Documents, direct buried ductile iron pipe shall be Class 52 with push on joints.

C. Unless otherwise indicated or specified in the Contract Documents, ductile iron flanged pipe for vault or above ground service, or for installation in buried vaults, shall be Class 53 with flanged joints

D. Unless otherwise indicated or specified in the Contract Documents, direct buried fittings shall be ductile iron Class 350 with mechanical joints.

E. Pipe and fittings for water, sewage or sludge service, except where specified, shall have a bituminous outside coating in accordance with AWWA C110, C151or C153, as applicable.

F. Obtain from the manufacturer sufficient gauged pipe sections in accordance with AWWA C151 to ensure the availability of each pipe diameter required on the Project.

2.3 PIPE AND FITTING JOINTS

A. Push-on-joints and mechanical joints shall conform to ANSI/AWWA C111/A21.11.

B. Flanged joints shall be 150 pound and shall be faced and drilled after being screwed on the pipe, with flanges true to 90 degrees with the pipe axis and shall be installed flush with the end of the pipe.

C. Where indicated on the Drawings, provide restrained joints suitable for a 150 psi working pressure and fabricated of heavy section cast iron casting. Gaskets shall meet the material requirements of ANSI/AWWA A21.11/C111 for mechanical joint gaskets.

D. Restrained joints for rubber-type push-on joint pipe shall be field lock gaskets or EBAA series 1700 bell restrainers per Aquarion specifications.

2.4 FITTINGS

A. Fittings shall be domestic ductile iron Class 350 mechanical joint.

B. Fittings less than or equal to 12 inches in size shall conform to ANSI/AWWA C110/A21.10 or ANSI/AWWA C153/A21.53 and shall have a 350 psi pressure rating.

C. Fittings greater than 12 inches in size shall conform to ANSI/AWWA C110/A21.10 or ANSI/AWWA C153/A21.53 and shall have the following pressure ratings:

1. Fittings greater than 12 inches and less than or equal to 24 inches - 350 psi

2. Fittings greater than 24 inches - 250 psi

D. Mechanical joint retainer glands shall be installed on all mechanical joints, except where rodding is used. Retainer glands shall be specifically designed to fit standard mechanical joint bells with corrosion resistant, high strength, low-alloy T-head bolts conforming to ANSI/AWWA A21.11/C-111 and ANSI/AWWA A21.53/C-153. Retainer glands shall be manufactured of ductile iron conforming to ASTM A536-80 grade 60-42-10. Wedges shall be of hardened ductile iron and require the same torque in all sizes. These devices shall have a minimum 250 psi pressure rating with a minimum safety factor of 2:1 and shall be EBAA IRON, Inc., series 1100 or equal. Glands shall be listed with Underwriters Laboratories and/or approved by Factory Mutual.

E. Cast-in-place concrete thrust blocks are required at all fittings and will be used in conjunction with retainer glands, as specified in Paragraph 3.12 of this section.

F. Anchoring tees shall have main run ends as indicated on the Drawings or as required for the installation. The branch shall have a plain end with an integral gland and

rotating mechanical joint gland to provide a restrained connection with the adjacent valve or fitting.

2.5 COUPLINGS

A. Couplings and transitional couplings for pipe less than or equal to 12 inches in diameter shall consist of a long body cast iron sleeve and shall have gaskets suitable for the pipe being joined. The bolts and nuts shall be corrosion resistant high strength, low alloy steel such as Cor-Ten steel or an approved equal. Couplings shall be Romac style 501, Dresser style 153, Rockwell type 441, or equal. Transition couplings for pipe less than or equal to 12 inches in diameter shall be Dresser Style 162, Rockwell Type 441, Smith Blair Omni Style 442, or equal.

B. Couplings and transitional couplings for pipe greater than 12 inches in diameter shall consist of a steel sleeve and with gaskets suitable for the pipe being joined. The bolts and nuts shall be corrosion resistant high strength, low alloy steel such as Cor-Ten steel or an approved equal. Couplings shall be Dresser style 38, Smith Blair Style 311, Romac Style 400, or equal. Transition couplings for pipe greater than 12 inches in diameter shall be Dresser Style 62, Smith Blair Style 413, Romac Style TC400, or equal.

C. Provide couplings with an exterior epoxy coating.

D. Solid sleeves shall have long body type (12 inches min.) and mechanical joints with retainer glands.

2.6 GASKETS, GLANDS, NUTS, AND BOLTS

A. Gaskets, glands, nuts, bolts and accessories shall conform to ANSI/AWWA C111/A21.11 or C153/A21.53, as appropriate.

B. Gaskets shall be of plain tipped rubber, suitable for exposure to the liquid within the pipe.

C. Lubricants must be suitable for the type of fluid to be carried by the pipeline, and shall be NSF approved for water service, where applicable.

D. Glands shall be ductile or cast iron.

E. Bolts shall be high strength, low alloy.

F. Requirements for flanged joints:

1. Gaskets for flanged joints shall be full faced red rubber, 1/8 inches thick. Gaskets shall conform to the dimensions of Table A.1 of ANSI/AWWA C115/A21.15. Ring gaskets shall be utilized for joints 14 inches in diameter and larger.

2. Assemble flanged joints with bolts and nuts, bolt studs with nut on each end, or studs with nuts in tapped flanges. Bolts and nuts shall be of low carbon steel conforming to the chemical and mechanical requirements of ASTM A307, 60,000 psi tensile strength, Grade B. Bolts, nuts and studs shall be cadmium plated.

2.7 TEST CONNECTIONS

A. Install air release, test connections, and blow offs in the piping for pressure testing and disinfection at locations to be determined by the Contractor and approved by the Engineer.

1. Corporation cocks shall be in accordance with ANSI/AWWA C800 and shall be domestically manufactured brass, ball valve style to meet Aquarion specifications.

2. Copper tubing shall be annealed Type K soft tubing and shall conform to the requirements of ASTM B88.

3. Upon completion of testing and disinfection, remove the corporation cock and replace with a brass plug and the copper tubing removed. Field swab the brass plug for disinfection in accordance with AWWA C651.

PART 3 EXECUTION

3.1 GENERAL

A. Deliver, handle, store and install ductile iron pipe in accordance with ANSI/AWWA C600.

3.2 DELIVERY, STORAGE AND HANDLING

A. Delivery of Pipe and Fittings

1. Coordinate delivery of pipe and fittings with installation and unload along the line of work outside the trench near as practicable to the point of final placement, facing in the specified direction and properly wedged secure. Give minimum 24 hour notice to the Engineer prior to pipe deliveries. Notice shall include the method of unloading.

2. Unload and handle pipe and fittings with a crane or backhoe of proper capacity outfitted with a steel cable sling, belt sling or other specially designed attachment to protect the pipe coating.

3. At the end of each work week, no more than the amount of pipe to be installed the following work week shall remain along the construction route. All pipes remaining at the construction route are to be properly wedged to prevent movement and not interfere with traffic or pedestrian movement. All excess pipes are to be stockpiled at an approved staging yard in accordance with AWWA C600.

B. Storage of Materials

1. Store pipe in a manner to keep pipe interior free from dirt and foreign matter. Store pipe on wood blocking, rails or other suitable materials. Pipe shall not be stored on stones.

2. Pipe may be stored on top of each other to the maximum stacking height specified by AWWA C600.

3. Protect materials subject to corrosion in accordance with manufacturer's recommendations.

4. If pipe or project materials are stored at the Contractor's approved staging yard, the Engineer shall be permitted reasonable access to the staging yard for inspection of the pipe and materials.

5. Pipe ends shall be sealed tight using polyethylene bags and tape immediately after unloading, regardless of the storage time length, in order to keep foreign matter and wind blown debris out.

6. All vales, hydrant and fittings are to be stored off of the ground on wooden pallets.

C. Handling Materials

1. Handle materials in such a manner so as to prevent damage to the concrete or mortar coating or lining.

2. Materials are to be handled using methods approved by the pipe manufacturer.

3. Materials damaged during handling will be rejected and shall be replaced at the Contractor's expense.

4. Ensure that no foreign materials enter the materials during handling.

3.3 COORDINATION

A. Existing mains may have to be shut down to complete the connections as shown on the Drawings and as specified herein.

1. Existing valves will only be operated by the Owner.

2. Submit requests for shutdown of existing piping to the Engineer at least 3 working days prior to the operations, and reschedule operations to prevent conflicts with the Owner's operations.

3. The Owner reserves the right to cancel the shut-down at any time without penalty if system conditions exist in which it would be a matter of public health or safety to do so.

4. The Owner does not guarantee complete shut down of valves. Make necessary provisions to do work under existing conditions.

3.4 DEFECTIVE PIPE

A. Defective pipe or fittings will be rejected for use on this project. Defective pipe is classified as follows:

1. Damage to interior cement-mortar lining

2. Insufficient cement-mortar lining thickness

3. Pipe out of round

4. Damaged pipe barrel area

5. Damaged pipe bells or spigots

6. Missing, misplaced or illegible marking and identification

7. Outside pipe diameter shall not exceed allowable tolerance

B. If defective pipe is discovered after it has been installed, it shall be removed and replace with sound pipe, at no additional cost to the Owner.

3.5 JOB CONDITIONS

A. Environmental Requirements

1. Do not lay pipe when weather conditions are unsuitable, as determined by the Engineer, for pipe laying work.

2. Equipment for pipe laying shall be maintained in good operating order.

3. Job site shall be kept clean of debris and organized.

B. Protection

1. At all times when pipe laying is not in progress, the open ends of pipe shall be closed by a watertight plug. This provision shall apply at all times when pipe laying operations are suspended.

C. Work Affecting Existing Pipelines

1. Work on Existing Pipelines:

a. Prior to any work on existing pipelines, remove soils, rust and other debris from the exterior wall of the pipe a minimum of 12 inches beyond the work area.

b. Cut pipes as shown or required with machines specifically designed for this work.

c. Install temporary plugs to keep out all mud, dirt, water and debris.

d. Provide necessary adapters, fittings, pipe and appurtenances required.

e. Cut or tap existing mains at the mid span of a pipe barrel. In no case shall a pipe be cut or tapped within 24 inches of a pipe joint.

3.6 CLEANING PIPE AND FITTINGS

A. Clean and remove foreign matter from the interior of each pipe and fitting before placing in the trench. Remove pipe and fittings whose interior has been contaminated with oil, gasoline or kerosene and replace at no additional cost to the Owner. Remove pipe and fittings whose interior has been contaminated with any material which is a regulated drinking water contaminate or which damages the cement and replace at no additional cost to the Owner. Should foreign material or contaminants be observed in previously installed pipe, cease work until foreign material or contaminated pipe is decontaminated or removed.

B. Remove all lumps, blisters, and excess coal-tar coating from the bell and spigot ends of each pipe or fitting. The outside of the spigot and the inside of the bell shall be wire-brushed and wiped clean and be dry and free from oil and grease before the pipe or fitting is laid.

C. On all ductile iron pipe or fittings, the bell of the pipe and the spigot of the adjacent pipe or fitting shall be wire-brushed and cleaned of rust and dirt. The bell of the pipe or fitting and the spigot of the adjacent pipe shall then be lubricated with the joint lubricant furnished with the pipe, and used in accordance with the manufacturer's directions.

3.7 ALIGNMENT AND GRADE

A. Lay and maintain the pipe at the required lines and grades as shown on the Drawings. Fittings shall be at the locations indicated on the Drawings with joints centered, and spigots properly fitted. No deviation shall be made from the line and grade indicated on the drawings, except with the approval of the Engineer.

B. Joint Openings and Deflection:

1. The maximum allowable joint openings and deflection for push-on joint pipe and restrained joint pipe shall be one-half the manufacturer's maximum allowable opening and deflection.

C. Line or Grade Conflicts with Other Structures

1. Wherever obstructions not shown on the Drawings are encountered during the progress of the Work and interfere to such an extent that an alteration in the Drawing is required, the Engineer will order a deviation from the line and grade at locations where obstructions such as culverts, ducts, wire and/or pipes are encountered. The pipe shall be laid over or under such obstacles with a clearance of 6 inches. The choice of "over" or "under" is shown on the Drawings, but the Engineer reserves the right to make any alterations at the time of construction.

D. Where underground conditions indicate a change of alignment or grade, such change shall be made only with the written consent of the Engineer.

E. Except at locations indicated on the Drawings by the profile, do not establish high points where air can accumulate.

3.8 PIPE INSTALLATION

A. General Requirements

1. Prepare the pipe trench in accordance with Section 02315.

2. Keep trenches dewatered while installing pipe until all required pipe joints have been made and the trench has been backfilled above the water table to a point where pipe uplift will not occur when the pipe is empty.

3. Carefully lower pipe and fittings into the trench piece by piece by means of a crane, ropes or other tools or equipment, in such a manner as to prevent damage to pipeline materials and protective coatings and linings. Under no circumstances shall pipeline materials be dropped or dumped into the trench.

4. Carefully inspect pipe and fittings for cleanliness and defects prior to placing them in the trench.

5. Install underground warning tape over the pipe in accordance with Section 02317.

B. Laying Pipe

1. Install pipe with a minimum of 4.5 feet of cover, unless indicated otherwise on the Drawings or directed by the Engineer.

2. Prevent foreign material from entering the pipe while it is being placed in the line. During laying operations, no debris, tools, clothing or other materials shall be placed in the pipe.

3. When laying pipe, the spigot end shall be centered in the bell, the pipe forced home and the joint completely assembled. The pipe shall be adjusted to correct line and grade and secured in place with approved backfill material, properly tamped under and around the pipeline.

4. When laying the pipe, remove and replace fittings that do not allow a sufficient and uniform space for joints at no additional cost to the Owner.

C. Cutting Pipe

1. Furnish pipe in full lengths. Cut ductile iron pipe without damage to the pipe or cement lining. The cutting shall be done to leave a smooth end at right angles to the axis of the pipe.

2. Cut ductile iron pipe either by the use of compression-type chain cutters which exert an even continuous force on the wall of the pipe or by power driven abrasive wheels.

3. On ductile iron pipe using rubber joints, the outside edge of the cut end must be tapered back approximately ¼ inch at an angle of about 30 degrees so as to provide for the proper assembly of this joint.

D. Permissible Deflection at Joints

1. Wherever it is necessary to deflect pipe from a straight line, either in the vertical or horizontal plane, to avoid obstructions or where long-radius curves are permitted, the amount of deflection allowed shall not exceed one-half of the manufacturer's maximum allowable joint deflection, and shall be approved by the Engineer.

2. Radius curves indicated on the Drawings or approved during Shop Drawing review shall be made using full lengths of pipe. The use of short lengths of pipe and extra joint in order to make a smaller radius turn will not be allowed without the written approval of the Engineer.

3.9 PUSH-ON JOINTS

A. Push-on joints shall be made in accordance with the manufacturer's instructions. Install gaskets in the pipe bell after lowering the pipe into the trench for installation. Thoroughly clean the bell and spigot of dirt and tar blisters in the trench utilizing a wire brush or bristle brush. Insert rubber gasket in the groove of the bell end of the pipe beginning at the bottom of the bell and working to the top of the bell. Apply lubricant per the manufacturer's recommendations utilizing a paint brush to the pipe

gasket and the pipe spigot to be joined. Place a clean rag under the joint to protect the joint from dirt caused by unintentional grounding of the pipe during jointing. Upon completion, remove the rag. Align the plain end of the pipe to be laid and insert in the bell of the pipe to which it is to be joined and push home with a jack or by other means. After joining the pipe use a metal feeler to make certain that the rubber gasket is correctly located.

