

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES AND
ENVIRONMENTAL CONTROL
CONTRACT # NAT17001-DAMCONST

SPECIFICATIONS
FOR

IMPROVEMENTS TO DELAWARE DAMS

IMPROVEMENTS TO CHIPMANS POND DAM;
IMPROVEMENTS TO CONCORD POND DAM; AND
IMPROVEMENTS TO CRAIGS POND DAM

IN

Towns of Seaford and Laurel
Sussex County, Delaware

Completion Time: 500 Calendar Days

PREPARED
BY

O'Brien & Gere Engineers, Inc.

ISSUED FOR BID
FEBRUARY 9, 2017

FEBRUARY 2017 | 12804 | 61925

**State of Delaware
Department of Natural Resources and
Environmental Control
Contract # NAT17001-DAMCONST
Improvements to Delaware Dams**

**Improvements to Chipmans Pond Dam;
Improvements to Concord Pond Dam; and
Improvements to Craigs Pond Dam**

Prepared for:
Delaware Department of Natural Resources and
Environmental Control



Robert R. Bowers

ROBERT R. BOWERS, P.E., VICE PRESIDENT
O'BRIEN & GERE ENGINEERS, INC.

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- M-1 New Gate and Trash Rack Details

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000 Title Sheet

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- G-1 Abbreviations, Drawing Index & Methods of Sectioning
- G-2 Existing Conditions Site Plan
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- REF-1 Boring Logs

END OF SECTION

INVITATION TO BID

Sealed bids for DNREC Contract No. **NAT17001-DAMCONST – IMPROVEMENTS TO DELAWARE DAMS** will be received by the State of Delaware, Department of Natural Resources and Environmental Control, at the Reception Desk of the Richardson & Robbins Building, 89 Kings Highway, Dover, Delaware 19901 until 3:00 pm local time on Wednesday, March 29, 2017, at which time they will be publicly opened and read aloud in the Auditorium. Bidder bears the risk of late delivery. Any bids received after the stated time will be returned unopened.

The project involves the construction of improvements to Chipmans Pond Dam, Concord Pond Dam and Craigs Pond Dam located in the Towns of Laurel and Seaford, Sussex County. The improvements include, but are not limited to, construction of dam outlet structures including pile foundations, gates, trash racks, concrete slabs and pile caps, spillway modifications, riprap and associated site work. Completion of all work shall be completed within 500 calendar days of the Notice to Proceed.

A **MANDATORY** Pre-Bid Meeting will be held on Wednesday, March 8, 2017, at 10:00 am local time in the Auditorium at the Richardson & Robbins Building, 89 Kings Highway, Dover, Delaware 19901 for the purpose of establishing the listing of subcontractors and to answer questions. Representatives of each party to any Joint Venture must attend this meeting. **ATTENDANCE AT THIS MEETING IS A PREREQUISITE FOR BIDDING ON THIS CONTRACT.**

Sealed bids shall be addressed to the Department of Natural Resources and Environmental Control, 89 Kings Highway, Dover, Delaware 19901, Attention: Janice L Shute, PE. The outer envelope should clearly indicate: **"CONTRACT NO. NAT17001-DAMCONST – IMPROVEMENTS TO DELAWARE DAMS - SEALED BID - DO NOT OPEN."**

Contract documents may be obtained at the office of the Department of Natural Resources and Environmental Control, 89 Kings Highway, Dover, DE 19901, from Coleen Ponden, upon receipt of \$50 per set, non-refundable. Checks are to be made payable to "DNREC".

Construction documents will be available for review at the following locations:

New Castle Conservation District, Dam Safety Program Office, 2430 Old County Road, Newark, DE 19702; Kent Conservation District, 800 Bay Road, Suite 2, Dover, DE 19901; DNREC Drainage Program, 21309 Berlin Road, Unit 6, Georgetown, DE 19947.

Bidders will not be subject to discrimination on the basis of race, creed, color, sex, sexual orientation, gender identity or national origin in consideration of this award, and Minority Business Enterprises, Disadvantaged Business Enterprises, Women-Owned Business Enterprises and Veteran-Owned Business Enterprises will be afforded full opportunity to submit bids on this contract. Each bid must be accompanied by a bid security equivalent to ten percent of the bid amount and all additive alternates. The successful bidder must post a performance bond and payment bond in a sum equal to 100 percent of the contract price upon execution of the contract. The Owner reserves the right to reject any or all bids and to waive any informalities therein. The Owner may extend the time and place for the opening of the bids from that described in the advertisement, with not less than two calendar days' notice by certified delivery, facsimile machine or other electronic means to those bidders receiving plans.

END OF ADVERTISEMENT FOR BIDS

INSTRUCTIONS TO BIDDERS

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4. BIDDING PROCEDURES
5. CONSIDERATION OF BIDS
6. POST-BID INFORMATION
7. PERFORMANCE BOND AND PAYMENT BOND
8. FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

ARTICLE 1: GENERAL**1.1 DEFINITIONS**

1.1.1 Whenever the following terms are used, their intent and meaning shall be interpreted as follows:

1.2 STATE: The State of Delaware.

1.3 AGENCY: Contracting State Agency as noted on cover sheet.

1.4 DESIGNATED OFFICIAL: The agent authorized to act for the Agency.

1.5 BIDDING DOCUMENTS: Bidding Documents include the Bidding Requirements and the proposed Contract Documents. The Bidding Requirements consist of the Advertisement for Bid, Invitation to Bid, Instructions to Bidders, Supplementary Instructions to Bidders (if any), General Conditions, Supplementary General Conditions, General Requirements, Special Provisions (if any), the Bid Form (including the Non-collusion Statement), and other sample bidding and contract forms. The proposed Contract Documents consist of the form of Agreement between the Owner and Contractor, as well as the Drawings, Specifications (Project Manual) and all Addenda issued prior to execution of the Contract.

1.6 CONTRACT DOCUMENTS: The Contract Documents consist of the, Instructions to Bidders, Supplementary Instructions to Bidders (if any), General Conditions, Supplementary General Conditions, General Requirements, Special Provisions (if any), the form of agreement between the Owner and the Contractor, Drawings (if any), Specifications (Project Manual), and all addenda.

1.7 AGREEMENT: The form of the Agreement shall be AIA Document A101, Standard Form of Agreement between Owner and Contractor where the basis of payment is a STIPULATED SUM. In the case of conflict between the instructions contained therein and the General Requirements herein, these General Requirements shall prevail.

1.8 GENERAL REQUIREMENTS (or CONDITIONS): General Requirements (or conditions) are instructions pertaining to the Bidding Documents and to contracts in general. They contain, in summary, requirements of laws of the State; policies of the Agency and instructions to bidders.

1.9 SPECIAL PROVISIONS: Special Provisions are specific conditions or requirements peculiar to the bidding documents and to the contract under consideration and are supplemental to the General Requirements. Should the Special Provisions conflict with the General Requirements, the Special Provisions shall prevail.

1.10 ADDENDA: Written or graphic instruments issued by the Owner/Architect prior to the execution of the contract which modify or interpret the Bidding Documents by additions, deletions, clarifications or corrections.

1.11 BIDDER OR VENDOR: A person or entity who formally submits a Bid for the material or Work contemplated, acting directly or through a duly authorized representative who meets the requirements set forth in the Bidding Documents.

1.12 SUB-BIDDER: A person or entity who submits a Bid to a Bidder for materials or labor, or both for a portion of the Work.

1.13 BID: A complete and properly executed proposal to do the Work for the sums stipulated therein, submitted in accordance with the Bidding Documents.

- 1.14 BASE BID: The sum stated in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents as the base, to which Work may be added or from which Work may be deleted for sums stated in Alternate Bids (if any are required to be stated in the bid).
- 1.15 ALTERNATE BID (or ALTERNATE): An amount stated in the Bid, where applicable, to be added to or deducted from the amount of the Base Bid if the corresponding change in the Work, as described in the Bidding Documents is accepted.
- 1.16 UNIT PRICE: An amount stated in the Bid, where applicable, as a price per unit of measurement for materials, equipment or services or a portion of the Work as described in the Bidding Documents.
- 1.17 SURETY: The corporate body which is bound with and for the Contract, or which is liable, and which engages to be responsible for the Contractor's payments of all debts pertaining to and for his acceptable performance of the Work for which he has contracted.
- 1.18 BIDDER'S DEPOSIT: The security designated in the Bid to be furnished by the Bidder as a guaranty of good faith to enter into a contract with the Agency if the Work to be performed or the material or equipment to be furnished is awarded to him.
- 1.19 CONTRACT: The written agreement covering the furnishing and delivery of material or work to be performed.
- 1.20 CONTRACTOR: Any individual, firm or corporation with whom a contract is made by the Agency.
- 1.21 SUBCONTRACTOR: An individual, partnership or corporation which has a direct contract with a contractor to furnish labor and materials at the job site, or to perform construction labor and furnish material in connection with such labor at the job site.
- 1.22 CONTRACT BOND: The approved form of security furnished by the contractor and his surety as a guaranty of good faith on the part of the contractor to execute the work in accordance with the terms of the contract.

ARTICLE 2: BIDDER'S REPRESENTATIONS

- 2.1 PRE-BID MEETING
- 2.1.1 A pre-bid meeting for this project will be held at the time and place designated. Attendance at this meeting is a pre-requisite for submitting a Bid, unless this requirement is specifically waived elsewhere in the Bid Documents.
- 2.2 By submitting a Bid, the Bidder represents that:
- 2.2.1 The Bidder has read and understands the Bidding Documents and that the Bid is made in accordance therewith.
- 2.2.2 The Bidder has visited the site, become familiar with existing conditions under which the Work is to be performed, and has correlated the Bidder's his personal observations with the requirements of the proposed Contract Documents.
- 2.2.3 The Bid is based upon the materials, equipment, and systems required by the Bidding Documents without exception.

2.3 JOINT VENTURE REQUIREMENTS

- 2.3.1 For Public Works Contracts, each Joint Venturer shall be qualified and capable to complete the Work with their own forces.
- 2.3.2 Included with the Bid submission, and as a requirement to bid, a copy of the executed Joint Venture Agreement shall be submitted and signed by all Joint Venturers involved.
- 2.3.3 All required Bid Bonds, Performance Bonds, Material and Labor Payment Bonds must be executed by both Joint Venturers and be placed in both of their names.
- 2.3.4 All required insurance certificates shall name both Joint Venturers.
- 2.3.5 Both Joint Venturers shall sign the Bid Form and shall submit a copy of a valid Delaware Business License with their Bid.
- 2.3.6 Both Joint Venturers shall include their Federal E.I. Number with the Bid.
- 2.3.7 In the event of a mandatory Pre-bid Meeting, each Joint Venturer shall have a representative in attendance.
- 2.3.8 Due to exceptional circumstances and for good cause shown, one or more of these provisions may be waived at the discretion of the State.

2.4 ASSIGNMENT OF ANTITRUST CLAIMS

- 2.4.1 As consideration for the award and execution by the Owner of this contract, the Contractor hereby grants, conveys, sells, assigns and transfers to the State of Delaware all of its right, title and interests in and to all known or unknown causes of action it presently has or may now or hereafter acquire under the antitrust laws of the United States and the State of Delaware, relating to the particular goods or services purchased or acquired by the Owner pursuant to this contract.

ARTICLE 3: BIDDING DOCUMENTS**3.1 COPIES OF BID DOCUMENTS**

- 3.1.1 Bidders may obtain complete sets of the Bidding Documents from the Architectural/Engineering firm designated in the Advertisement or Invitation to Bid in the number and for the deposit sum, if any, stated therein.
- 3.1.2 Bidders shall use complete sets of Bidding Documents for preparation of Bids. The issuing Agency nor the Architect assumes no responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.
- 3.1.3 Any errors, inconsistencies or omissions discovered shall be reported to the Architect immediately.
- 3.1.4 The Agency and Architect may make copies of the Bidding Documents available on the above terms for the purpose of obtaining Bids on the Work. No license or grant of use is conferred by issuance of copies of the Bidding Documents.

3.2 INTERPRETATION OR CORRECTION OF BIDDING DOCUMENTS

- 3.2.1 The Bidder shall carefully study and compare the Bidding Documents with each other, and with other work being bid concurrently or presently under construction to the extent that it relates to the Work for which the Bid is submitted, shall examine the site and local conditions, and shall report any errors, inconsistencies, or ambiguities discovered to the Architect.
- 3.2.2 Bidders or Sub-bidders requiring clarification or interpretation of the Bidding Documents shall make a written request to the Architect at least seven days prior to the date for receipt of Bids. Interpretations, corrections and changes to the Bidding Documents will be made by written Addendum. Interpretations, corrections, or changes to the Bidding Documents made in any other manner shall not be binding.
- 3.2.3 The apparent silence of the specifications as to any detail, or the apparent omission from it of detailed description concerning any point, shall be regarded as meaning that only the best commercial practice is to prevail and only material and workmanship of the first quality are to be used. Proof of specification compliance will be the responsibility of the Bidder.
- 3.2.4 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for all permits, labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for the proper execution and completion of the Work.
- 3.2.5 The Owner will bear the costs for all impact and user fees associated with the project.

3.3 SUBSTITUTIONS

- 3.3.1 The materials, products and equipment described in the Bidding Documents establish a standard of quality, required function, dimension, and appearance to be met by any proposed substitution. The specification of a particular manufacturer or model number is not intended to be proprietary in any way. Substitutions of products for those named will be considered, providing that the Vendor certifies that the function, quality, and performance characteristics of the material offered is equal or superior to that specified. It shall be the Bidder's responsibility to assure that the proposed substitution will not affect the intent of the design, and to make any installation modifications required to accommodate the substitution.
- 3.3.2 Requests for substitutions shall be made in writing to the Architect at least ten days prior to the date of the Bid Opening. Such requests shall include a complete description of the proposed substitution, drawings, performance and test data, explanation of required installation modifications due the substitution, and any other information necessary for an evaluation. The burden of proof of the merit of the proposed substitution is upon the proposer. The Architect's decision of approval or disapproval shall be final. The Architect is to notify Owner prior to any approvals.
- 3.3.3 If the Architect approves a substitution prior to the receipt of Bids, such approval shall be set forth in an Addendum. Approvals made in any other manner shall not be binding.
- 3.3.4 The Architect shall have no obligation to consider any substitutions after the Contract award.