3.10 MECHANICAL JOINTS

A. Mechanical joints shall be made in accordance with Appendix A of ANSI A21.11/AWWA C111 and the manufacturer's instructions. Thoroughly clean and lubricate the joint surfaces and rubber gasket before assembly. Tighten bolts to the specified torques. Under no conditions shall extension wrenches or an extended handle ratchet wrench be used to secure greater leverage.

3.11 CONCRETE THRUST BLOCKS

A. Concrete thrust blocks shall be used in conjunction with retainer glands or other restraining methods at all tees, bends, offsets, hydrants, caps and plugs. Concrete shall be 3,000 psi.

B. Place cast-in-place concrete thrust blocks at all bends (regardless of the angle of deflection or direction), caps, offsets, hydrants, and tees, as well as in locations shown on the Drawings or directed by the Engineer. Cast-in-place thrust blocks shall be formed with wood forms; rough earth forms are not acceptable. Protect pipeline materials and fittings from direct adherence of the concrete thrust block by wrapping in plastic, roofing felt, reinforced manila paper or similar material. The thrust block shall not bear directly on the joint and shall not interfere with future adjustments, tightening, or removal of the joint. Thrust blocks shall bear against undisturbed soil at the side or end of the trench and this undisturbed surface shall be carefully cleaned off so as to be vertical. The thrust blocks shall have a minimum horizontal thickness of 2 feet and shall have the minimum bearing area listed on the Drawings, measured perpendicular to the direction of thrust.

3.12 DISINFECTION

A. Disinfect pipe, fittings and valves in accordance with Section 02501, before placing into service.

3.13 TESTING

A. Pipe, fittings and valves installed under this contract shall be tested in accordance with Section 02502, before being placed into service.

3.14 DEACTIVATION OF WATER MAINS

A. Excavate and remove sections of the existing water main as shown on the Drawings. Repairs and capping of the main shall be in accordance with the Drawings.

B. After the pipe has been capped, the top sections of all gate boxes shall be removed and stacked, the holes filled in with suitable backfill material and patched with bituminous concrete in the area of the gate box.

C. The deactivation of the water mains shall be done upon completion of:

1. Installation and successful testing of the new pipeline including all hydrants and appurtenances, and

2. Removal and reconnection of all buildings from the existing pipelines to the new pipelines.

3. Approval for the deactivation of the water mains by the Engineer or Owner.

D. Surface repair methods shall meet the requirements of the applicable surface repair item.

END OF SECTION

SECTION 02519

WATER SERVICES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Furnish all labor, materials, equipment, and incidentals required to:

a. Relocate existing water services.

b. Tap the existing or relocated water mains to provide relocated water services or to transfer existing water services from the existing water mains to the proposed water mains.

2. Materials provided under this section include:

a. Corporations;

b. Curb Stops and Boxes;

c. Unions, Couplings, and Connection Adapters;

d. Service Saddles;

e. Copper Tubing;

B. Related Sections

1. Section 02315 – Excavation, Backfill, and Compaction

2. Section 02320 – Borrow Materials

1.2 REFERENCES

A. AWWA C651 – Disinfecting Water Mains

B. AWWA C800 – Underground Service Line Valves and Fittings.

C. ASTM A48/A48M – Standard Specification for Gray Iron Castings.

D. ASTM A536 – Standard Specification for Ductile Iron Castings.

E. ASTM B62 – Standard Specification for Composition Bronze or Ounce Metal Castings

F. ASTM B68 – Standard Specification for Seamless Copper Tube, Bright Annealed

G. ASTM B75 – Standard Specification for Seamless Copper Tube

H. ASTM B88 – Standard Specification for Seamless Copper Water Tube.

1.3 SUBMITTALS

A. Shop drawings for all underground service brass, corporations, curb stops and boxes, unions, couplings, and boxes, service saddles, water meters, and copper/polyethylene tubing shall be submitted to the Engineer.

1.4 QUALITY ASSURANCE

A. All materials shall be provided by well-established firms who are fully experienced, reputable and qualified in the manufacture of the particular equipment to be furnished. The equipment shall be designed, constructed and installed in accordance with the best practices and methods and shall comply with these specifications as applicable.

B. All components specified in this Section and supplied on the project shall be North American made.

C. All materials used in conjunction with drinking water distribution systems shall be in accordance with ANSI/NSF 61.

D. Advanced notice shall be provided to all homeowners at least 48 hours prior to any interruption of water service.

PART 2 PRODUCTS

2.1 MATERIALS

A. General

1. All underground service brass including corporations, curb stops, couplings, fittings, adapters, and any other below ground fittings, shall be red brass (85% copper / 5% tin / 5% lead / 5% zinc) manufactured to ASTM B62, and also meeting the requirements of AWWA C800.

B. Corporation Stops

1. Inlet Connection

a. The inlet shall be AWWA (CC) tapered threads;

2. Outlet Connection

a. Conductive compression for CTS O.D. tubing (straight-way, ¼ bend, or 1/8 bend);

3. Ball-Type Corporation Stops

a. Maximum working pressures up to 300 psig for sizes ¾" to 2".

b. Full-size waterway with coated ball for easy turning and full 360-degree stem rotation.

c. 80 durometer Neoprene rubber seats sealing in both directions.

d. Double o-ring stem seals with end piece o-ring providing secondary seal to prevent leakage.

e. Blow-out proof stem design with stainless steel reinforced seat seal.

f. Ball type corporations shall be as manufactured by Ford Meter Box Company, Red Hed Manufacturing Co., A.Y. McDonald Manufacturing Co., and Mueller Company.

C. Curb Stops

1. Inlet Connection

a. Conductive compression for CTS O.D. tubing (straight-way, ¼ bend, or 1/8 bend);

2. Outlet Connection

a. Conductive compression for CTS O.D. tubing (straight-way, ¼ bend, or 1/8 bend);

3. Ball Style Curb Stop

a. Shall be designed to withstand 300 psig working pressure.

b. Solid one-piece tee head and stem.

c. Double o-ring stem seals and coated brass ball supported by two Buna-N seats.

d. The curb stop shall have a quarter turn stop (90-degree motion) requiring low turning torque allowing positive shut-off from either direction with check and no waste.

e. Full round way provides straight through flow.

f. Minneapolis pattern with threads available for Minneapolis style curb box.

g. Ball style curb stops shall be as manufactured by Ford Meter Box Company, Red Hed Manufacturing Co., A.Y. McDonald Manufacturing Co., and Mueller Company.

D. Curb Boxes

1. Each curb stop shall be provided with a cast iron curb box and cover weighing a minimum of 15 pounds.

2. The curb box shall be the extension type with arch pattern base. For valves larger than 1" diameter, the optional foot piece shall be provided.

3. The inside diameter of the upper section shall be at least 1¼ inches.

4. Curb box shall be equipped with a 9/16 minimum diameter stationary extension rod (extending to within 18-inches of the top of the curb box) attached to the valve with a stainless steel or brass collar pin.

5. Boxes shall be completely and thoroughly coated with bitumastic paint.

6. Cover shall have 2 hole style Erie pattern with the word "WATER" imprinted on it.

7. Curb boxes and covers shall be as manufactured by Ford Meter Box Company, A.Y. McDonald Manufacturing Co., or Mueller Company.

E. Unions, Couplings, and Connecting Adapters

1. Brass unions, couplings, and connecting adapters shall be as necessary for the type of piping or tubing being joined.

2. Provide electrical continuity.

3. Acceptable manufacturers include Ford Meter Box Company, Red Hed Manufacturing Co., A.Y. McDonald Manufacturing Co., and Mueller Company.

F. Service Saddles

1. Service saddles shall have a body with a CC threaded outlet and seal.

2. Service clamps shall be specifically sized for the particular water main pipe material.

3. Provide a drip-tight connection.

4. Connections to existing mains shall be performed using:

a. Service saddles shall be wide band type with stainless steel bands of 3.25-inch minimum width.

5. Bolts, nuts, and washers shall be stainless steel.

6. Straps shall be made of Type 304 stainless steel.

7. Acceptable manufacturers include Ford Meter Box Company, Smith-Blair Company, and Mueller Company.

G. Copper Tubing

1. Copper tubing for water service connections shall be Type K Heavy Wall Annealed seamless copper tubing conforming to the requirements of ASTM B88.

2. The name or trademark of the manufacturer and type shall be stamped at intervals along the tubing.

PART 3 EXECUTION

3.1 INSTALLATION

A. A standard gooseneck (with generous sweeps, both horizontal and vertical) shall be provided at the corporation in conjunction with copper/polyethylene tubing to provide flexibility for settlement that might occur.

B. The new service pipe shall not have joints or connections other than needed at the corporation and the curb box. Contractor must provide 100-foot coils for services less than 100 feet from the water main. Fittings or unions are not allowed on services less than 100 feet in length.

C. The copper tubing shall be connected directly to the existing service pipe just past the new curb stop near the property line with appropriate adapters and compression couplings as necessary.

D. Curb stop and box shall be installed approximately at the property or street line in front of the property to be serviced.

E. Curb stops shall be placed a minimum of 3 feet behind all retaining walls, structures, etc. as directed by the Engineer as applicable. Where coring is required, a 4 inch sleeve shall be installed and extended one foot on either side of the structure.

F. Any existing services to be abandoned shall be crimped and the existing curb box removed.

3.2 TESTING

A. All newly installed service connections shall be subject to line pressure in an open trench to determine tightness of joints before backfilling.

B. Service connection inspection by a Water Company representative is required prior to backfilling.

C. Actual installation of services to the new main will not be done until the new main has been tested, disinfected and approved by the Engineer.

END OF SECTION

SECTION 02530

MANHOLES, CATCH BASINS AND DRAINAGE STRUCTURES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Precast concrete manholes
2. Precast concrete catch basins
3. Concrete junction chambers
4. Concrete endwalls
5. Cast iron manhole frames and covers
6. Cast iron catch basin frames and grates
7. Riprap outlet aprons

B. Related Sections

1. Section 02635 – Reinforced Concrete Pipe and Box Culverts

1.2 REFERENCES

A. State of Connecticut, Department of Transportation "Standard Specification for Roads, Bridges and Incidental Construction, Form 816", 2004 Edition as amended

B. AASHTO – American Association of State Highway and Transportation Officials, Standard Specifications for Highways and Bridges, most recent edition.

C. ASTM C32 - Standard Specification for Sewer and Manhole Brick (made from clay or shale).

D. ASTM A48 – Standard Specification for Gray Iron Castings.

E. ASTM C150 – Standard Specification for Portland Cement.

F. ASTM C207 – Standard Specification for Hydrated Lime for Masonry Purposes.

G. ASTM C478 – Standard Specification for Precast Reinforced Concrete Manhole Sections.

H. ASTM C443 – Standard Specification for Joints for Circular Concrete Sewer and Culvert Piping Using Rubber Gaskets.

I. ASTM C923 - Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals.

J. ASTM C990 – Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants.

1.3 SUBMITTALS

A. Submit Shop Drawings, showing details of construction, reinforcing, joints, pipe connections to structures, manhole rungs, manhole frames and covers, dampproofing coating, catch basin frames and grates.

B. Submit weights of manhole frames and covers and catch basin frames and grates.

C. For junction structures, provide working drawings to include but not be limited to the following:

1. Layout plan of junction structure including openings for existing and proposed pipes (inverts and diameter information).

2. Type, size, location and spacing of steel reinforcing and inserts for anchoring threaded deformed steel bars. Bending diagrams, material lists and catalog cuts for inserts shall be provided.

3. Material designations.

4. Working drawings shall be stamped by a Professional Engineer licensed in the State of Connecticut. Each sheet of the working drawings shall be stamped.

5. Design computations for static, active (HS-20) and combined loads, as well as buoyancy calculations. These computations shall be stamped by a Professional Engineer licensed in the State of Connecticut.

1.4 QUALITY ASSURANCE

A. The quality of materials, the process of manufacture, and the finished sections shall be subject to inspection and approval by the Engineer, or other representative of the Owner. Such inspection may be made at the place of manufacture, or at the Site after delivery, or at both places, and the materials shall be subject to rejection at any time on account of failure to meet any of the Specification requirements, even though samples may have been accepted as satisfactory at the place of manufacture. Material rejected after delivery to the job shall be marked for identification and shall be removed from the job at once. Materials which have been damaged after delivery will be rejected, and if already installed, shall be acceptably repaired, if permitted, or removed and replaced, at no additional cost to the Owner.

B. At the time of inspection, the materials will be carefully examined for compliance with the latest ASTM designation specified and these Specifications, and with the approved manufacturer's drawings. Manhole sections will be inspected for general appearance, dimension, "scratch-strength," blisters, cracks, roughness, and soundness. The surface shall be dense and close-textured.

C. Imperfections in manhole sections may be repaired, subject to the approval of the Engineer, after demonstration by the manufacturer that strong and permanent repairs result. Repairs will be carefully inspected before final approval. Cement mortar used for repairs shall have a minimum compressive strength of 4,000 psi at 7 days and 5,000 psi at 28 days, when tested in 3 inch by 6 inch cylinders stored in the standard manner. Epoxy mortar may be utilized for repairs subject to the approval of the Engineer.

D. Personnel shall have confined space entry training as appropriate for the work to be performed.

E. Manholes and catch basins shall be designed for lateral earth pressures and to resist flotation.

PART 2 PRODUCTS

2.1 PRECAST CONCRETE MANHOLE AND CATCH BASIN SECTIONS

A. Precast concrete barrel sections and transition top sections, shall conform to ASTM C478 and the following requirements:

1. The wall thickness shall not be less than 5 inches for 48 inch diameter reinforced barrel sections, 6 inches for 60 inch diameter reinforced barrel sections, 7 inches for 72 inch diameter reinforced barrel sections, and 8 inches for 96 inch diameter reinforced barrel sections.

2. Top sections shall be eccentric except that flat top sections shall be used where shallow cover requires a top section less than 4 feet as shown on the Drawings.

3. Barrel sections shall have tongue and groove joints.

4. All sections shall be cured by an approved method and shall not be shipped nor subjected to loading until the concrete compressive strength has attained 3,000 psi and not before 5 days after fabrication and/or repair, whichever is longer.

5. Precast concrete barrel sections with precast top slabs and precast concrete transition sections shall be designed for a minimum of AASHTO HS20-44 loading plus the weight of the soil above at 120 pcf.

6. The date of manufacture and the name and trademark of the manufacturer shall be clearly marked on each precast section.

7. Precast concrete bases shall be monolithically constructed. The thickness of the bottom slab of the precast bases shall not be less than the barrel sections or top slab whichever is greater. Precast concrete bases shall be constructed with a 6 inch extended base, unless otherwise shown on the Drawings.

8. Knock out panels for piping shall be provided in precast sections at the locations shown on the Drawings. They shall be integrally cast with the section, 2½ inches thick and shall be sized as shown on the Drawings. There shall be no steel reinforcing in knock out panels.

9. The side wall height of the base section shall be a minimum of 12 inches above the top of the pipe coming into the manholes and catch basins.

10. Refer to drawings for depth of sump to be provided below catch basin outlet pipes.

2.2 MANHOLE FRAMES AND COVERS

A. Manhole frames and covers shall be of good quality, strong, tough, even grained cast iron, smooth, free from scale, lumps, blisters, sand holes and defects of any kind. Manhole covers and frame seats shall be machined to a true surface. Castings shall be thoroughly cleaned and subject to hammer inspection. Cast iron shall conform to ASTM A48, Class 30B.