3.4 ADDENDA

- 3.4.1 Addenda will be mailed or delivered to all who are known by the Architect to have received a complete set of the Bidding Documents.

- 3.4.2 Copies of Addenda will be made available for inspection wherever Bidding Documents are on file for that purpose.
- 3.4.3 No Addenda will be issued later than 4 days prior to the date for receipt of Bids except an Addendum withdrawing the request for Bids or one which extends the time or changes the location for the opening of bids.
- 3.4.4 Each bidder shall ascertain prior to submitting his Bid that they have received all Addenda issued, and shall acknowledge their receipt in their Bid in the appropriate space. Not acknowledging an issued Addenda could be grounds for determining a bid to be non-responsive.

ARTICLE 4: BIDDING PROCEDURES

4.1 PREPARATION OF BIDS

- 4.1.1 Submit the bids on the Bid Forms included with the Bidding Documents.
- 4.1.2 Submit the original Bid Form for each bid. Bid Forms may be removed from the project manual for this purpose.
- 4.1.3 Execute all blanks on the Bid Form in a non-erasable medium (typewriter or manually in ink).
- 4.1.4 Where so indicated by the makeup on the Bid Form, express sums in both words and figures, in case of discrepancy between the two, the written amount shall govern.
- 4.1.5 Interlineations, alterations or erasures must be initialed by the signer of the Bid.
- 4.1.6 BID ALL REQUESTED ALTERNATES AND UNIT PRICES, IF ANY. If there is no change in the Base Bid for an Alternate, enter "No Change". The Contractor is responsible for verifying that they have received all addenda issued during the bidding period. Work required by Addenda shall automatically become part of the Contract.
- 4.1.7 Make no additional stipulations on the Bid Form and do not qualify the Bid in any other manner.
- 4.1.8 Each copy of the Bid shall include the legal name of the Bidder and a statement whether the Bidder is a sole proprietor, a partnership, a corporation, or any legal entity, and each copy shall be signed by the person or persons legally authorized to bind the Bidder to a contract. A Bid by a corporation shall further give the state of incorporation and have the corporate seal affixed. A Bid submitted by an agent shall have a current Power of Attorney attached, certifying agent's authority to bind the Bidder.
- 4.1.9 Bidder shall complete the Non-Collusion Statement form included with the Bid Forms and include it with their Bid.
- 4.1.10 In the construction of all Public Works projects for the State of Delaware or any agency thereof, preference in employment of laborers, workers or mechanics shall be given to bona fide legal citizens of the State who have established citizenship by residence of at least 90 days in the State.
- 4.1.11 Each bidder shall include in their bid a copy of a valid Delaware Business License.'
- 4.1.12 Each bidder shall include signed Affidavit(s) for the Bidder and each listed Subcontractor certifying compliance with OMB Regulation 4104- "Regulations for the Drug Testing of Contractor and Subcontractor Employees Working on "Large Public Works Projects." "Large Public Works" is based upon the current threshold required for bidding Public Works as set by the Purchasing and Contracting Advisory Council.

4.2 BID SECURITY

4.2.1 All bids shall be accompanied by a deposit of either a good and sufficient bond to the agency for the benefit of the agency, with corporate surety authorized to do business in this State, the form of the bond and the surety to be approved by the agency, or a security of the bidder assigned to the agency, for a sum equal to at least 10% of the bid plus all add alternates, or in lieu of the bid bond a security deposit in the form of a certified check, bank treasurer's check, cashier's check, money order, or other prior approved secured deposit assigned to the State. The bid bond need not be for a specific sum, but may be stated to be for a sum equal to 10% of the bid plus all add alternates to which it relates and not to exceed a certain stated sum, if said sum is equal to at least 10% of the bid. The Bid Bond form used shall be the standard OMB form (attached).

4.2.2 The Agency has the right to retain the bid security of Bidders to whom an award is being considered until either a formal contract has been executed and bonds have been furnished or the specified time has elapsed so the Bids may be withdrawn or all Bids have been rejected.

4.2.3 In the event of any successful Bidder refusing or neglecting to execute a formal contract and bond within 20 days of the awarding of the contract, the bid bond or security deposited by the successful bidder shall be forfeited.

4.3 SUBCONTRACTOR LIST

4.3.1 As required by Delaware Code, Title 29, section 6962(d)(10)b, each Bidder shall submit with their Bid a completed List of Sub-Contractors included with the Bid Form. NAME ONLY ONE SUBCONTRACTOR FOR EACH TRADE. A Bid will be considered non-responsive unless the completed list is included.

4.3.2 Provide the Name and Address for each listed subcontractor. Addresses by City, Town or Locality, plus State, will be acceptable.

4.3.3 It is the responsibility of the Contractor to ensure that their Subcontractors are in compliance with the provisions of this law. Also, if a Contractor elects to list themselves as a Subcontractor for any category, they must specifically name themselves on the Bid Form and be able to document their capability to act as Subcontractor in that category in accordance with this law.

4.4 EQUALITY OF EMPLOYMENT OPPORTUNITY ON PUBLIC WORKS

4.4.1 During the performance of this contract, the contractor agrees as follows:

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

B. The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive

consideration for employment without regard to race, creed, sex, color, sexual orientation, gender identity or national origin."

4.5 PREVAILING WAGE REQUIREMENT

4.5.1 Wage Provisions: For renovation and new construction projects whose costs exceed the thresholds contained in Delaware Code, Title 29, Section 6960, the minimum wage rates for various classes of laborers and mechanics shall be as determined by the Department of Labor, Division of Industrial Affairs of the State of Delaware.

4.5.2 The employer shall pay all mechanics and labors employed directly upon the site of work, unconditionally and not less often than once a week and without subsequent deduction or rebate on any account, the full amounts accrued at time of payment, computed at wage rates not less than those stated in the specifications, regardless of any contractual relationship which may be alleged to exist between the employer and such laborers and mechanics.

4.5.3 The scale of the wages to be paid shall be posted by the employer in a prominent and easily accessible place at the site of the work.

4.5.4 Every contract based upon these specifications shall contain a stipulation that sworn payroll information, as required by the Department of Labor, be furnished weekly. The Department of Labor shall keep and maintain the sworn payroll information for a period of 6 months from the last day of the work week covered by the payroll.

4.6 SUBMISSION OF BIDS

4.6.1 Enclose the Bid, the Bid Security, and any other documents required to be submitted with the Bid in a sealed opaque envelope. Address the envelope to the party receiving the Bids. Identify with the project name, project number, and the Bidder's name and address. If the Bid is sent by mail, enclose the sealed envelope in a separate mailing envelope with the notation "BID ENCLOSED" on the face thereof. The State is not responsible for the opening of bids prior to bid opening date and time that are not properly marked.

4.6.2 Deposit Bids at the designated location prior to the time and date for receipt of bids indicated in the Advertisement for Bids. Bids received after the time and date for receipt of bids will be marked "LATE BID" and returned.

4.6.3 Bidder assumes full responsibility for timely delivery at location designated for receipt of bids.

4.6.4 Oral, telephonic or telegraphic bids are invalid and will not receive consideration.

4.6.5 Withdrawn Bids may be resubmitted up to the date and time designated for the receipt of Bids, provided that they are then fully in compliance with these Instructions to Bidders.

4.7 MODIFICATION OR WITHDRAW OF BIDS

4.7.1 Prior to the closing date for receipt of Bids, a Bidder may withdraw a Bid by personal request and by showing proper identification to the Architect. A request for withdraw by letter or fax, if the Architect is notified in writing prior to receipt of fax, is acceptable. A fax directing a modification in the bid price will render the Bid informal, causing it to be ineligible for consideration of award. Telephone directives for modification of the bid price shall not be permitted and will have no bearing on the submitted proposal in any manner.

4.7.2 Bidders submitting Bids that are late shall be notified as soon as practicable and the bid shall be returned.

- 4.7.3 A Bid may not be modified, withdrawn or canceled by the Bidder during a thirty (30) day period following the time and date designated for the receipt and opening of Bids, and Bidder so agrees in submitting their Bid. Bids shall be binding for 30 days after the date of the Bid opening.

ARTICLE 5: CONSIDERATION OF BIDS

5.1 OPENING/REJECTION OF BIDS

- 5.1.1 Unless otherwise stated, Bids received on time will be publicly opened and will be read aloud. An abstract of the Bids will be made available to Bidders.

- 5.1.2 The Agency shall have the right to reject any and all Bids. A Bid not accompanied by a required Bid Security or by other data required by the Bidding Documents, or a Bid which is in any way incomplete or irregular is subject to rejection.

- 5.1.3 If the Bids are rejected, it will be done within thirty (30) calendar day of the Bid opening.

5.2 COMPARISON OF BIDS

- 5.2.1 After the Bids have been opened and read, the bid prices will be compared and the result of such comparisons will be made available to the public. Comparisons of the Bids may be based on the Base Bid plus desired Alternates. The Agency shall have the right to accept Alternates in any order or combination.

- 5.2.2 The Agency reserves the right to waive technicalities, to reject any or all Bids, or any portion thereof, to advertise for new Bids, to proceed to do the Work otherwise, or to abandon the Work, if in the judgment of the Agency or its agent(s), it is in the best interest of the State.

- 5.2.3 An increase or decrease in the quantity for any item is not sufficient grounds for an increase or decrease in the Unit Price.

- 5.2.4 The prices quoted are to be those for which the material will be furnished F.O.B. Job Site and include all charges that may be imposed during the period of the Contract.

- 5.2.5 No qualifying letter or statements in or attached to the Bid, or separate discounts will be considered in determining the low Bid except as may be otherwise herein noted. Cash or separate discounts should be computed and incorporated into Unit Bid Price(s).

5.3 DISQUALIFICATION OF BIDDERS

- 5.3.1 An agency shall determine that each Bidder on any Public Works Contract is responsible before awarding the Contract. Factors to be considered in determining the responsibility of a Bidder include:

- A. The Bidder's financial, physical, personnel or other resources including Subcontracts;
- B. The Bidder's record of performance on past public or private construction projects, including, but not limited to, defaults and/or final adjudication or admission of violations of the Prevailing Wage Laws in Delaware or any other state;
- C. The Bidder's written safety plan;
- D. Whether the Bidder is qualified legally to contract with the State;

- E. Whether the Bidder supplied all necessary information concerning its responsibility; and,
- F. Any other specific criteria for a particular procurement, which an agency may establish; provided however, that, the criteria be set forth in the Invitation to Bid and is otherwise in conformity with State and/or Federal law.

5.3.2 If an agency determines that a Bidder is nonresponsive and/or nonresponsible, the determination shall be in writing and set forth the basis for the determination. A copy of the determination shall be sent to the affected Bidder within five (5) working days of said determination.

5.3.3 In addition, any one or more of the following causes may be considered as sufficient for the disqualification of a Bidder and the rejection of their Bid or Bids.

5.3.3.1 More than one Bid for the same Contract from an individual, firm or corporation under the same or different names.

5.3.3.2 Evidence of collusion among Bidders.

5.3.3.3 Unsatisfactory performance record as evidenced by past experience.

5.3.3.4 If the Unit Prices are obviously unbalanced either in excess or below reasonable cost analysis values.

5.3.3.5 If there are any unauthorized additions, interlineation, conditional or alternate bids or irregularities of any kind which may tend to make the Bid incomplete, indefinite or ambiguous as to its meaning.

5.3.3.6 If the Bid is not accompanied by the required Bid Security and other data required by the Bidding Documents.

5.3.3.7 If any exceptions or qualifications of the Bid are noted on the Bid Form.

5.4 ACCEPTANCE OF BID AND AWARD OF CONTRACT

5.4.1 A formal Contract shall be executed with the successful Bidder within twenty (20) calendar days after the award of the Contract.

5.4.2 Per Section 6962(d)(13) a., Title 29, Delaware Code, "The contracting agency shall award any public works contract within thirty (30) days of the bid opening to the lowest responsive and responsible Bidder, unless the Agency elects to award on the basis of best value, in which case the election to award on the basis of best value shall be stated in the Invitation To Bid."

5.4.3 Each Bid on any Public Works Contract must be deemed responsive by the Agency to be considered for award. A responsive Bid shall conform in all material respects to the requirements and criteria set forth in the Contract Documents and specifications.

5.4.4 The Agency shall have the right to accept Alternates in any order or combination, and to determine the low Bidder on the basis of the sum of the Base Bid, plus accepted Alternates.

- 5.4.5 The successful Bidder shall execute a formal contract, submit the required Insurance Certificate, and furnish good and sufficient bonds, unless specifically waived in the General Requirements, in accordance with the General Requirement, within twenty (20) days of official notice of contract award. The successful Bidder shall provide two business days prior to contract execution, copies of the Employee Drug Testing Program for the Bidder and all listed Subcontractors. Bonds shall be for the benefit of the Agency with surety in the amount of 100% of the total contract award. Said Bonds shall be conditioned upon the faithful performance of the contract. Bonds shall remain in affect for period of one year after the date of substantial completion.
- 5.4.6 If the successful Bidder fails to execute the required Contract, Bond and all required information, as aforesaid, within twenty (20) calendar days after the date of official Notice of the Award of the Contract, their Bid guaranty shall immediately be taken and become the property of the State for the benefit of the Agency as liquidated damages, and not as a forfeiture or as a penalty. Award will then be made to the next lowest qualified Bidder of the Work or readvertised, as the Agency may decide.
- 5.4.7 Each bidder shall supply with its bid its taxpayer identification number (i.e., federal employer identification number or social security number) and a copy of its Delaware business license, and should the vendor be awarded a contract, such vendor shall provide to the agency the taxpayer identification license numbers of such subcontractors. Such numbers shall be provided on the later of the date on which such subcontractor is required to be identified or the time the contract is executed. The successful Bidder shall provide to the agency to which it is contracting, within 30 days of entering into such public works contract, copies of all Delaware Business licenses of subcontractors and/or independent contractors that will perform work for such public works contract. However, if a subcontractor or independent contractor is hired or contracted more than 20 days after the Bidder entered the public works contract the Delaware Business license of such subcontractor or independent contractor shall be provided to the agency within 10 days of being contracted or hired.
- 5.4.8 The Bid Security shall be returned to the successful Bidder upon the execution of the formal contract. The Bid Securities of unsuccessful bidders shall be returned within thirty (30) calendar days after the opening of the Bids.