B. Manhole covers shall have a diamond pattern, pickholes and the words "STORM", as appropriate, cast in 3 inch letters. Manhole frame and covers shall be manufactured by Campbell Foundry Company or approved equal, Pattern 1202.

C. Manhole frames and covers shall be approved for use by the Connecticut Department of Transportation.

D. Manhole frames and covers shall comply with the detail shown on the Drawings.

E. Watertight manhole frames and covers shall be bolted and gasketed.

2.3 CATCH BASIN FRAMES AND GRATES

A. Catch basin frames and grates shall be of good quality, strong, tough, even grained cast iron, smooth, free from scale, lumps, blisters, sand holes and defects of any kind which render them unfit for the service for which they are intended. Grate and frame seats shall be machined to a true surface. Castings shall be thoroughly cleaned and subject to hammer inspection. Cast iron shall conform to ASTM A48, Class 30B.

B. The catch basin frames and grates shall comply with the details shown on the Drawings.

2.4 JOINTING PRECAST MANHOLE SECTIONS

A. Tongue and groove joints of precast manhole sections shall be sealed with a preformed flexible joint sealant. The preformed flexible joint sealant shall conform to ASTM C990.

2.5 MANHOLE RUNGS

A. Manhole rungs shall be either of cast aluminum alloy 6061-T6, drop front design, 14 inches wide with an abrasive step surface, or of steel reinforced, copolymer, polypropylene, plastic. Manhole rungs shall conform to OSHA requirements.

2.6 PIPE CONNECTIONS

A. Pipe connections shall be accomplished in the following ways:

1. For all pipe types except PVC and ductile iron, fill tapered hole around pipe with non-shrink waterproof grout, such as Hallemite; Waterplug; Embeco; or equal, after the pipe has been set into the structure.

2. For PVC and ductile iron pipe connections, use a flexible pipe-to-structure connector.

a. The flexible connectors shall be designed to provide a positive seal between the connector and the structure wall and between the connector and the pipe.

b. The flexible boot shall be manufactured of EPDM synthetic rubber in accordance with ASTM C443 and C923 and shall be 3/8 inch thick or greater.

c. The external bands shall be made entirely of 304 series non-magnetic stainless steel.

d. The flexible connectors shall be provided with a wedge-type or toggle-type expander to secure the pipe in the structure opening.

e. The flexible connectors shall meet the following criteria, in accordance with ASTM C923:

1) Shall not leak when subjected to a head pressure of 10 psi for 10 minutes.

2) Shall have the ability to deflect 7 degrees in any direction without leakage under the head pressure conditions described above.

3) Shall not leak when subject to a load of 150 lbs./in. pipe diameter and the head pressure conditions described above.

2.7 DAMPPROOFING

A. Provide two coats of bituminous dampproofing on outer surfaces of precast manholes at the rate of 30-60 square feet per gallon in accordance with manufacturer's instructions.

B. Dampproofing coating shall be a factory-applied asphalt compound specially made to adhere to below grade concrete structures.

C. The dampproofing shall be Hydrocide 648 by Sonneborn Building Products; Dehydratine 4 by Tamms Industries; RIW Marine Liquid by Toch Brothers; or approved equal.

2.8 CONCRETE JUNCTION CHAMBERS

A. Concrete:

1. All sections shall be cured by an approved method and shall not be subjected to loading until the concrete compressive strength has attained 3,000 psi and not before 5 days after construction, whichever is longer.

2. Structure shall meet a minimum of AASHTO HS20-44 loading plus the weight of the soil above at 120 pcf.

B. Reinforcing: ASTM A615, Grade 60.

C. Granular Fill: Granular fill beneath the junction chambers to conform to the requirements of CTDOT Form 816, Article M.02.01.

2.9 CONCRETE ENDWALL

A. Concrete: Class A Cnocrete conforming to the requirements of CTDOT Form 816, Article M.03.01.

B. Reinforcing: ASTM A615, Grade 60.

2.10 RIPRAP OUTLET PROECTION

A. Granular Fill: Granular fill beneath the junction chambers to conform to the requirements of CTDOT Form 816, Article M.02.01.

B. Geotextile: Mirafi 500X, or approved equial.

C. Riprap: Intermediate riprap conforming to the requirements of CTDOT Form 816, Article M.12.02.

2.11 CONCRETE BLOCK FOR FRAME ADJUSTMENT

A. ASTM C55, Grade S II.

2.12 CONCRETE BLOCK FOR STRUCTURES

A. Masonry Concrete Units shall conform to the requirements of CTDOT Form 816, Article M.08.02-3.

2.13 MORTAR

A. Mortar shall conform to CTDOT Form 816, Article M.11.04.

PART 3 EXECUTION

3.1 INSTALLATION – PRECAST UNITS

A. Installation

1. Construct manholes, junction chambers, endwalls, catch basins, and riprap outlets to the dimensions shown on the Drawings and as specified. Protect all work against flooding and flotation.

2. Set precast concrete barrel sections so as to be vertical and with sections in true alignment with a ¼ inch maximum tolerance to be allowed. Seal the joints of precast concrete barrel sections with the preformed flexible joint sealant used in sufficient quantity to fill 75% of the joint cavity. Fill the outside and inside joint with non-shrink mortar and finish flush with the adjoining surfaces. Backfilling shall be done in a careful manner, bringing the fill up evenly on all sides. Install the precast sections in a manner that will result in a watertight joint.

3. Plug holes in the concrete barrel sections required for handling or other purposes with a non-shrink grout or non-shrink grout in combination with concrete or rubber plugs, and finish flush on the inside.

4. Where a structure replaces an existing structure, removal of the existing structure shall be part of this item.

B. Pipe Connections

1. General

a. Connect pipe stubs for future extensions to the structures as shown on the Drawings and close the stub end by a suitable watertight plug.

2. Flexible Pipe-to-Structure Connectors

a. Use the flexible pipe-to-structure connectors for PVC pipe.

b. Install the flexible connectors in accordance with the manufacturer's recommendations.

3. Grouting

a. Grout all pipe types except PVC into place in the existing structure using non-shrink, water-proof grout.

b. After the new pipe has been set in place, completely fill the hole around the new pipe with non-shrink, water-proof grout.

c. Place a 6 inch thick concrete encasement a total of 12 inches in length around the pipe stub adjacent to the wall of the structure. Concrete shall have a 28 day compressive strength of 3,000 psi.

C. Manhole Rung Installation

1. Aluminum manhole rungs shall be cast into precast sections, on 12-inch centers, by the precast concrete manufacturer. Those parts of the rungs which are embedded shall receive a heavy coating of zinc chromate or other approved paint (10 mils dry film thickness minimum).

2. Steel reinforced copolymer polypropylene plastic steps shall be press fitted by hand driven hammer into preformed holes in cured precast sections, on 12 inch centers, by the precast concrete manufacturer.

D. Brick and Blockwork

1. Mix mortar only in such quantity as may be required for immediate use and use before the initial set has taken place. Do not retain mortar for more than one and one-half hours and constantly work over with a hoe or shovel until used. Anti-freeze mixtures will not be allowed in the mortar. No masonry shall be laid when the outside temperature is below 40°F unless provisions are made to protect the mortar, bricks, and finished work from frost by heating and enclosing the work with tarpaulins or other suitable material. The Engineer's decision as to the adequacy of protection against freezing shall be final.

2. Construct channels and shelves of brick as shown on the Drawings. The brick channels shall correspond in shape with the lower half of the pipe. The top of the shelf shall be set at the elevation of the crown of the highest pipe and shall be sloped 1 inch per foot to drain toward the flow through channel. Construct brick surfaces exposed to sewage flow with the nominal 2 inch by 8 inch face exposed (i.e., bricks on edge).

3. Set manhole covers and frames and catch basin frames and grates in a full mortar bed and concrete block, a maximum of 12 inches thick for conical tops and 6 inches thick for flat top sections, utilized to assure frame and cover are set to the existing grade. Reset the manhole frames and covers and catch basin frames and grates to final grade prior to placement of final paving.

3.2 INSTALLATION – CONCRETE MASONRY UNITS

A. Construct in accordance with CTDOT Form 816, Article M05.07.03.

B. Construct in locations only as ordered by the Engineer or Owner.

C. All masonry units shall be laid in full mortar beds.

D. Construct basins and manholes to the dimensions and lines shown on the precast units.

3.3 CLEANING

A. Clean manholes, storm drainage pipes and catch basins within the project area of silt, debris and foreign matter of any kind, prior to final inspection.

END OF SECTION

SECTION 02584

GAS UTILITY SERVICES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the contract, including General and Supplementary Conditions and other Division 1 Specifications, apply to this section.

1.2 SUMMARY

A. General: Relocate gas utility services in accordance with Contract Documents. The Work includes but is not limited to the following:

1. Sawcutting and excavating to expose gas services requiring relocation.

2. Coordination with gas company for relocation of services.

3. Backfilling the relocated services after the gas company has relocated them.

B. Related Sections include the following:

1. Section 02315 – Excavating, backfilling, Compacting and Dewatering

1.3 COORDINATION

A. Coordinate and schedule the work of this Section with all trades involved to prevent interference, and in order to allow adequate time at the proper stage of construction to properly perform all work of this Section.

1.4 REQUIREMENTS AND RESTRICTIONS

A. Requirements given herein may be affected by other related requirements of the project specifications. Correlation of contract requirements is the responsibility of the Site Contractor.

B.. The Work shall comply with all applicable codes and regulations. The General Contractor shall furnish all bonds necessary to secure permits for cuts and connections to utilities and water.

C. The term "Local Standards" as used herein, means the standards of design and construction of the respective municipality and Yankee Gas. Said standards apply except where exceeded by this specification.

E. Maintain in operating condition all active utilities, sewers, gutters and other drains encountered in the utility installation to the maximum extent practicable. Repair to the satisfaction of the Engineer any surface or subsurface improvement damaged during the course of the Work (unless such improvement is shown to be abandoned or removed), whether or not such improvement is shown on the Drawings.

1.5 STANDARDS

A. Except as modified by governing codes and by the Contract Documents, comply with the applicable provisions and recommendations of the following:

1. Yankee Gas standards for gas service.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Materials to conform to Yankee Gas standards.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine all Work prepared by others to receive Work of this Section and report any defects affecting installation to the Engineer for correction. Commencement of Work will be construed as complete acceptance of preparatory Work by others.

3.2 GAS SERVICE

A. Gas service installation will be provided by the gas company up to and including the gas meter.

END OF SECTION

SECTION 02635

REINFORCED CONCRETE PIPE AND BOX CULVERTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Materials specified herein include reinforced concrete pipe, box culverts, and fittings for non-watertight applications.

2. Applications

a. Storm drains

B. Related Sections

1. Section 02315 – Excavation, Backfill, Compaction & Dewatering

2. Section 02320 - Borrow Material

3. Section 02530 – Manholes, Catch Basins, and Drainage Appurtenances

1.2 REFERENCES

A. State of Connecticut, Department of Transportation "Standard Specification for Roads, Bridges and Incidental Construction, Form 816", 2004 Edition as amended

B. ASTM C14 – Standard Specification for Concrete Sewer, Storm Drain, and Culvert Pipe

C. ASTM C33 – Standard Specification for Concrete Aggregates

D. ASTM C76 – Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe

E. ASTM C150 – Standard Specification for Portland Cement

F. ASTM C330 – Standard Specification for Lightweight Aggregates for Structural Concrete

G. ASTM C361 – Standard Specification for Reinforced Concrete Low-Head Pressure Pipe

H. ASTM C443 – Standard Specification for Joints for Concrete Sewer and Culvert Piping, Using Rubber Gaskets

I. ASTM C444 – Standard Specification for Perforated Concrete Pipe

J. ASTM C478 – Standard Specification for Precast Reinforced Concrete Manhole Sections

K. ASTM C497 – Standard Test Methods for Concrete Pipe, Manhole Sections, or Tile

L. ASTM C506 – Standard Specification for Reinforced Concrete Arch Culvert, Storm Drain, and Sewer Pipe

M. ASTM C507 – Standard Specification for Reinforced Concrete Elliptical Culvert, Storm Drain, and Sewer Pipe

N. ASTM C655 – Standard Specification for Reinforced Concrete D-Load Culvert, Storm Drain, and Sewer Pipe

O. ASTM C822 – Standard Terminology Relating to Concrete Pipe and Related Products

P. ASTM C923 – Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals

Q. ASTM C924 – Standard Practice for Testing Concrete Pipe Sewer Lines by Low-Pressure Air Test Method

R. ASTM C969 – Standard Practice for Infiltration and Exfiltration Acceptance Testing of Installed Precast Concrete Pipe Sewer Lines

S. ASTM C985 – Standard Specification for Nonreinforced Concrete Specified Strength Culvert, Storm Drain, and Sewer Pipe

T. ASTM C1103 – Standard Practice for Joint Acceptance Testing of Installed Concrete Pipe Sewer Lines

U. ASTM C1131 – Standard Practice for Least Cost (Life Cycle) Analysis of Concrete Culvert, Storm Sewer, and Sanitary Sewer Systems

V. ASTM C1214 – Standard Test Method for Concrete Pipe Sewerlines by Negative Air Pressure (Vacuum) Test Method

W. ASTM C1244 – Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test Prior to Backfill

X. ASTM C1433 – Standard Specification for Precast Reinforced Concrete Box Sections for Culverts, Storm Drains, and Sewers

Y. ASTM D412 – Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension

Z. ASTM D2240 – Standard Test Method for Rubber Property – Durometer Hardness

AA. ASTM D3034 – Standard Specification for Type PSM Polyvinyl Chloride (PVC) Sewer Pipe and Fittings

BB. ASTM F477 – Standard Specifications for Elastomer Seals (Gaskets) for Joining Plastic Pipe

CC. AWWA C301 –Prestressed Concrete Pressure Pipe, Steel Cylinder Type, for Water and Other Liquids

DD. AWWA C302 – Reinforced Concrete Pressure Pipe, Noncylinder Type

1.3 SUBMITTALS

A. Manufacturer's product data including shop drawings showing dimensions and details of pipe joints and fittings.

B. Installation instructions.

C. Provide Certificates of Compliance on pipe materials.

1.4 QUALITY ASSURANCE

A. The manufacturer shall be responsible for the performance of all acceptance tests as specified in ASTM C76.

B. Pipe shall not be shipped until the compressive strength of the concrete has attained 4,000 psi and not before 5 days after manufacture, and/or repair, whichever is the longer.

1.5 DELIVERY, STORAGE AND HANDLING

A. All pipe which has been damaged after delivery will be rejected and immediately removed from the site.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Arrow Precast,

B. Oldcastle Precast;

C. Kerr Concrete Pipe;

D. Rinker;

E. or approved equal.

2.2 REINFORCED CONCRETE PIPE

A. Standard laying length of pipe shall be not less than 7'-6", except for fittings and manhole stubs.

B. The pipe interior shall be smooth and even, free from roughness, projections, indentations, offsets, or irregularities of any kind. The concrete mass shall be dense and uniform.

C. The pipe shall be clearly marked as outlined in ASTM C76. The markings may be at either end of the pipe for the convenience of the manufacturer, but for any one size shall always be at the same end of each pipe length.

D. After manufacture, each length of pipe shall be checked against the length noted on the shop drawings. Variations in length of the same pipe shall not exceed ASTM C-76 requirements.

E. Reinforced concrete pipe for non-watertight applications shall be either:

1. Bell and Spigot Type

2. Tongue and Groove Type

3. Straight Wall Joint Type

4. Slip Joint Type

5. Horizontal Elliptical Type

F. Pipe with collar in lieu of integral bells will not be acceptable.

G. Pipe shall be Class 4 with a minimum concrete strength of 4,000 psi., unless otherwise noted on plans.

H. Joints shall be mortar type.

I. Field leakage testing is not required.

J. Grout shall be non-shrink type and shall be premixed.

2.3 BOX CULVERTS

A. Concrete shall be 5,000 psi at 30 days.

B. Reinforcing steel shall conform to ASTM A615 and ASTM A82 or ASTM A185.

C. Culvert shall be capable of supporting AASHTO HS-20-44 loading

D. Butyl joint sealant to conform to ASTM C990.

PART 3 EXECUTION

3.1 PREPARATION

A. All materials to be used on the project are subject to inspection in the field by the Engineer.

B. Prepare the area prior to placement of the pipe by removing stones and other hard foreign matter that could damage the pipe, impede consistent compaction, or cause improper bedding and invert grades of the pipe.

C. Excavation, trenching and back filling procedures shall be in accordance with Section 02315.

D. No pipe is to be laid in water, in an unsuitable trench or during unsuitable weather conditions.

E. Excavate bell holes at each joint to permit correct assembly and inspection of entire joint.

F. Verify that the surface has been prepared to the proper line and grade by shooting invert elevation grades.

G. Lift or roll pipe into position. Do not drag over the prepared bedding.

3.2 INSTALLATION

A. General

1. Concrete pipe shall be installed in accordance with ASTM Standards and the manufacturers recommendations.

2. Pipe laying shall proceed upgrade with the spigot ends pointing in the direction of flow.

3. No single piece of pipe shall be laid unless it is generally straight. The centerline of the pipe shall not deviate from a straight line drawn between the

centers of the openings at the ends of the pipe by more than 1/16 inch per foot of length. If a piece of pipe fails to meet this requirement check for straightness, it shall be rejected and removed from the site. Laying instructions of the manufacturer shall be explicitly followed.

4. Thoroughly clean pipe and fittings before installing. Keep them clean until they are used in the work, and conform to the lines, grades, and dimensions required when installed.

5. All materials found to have cracks, flaws or other defects, during the progress of the work, will be rejected by the Engineer. All defective materials furnished by the Contractor shall be promptly removed by him from the site at no additional cost to the Owner.

6. Bell or spigot joint surfaces that are out of round shall be aligned to meet this requirement or shall be rejected as unsatisfactory and removed from the job, at the sole discretion of the Engineer.

7. Pipe sections connecting to manholes shall have a joint in each line within 2 feet of the outside face of each manhole or structure.

8. Plug or close off pipes, which are stubbed off for a manhole, concrete structure, or for future connection by others, with temporary watertight plugs.

9. Set pipe at the slope and grades indicated on the Drawings. Ensure pipe remains at proper grades by shoring it.

10. Pipe bedding shall form a continuous and uniform bearing and support for the pipe barrel between joints. Pipe shall not rest directly on the bell or pipe joint.

11. Backfill around the sides of the pipe with the approved bedding material up to the crown of the pipe.

B. Non-Watertight Joints

1. After cement mortar is applied, wrap joints with filter fabric, 24-inch wide strips of filter fabric overlapping ends in 12-inch minimum. Secure with tape.

C. Repair Joints

1. When laying bell and spigot type pipe, the spigot end shall be centered in the bell and the pipe forced home and brought to correct line and grade.

2. The pipe shall then be secured in place with approved backfill material tamped under the pipe and around the barrel of the pipe in the vicinity of the middle of the length. This material in to be placed and tamped prior to cementing the joint.

3. Joints of concrete pipe in the trench, which cannot be cemented immediately, shall be maintained in a dry condition and a cloth covering shall be laid over the top of the joint so as to prevent the entry of dirt or other deleterious material.

3.3 CLEANING

A. Prior to final acceptance and final manhole-to-manhole inspection of the system by the Engineer, flush and clean all parts of the system. If any foreign matter is still present in the system, reflush and clean the sections and portions of the lines as required.

B. Remove all accumulated construction debris, rocks, gravel, sand, silt, and other foreign material from the sewer system at or near the closest downstream manhole. If necessary, use mechanical rodding or bucketing equipment.

END OF SECTION

SECTION 02740

BITUMINOUS CONCRETE PAVEMENT

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Bituminous concrete paving, temporary and permanent, wearing, binder and base course.

B. Related Sections

1. Section 02315 - Excavation, Backfilling, Compaction and Dewatering

2. Section 02760 – Pavement Markings

1.2 REFERENCES

A. State of Connecticut Department of Transportation "Standard Specifications for Roads, Bridges and Incidental Construction Form 816, 2004 Edition as amended to date.

B. AASHTO Standard Specifications for Transportation Materials and Methods of Sampling and Testing, 1990 Edition, as amended.

C. ASTM D446 – Standard Specifications and Operating Instructions for Glass Capillary Kinematic Viscometers

D. ASTM D2939 – Standard Test Methods for Emulsified Bitumens Used as Protective Coatings

E. AASHTO M 81

F. AASHTO M 82

G. AASHTO M 116

H. AASHTO M 140

I. AASHTO M 144

J. AASHTO M 173

K. AASHTO M 208

L. AASHTO M 226

M. AASHTO T 44

N. AASHTO T 55

O. AASHTO T 96 – L.A. Abrasion Test

P. AASHTO T 195 (Ross Count)

Q. TAI - (The Asphalt Institute) - MS-3 Asphalt Plant Manual.

R. TAI - (The Asphalt Institute) - MS-8 Asphalt Paving Manual.

1.3 SUBMITTALS

A. Product information and mix design for each mix specified under this Section.

B. Product data sheets for all additives proposed in the mix design.

C. Certificate indicating the mixes specified meet or exceed the requirements specified herein.

D. Certificate indicating the mix plant conforms to State of Connecticut Department of Transportation "Standard Specifications for Roads, Bridges and Incidental Construction", Form 816.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with State of Connecticut Department of Transportation "Standard Specifications for Roads, Bridges and Incidental Construction Form 816.

B. Mixing Plant: Conform to State of Connecticut Department of Transportation "Standard Specifications for Roads, Bridges and Incidental Construction Form 816.

C. Obtain materials from same source throughout.

PART 2 PRODUCTS

2.1 MATERIALS

A. General

1. Bituminous materials shall conform to the requirements of these Specifications.

2. Bitumen delivered to a project or to a mix plant must be accompanied by a proper certificate signed by the producer's authorized representative. Shipments of material not accompanied by a certificate will not be accepted for use in the work.

B. Bituminous Concrete Paving shall be as specified in the State of Connecticut Department of Transportation "Standard Specifications for Roads, Bridges and Incidental Construction" Form 816.

C. Reclaimed Asphalt Pavement (RAP)

1. Reclaimed Asphalt Pavement (RAP) shall consist of the material obtained from highways or streets by crushing, milling or planing existing pavements. This material shall be transported to the mix plant yard and processed through an approved crusher so that the resulting material will contain no particles larger than 38 millimeters. The material shall be stockpiled on a free draining base and kept separate from the other aggregates. The material contained in the stockpiles shall have a reasonably uniform gradation from fine to coarse and shall not be contaminated by foreign materials.

D. Processed Glass Aggregate (PGA)

1. The use of Processed Glass Aggregate (PGA) meeting the requirements of M2.01.8 may be added at a maximum addition rate of 10% mass. This addition will only be allowed in base and binder bituminous concrete mixtures. PGA in mixes containing reclaimed asphalt pavement (RAP) will be considered as part of the overall allowable mass of RAP in the mix. If PGA is used in the mix a separate aggregate bin shall be used and the use of lime as an anti-stripping agent will be required.

E. Mineral Filler

1. Mineral filler shall consist of approved Portland Cement, limestone dust, hydrated lime, stone float or stone dust. Stone dust shall be produced from crushed ledge stone and shall be the product of a secondary crusher so processed as to deliver a product of uniform grading. Mineral filler shall completely pass a 300 micrometer sieve and at least 65% shall pass a 75 micrometer sieve.

F. Bituminous Materials

1. The asphalt cement for the mixture shall be the grade designated by the Engineer and shall conform to the requirements of CT DOT Section 4.06. When required an approved anti-stripping additive shall be added to the asphalt cement.

2. Bituminous material for the tack coat on the existing surface, where required and specified, shall be emulsified asphalt, grade RS-1 conforming to CT DOT Section 4.06.

3. For any bituminous mixture containing RAP, submit in addition to the Job-Mix Formula, the amount and type of asphalt modifier to be added to the mixture to restore the asphalt properties of the RAP to a level that is reasonably consistent with the requirements of current specifications for new asphalt. The restored asphalt when recovered by the Abson Method from the recycled mixture shall have a minimum penetration at 25°C of 50 and a maximum absolute viscosity at 60°C of 800 pascal seconds.

4. Only asphalt cement, grades AC-5, AC-10, AC-20 or a blend thereof will be used as modifiers and shall meet the requirements of CT DOT Section 4.06.

PART 3 EXECUTION

3.1 PAVING – TEMPORARY

A. Install temporary pavement over trenches or other areas as ordered by the Engineer or Owner.

B. Temporary pavement shall be placed over trenches that are compacted in accordance with the Contract Drawings.

C. Temporary pavement shall be removed prior to placement of final pavement, and shall be removed by sawcutting to neat lines. Sawcutting and removal of temporary pavement shall be included in the price of the unit item.

3.2 PAVING - GENERAL

A. Install bituminous concrete pavement in accordance with State of Connecticut Department of Transportation "Standard Specifications for Roads, Bridges and Incidental Construction Form 816.

B. Place binder course as soon as possible after the gravel base has been prepared, shaped and compacted for Town streets and driveway/sidewalk repair.

C. Place and compact binder course by steel-wheeled rollers of sufficient weight to thoroughly compact the bituminous concrete.

D. Maintain pavement under this Contract during the guarantee period of one year and promptly (within 3 days of notice given by the Engineer) refill and repave areas which have settled or are otherwise unsatisfactory for traffic.

E. All pavement thicknesses referred to herein are compacted thicknesses. Place sufficient mix to ensure that the specified thickness of pavement occurs wherever called for.

F. In no case will pavement be placed until the gravel base is dry and compacted to at least 95% maximum density at optimum moisture content.

G. No mix shall be placed on wet or damp surfaces. When surface and ambient temperatures are 15°C and rising, use mix prepared and placed in accordance with the specified requirements of the mix hereinbefore designated as OGFC.

H. Regardless of any temperature requirements, no mix conforming to the requirements of these specifications shall be placed after October 31 or before May 1 of any year.

I. Furnish and spread calcium chloride on disturbed surfaces to control dust conditions.

J. The contact surfaces of curbings, castings, and other structures shall be painted with a tack coat prior to placement of paving.

K. Along curbs, structures and all other places not accessible with a roller, the paving mixture shall be thoroughly compacted with tampers. Such tampers shall not weigh less than 25 pounds and shall have a tamping face no more than 50 square inches in size. The surface of the mixture after compaction shall be smooth and true to the established line and grade.

L. When the air temperature falls below 50°F, extra precautions shall be taken in drying the aggregates, controlling the temperatures of the materials and placing and compacting the mixtures.

M. No mixtures shall be placed when the air temperature is below 40°F, or when the material on which the mixtures are to be placed contains frost or has a surface temperature ENGINEER considers too low.

N. No vehicular traffic or loads shall be permitted on the newly completed pavement until adequate stability has been attained and the material has cooled sufficiently to prevent distortion or loss of fines. If the climatic or other conditions warrant it, the period of time before opening to traffic may be extended at the discretion of the Engineer.

O. Existing drainage patterns shall not be altered by the new pavement construction unless otherwise shown on the Drawings.

P. Maintain binder course in a condition suitable for traffic throughout the construction period. Defects shall be repaired within 3 days of notification.

Q. Prepare the binder course for placement of the top course. The binder course shall be regraded, placing additional bituminous concrete where settling has occurred, repairing the existing surface and replacing broken or damaged sections at no additional cost to the Owner. The binder course surface shall be in all respects acceptable to the Engineer before the final pavement is placed. The surface shall then be broom cleaned.

R. Following preparation of the binder course, apply the tack coat at 0.10 gallons per square yard and place the top course.

S. Apply joint adhesive to all longitudinal joints for proper adhesion of the new bituminous concrete pavement to the existing.

T. Pavement markings damaged during the course of the work shall be repaired.

U. Following all paving, the area along the edge of all pavement, sidewalks, berms, waterways, etc. shall be backed up with gravel, or loam and seed as required, so that it is flush with the adjacent paving. Whenever possible, the final surface of the backup material shall slope away from the surface edge to allow proper sheeting of runoff.

3.3 FULL-WIDTH OVERLAY

A. Prepare the roadway surface prior to the start of spreading bituminous concrete. This shall include but not be limited to sweeping, repairing, removing of debris, and tack coating the surface of the road to be overlaid.

B. Prior to the start of spreading the permanent bituminous concrete overlay, prepare the roadway surface by placing a shim coat to eliminate surface rutting and settlement.

C. Prior to the start of spreading the permanent bituminous concrete overlay adjust all structures for the finish, compacted overlay thickness.

D. Overlay of Town streets shall be "toed-in" to the existing pavement by sawcutting the width of the street a 12 inch wide by 3 inch deep groove for the purpose of tying-in the proposed overlay. Cut the existing pavement by means of a saw; jackhammers will then be used to properly remove the pavement within the groove. The groove shall be properly tack coated to provide adequate adhesion to the existing pavement joint.

E. Immediately after the roadway surface has been prepared, an overlay of bituminous concrete shall be applied to the Town streets to a minimum depth as called for on the Drawings.

F. The finished overlay course shall blend smoothly with all rim elevations of catch basins, manhole covers, gate box covers and any other utilities and shall in no way interfere with or alter the existing surface drainage. Driveway aprons which in the opinion of the Engineer are affected by the overlay shall be overlaid in such a manner to maintain current surface drainage along the street gutterline. In no case shall surface drainage from the street be shed onto local driveways.

END OF SECTION

SECTION 02760

PAVEMENT MARKINGS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. New painted pavement markings

2. Replacement of pavement markings disturbed as part of construction activities.

B. Related Sections

1. Section 02740 - Bituminous Concrete Pavement

1.2 REFERENCES

A. AASHTO Standard Specifications for Transportation Materials and Methods of Sampling and Testing, 1986 Edition, as amended.

B. State of Connecticut Department of Transportation – Standard Specifications for Roads, Bridges and Incidental Construction, Form 816, 2004 Edition as amended.

1.3 SUBMITTALS

A. Submit material specifications and shop drawings for all materials furnished under this Section including, but not limited to the following:

1. Pavement marking paint

2. Paint application system and equipment

PART 2 PRODUCTS

2.1 MATERIALS

A. Waterborne Pavement Marking Paint

1. In accordance with Connecticut Department of Transportation – Standards for Roads, Bridges and Incidental Construction, Form 816, pavement marking paint shall conform to the requirements of Article M.07.20 for waterborne pavement marking paint.

2. The paint shall be capable of being applied to bituminous and Portland cement concrete pavements with striping equipment that does not require heating above ambient temperatures.