ARTICLE 6: POST-BID INFORMATION

- 6.1 CONTRACTOR'S QUALIFICATION STATEMENT
- 6.1.1 Bidders to whom award of a Contract is under consideration shall, if requested by the Agency, submit a properly executed AIA Document A305, Contractor's Qualification Statement, unless such a statement has been previously required and submitted.
- 6.2 BUSINESS DESIGNATION FORM
- 6.2.1 Successful bidder shall be required to accurately complete an Office of Management and Budget Business Designation Form for Subcontractors.

ARTICLE 7: PERFORMANCE BOND AND PAYMENT BOND

- 7.1 BOND REQUIREMENTS
- 7.1.1 The cost of furnishing the required Bonds, that are stipulated in the Bidding Documents, shall be included in the Bid.
- 7.1.2 If the Bidder is required by the Agency to secure a bond from other than the Bidder's usual sources, changes in cost will be adjusted as provide in the Contract Documents.

7.1.3 The Performance and Payment Bond forms used shall be the standard OMB forms (attached).

7.2 TIME OF DELIVERY AND FORM OF BONDS

7.2.1 The bonds shall be dated on or after the date of the Contract.

7.2.2 The Bidder shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix a certified and current copy of the power of attorney.

ARTICLE 8: FORM OF AGREEMENT BETWEEN AGENCY AND CONTRACTOR

8.1 Unless otherwise required in the Bidding Documents, the Agreement for the Work will be written on AIA Document A101, Standard Form of Agreement Between Owner and Contractor Where the Basis of Payment is a Stipulated Sum.

END OF INSTRUCTIONS TO BIDDERS

SECTION 00 31 32

GEOTECHNICAL DATA

A. GENERAL

1. This Document with its referenced attachments is part of the Procurement and Contracting Requirements for Project. They provide Owner's information for Bidders' convenience and are intended to supplement rather than serve in lieu of Bidders' own investigations. They are made available for Bidders' convenience and information, but are not a warranty of existing conditions. This Document and its attachments are not part of the Contract Documents.
2. Soil-boring data for Project, obtained by the Engineer, is included on the Contract Drawings.

END OF SECTION

IMPROVEMENTS TO DELAWARE DAMS
CHIPMANS POND DAM/CONCORD POND DAM/CRAIGS POND DAM
LAUREL AND SEAFORD, DE
NAT17001-DAMCONST

BID FORM

For Bids Due: _____

To: Delaware Department of Natural Resources and
Environmental Control
Division of Fish and Wildlife
89 Kings Highway
Dover, DE 19901

Name of Bidder: _____

Delaware Business License No.: _____ Taxpayer ID No.: _____
(A copy of Bidder's Delaware Business License must be attached to this form.)

(Other License Nos.): _____

Phone No.: () _____ - _____ Fax No.: () _____ - _____

The undersigned, representing that he has read and understands the Bidding Documents and that this bid is made in accordance therewith, that he has visited the site and has familiarized himself with the local conditions under which the Work is to be performed, and that his bid is based upon the materials, systems and equipment described in the Bidding Documents without exception, hereby proposes and agrees to provide all labor, materials, plant, equipment, supplies, transport and other facilities required to execute the work described by the aforesaid documents for the lump sum itemized below:

Item 1 – Mobilization and Demobilization at a Fixed Maximum Lump Sum Price of:

\$ _____
(\$ 75,000.00)

Item 2 – Improvements to Chipmans Pond Dam at the Lump Sum Price of:

\$ _____
(\$)

Item 3 – Improvements to Concord Pond Dam at the Lump Sum Price of:

\$ _____
(\$)

Item 4 – Improvements to Craigs Pond Dam at the Lump Sum Price of:

\$ _____
(\$)

GRAND TOTAL BID (Sum of Items 1 through 4)

\$ _____
(\$)

IMPROVEMENTS TO DELAWARE DAMS
CHIPMANS POND DAM/CONCORD POND DAM/CRAIGS POND DAM
LAUREL AND SEAFORD, DE
NAT17001-DAMCONST

BID FORM

ALTERNATES

Alternate prices conform to applicable project specification section. Refer to specifications for a complete description of the following Alternates. An “ADD” or “DEDUCT” amount is indicated by the crossed out part that does not apply.

ALTERNATE No. 1: Improvements to Concord Pond Dam – Delete Construction of Improvements to Southwest Gates

Add/Deduct: _____
(\$ _____)

UNIT PRICES

Unit prices conform to applicable project specification section. Refer to the specifications for a complete description of the following Unit Prices:

UNIT PRICE NO.	BRIEF DESCRIPTION	QUANTITY	UNIT PRICE	EXTENSION
1	Steel H Piles driven below tip elevations shown on the Contract Drawings	80 LF	\$ 75.00	\$6,000.00
2	Splice Steel H Piles as required when driven below tip elevations shown on the Contract Drawings under Unit Price Item No. 1	4 EA	\$375.00	\$1,500.00
3	Concrete Filled Steel Piles driven below tip elevations shown on the Contract Drawings	80 LF	\$ 75.00	\$6,000.00
4	Splice Concrete Filled Steel Piles as required when driven below the tip elevations shown on the Contract Drawings under Unit Price Item No. 3	4 EA	\$375.00	\$1,500.00
5	Additional R-7 Riprap	50 TONS	\$ 60.00	\$3,000.00
6	Additional DelDOT Type B Graded Aggregate	75 CY	\$ 50.00	\$3,750.00
7	Additional DelDOT Type B Hot Mix Asphalt	100 TONS	\$ 80.00	\$8,000.00
8	Additional DelDOT Type C Hot Mix Asphalt	30 TONS	\$ 90.00	\$2,700.00
9	Additional DelDOT Class A Concrete	30 CY	\$ 750.00	\$22,500.00

IMPROVEMENTS TO DELAWARE DAMS
CHIPMANS POND DAM/CONCORD POND DAM/CRAIGS POND DAM
LAUREL AND SEAFORD, DE
NAT17001-DAMCONST

BID FORM

UNIT PRICES (continued)

UNIT PRICE NO.	BRIEF DESCRIPTION	QUANTITY	UNIT PRICE	EXTENSION
10	Additional Excavation	50 CY	\$ 20.00	\$1,000.00
11	Additional Non-Woven Geotextile	250 SY	\$ 2.00	\$500.00

ALLOWANCES

Allowances conform to applicable project specification section. Refer to specifications for a complete description of the following Allowances.

Allowances are to be used to address additional scope of work including, but not limited to, potential repairs, rehabilitation or other additional work that may be identified by the Owner after Contract Award and after control of water measures have been installed and submerged work areas dewatered. Allowances will not be used for work identified by the Owner as Lump Sum or Unit Price Items.

ALLOWANCE No. 1: Contingency Allowance for additional work at Chipmans Pond Dam, Concord Pond Dam and Craigs Pond Dam.

\$ Seventy-five thousand dollars and Zero cents
(\$ 75,000.00)

IMPROVEMENTS TO DELAWARE DAMS
CHIPMANS POND DAM/CONCORD POND DAM/CRAIGS POND DAM
LAUREL AND SEAFORD, DE
NAT17001-DAMCONST

BID FORM

I/We acknowledge Addendums numbered _____ and the price(s) submitted include any cost/schedule impact they may have.