3. The following additional pavement marking paint requirements shall be met:

a. The total nonvolatile content shall not be less than 70% by weight.

b. Pigment shall be 45-55% by weight.

c. Weight per gallon shall not be less than 12.5 pounds.

d. Drying time to no pickup shall be 15 minutes.

B. Application Requirements

1. Marking paint shall be applied at a rate of 100 to 115 square feet per gallon.

2. Material application temperature shall be from 40°F to 120°F.

3. No thinners shall be used for the above listed pavement marking applications except in accordance with the manufacturer's specifications and at the direction of the Owner's Project Representative.

4. Minimum finished paint thickness shall be 15 mils.

PART 3 EXECUTION

3.1 PREPARATION

A. All surface dirt within the areas to be painted shall be removed. Large areas of tar, grease or foreign materials may require sand blasting, steam cleaning or power brooming to accomplish complete removal.

B. Application of markings shall not proceed until final authorization is received from the Owner.

C. Bituminous concrete pavements shall have been in place for at least 48 hours prior to the application of pavement markings.

3.2 INSTALLATION

A. All permanent pavement repair areas shall be repainted to match the original pavement markings.

B. New pavement markings shall be as shown on the Drawings and as specified herein.

C. Painting shall be in accordance with Connecticut Department of Transportation – Standards for Roads, Bridges and Incidental Construction, Form 816.

D. No paint or pavement marking material shall be heated above the temperature marked on the container.

E. All painting shall be performed in a neat and workmanlike manner.

F. Lines shall sharp and clear with no feathered edging or fogging.

G. If for any reason material is spilled or tracked on the pavement or any markings applied by Contractor, in Owner's judgment, are not acceptable, then the Contractor shall remove such material by a method that shall not damage the roadway surface and is acceptable to Owner's Project Representative, clean and prepare the surface for a reapplication of markings, and reapply the markings as directed without additional compensation for the corrective work.

3.3 PROTECTION

A. Markings shall remain protected until sufficiently dry to bear traffic on roadways that are open to traffic.

B. Precautions shall be taken to prevent tracking by tires of the striping equipment.

C. Markings shall be protected by traffic cones of not less than 28 inches in height.

END OF SECTION

SECTION 02920

LAWNS AND GRASSES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Restoration of all vegetated areas disturbed during construction
2. New loam and seed areas
3. Temporary seeded areas

B. Related Sections

1. Section 02200 – Site Preparation

1.2 REFERENCES

A. ASTM D5539 – Standard Specification for Seed Starter Mix

1.3 QUALITY ASSURANCE

A. Seed shall be placed only between the periods from April 15th to June 1st, and from August 15th to October 1st, unless otherwise approved by the Engineer.

1.4 SUBMITTALS

A. Submit the following for approval:

1. Lawn seed mixture including percent by weight of each seed type, and manufacturer/supplier name.
2. Manufacturer's/supplier's descriptive literature for seed and hydromulch.
3. Suitable laboratory analysis of the soil to determine the quantity of fertilizer and lime to be applied.
4. Lime and starter fertilizer application rates based on laboratory soil tests.
5. Seed tags: After applying seed to all areas, retain and submit all seed bags to the Landscape Architect.

1.5 DELIVERY AND STORAGE

A. Adequately protect all products from moisture during delivery and storage.

B. Deliver soil amendments, seed and hydromulch that is dry and free flowing, in original containers, each bearing the manufacturer's guaranteed analysis, conforming to applicable state laws. Any product which becomes caked or otherwise damaged, making it unsuitable for use, will not be accepted.

1.6 JOB CONDITIONS

A. Supply and distribute all water required to sustain vegetation at no additional cost to the Owner.

B. Improper work and/or materials to be corrected whenever discovered.

C. Upon completion of all seeding, remove and dispose of all materials, stones and debris resulting from work operations of this Section. Legally dispose of all materials and debris to designated on-site fill areas approved by the Owner. Restore to original conditions all damaged pavements, structures or any other items resulting from installation operations of this Section.

1.7 REVIEW AND ACCEPTANCE

A. Upon completion of all seeded areas, review of the seeded areas will be made upon written request of such review by the Contractor, when submitted at least ten (10) days before the anticipated date of review.

B. Issue the request, in no case earlier than six (6) weeks, after the installation of all temporary seeded areas.

C. Inspection and acceptance may be requested and granted in part, provided the areas for which acceptance is requested are substantial in size with clearly defined boundaries.

D. Establish a dense growth of permanent grasses. Any part of the seeded areas that fails to show a uniform stand of grass is to be reseeded and re-mulched as originally specified in this Section.

PART 2 PRODUCTS

2.1 MATERIALS

A. Loam

1. Loam shall consist of fertile, friable, natural topsoil typical of the locality without admixture of subsoil, refuse or other foreign materials and shall be obtained from a well-drained arable site. It shall be such a mixture of sand, silt and clay particles as to exhibit sandy and clayey properties in and about equal proportions. It shall be reasonably free of stumps, roots, heavy or stiff clay, stones larger than 1-inch in diameter, lumps, coarse sand, noxious weeds, sticks, brush or other litter. Topsoil as delivered to the site or stockpiled shall have pH between 6.0 and 7.0 and shall contain not less than 5 percent or more than 8 percent organic matter as determined by loss of ignition of moisture-free samples dried at 100 degrees Celsius. The topsoil shall meet the following mechanical analysis:

	PERCENTAGE FINER
1-in screen opening	100
No. 10 mesh	95 to 100
No. 270 mesh	35 to 75
0.002 mm*	5 to 25

* Clay size fraction determined by pipette or hydrometer analysis.

B. Starter Fertilizer

1. Commercial grade fertilizer with an approximate 1-2-1 ratio. Elements may be organic, inorganic or a combination and shall be available according to the methods adopted by the Association of Agricultural Chemists. Deliver the fertilizer in standard-sized, sealed bags of the manufacturer accompanied by the manufacturer's guarantee.

C. Lime

1. Ground dolomitic agricultural limestone conforming to ASTM C 602, Class T. At least seventy-five percent (75%) shall pass a #20 mesh sieve with total calcium carbonates not less than eighty percent (80%).

D. Lawn Seed

1. Seed shall be of the previous year's crop.
2. Required ranges:
   a. Purity > 90%
   b. Germination > 80%
   c. Crop < 0.5%
   d. Weed < 0.3%
   e. Noxious Weed – 0%
   f. Inert < 8%
3. The standard seed mixture shall be applied at a minimum rate of 175 lbs./acre, 4 lbs./1,000 sf.
4. Grass seed shall conform to the following mixture in proportion by weight and weed content and shall pass the minimum percentages of purity and germination as indicated for same.

LAWN AREA SEED MIX	% WEIGHT
"Rebel II" Tall Fescue	70%
"Baron" Kentucky Bluegrass	10%
"Palmer" Perennial Ryegrass	20%

5. All seed shall comply with State and Federal seed laws.

6. A sworn certificate indicating each variety of seed, weed content, germination of seed, net weight, date of shipment and manufacturer's name shall accompany each seed shipment. Regardless of approval by the Engineer to sow the seed, complete responsibility for satisfactory results shall rest entirely on the Contractor.

E. Temporary Seed

1. Fresh, viable, recleaned, pure, quality seed of the latest crop, delivered in original, unopened packages, bearing guaranteed analysis tags, name of seed supplier and date of packaging.

2. Seed mixture to be a blend of 90% perennial rye grass and 10% Chewings Fescue, by volume.

F. Hydromulch

1. Silva Fiber Plus, 100% virgin wood fiber mulch with 3% premused tackifier as manufactured by Weyerhauser Company.

PART 3 EXECUTION

3.1 PREPARATION

A. The ground surface shall be fine graded and raked so as to prepare the surface of the loam for lime, fertilizer and seed.

B. The Contractor shall perform a laboratory soil test on the proposed loam before placing any lime, fertilizer, or seed. This work shall be in accordance with ASTM D5539.

3.2 LAWN AREAS

A. Fertilizer and lime shall be applied to the surface of the ground in accordance with the manufacturers' instructions, and based on the results of the certified soils test.

B. The seed shall then be placed using a drop or rotary spreader at the rate recommended by the seed manufacturer for the intended use of the lawn or grass area being restored.

C. After spreading of the seed, lightly rake the surface to work the seed in. The surface shall then be rolled.

D. All seed on banks and slopes of three to one (3:1) and greater will be staked.

3.3 HYDRO-SEEDING AND MULCHING

A. Before any seed is sown, the topsoil is to be raked until the surface is smooth and friable. Seed by means of an approved mechanical agitation hydro-seeder.

B. Mix specified seed, starter fertilizer and wood fiber mulch (with tackifier) as a slurry, using approved hydroseeding equipment. Continue mixing until uniformly blended into a homogeneous slurry suitable for hydraulic application.

C. Apply slurry (with seed, fertilizer and mulch) uniformly to all seeded areas in a one-step process.

D. Apply wood fiber mulch at a minimum rate of one thousand five hundred (1,500) pounds per acre (35 pounds per 1000 square feet) dry weight together with a seeding rate of three hundred fifty (350) pounds per acre (eight (8) pounds per 1000 square feet) and starter fertilizer at a rate equal to one pound of nitrogen per 1000 square feet.

E. Do not apply slurry to building or pavement surfaces or trees. Over spray is to be removed by the Contractor and affected areas repaired to their original state.

F. Execute seeding whenever weather and soil conditions are favorable and when wind does not exceed a velocity of five miles per hour (5 mph). Recommended time of seeding is April 1 to May 31 and September 1 to October 15. However, time of seeding is at the Contractor's discretion.

G. Keep seeded areas uniformly moist to a depth of four inches (4") at all times until germination. Water, as many times as necessary thereafter, to provide acceptable seeded areas.

3.4 MAINTENANCE

A. The responsibility for satisfactory results on work carried out under this item rests entirely on the Contractor, regardless of the prior approval of the materials and methods on the part of the Engineer.

B. Maintain loamed and seeded areas by mulching, covering, netting, watering, fencing, etc., until an acceptable stand of vegetation is approved by the Engineer.

C. The dressed and seeded areas shall be carefully and suitably sprinkled with water as necessary from time to time. Suitable signs and barricades should be placed to protect the seeded areas. After the grass has started to grow, all areas and parts of areas that fail to show a uniform stand of grass for any reason whatsoever, shall be seeded repeatedly until all areas are covered with a satisfactory growth of grass.

D. Suitable signs and barricades should be placed to protect the seeded areas. After the grass has started all areas and parts of areas that fail to show a uniform stand of grass for any reason whatsoever, shall be reseeded until all areas are covered with a satisfactory growth of grass.

3.5 SPECIAL CONSIDERATIONS

A. Following the final top course of paving all pavement edges, waterways, sidewalks, berms, etc. shall be brought to grade with loam, fine graded, raked, seeded, and rolled to the satisfaction of the Engineer. Whenever possible the final surface of the loam backup shall slope away from the surface edge to allow proper sheeting of runoff. The Contractor shall be solely responsible for protecting, maintaining, and repairing this work until a satisfactory start of healthy grass is established.

B. Upon removal of the haybales and siltation fence, the Contractor shall loam and seed all disturbed areas.

C. In locations where the project area passes through existing grass, weed brush or tree-surfaced areas that are not covered by a specific lawn repair item, surface restoration shall be as follows:

1. After completion of backfilling, the existing loam and surface materials, which were salvaged during excavation, shall be returned to the top of the trench.

2. After natural settlement and compaction has taken place, the trench surface shall be harrowed, dragged and raked as necessary to produce a smooth and level surface.

3. The area is then to be sowed with “orchard grass” or “rye grass” or other such materials to hold the soil and produce a growth similar to that existing prior to construction.

3.6 GUARANTEE PERIOD AND FINAL ACCEPTANCE

A. All seeded areas shall be guaranteed for not less than 1 full year from the time of final acceptance.

B. At the end of the guaranteed period, inspection will be made by the Engineer upon written request submitted at least 10 days before the anticipated date. Seeded areas not demonstrating satisfactory stands as outlined above, as determined by the Engineer, shall be renovated, reseeded and maintained meeting all requirements as specified herein.

C. After all necessary corrective work has been completed, the Engineer shall certify in writing the final acceptance of the seeded areas.

END OF SECTION

SECTION 02990

MISCELLANEOUS IMPROVEMENTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Remove and Reset Existing Vinyl Fence

2. Restore Pea Gravel Parking Area.

B. Related Sections

1. Section 02200 – Site Preparation

1.2 SUBMITTALS

A. Submit the following for approval:

1. Pea gravel sieve analysis.

PART 2 PRODUCTS

2.1 MATERIALS

A. Remove and Reset Existing Vinyl Fence

1. Salvage existing vinyl fence or provide new fence matching existing fencing in size, dimension and color. Subject to approval by property owner.

2. Crushed stone for post holes to conform to CTDOT Form 816, Article M.02.01-1, Gradation No. 6.

3. Concrete for posts shall be 3,000 psi.

B. Restore Peas Gravel Parking Area

1. Pea gravel to match existing pea gravel parking area in size and color.

PART 3 EXECUTION

3.1 REMOVE AND RESET EXISTING VINYL FENCE

A. Remove existing vinyl fence and store securely.

B. Follow manufacturer installation instructions.

C. Excavate post holes for sufficient depth plus six inches as shown on detail.

D. Place 6 inches of crushes stone in bottom of post hole.

E. Set posts in hole and encase in concrete.

F. Level as necessary.

G. Connect adjoining fence sections in accordance with manufacturer requirements.

3.2 RESTORE PEA GRAVEL PARKING AREA.

A. Compact subgrade beneath pea gravel.

B. Place pea gravel over existing trench.

C. Compact pea gravel to 95% density.

END OF SECTION

SECTION 03100

CONCRETE FORMS AND ACCESSORIES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Wood Form Material
2. Prefabricated Forms
3. Formwork Accessories

B. Related Sections

1. Section 03300 - Cast-in-Place Concrete
2. Section 15050 – Piping - General

1.2 REFERENCES

A. American Concrete Institute (ACI)

1. ACI 301 - Specifications for Structural Concrete for Buildings
2. ACI 318 - Building Code Requirements for Reinforced Concrete
3. ACI 347 - Guide to Formwork for Concrete

B. American Society for Testing and Materials (ASTM)

1. D4 - Standard Test Method for Bitumen Content
2. D6 - Standard Test Method for Loss on Heating of Oil and Asphaltic Compounds
3. D71 - Standard Test Method for Relative Density of Solid Pitch and Asphalt (Displacement Method)
4. D217 - Standard Test Method for Cone Penetration of Lubricating Grease
5. D1056 - Specification for Flexible Cellular Materials - Sponge or Expanded Rubber
6. D1751 - Standard Specifications for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types)
7. D1752 - Standard Specification for Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction
8. D4397 - Standard Specification for Polyethylene Sheeting for Construction, Industrial and Agricultural Applications

C. American Association of State Highway and Transportation Officials (AASHTO)

1. AASHTO Standard Specifications for Transportation Materials and Methods of Sampling and Testing

D. National Institute of Standards and Technology (NIST)

1. Voluntary Product Standard PS 1-95 - Construction and Industrial Plywood

1.3 SUBMITTALS

A. Drawings showing schedule of placement, location of all construction joints and all control joints with methods of forming. Show the location and elevation of all sleeves, wall pipes and embedded items.