This bid shall remain valid and cannot be withdrawn for thirty (30) days from the date of opening of bids (60 days for School Districts and Department of Education), and the undersigned shall abide by the Bid Security forfeiture provisions. Bid Security is attached to this Bid.

The Owner shall have the right to reject any or all bids, and to waive any informality or irregularity in any bid received.

This bid is based upon work being accomplished by the Sub-Contractors named on the list attached to this bid.

Should I/We be awarded this contract, I/We pledge to achieve substantial completion of all the work within five hundred (500) calendar days of the Notice to Proceed.

The undersigned represents and warrants that he has complied and shall comply with all requirements of local, state, and national laws; that no legal requirement has been or shall be violated in making or accepting this bid, in awarding the contract to him or in the prosecution of the work required; that the bid is legal and firm; that he has not, directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken action in restraint of free competitive bidding.

Upon receipt of written notice of the acceptance of this Bid, the Bidder shall, within twenty (20) calendar days, execute the agreement in the required form and deliver the Contract Bonds, and Insurance Certificates, required by the Contract Documents.

I am / We are an Individual / a Partnership / a Corporation

By _____ Trading as _____
(Individual's / General Partner's / Corporate Name)

(State of Corporation)

Business Address: _____

Witness: _____ **By:** _____
(SEAL) (Authorized Signature)

(Title)
Date: _____

ATTACHMENTS

Sub-Contractor List
Non-Collusion Statement
Affidavit(s) of Employee Drug Testing Program
Bid Security
Summary Control of Water Plan for Chipmans Pond Dam

IMPROVEMENTS TO DELAWARE DAMS
CHIPMANS POND DAM/CONCORD POND DAM/CRAIGS POND DAM
LAUREL AND SEAFORD, DE
NAT17001-DAMCONST

BID FORM

SUBCONTRACTOR LIST

In accordance with Title 29, Chapter 6962 (d)(10)b Delaware Code, the following sub-contractor listing must accompany the bid submittal. The name and address of the sub-contractor **must be listed for each category** where the bidder intends to use a sub-contractor to perform that category of work. In order to provide full disclosure and acceptance of the bid by the *Owner*, **it is required that bidders list themselves as being the sub-contractor for all categories where he/she is qualified and intends to perform such work.** This form must be filled out completely with no additions or deletions. **Note that all subcontractors listed below must have a signed Affidavit of Employee Drug Testing Program included with this bid.**

<u>Subcontractor Category</u>	<u>Subcontractor</u>	<u>Address (City & State)</u>	<u>Subcontractors tax payer ID # or Delaware Business license #</u>
1. Traffic Control	_____	_____	_____
2. Structural Steel/Metal Fabrication	_____	_____	_____
3. Structural Steel Erection	_____	_____	_____
4. Water Control Gate Manufacturer/Supplier	_____	_____	_____
5. Pile Driving – Steel H-Piles And Concrete Filled Piles	_____	_____	_____
6. Sheet Pile Driving	_____	_____	_____
7. Control of Water	_____	_____	_____
8. Concrete, Including Repairs And Rehabilitation	_____	_____	_____
9. Hot Mix Asphalt Paving	_____	_____	_____

IMPROVEMENTS TO DELAWARE DAMS
CHIPMANS POND DAM/CONCORD POND DAM/CRAIGS POND DAM
LAUREL AND SEAFORD, DE
NAT17001-DAMCONST

BID FORM

NON-COLLUSION STATEMENT

This is to certify that the undersigned bidder has neither directly nor indirectly, entered into any agreement, participated in any collusion or otherwise taken any action in restraint of free competitive bidding in connection with this proposal submitted this date (*to the Office of Management and Budget, Division of Facilities Management*).

All the terms and conditions of (*Project or Contract Number*) have been thoroughly examined and are understood.

NAME OF BIDDER: _____

**AUTHORIZED REPRESENTATIVE
(TYPED):** _____

**AUTHORIZED REPRESENTATIVE
(SIGNATURE):** _____

TITLE: _____

ADDRESS OF BIDDER: _____

E-MAIL: _____

PHONE NUMBER: _____

Sworn to and Subscribed before me this _____ day of _____ 20____.

My Commission expires _____. NOTARY PUBLIC _____.

THIS PAGE MUST BE SIGNED AND NOTARIZED FOR YOUR BID TO BE CONSIDERED.

IMPROVEMENTS TO DELAWARE DAMS
CHIPMANS POND DAM/CONCORD POND DAM/CRAIGS POND DAM
LAUREL AND SEAFORD, DE
NAT17001-DAMCONST

**AFFIDAVIT
OF
EMPLOYEE DRUG TESTING PROGRAM**

4104 Regulations for the Drug Testing of Contractor and Subcontractor Employees Working on Large Public Works Projects requires that Contractors and Subcontractors implement a program of mandatory drug testing for Employees who work on Large Public Works Contracts funded all or in part with public funds.

We hereby certify that we have in place or will implement during the entire term of the contract a Mandatory Drug Testing Program for our employees on the jobsite that complies with this regulation:

Contractor/Subcontractor Name: _____

Contractor/Subcontractor Address: _____

Authorized Representative (typed or printed): _____

Authorized Representative (signature): _____

Title: _____

Sworn to and Subscribed before me this _____ day of _____ 20____.

My Commission expires _____. NOTARY PUBLIC _____.

THIS PAGE MUST BE SIGNED AND NOTARIZED FOR YOUR BID TO BE CONSIDERED.

IMPROVEMENTS TO DELAWARE DAMS
CHIPMANS POND DAM/CONCORD POND DAM/CRAIGS POND DAM
LAUREL AND SEAFORD, DE
NAT17001-DAMCONST

**SUMMARY CONTROL OF WATER PLAN
FOR CHIPMANS POND DAM**

The bidder shall attach a Summary Control of Water Plan for the bypassing of normal and flood flows from Chipmans Pond around the work area to the downstream receiving water. Refer to Specification Section 31 52 00 for the requirements for a Summary Control of Water Plan.

A SUMMARY CONTROL OF WATER PLAN SHALL BE INCLUDED FOR YOUR BID TO BE CONSIDERED.

STATE OF DELAWARE
OFFICE OF MANAGEMENT AND BUDGET

BID BOND

TO ACCOMPANY PROPOSAL
(Not necessary if security is used)

KNOW ALL MEN BY THESE PRESENTS That: _____
_____ of _____ in the County of _____
_____ and State of _____ as **Principal**, and _____
_____ of _____ in the County of _____
and State of _____ as **Surety**, legally authorized to do business in the State of Delaware
("State"), are held and firmly unto the **State** in the sum of _____
_____ Dollars (\$ _____), or _____ percent not to exceed _____
_____ Dollars (\$ _____)
of amount of bid on Contract No. **NAT17001-DAMCONST** to be paid to the **State** for the use and benefit of
the **Department of Natural Resources and Environmental Control** for which payment well and truly to be
made, we do bind ourselves, our and each of our heirs, executors, administrators, and successors, jointly and
severally for and in the whole firmly by these presents.

NOW THE CONDITION OF THIS OBLIGATION IS SUCH That if the above bonded **Principal**
who has submitted to the **Department of Natural Resources and Environmental Control** a certain
proposal to enter into this contract for the furnishing of certain material and/or services within the **State**,
shall be awarded this Contract, and if said **Principal** shall well and truly enter into and execute this Contract
as may be required by the terms of this Contract and approved by the **Department of Natural Resources
and Environmental Control** this Contract to be entered into within twenty days after the date of official
notice of the award thereof in accordance with the terms of said proposal, then this obligation shall be void or
else to be and remain in full force and virtue.

Sealed with _____ seal and dated this _____ day of _____ in the year of our Lord two
thousand and _____ (20____).

SEALED, AND DELIVERED IN THE
Presence of

Name of Bidder (Organization)

Corporate
Seal

By:

Authorized Signature

Attest _____

Title

Name of Surety

Witness: _____

By:

Title

STANDARD FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR A101-2007

The contract to be utilized on this project shall be the "Standard Form of Agreement Between Owner and Contractor" AIA Document A101-2007.

DRAFT AIA® Document A101™ – 2007

Standard Form of Agreement Between Owner and Contractor *where the basis of payment is a Stipulated Sum*

AGREEMENT made as of the « » day of « » in the year « »
(In words, indicate day, month and year.)

BETWEEN the Owner:
(Name, legal status, address and other information)

« »
« »
« »
« »

and the Contractor:
(Name, legal status, address and other information)

« »
« »
« »
« »

for the following Project:
(Name, location and detailed description)

«Division of Watershed»
« »
« »

The Architect:
(Name, legal status, address and other information)

« »
« »
« »
« »

The Owner and Contractor agree as follows.

ADDITIONS AND DELETIONS:

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

AIA Document A201™-2007, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

ELECTRONIC COPYING of any portion of this AIA® Document to another electronic file is prohibited and constitutes a violation of copyright laws as set forth in the footer of this document.

TABLE OF ARTICLES

1	THE CONTRACT DOCUMENTS
2	THE WORK OF THIS CONTRACT
3	DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION
4	CONTRACT SUM
5	PAYMENTS
6	DISPUTE RESOLUTION
7	TERMINATION OR SUSPENSION
8	MISCELLANEOUS PROVISIONS
9	ENUMERATION OF CONTRACT DOCUMENTS
10	INSURANCE AND BONDS

ARTICLE 1 THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. An enumeration of the Contract Documents, other than a Modification, appears in Article 9.

ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others.

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be the date of this Agreement unless a different date is stated below or provision is made for the date to be fixed in a notice to proceed issued by the Owner.

(Insert the date of commencement if it differs from the date of this Agreement or, if applicable, state that the date will be fixed in a notice to proceed.)

<< >>

If, prior to the commencement of the Work, the Owner requires time to file mortgages and other security interests, the Owner's time requirement shall be as follows:

<< >>

§ 3.2 The Contract Time shall be measured from the date of commencement.

§ 3.3 The Contractor shall achieve Substantial Completion of the entire Work not later than << >> (<< >>) days from the date of commencement, or as follows:

(Insert number of calendar days. Alternatively, a calendar date may be used when coordinated with the date of commencement. If appropriate, insert requirements for earlier Substantial Completion of certain portions of the Work.)

<< >>

Portion of Work

Substantial Completion Date

, subject to adjustments of this Contract Time as provided in the Contract Documents.

(Insert provisions, if any, for liquidated damages relating to failure to achieve Substantial Completion on time or for bonus payments for early completion of the Work.)

« »

ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be « » (\$ « »), subject to additions and deductions as provided in the Contract Documents.

§ 4.2 The Contract Sum is based upon the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner:

(State the numbers or other identification of accepted alternates. If the bidding or proposal documents permit the Owner to accept other alternates subsequent to the execution of this Agreement, attach a schedule of such other alternates showing the amount for each and the date when that amount expires.)

« »

§ 4.3 Unit prices, if any:

(Identify and state the unit price; state quantity limitations, if any, to which the unit price will be applicable.)

Item

Units and Limitations

Price Per Unit (\$0.00)

§ 4.4 Allowances included in the Contract Sum, if any:

(Identify allowance and state exclusions, if any, from the allowance price.)

Item

Price

ARTICLE 5 PAYMENTS

§ 5.1 PROGRESS PAYMENTS

§ 5.1.1 Based upon Applications for Payment submitted to the Architect by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

« »

§ 5.1.3 Provided that an Application for Payment is received by the Architect not later than the « » day of a month, the Owner shall make payment of the certified amount to the Contractor not later than the « » day of the « » month. If an Application for Payment is received by the Architect after the application date fixed above, payment shall be made by the Owner not later than « » (« ») days after the Architect receives the Application for Payment. *(Federal, state or local laws may require payment within a certain period of time.)*

§ 5.1.4 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form and supported by such data to substantiate its accuracy as the Architect may require. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.5 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.6 Subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

- .1 Take that portion of the Contract Sum properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of the Contract Sum allocated to that portion of the Work in the schedule of values, less retainage of « » percent (« » %). Pending final determination of cost to the Owner of changes in the Work, amounts not in dispute shall be included as provided in Section 7.3.9 of AIA Document A201™–2007, General Conditions of the Contract for Construction;
- .2 Add that portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction (or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing), less retainage of « » percent (« » %);
- .3 Subtract the aggregate of previous payments made by the Owner; and
- .4 Subtract amounts, if any, for which the Architect has withheld or nullified a Certificate for Payment as provided in Section 9.5 of AIA Document A201–2007.

§ 5.1.7 The progress payment amount determined in accordance with Section 5.1.6 shall be further modified under the following circumstances:

- .1 Add, upon Substantial Completion of the Work, a sum sufficient to increase the total payments to the full amount of the Contract Sum, less such amounts as the Architect shall determine for incomplete Work, retainage applicable to such work and unsettled claims; and
(Section 9.8.5 of AIA Document A201–2007 requires release of applicable retainage upon Substantial Completion of Work with consent of surety, if any.)
- .2 Add, if final completion of the Work is thereafter materially delayed through no fault of the Contractor, any additional amounts payable in accordance with Section 9.10.3 of AIA Document A201–2007.

§ 5.1.8 Reduction or limitation of retainage, if any, shall be as follows:

(If it is intended, prior to Substantial Completion of the entire Work, to reduce or limit the retainage resulting from the percentages inserted in Sections 5.1.6.1 and 5.1.6.2 above, and this is not explained elsewhere in the Contract Documents, insert here provisions for such reduction or limitation.)

« »

§ 5.1.9 Except with the Owner's prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

§ 5.2 FINAL PAYMENT

§ 5.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

- .1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Section 12.2.2 of AIA Document A201–2007, and to satisfy other requirements, if any, which extend beyond final payment; and
- .2 a final Certificate for Payment has been issued by the Architect.

§ 5.2.2 The Owner's final payment to the Contractor shall be made no later than 30 days after the issuance of the Architect's final Certificate for Payment, or as follows:

« »

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 INITIAL DECISION MAKER

The Architect will serve as Initial Decision Maker pursuant to Section 15.2 of AIA Document A201–2007, unless the parties appoint below another individual, not a party to this Agreement, to serve as Initial Decision Maker.