B. Drawings showing sizes and materials for forms, form bracing, and form ties.

C. Product Data on form release agent, permanent formwork and inserts.

D. Samples for the following materials:

1. Form ties (including cones) and spreaders

2. Compressible filler

3. Premolded fillers

4. Other materials requested by the Owner's Representative

1.4 DESIGN REQUIREMENTS

A. Design formwork and shoring at the Contractor's expense by a Professional Engineer registered in the State where the work will be performed to conform to all design and code requirements in ACI 301, ACI 318 and ACI 347 and other applicable regulations and codes. The design shall consider any special requirements that may result due to the use of super plasticized and/or retarded set concrete.

PART 2 PRODUCTS

2.1 WOOD FORM MATERIALS

A. Plywood: Class I High Density Overlay plyform, exterior grade, not less than 5 ply nor less than 5/8 inches thick conforming to Voluntary Product Standard PS 1-95

B. Lumber: Douglas Fir species, No. 1 grade S4S with grade stamp clearly visible

2.2 PREFABRICATED FORMS

A. Manufacturers:

1. Symons Corporation, DesPlains, Illinois

2. HICO Corporation, Bronx, NY

3. Approved equal

B. Preformed Steel Forms: Minimum 16 gauge (1.5 mm), tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and

appearances of finished concrete surfaces; with clean, warp free, undented, ungouged, undamaged surfaces

C. Glass Fiber Fabric Reinforced Plastic Forms: Matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearances of finished concrete surfaces

2.3 FORMWORK ACCESSORIES

A. Form Ties:

1. Ties for foundation walls shall be metal and designed with removable setback cones so that after removal of the projecting part, no metal shall remain within 1½ inches of the face of the concrete.

2. Form ties for tanks, wet wells, pump chambers, below grade structures and other water retaining structures shall have an integral waterstop welded to the tie and shall have setback cones.

3. Flat bar snap ties for panel forms shall have plastic or rubber inserts with 1½ inch minimum depth to allow patching of tie hole after removal.

4. Setback cones shall be wood or plastic tapered cones 1 inch diameter and 1½ inches deep to allow filling and patching of the concrete surface after removal.

5. Common wire ties shall not be used.

B. Form Release Agent:

1. Non-staining and non-emulsifiable type which will not stain concrete or absorb moisture nor interfere with adherence of any material to be applied to concrete surfaces.

C. Corners:

1. Chamfered No. 1 Poplar wood strips; ¾ inch by ¾ inch; maximum possible lengths

D. Dovetail Anchor Slot:

1. Galvanized steel 22 gauge thick; non-filled, release tape sealed slots for securing to concrete formwork

E. Flashing Reglets:

1. Galvanized steel 22 gauge thick, longest possible lengths, with alignment splines for joints, release tape sealed slots for securing to concrete formwork

F. Compressible Filler:

1. Closed cell expanded neoprene, ASTM D1056, Grade No. 2C1, ozone and weather resistant

G. Premolded Joint Filler:

1. Buildings and Structures: Self-expanding cork, ASTM D1752, Type III; and Federal Specification HH-F-341-F, Type II, Class C; capable of one directional swelling up to 140% of its original thickness

2. Sidewalks: Asphalt impregnated, ASTM D1751, ¾ inch thick unless otherwise shown on the Drawings

PART 3 EXECUTION

3.1 GENERAL

A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with Drawings.

B. Review all work prepared by others to receive work of this Section and correct any defects affecting installation. Commencement of work by the Contractor will be construed as complete acceptance of preparatory work by others.

C. Handle and store materials separately in such manner as to prevent intrusion of foreign matter, segregation, or deterioration. Do not use foreign materials or those containing frozen material. Remove improper and rejected materials immediately from point of use. Cover materials and accessories during construction period.

3.2 EARTH FORMS

A. Earth forms are not permitted.

3.3 FORM PREPARATION

A. Coat contact surfaces of forms with a form release agent prior to form installation.

B. Thoroughly clean steel forms between uses using high pressure water or jet or sand blasting to remove all mill scale, concrete laitance or other ferrous deposits from the contact surfaces of the forms.

C. Before re-use of wood forms, thoroughly clean form contact surfaces, repair damaged areas and remove projecting nails. A partial or complete steel lining on wood sheathing or plywood will not be allowed.

3.4 ERECTION - FORMWORK

A. Erect formwork, shoring and bracing to achieve design requirements of ACI 301 and the following additional requirements:

1. Variation from plumb in the lines and surfaces of columns, piers, and in walls

a. In any 10 feet of length ¼ inch

b. Maximum for entire length ½ inch

2. Variation of the linear building lines from established position in plan and related positions of columns, walls and partitions:

a. In any bay ¼ inch

b. In any 20 foot of length ¼ inch

c. Maximum for the entire length ½ inch

3. Variation in cross-sectional dimensions of columns and beams and in thickness of slabs and walls:

   a. Minus 1/8 inch

   b. Plus ¼ inch

3.5 JOINTS

A. Construction and expansion joints indicated on the Drawings are mandatory and shall not be omitted.

B. Use premolded joint filler at expansion joints unless otherwise noted.

C. Form construction and expansion joints with a keyway and waterstop unless otherwise shown on the Drawings. The depth of the keyway shall be approximately 3 inches and the minimum width of keyway shall be one-third the width of the wall or floor section unless otherwise shown on the Drawings. Construction and expansion joints are to be formed in place prior to notifying the Owner's Representative for inspection of formwork.

D. Where joints other than those shown are required, obtain approval prior to installation.

E. Joints shall be straight and true. Brace all slab bulkheads adequately to keep joints straight. Construction joints in slabs exceeding 5 inches in thickness shall be keyed using a keyway nominally 3-5/8 inches by 1/3 of the slab thickness.

F. Maximum spacing of vertical construction joints in walls shall not exceed 40 feet unless otherwise shown on the Drawings.

G. Joints not indicated or specified shall be placed to least impair strength of structure and shall be subject to approval of the Owner's Representative.

3.6 INSERTS, EMBEDDED ITEMS, AND OPENINGS

A. Provide formed openings where required for items to be embedded in or passing through concrete work in conformance with requirements of ACI 318, paragraph 6.3, "Conduits and pipes embedded in concrete."

B. Locate and set in place items that will be cast directly into concrete.

C. Coordinate work of other Sections in forming and placing openings, slots, reglets, recesses, chases, sleeves, wall pipes, anchor bolts and other inserts. Wall pipes and sleeves shall conform to the requirements of Section 15050.

D. Install accessories in accordance with manufacturer's instructions, straight, level and plumb. Ensure items are not disturbed or damaged during placement of concrete.

E. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at the bottom of forms to allow flushing water to drain.

F. Close temporary openings with tight fitting panels, flush with inside face of forms and neatly fitted so that joints will not be apparent in exposed concrete surfaces after concrete placement.

3.7 ACCESSORIES

A. Install form liners into formwork prior to placement of reinforcing steel or concrete in compliance with the manufacturer's requirements.

B. Position recessed dovetail anchor slots for masonry anchors to spacing and intervals specified in Section 04810 and shown on the Drawings.

C. Position metal fabrications accessories and inserts supplied under Sections 05120 and 05500 as specified therein and shown on the Drawings.

D. Position flashing reglets supplied under Section 07620 as specified therein and shown on the Drawings.

3.8 FORM REMOVAL

A. The Contractor shall be responsible for damage resulting from form removal. Forms and shoring for structural slabs or beams shall remain in place in accordance with requirements in ACI 301. Form removal shall also conform to the requirements specified in Section 03300.

3.9 INSPECTION

A. The Owner’s Representative shall be notified when the forms are complete and ready for inspection at least thirty-six hours prior to the proposed concrete placement.

B. Failure of the forms to comply with the requirements specified herein, or to produce concrete complying with requirements of these Specifications, shall be grounds for rejection of that portion of the concrete work. Rejected work shall be repaired or replaced at no additional cost to the Owner. Such repair or replacement shall be subject to the requirements of these Specifications and approval of the Owner’s Representative.

END OF SECTION

SECTION 03200

CONCRETE REINFORCEMENT

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Reinforcing Steel Bars
2. Welded Wire Fabric
3. Reinforcing Accessories

B. Related Sections

1. Section 03100 - Concrete Forms and Accessories.
2. Section 03300 - Cast-in-Place Concrete

1.2 REFERENCES

A. The Connecticut State Building Code, latest edition.

B. American Concrete Institute (ACI)

1. ACI 117 - Standard Tolerance for Concrete Construction and Materials.
2. ACI 301 - Specifications for Structural Concrete for Buildings.
3. ACI 315 - Details and Detailing of Concrete Reinforcement.
4. ACI 318 - Building Code Requirements for Reinforced Concrete, American Concrete Institute.
5. ACI 350R - Environmental Engineering Concrete Structures.
6. ACI SP-66 - Detailing Manual.

C. American Society for Testing and Materials (ASTM)

1. A185 - Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.
2. A615 - Specification for Deformed and Plain Billet - Steel Bars for Concrete Reinforcement.
3. A675 - Specifications for Steel Bars, Carbon, Hot Wrought, Special Quality, Mechanical Properties.

D. American Welding Society (AWS)

1. D1.4 Structural Welding Code - Reinforcing Steel.

E. Concrete Reinforcing Steel Institute (CRSI)

1. CRSI 63 - Recommended Practice for Placing Reinforcing Bars.

2. CRSI 65 - Recommended Practice for Placing Bar Supports, specifications and nomenclature.

1.3 SUBMITTALS

A. Provide shop drawings in accordance with the recommendations of ACI 315, "Details and Detailing of Concrete Reinforcement" and show the following: elevations, dimensions of concrete work with specified reinforcement clearances; ledges, brackets, openings, sleeves or other items furnished by other Sections, where interference with reinforcement may occur; bending diagrams; assembly diagrams; splices and laps of reinforcement; temperature and shrinkage reinforcement; construction joint reinforcement and shape; dimensions, grade designations, and details of reinforcement and accessories. Show dowels with concrete work to be placed first. Shop drawings shall be drawn to scale.

B. Bar Bending Details - The bars shall be referenced to the same identification marks shown on the placement drawings. Bars to have special coatings and/or to be of special steel or special yield strength are to be clearly identified.

C. Prior to delivery of reinforcing steel or concrete to job site, submit certified mill test reports of reinforcing steel and cement (including names and locations of mills and shops, and analyses of chemical and physical properties), properly correlated to concrete to be used in this project.

1.4 DELIVERY, HANDLING AND STORAGE

A. Reinforcing steel shall be substantially free from mill scale, rust, dirt, grease, or other foreign matter.

B. Reinforcing steel shall be covered and stored off the ground, protected from moisture, and kept free from dirt, oil, or other foreign matter.

PART 2 PRODUCTS

2.1 REINFORCING STEEL BARS

A. Reinforcing steel bars shall be newly rolled billet steel conforming to ASTM A615, Grade 60.

B. Minimum yield strength shall be 60,000 psi.

C. Where reinforcing steel bars are called for to be epoxy grouted into existing concrete, the system shall conform to Hilti HVA Adhesive or Hit C-100 Anchoring systems, Powers, Power-Fast System, or approved equal. Anchorage shall develop an allowable bond strength equal to 24,000 psi times the area of the bar, or an ultimate strength equal to the tensile strength of the bar.

2.2 WELDED WIRE FABRIC

A. Welded wire fabric shall conform to ASTM A185

2.3 REINFORCEMENT ACCESSORIES

A. Reinforcement accessories shall conform to Product Standard PS7-766, National Bureau of Standards, Department of commerce, Class C, as produced by Dayton

Superior Corporation; R.K.L. Building Specialties Co., Inc. or equal approved by the Owner's Representative.

B. Reinforcement accessories shall include spacers, chair ties, slab bolsters, clips, chair bars, and other devices for properly assembling, placing, spacing, supporting, and fastening reinforcement.

C. Tie wire shall be of sufficient strength for all intended purpose, but not less than No. 18 gauge. Metal supports shall be of such type as not to penetrate surface of formwork and show through surface of concrete.

D. Accessories touching interior formed surfaces exposed to view shall have not less than 1/8 inch of plastic between metal and concrete surface. Plastic tips shall extend not less than 1/2 inch up on metal legs.

E. Individual and continuous slab bolsters and chairs shall be of type to suit various conditions encountered and must be capable of supporting 300 pound load without damage or permanent distortion.

F. Expansion Joint Dowels

1. Dowels shall conform to ASTM A675.

2. Expansion dowel caps shall be No. 87 dowel caps as manufactured by Heck Building Products, Inc., Type F-46 dowel caps as manufactured by the Dayton Sure-Grip and Shore Company, or equal.

PART 3 EXECUTION

3.1 EXAMINATION

A. Review all work prepared by others to receive work of this Section. Commencement of work will be construed as complete acceptance of preparatory work by others.

3.2 PREPARATION

A. Notify the Owner's Representative prior to the start of any phase of the reinforcing work so as to provide the opportunity to inspect the work. Such notification shall be made at least 24 hours in advance of reinforcement placements and at least 36 hours in advance of other inspections (forms, etc.).

3.3 REINFORCING BAR FABRICATION

A. Fabrication of reinforcement shall be in accordance with the recommendations of CRSI.

B. Reinforcing bars shall be cold bent and shall not be straightened or re-bent. Bars shall not be field bent unless approved by the Owner's Representative.

C. Reinforcing bars shall be bent around a revolving collar having a diameter of not less than that recommended by the CRSI.

D. Reinforcing bar ends that are to be butt spliced or threaded, shall have the applicable end saw-cut. Such ends shall terminate in flat surfaces at a right angle to the axis of the bar.

E. Where reinforcing bars are called for to be welded, the welding shall conform to AWS D1.4 Structural Welding Code - Reinforcing Steel.

3.4 INSTALLATION

A. Reinforcement shall be placed in accordance with requirements of CRSI -63 - "Recommended Practice for Placing Reinforcing Bars" and CRSI 65, "Recommended Practice for Placing Bar Supports" and with further requirements below.

B. Reinforcement shall be accurately placed in accordance with Contract Documents and shall be firmly secured in position by wire ties, chairs, spacers, and hangers, each of type approved by the Owner's Representative. For slabs, grade beams, etc. where concrete is poured on grade, use additional setup bars and concrete brick to provide required cover over reinforcement.

C. Bending, welding or cutting reinforcement in field in any manner other than as shown on Drawings, is prohibited, unless specific approval for each case is given by the Owner's Representative.

D. Reinforcement shall be continuous through construction joints unless otherwise indicated on Drawings.

E. Reinforcement shall be spliced only in accordance with requirements of Contract Documents or as otherwise specifically approved. Splices of reinforcement at points of maximum stress shall generally be avoided.

F. Welded wire fabric shall lap 6 inches or one space plus 2 inches whichever is larger, and shall be wired together. Provide No. 4 set up bars spaced 30 inches on center for slabs-on-grade or elevated slabs with composite decks.

G. Proceed with installation of embedded items, and reinforcement, but do not place concrete into or around such items until the Owner's Representative has approved work.

3.5 FIELD QUALITY CONTROL

A. The Owner's Representative shall have the right to postpone or stop concrete operations when in his judgment, reinforcement and embedded item installation has not been properly completed or the quality of construction will impair strength and durability or desired finished product. Costs arising from delays due to noncompliance will not be considered.

B. Any material or workmanship that is rejected, either at the batch plant or at the site, shall be replaced promptly at no additional cost to the Owner.

C. Before concrete is placed, reinforcement shall be free of excessive rust, dirt, oil, scale or other foreign matter that will destroy or reduce bond requirements. Reinforcement expected to be exposed to weather for a considerable length of time shall be painted with a heavy coat of cement grout. Protect stored materials so as not to bend or distort bars in any way. Bars that become damaged will be rejected.

D. Before concrete is placed, check all installed reinforcement to ensure that it conforms to Contract Documents and approved Shop Drawings. Such checking

shall be done only by qualified experienced personnel. In addition, the Owner's Representative shall be notified at least 36 hours prior to concrete placement and given opportunity to inspect completed reinforcement. Prior approval of Shop Drawings shall in no way limit the Owner's Representative's right to require modifications or additions to reinforcement or accessories.

E. Expansion joint dowels must be straight and clean, free of loose flaky rust and loose scale. Dowels may be sheared to length provided deformation from true shape caused by shearing does not exceed 0.04 inches on the diameter of the dowel and extends no more than 0.04 inches from the end. Bars shall be coated with a bond breaker on the expansion end of the dowel. Expansion caps shall be provided on the expansion end.

3.6 ADJUSTING

A. Carry out corrections without delay as directed by the Owner's Representative when construction operations indicate that requirements of Contract Documents or prudent construction practices are being or are about to be violated.

END OF SECTION

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SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes

1. Concrete Materials
2. Admixtures
3. Concrete Mix
4. Miscellaneous Concrete Materials

B. RELATED SECTIONS

1. Section 03100 - Concrete Forms and Accessories
2. Section 03200 – Concrete Reinforcement

1.2 REFERENCES

A. The Connecticut State Building Code, latest edition

B. American Concrete Institute (ACI)

1. ACI 301-95 - Specifications for Structural Concrete for Buildings, (included as part of this specification)
2. ACI 305 - Hot Weather Concreting
3. ACI 306.1-90 - Standard Specifications for Cold Weather Concreting
4. ACI 318-05 - Building Code Requirements for Reinforced Concrete", American Concrete Institute

C. American Society for Testing and Materials (ASTM)

1. C33 – Standard Specification for Concrete Aggregates
2. C39 – Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
3. C40 - Standard Test Method for Organic Impurities in Fine Aggregates for Concrete
4. C42 – Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
5. C87 - Standard Test Method for Effect of Organic Impurities in Fine Aggregate on Strength of Mortar
6. C94 - Standard Specification for Ready-Mixed Concrete

7. C131 - Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine

8. C150 – Standard Specification for Portland Cement

9. C260 - Standard Specification for Air-Entraining Admixtures for Concrete

10. C309 – Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete

11. C494 - Standard Specification for Chemical Admixtures for Concrete

12. C535 - Standard Test Method for Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine

13. C618 – Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete

14. C685 – Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing

15. C881 – Standard Specification for Epoxy-Resin Base Bonding Systems for Concrete

16. C989 – Standard Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars

17. C1059 – Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete

1.3 SUBMITTALS

A. Submit concrete mix proposed for use, indicating design strength, supplier, batch quantities, and constituents. Provide test report copies indicating prior satisfactory performance in accordance with ACI 301.

B. Submit data and descriptive literature for concrete constituents including admixtures, aggregate tests, bond breaker, bonding agent, and repair grout.

C. Submit detailed methods proposed for curing and protection of concrete. This submittal shall be made not less than 10 days prior to the placement of any concrete.

D. Submit a truck load ticket for every concrete delivery. Ticket information shall include batch time and date, weights of all constituents, quantity of admixtures, water added at the batch plant and moisture content of coarse and fine aggregates.

E. Maintain an accurate daily record of the locations and quantity of concrete placed.

1.4 QUALITY ASSURANCE

A. Inspection of cast-in-place concrete work, and testing, including slump tests, air content, and standard compression test cylinders will be performed by and independent testing agency approved by the Owner and paid for by the Contractor. Materials and workmanship shall be subjected to inspection and testing in mill, shop and/or field by the Owner or the Owner's designated representative.

B. Provide notification prior to the start of any phase of concrete placement work so as to provide the opportunity to inspect the work. Such notification shall be made at least 24 hours in advance of concrete placements and at least 36 hours in advance of other inspections (forms, rebar, etc.).

C. Facilitate inspection by the Owner's Representative, and furnish the following:

1. Safe access to the work at all times to allow proper inspection of the work

2. Full and ample means and assistance for sampling and testing materials and proper facilities for inspection of work in plant and at project site

3. Covered box large enough to contain twenty-four standard concrete cylinders. At temperatures below 60°F, box shall be electrically heated and thermostatically controlled to maintain inside temperature of 60° to 80°F. Cylinders shall be placed in box immediately after molding and shall be covered with moist burlap until delivery to laboratory, 24 to 72 hours after molding.

4. Access by the Owner's Representative to the batch plant supplying the concrete at any time.

D. Compression tests shall consist of one set of 4 cylinders for each test made, cured, and tested by testing laboratories during progress of job. 6 cylinders shall be required for each test made with concrete mix containing fly ash or ground granulated blast furnace slag. One set of cylinders shall be taken for every 100 cubic yards of concrete or fraction thereof placed in any one day.

1. 1 cylinder of each set shall be tested for 7-day compressive strength; 2 cylinders shall be tested for 28-day compressive strength. The remaining cylinder shall be tested for 56-day compressive strength if either one of the 28-day tests are below the specified strength, otherwise the 56-day test will be eliminated.

2. For modified mix with fly ash or ground granulated blast furnace slag, 1 cylinder of each set shall be tested for 7-day compressive strength, 2 cylinders shall be tested for 28-day compressive strength and 2 cylinders shall be tested for 56-days compressive strength. The remaining cylinder shall be tested for 84-day compressive strength if either one of the 56-day tests are below the specified strength, otherwise the 84-day test will be eliminated.

3. The Contractor will provide and pay for the services of an approved testing laboratory to test the cylinders. Compression strength test of cylinders shall conform to ASTM C39, latest revision. The testing laboratory will submit certified copies of the test results directly to the Owner's Representative within 24 hours after tests are made.

4. Sampling, molding, curing and testing of cylinders shall conform to ASTM requirements. Specimens shall be cured under laboratory conditions. The Owner's Representative may require additional cylinders to be cured under field conditions when unusual conditions may tend to reduce concrete strength.

5. Report of tests shall include: name of project, date and location of concrete placement, design strength of concrete, mix data, slump, air content (if tested), compressive strength, age and condition of test cylinder, type of fracture, and type of curing.

E. Slump test, to check consistency, shall be made from the sample used to mold cylinders. Additional slump tests may be taken of every batch delivered to job site.

F. Tests for determination of air content shall be made as required to verify conformance with the specifications.

G. The strength level of the concrete mix shall be considered satisfactory if both of the following criteria are satisfied:

1. Every arithmetic average of any three consecutive strength tests equals or exceeds the specified design strength.

2. No individual strength test (average of two cylinders from the same test group) falls below the specified design strength by more than 500 psi when the specified design strength is 5000 psi or less or by more that 10 percent of the specified design strength when the design strength is more than 5000 psi.

H. When tests of control specimens fall below these requirements, the Owner's Representative will require 56 day or 84 day cylinder tests or core specimens taken from concrete in question and tested in accordance with ASTM C42. If these specimens do not meet strength requirements, the Owner's Representative has the right to require additional curing, load tests, strengthening or removal and replacement of those parts of the structure which are unacceptable, and in addition, removal of such sound portions of structure as necessary to ensure safety, appearance, and durability of structure. Additional testing, load tests, strengthening or removal and replacement of parts or structure and any costs associated with delay of project shall be at no additional cost to the Owner.

I. Any material or workmanship which is rejected, either at the batch plant or at the site, shall be replaced promptly at no additional cost to the Owner.

J. If arrangements for corrections and/or replacements are not made within seven days after notice of rejection, the Owner has the right to have corrections and/or replacement made and charge cost thereof and any costs associated with delay of project against balance of monies withheld.

K. Acceptance of work and admixtures at the batch plant shall not prevent final rejection at job site upon arrival or after it has been installed, if work is found to be defective.

L. Portions of a structure which do not meet the requirements of the Contract Documents based on appearance or for any other aesthetic reason, shall be corrected or removed and replaced at no additional cost to the Owner.

M. Work on new concrete structures shall conform to the requirements of ACI 306.1, Standard Specifications for Cold Weather Concreting, except as modified herein.

PART 2 PRODUCTS

2.1 CONCRETE MATERIALS

A. Cement: shall be American-made Portland Cement, free from water soluble salts or alkalies which will cause efflorescence on exposed surfaces. Portland Cement shall be Type II, ASTM C150. Air entraining cements are prohibited.

B. Pozzolans and Blast Furnace Slag

1. Fly Ash: Class F conforming to the requirements of ASTM C618.

2. Ground Granulated Iron Blast-Furnace Slag: Conforming to ASTM C989.

C. Normal weight Fine Aggregate

1. Washed, inert, natural sand conforming to ASTM C33 and the following additional requirements.

a. Fineness Modulus 2.75 (plus/minus 0.25)

b. Clay lumps and friable particles – 3.0 percent maximum

c. Coal and lignite – 0.5 percent maximum

d. Organic Impurities (ASTM C40) – Organic Plate No. 2

e. Strength of Mortar (ASTM C87) – not less than 95 percent at 7 days

f. Soundness (AASHTO T-104) - 10 percent maximum loss (magnesium sulfate solution, five cycles)

D. Normal weight Coarse Aggregate

1. Well graded crushed stone or washed gravel conforming to ASTM C33 and the following additional requirements:

a. Material finer than No. 200 sieve – 1.0 percent maximum

b. Clay lumps and friable particles – 2.0 percent maximum

c. Chert (less than 2.40 specific gravity, saturated surface dry) – 3.0 percent maximum by weight.

d. Sum of clay lumps, friable particles, and chert (less than 2.40 specific gravity, saturated surface dry) – 3.0 percent maximum by weight. This limitation only applies to aggregates in which chert appears as an impurity.

e. Coal and lignite – 0.5 percent maximum

f. Soundness - 18 percent maximum loss (magnesium sulfate solution, five cycles)

g. Soundness - 10 percent maximum loss (sodium sulfate solution, five cycles)

2. Coarse aggregates shall not exceed 35% by weight "percentage of wear" as determined by the Los Angeles Abrasion and Impact Tests in ASTM C131 and C535.

E. Water shall be from approved source, potable, clean and free from oils, acids, alkali, organic matter and other deleterious material.

2.2 ADMIXTURES

A. Water-reducing agent:

1. Water-reducing agent shall be by same manufacturer as air-entraining agent.

2. Daracem - 55 W.R. Grace & Co.

3. Pozzolith 220N – BASF Admixtures, Inc.

4. Eucon MR - Euclid Chemical Co.

5. Approved equal conforming to ASTM C494 Type A.

B. Air-entraining agent:

1. DAREX AEA - W.R. Grace & Co.

2. MB-VR or MB-AE90 - BASF Admixtures, Inc.

3. Air-Mix - Euclid Chemical Co.

4. Approved equal conforming to ASTM C260.

C. Admixtures which retard setting of cement in concrete shall not be used without written approval of the Owner's Representative. Admixtures causing accelerated setting of cement in concrete shall not be used.

2.3 CONCRETE MIX

A. Select proportions of ingredients to meet the design strength and materials limits specified and to produce concrete having proper placability, durability, strength, appearance and other required properties. Proportioning shall also conform to the requirements in ACI 301 and ACI 318.

B. The concrete mix design shall be a 4000 psi compressive strength concrete using ¾ inch aggregate. The design mix shall be selected based on previous test records for a mix with essentially the same proportions, and shall meet the following limiting values in Table A:

TABLE A - MAXIMUM ALLOWABLE WATER/CEMENT RATIOS

Minimum Allowable 28 day Compressive Strength (psi)	Maximum Allowable Water / Cement Ratio	Total Cementitious Material (Pounds)	
		Min	Max
4000	0.45	611	635

C. If sufficient test records are not available, (at least 30 consecutive strength tests or two groups of tests totaling at least 30 within the past 12 months), the design mix shall be developed using laboratory trial mixtures in accordance with ACI 301.

D. All concrete is normal weight with air-dry weight not to exceed 150 lbs. per cubic foot.

E. Fly ash may be substituted for up to 20 percent by weight of the total cementitious material. Ground granulated iron blast-furnace slag may be substituted for up to 40 percent by weight of the total cementitious material.

F. For concrete flatwork with a steel trowel finish, fly ash may be substituted for up to 10 percent by weight and ground granulated iron blast-furnace slag may be substituted for up to 25 percent by weight of the total cementitious material.

G. All concrete shall contain the approved air-entraining admixture as per manufacturer's written instructions to provide entrained air by volume in the cured concrete between 4.5 and 6.5%.

H. The design mix shall meet the following slump limiting values in Table B:

Table B – Concrete Slump[1]

Portion of Structure	Recommended (inches)	Maximum Range (inches)
Mats	2	2-3
Walls, Column, Beams	4	3-5
Slabs	3	2-4

1. After addition of high range water reducer

I. The approved water-reducing admixture shall be used in all concrete, in accordance with manufacturer's written instructions.

2.4 MISCELLANEOUS MATERIALS

A. Grout shall be a ready-to-use, non-metallic, non-shrink aggregate product requiring only the addition of water at the job site. Grout shall be as manufactured by Five Star Products, Inc.; Euclid Chemical Company; Master Builders; or approved equal. Grout shall be easily workable and shall have no drying shrinkage at any age. Compressive strength of grout (2 inch by 2 inch cubes) shall not be less than 5000 psi at 7 days, and 7500 psi at 28 days.

B. Concrete Construction Joint Roughener:

1. Provide a water soluble non-flammable, surface-retardant roughener.

2. Product and Manufacturer:

a. Rugasol-S by Sika Corporation for horizontal joints only

b. Tuf-Cote (Deep Etch) by Preco Industries Ltd. for vertical joints

c. Approval equal

C. Bond Breaker:

1. Provide an adhesive-backed glazed butyl or polyethylene tape which will satisfactorily adhere to the premolded joint filler or concrete surface as required. The tape shall be the same width as the joint.

2. Bond breaker for concrete other than where tape is specifically called for shall be either bond breaker tape or an ASTM C309 non-staining type bond prevention coating such as Masterkure 100WB by Degussa Construction Chemicals, Super Bondbreaker VOC or Super Bondbreaker WB by Edoco Burke Construction Chemicals, Tilt-Eez VOC or Tilt-Eez WB by Conspec Marketing & Manufacturing or equal.

D. Bonding Agent:

1. Provide a two-component, 100% solids, moisture –tolerant structural epoxy adhesive conforming to ASTM C881, Type II. The bonding agent shall be Sikadur 32 Hi-Mod by Sika Corporation of Lyndhurst, NJ, Concresive Liquid (LPL) by Degussa Admixtures, Inc. of Cleveland, OH or equal.

2. Latex bonding agent shall be a non-remulsifiable acrylic-polymer latex conforming to ASTM C1059 Type II.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify cover requirements over all reinforcement.

B. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not cause hardship in placing concrete.

C. Verify site conditions to insure that full access is available for placement of concrete.

3.2 JOINTS

A. Construction and expansion joints indicated on Drawings are mandatory and shall not be omitted. Construction joints shall conform to the requirements of Section 03100 and the following:

1. Before placing new concrete against concrete already in place and hardened, the surface shall again be cleaned with a jet where practical. The exposed aggregate shall then be mopped with a mortar composed of the same proportions of sand and placed and mopped in place immediately prior to the placing of concrete and shall not have set up or hardened prior to the placing of concrete.

2. Where joints other than those shown are required, they shall be made at such locations as the Owner's Representative may allow, and shall in no case impair the structural strength of the structure.

B. Joints not indicated or specified shall be placed to least impair strength of structure and shall be subject to approval of the Owner's Representative.

C. Saw-cut joints shall be installed in the locations shown on the Drawings. Saw-cut joints shall not be substituted for formed construction joints unless approved by the Owner's Representative. Saw-cut joints shall conform to the following requirements:

1. The depth of the saw cut shall be at least ¼ of the slab thickness or a minimum depth of one inch unless otherwise shown on the Drawings.

2. Do not saw cut through slab reinforcing steel unless directed to do so in writing by the Owner's Representative.

3. Joints produced using conventional wet-cut process shall be completed within 4 to 12 hours after the slab has been finished - 4 hours in hot weather conditions and 12 hours in cold weather conditions.

4. Joints produced using the early-entry dry cut process shall be formed using diamond-impregnated blades and shall be completed within 1 to 4 hours after the slab has been finished – 1 hour in hot weather conditions and 4 hours in cold weather conditions. The maximum depth of joints produced by the dry cut process shall not exceed 1-1/4 inches. Care should be taken to make sure that the saw does not ride up over large or hard coarse aggregates.

5. Regardless of the saw cutting process chosen, the saw cutting must be performed before the concrete starts to cool, as soon as the concrete surface is firm enough not to be torn or damaged by the cutting blade, and before random-drying-shrinkage cracks can form in the concrete slab.

3.3 MIXING, CONSISTENCY, AND DELIVERY OF CONCRETE

A. Concrete shall be ready-mixed, produced by a central batch plant. Hand or site mixing shall not be allowed. Constituents, including admixtures, shall be batched at the central batch plant. Admixtures shall be premixed in solution form and dispensed as recommended by the manufacturer.

B. Central plant and rolling stock equipment and methods shall conform to Truck Mixer and Agitator Standard of Truck Mixer Manufacturer's National Ready-Mixed Concrete Association, ASTM C94, ASTM C685, and Contract Documents. Consistency of concrete at time of placement shall be at a 3 inch slump, +/- 1 inch.

C. Ready mixed concrete shall be transported to the site in watertight agitator or mixer trucks loaded not in excess of rated capacities. Discharge at site shall be within one and one-half hours after cement is first introduced into the aggregates. Concrete with a temperature greater than 90°F. shall be rejected and removed from the site.

During any of the following conditions: high ambient temperature, high concrete temperature, low relative humidity, increased wind velocity, high solar radiation, when the temperature of the concrete is 85°F or above, the time between the introduction of cement to the aggregates and discharge shall not exceed one hour. In addition, when the rate of evaporation on the surface of the concrete is expected to approach 0.2 $lb/ft^2/hr$. (see chart in ACI 305R) special precautions shall be taken against the formation of plastic shrinkage cracking on the surface of the concrete after placement.

During any period when for more than three successive days the average daily outdoor temperature drops below 40°F, the concrete temperature at the time of placement shall be as specified in Table C below.

Table C – Concrete Temperature During Cold Weather

Least dimension of section, inches.	Minimum temperature of concrete as placed and maintained during the protection period, °F	Maximum gradual decrease in surface temperature during any 24 hours after end of protection, °F
Less than 12	55	50
12 to less than 36	50	40
36 to 72	45	30
Greater than 72	40	20

Central mixed concrete shall be plant mixed a minimum of five minutes. Agitation shall begin immediately after premixed concrete is placed in truck and shall continue without interruption until discharged. Transit mixed concrete shall be mixed at mixing speed for at least ten minutes immediately after charging truck followed by agitation without interruption until discharged.

D. Retempering of concrete which has partially hardened by mixing with or without additional cement, aggregates, or water shall not be permitted.

3.4 PLACING CONCRETE

A. Remove excess water and foreign matter from forms and excavations. Do not place concrete on frozen soil. Provide adequate protection against frost action during freezing weather.

B. Transport concrete from mixer to place of final deposit as rapidly as practical by methods which prevent separation of ingredients and displacement of reinforcements, and which avoid re-handling. Do not deposit partially hardened concrete. When concrete is conveyed by chutes, equipment shall be of such size and shape to ensure continuous flow in chute. Flat (coal) chutes shall not be used. Chutes shall be of metal or metal lined and uniformly sloped. Slope shall not be less than 25° nor more than 45° from horizontal. Concrete shall be lowered and maintained as near to the surface of deposit as practicable. The chute shall be thoroughly cleaned before and after each use and debris and any water shall be discharged outside of the forms. Concrete shall not be allowed to flow horizontally over distances exceeding 10 feet or dropped vertically over 6 feet.

C. Place concrete in such a manner as to prevent segregation and accumulations of hardened concrete on forms or reinforcement above the grade of concrete being placed. Suitable hoppers and spouts with restricted outlets and tremies shall be used as required.

D. Thoroughly consolidate each layer of concrete by rodding and vibrating using internal type mechanical vibrator. Vibration shall be done by experienced operators under close supervision and shall be carried on only enough to produce homogeneity and optimum consolidation without permitting segregation of constituents or "pumping" of air. Vibrators used for normal weight concrete shall operate at speeds of not less than 7,000 vpm and be of suitable capacity. Do not use vibrators to

move concrete. Vibration shall be supplemented by spading to remove bubbles and honeycombs adjacent to visible surfaces. At least one vibrator shall be on hand for every 10 cubic yards of concrete placed per hour, plus one spare. Vibrators shall be operable and on site prior to starting concrete placement.

E. Deposit concrete continuously, and in layers of such thickness that no concrete will be deposited on concrete which has hardened sufficiently to cause formation of seams and planes of weakness within the section. If a section cannot be placed continuously between planned construction joints, as specified, field joints and additional reinforcement shall be introduced at the Contractor's expense to preserve structural continuity.

F. Cold joints, particularly in exposed concrete, including "honeycombs", are unacceptable. If they occur in concrete surfaces exposed to view, the Owner's Representative will require that entire section in which blemish occurs be removed and replaced with new materials at the Contractor's expense.

3.5 CURING AND PROTECTION

A. When concrete is placed at or below an ambient air temperature of 40°F. or whenever this temperature or lower values are likely to occur within 48 hours after placement of concrete, cold weather concreting procedures, according to ACI 306.1 and as specified herein, shall be followed. The entire area affected shall be protected by adequate housing or covering, and heating. No salt, chemicals or other foreign materials shall be used in the mix to lower the freezing point of concrete. No oil or kerosene heaters shall be utilized. Vent flue gases from combustion heating units to the outside of the enclosure.

B. No frozen materials shall be used in batching concrete and any ice shall be removed from coming into contact with the concrete.

C. Protect concrete work against injury from heat, cold, and defacement of any nature during construction operations.

D. Concrete shall be treated and protected immediately after concreting or cement finishing is completed, to provide continuous moist curing above 50°F. for at least 7 days, regardless of ambient air temperatures.

E. All concrete shall be cured immediately after finishing in accordance with the following requirements:

1. Curing shall be accomplished by a continuous soaking process such as the use of soaker hose or sprinklers, or by use of plastic roll materials to cover the concrete, which shall be thoroughly wetted at least once a day or more often as required in very hot weather. Such plastic shall be placed as soon as possible after finishing of concrete so that scarring of the surface will not occur. Plastic shall be held in place on the surface of the concrete in such a manner and means as will not allow it to be blown off or otherwise dislodged from the concrete surface. Curing procedures shall be maintained continuously for a period of at least 7 days.

2. All methods of curing shall be subject to approval of the Owner's Representative, and each method employed shall be practical and adequate for

the curing required. Curing compounds in lieu of wet curing will not be allowed.

F. Keep permanent temperature records showing date and outside temperature during concreting operations. Thermometer readings shall be taken at start of work in morning, at noon, and again late in afternoon. Locations of concrete placed during such periods shall likewise be recorded in such manner as to show any effect temperatures may have had on construction.

3.6 REMOVAL OF FORMWORK

A. Forms shall not be removed until concrete has attained sufficient strength to support its own weight, construction loads to be placed thereon and lateral loads, without damage to structure or excessive deflection.

B. With the exception of construction joint bulkheads and keyways, forms and supports shall remain in place for not less than the minimum time periods noted below.

1. Unless specifically authorized by the Owner's Representative, forms for vertical surfaces shall not be removed before the concrete has attained a strength of not less than 30 percent of the minimum allowable prescribed compressive strength nor not less than the minimum time period specified in Table D.

2. Unless specifically authorized by the Owner's Representative, forms for horizontal surfaces shall not be removed before the concrete has attained a strength of not less than 60 percent of the minimum allowable prescribed compressive strength nor not less than the minimum time period specified in Table D.

Table D - Minimum Degree Day Requirement for Form Removal

Form Use	Degree-Days
Walls and Vertical Surfaces	200
Elevated Slabs	400
Beams and Girders	600

3. Definition of degree-days - Total number of days times mean daily air temperature at the surface of the concrete. For example, 5 days at temperature of 60°F. equals 300 degree-days. Days or fractions of days in which temperature is below 50°F. shall not be included in calculation of degree-days except where modified by Table C above.

C. Forms for construction joint bulkheads and keyways may be removed the following day, after the concrete pour. Extreme caution must be used to avoid damage to the concrete surface and keyway.

D. Any test cylinders required to verify the specified minimum strengths for form removal shall be field cured under the same conditions as the concrete they represent. Such cylinders and testing shall be at the Contractor's expense.

3.7 FINISHING OF CAST-IN-PLACE CONCRETE

A. Upper Horizontal Surfaces

1. Horizontal surfaces not subjected to wear, such as tops of parapets, copings, walls, etc., shall be formed by placing an excess of material in the forms and removing or striking off such excess with a template, forcing the coarse aggregate below the surface of the mortar.

2. Horizontal surfaces shall be attained by striking off excess concrete and in no case shall concrete be added to the tops of walls, etc., once initial set has taken place.

3. The top of such surfaces shall be finished in a manner as required and dictated by the necessary appearance of the part being finished. For covered surfaces, a wood float finish will in most cases be sufficient. Steel troweling may be necessary where concrete is exposed to view and adjacent surfaces have a steel trowel finish. In other cases, a "broom" finish may be required.

B. Formed Surfaces

1. Immediately after the end of the wet cure period, remove form ties and patch all tie-holes, rat holes, and other surface voids with a non-metallic, non-shrink grout, which most nearly matches the color and texture of the concrete surface. All protrusions shall be ground smooth with an approved mechanical grinder.

C. Surfaces Requiring Rub Finish

1. Rubbed finish of surfaces shall be provided on all poured interior and exterior vertical concrete surfaces and the underside of horizontal surfaces exposed to view, including all building and structure surfaces. Rubbing shall include but not be limited to:

   a. The exterior face of all building foundation walls, platforms and the like, from the top of the walls to 6 inches below grade, the interior faces of all building walls and ceilings, stair risers, retaining walls, stair cheeks, and the like.

2. Surfaces requiring a rubbed finish shall, when completed, shall present a smooth, even textured surface and proper appearance. The Owner's Representative shall be the sole judge of the acceptability of a rubbed finish. Cement utilized in rubbing shall be of the same type manufacturer and source as that used in batching the concrete. The following procedure shall be required for all surfaces requiring a rubbed finish.

   a. Immediately upon removal of the forms, snap all form ties and fill tie holes with non-shrink grout to a point slightly indented from the finished surface. Hand chip all air pockets and laitance covered holes greater than 1/4 inch. A mechanical grinder of a type approved by the Owner's Representative shall then be used to remove any form marks, ribs, or bulges, or other protruding surface defects.

   b. The surface shall then be wetted with clean water and a cement (4 parts), presifted fine sand (5 parts), and water grout shall be evenly

applied utilizing a sponge float filling all exposed voids. The surface shall be rubbed with a burlap bag and allowed to thoroughly dry.

c. The surface shall again be wetted and the grout reapplied with the sponge float and again rubbed with burlap, removing all excess material.

d. After the final rubbing is completed, the surface shall be thoroughly drenched and kept wet for a period of 7 days unless otherwise directed by the Owner's Representative. No other cement powder, grout or other surface coating will be allowed. Plastering of surfaces requiring a rubbed surface will NOT be tolerated.

3.8 REPAIRING OF HARDENED CONCRETE SURFACES

A. Defective concrete and honeycombed areas shall not be patched unless examined and approval is given by the Owner's Representative. After approval, areas involved shall be cut back to a minimum depth of 1 inch from the finished surface, or as otherwise directed, whichever is greater. Edges of areas to be repaired shall be cut square to a minimum depth of 3/4 inch. Feathered edges will not be allowed. Any voids or honeycomb around reinforcing steel shall be chipped away to provide at least 3/4 inch clearance all around to permit proper placement of repair concrete around the steel to the parent, sound concrete.

B. Exposed surfaces shall be thoroughly cleaned of all mud, paint, grime, scum, laitance, organic matter, detritus, calcareous growth and other foreign matter by sand and water blasting or other acceptable means. Immediately after cleaning, the surface shall be checked by the Owner's Representative for proper surface preparation, including fractured concrete or loose aggregate. Any such material shall be removed using pneumatic or hand tools. The final surfaces shall be thoroughly rinsed with clean water to remove remaining dirt and dust.

C. Premoisten the prepared surface for at least 2 hours to reduce the absorption of water by the parent concrete and to provide a reservoir for moist curing at the interface of the repair. The substrate should be saturated surface dry with no standing water. While the concrete surface is still damp, apply a thin 1/16 inch coat of neat cement slurry (mixed to the consistency of a heavy paste) with a bristle brush to provide a bond coat throughout the entire cavity of the repair. Before the slurry has dried or changed color, promptly install the repair concrete or dry-pack, as may be required or selected.

D. For relatively small areas, ram repair concrete into this portion of the formed void. This concrete shall comprise a crumbly-dry 1-1-1.5 mixture of cement, concrete sand and pea gravel (or 3/4 inch gravel) mixed slightly damp to the touch (just short of "balling"). The "dry-pack" consistency of the concrete shall be zero slumps, but moist enough so that when it is rodded and tamped until dense, an excess of paste will appear on the surface in the form of a spider web. In cases of unformed voids of thinner section, do not build-up repair in excess of a depth which will sag with the weight of the fresh mortar or concrete. Trowel smooth with heavy pressure.

E. The concrete shall be of the driest possible consistency and mix composition so that it can be worked into the corners and angles of forms and around the reinforcement,

without permitting the materials to segregate or free water to collect on the surface, due consideration being given to the methods of placing and compacting. Source and mixture of concrete shall be submitted for approval.

F. Concrete shall be deposited continuously, or in layers of such thickness that no concrete will be deposited which has hardened sufficiently to cause the formation of seams and planes of weakness within the section. Concrete shall be thoroughly consolidated and trowelled dense, smooth and plane. Avoid premature and excessive trowelling which could cause sagging.

G. Repair areas and adjacent parent concrete surfaces shall be continuously moist cured immediately after finishing for at least 7 days. Surfaces shall be covered with damp burlap and sealed with taped polyethylene. Membrane curing compounds shall not be used.

H. Leave finished work and adjacent concrete surfaces in a neat, clean condition with no evidence of spillovers or staining.

3.9 CLEANING

A. Concrete surfaces shall be cleaned of objectionable stains as determined by the Owner's Representative. Materials containing acid in any form or methods which will damage the "skin" of concrete surfaces shall not be employed, except where otherwise specified.

END OF SECTION

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