(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)

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§ 6.2 BINDING DISPUTE RESOLUTION

For any Claim subject to, but not resolved by, mediation pursuant to Section 15.3 of AIA Document A201–2007, the method of binding dispute resolution shall be as follows:

(Check the appropriate box. If the Owner and Contractor do not select a method of binding dispute resolution below, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, Claims will be resolved by litigation in a court of competent jurisdiction.)

☐ Arbitration pursuant to Section 15.4 of AIA Document A201–2007

☐ Litigation in a court of competent jurisdiction

☐ Other *(Specify)*

<< >>

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201–2007.

§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201–2007.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201–2007 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

(Insert rate of interest agreed upon, if any.)

<< >> % << >>

§ 8.3 The Owner's representative:

(Name, address and other information)

<< >>
<< >>
<< >>
<< >>
<< >>
<< >>

§ 8.4 The Contractor's representative:

(Name, address and other information)

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<< >>
<< >>
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<< >>

§ 8.5 Neither the Owner's nor the Contractor's representative shall be changed without ten days written notice to the other party.

§ 8.6 Other provisions:

<< >>

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 The Contract Documents, except for Modifications issued after execution of this Agreement, are enumerated in the sections below.

§ 9.1.1 The Agreement is this executed AIA Document A101–2007, Standard Form of Agreement Between Owner and Contractor.

§ 9.1.2 The General Conditions are AIA Document A201–2007, General Conditions of the Contract for Construction.

§ 9.1.3 The Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages
----------	-------	------	-------

§ 9.1.4 The Specifications:

(Either list the Specifications here or refer to an exhibit attached to this Agreement.)

<< >>

Section	Title	Date	Pages
---------	-------	------	-------

§ 9.1.5 The Drawings:

(Either list the Drawings here or refer to an exhibit attached to this Agreement.)

<< >>

Number	Title	Date
--------	-------	------

§ 9.1.6 The Addenda, if any:

Number	Date	Pages
--------	------	-------

Portions of Addenda relating to bidding requirements are not part of the Contract Documents unless the bidding requirements are also enumerated in this Article 9.

§ 9.1.7 Additional documents, if any, forming part of the Contract Documents:

- 1 AIA Document E201™–2007, Digital Data Protocol Exhibit, if completed by the parties, or the following:

<< >>

2 Other documents, if any, listed below:

(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A201–2007 provides that bidding requirements such as advertisement or invitation to bid, Instructions to Bidders, sample forms and the Contractor’s bid are not part of the Contract Documents unless enumerated in this Agreement. They should be listed here only if intended to be part of the Contract Documents.)

<< >>

ARTICLE 10 INSURANCE AND BONDS

The Contractor shall purchase and maintain insurance and provide bonds as set forth in Article 11 of AIA Document A201–2007.

(State bonding requirements, if any, and limits of liability for insurance required in Article 11 of AIA Document A201–2007.)

Type of insurance or bond

Limit of liability or bond amount (\$0.00)

This Agreement entered into as of the day and year first written above.

OWNER (Signature)

<< >><< >>

(Printed name and title)

CONTRACTOR (Signature)

<< >><< >>

(Printed name and title)

SUPPLEMENT TO AGREEMENT BETWEEN OWNER AND CONTRACTOR A101-2007

The following supplements modify the "Standard Form of Agreement Between Owner and Contractor," AIA Document A101-2007. Where a portion of the Standard Form of Agreement is modified or deleted by the following, the unaltered portions of the Standard Form of Agreement shall remain in effect.

ARTICLE 5: PAYMENTS**5.1 PROGRESS PAYMENTS****5.1.3 Delete paragraph 5.1.3 in its entirety and replace with the following:**

"Provided that a valid Application for Payment is received by the Architect that meets all requirements of the Contract, payment shall be made by the Owner not later than 30 days after the Owner receives the valid Application for Payment."

ARTICLE 6: DISPUTE RESOLUTION**6.2 BINDING DISPUTE RESOLUTION**

Check Other – and add the following sentence:

"Any remedies available in law or in equity."

ARTICLE 8: MISCELLANEOUS PROVISIONS**8.2 Insert the following:**

"Payments are due 30 days after receipt of a valid Application for Payment. After that 30 day period, interest may be charged at the rate of 1% per month not to exceed 12% per annum."

8.5 Delete paragraph 8.5 in its entirety and replace with the following:

"The Contractor's representative shall not be changed without ten days written notice to the Owner."

END OF SUPPLEMENT TO AGREEMENT BETWEEN OWNER AND CONTRACTOR

STATE OF DELAWARE
OFFICE OF MANAGEMENT AND BUDGET

PERFORMANCE BOND

Bond Number: _____

KNOW ALL PERSONS BY THESE PRESENTS, that we, _____, as principal (“**Principal**”), and _____, a _____ corporation, legally authorized to do business in the State of Delaware, as surety (“**Surety**”), are held and firmly bound unto the Department of Natural Resources and Environmental Control (“**Owner**”), in the amount of _____ (\$_____), to be paid to **Owner**, for which payment well and truly to be made, we do bind ourselves, our and each and every of our heirs, executors, administrations, successors and assigns, jointly and severally, for and in the whole, firmly by these presents.

Sealed with our seals and dated this _____ day of _____, 20____.

NOW THE CONDITION OF THIS OBLIGATION IS SUCH, that if **Principal**, who has been awarded by **Owner** that certain contract known as Contract No. **NAT17001-DAMCONST** dated the _____ day of _____, 20__ (the “**Contract**”), which Contract is incorporated herein by reference, shall well and truly provide and furnish all materials, appliances and tools and perform all the work required under and pursuant to the terms and conditions of the Contract and the Contract Documents (as defined in the Contract) or any changes or modifications thereto made as therein provided, shall make good and reimburse **Owner** sufficient funds to pay the costs of completing the Contract that **Owner** may sustain by reason of any failure or default on the part of **Principal**, and shall also indemnify and save harmless **Owner** from all costs, damages and expenses arising out of or by reason of the performance of the Contract and for as long as provided by the Contract; then this obligation shall be void, otherwise to be and remain in full force and effect.

Surety, for value received, hereby stipulates and agrees, if requested to do so by **Owner**, to fully perform and complete the work to be performed under the Contract pursuant to the terms, conditions and covenants thereof, if for any cause **Principal** fails or neglects to so fully perform and complete such work.

Surety, for value received, for itself and its successors and assigns, hereby stipulates and agrees that the obligation of **Surety** and its bond shall be in no way impaired or affected by any extension of time, modification, omission, addition or change in or to the Contract or the work to be performed thereunder, or by any payment thereunder before the time required therein, or by any waiver of any provisions thereof, or by any assignment, subletting or other transfer thereof or of any work to be performed or any monies due or to become due thereunder; and **Surety** hereby waives notice of any and all such extensions, modifications, omissions, additions, changes, payments, waivers, assignments, subcontracts and transfers and hereby expressly stipulates and agrees that any and all things done and omitted to be done by and in relation to assignees, subcontractors, and other

transferees shall have the same effect as to **Surety** as though done or omitted to be done by or in relation to **Principal**.

Surety hereby stipulates and agrees that no modifications, omissions or additions in or to the terms of the Contract shall in any way whatsoever affect the obligation of **Surety** and its bond.

Any proceeding, legal or equitable, under this Bond may be brought in any court of competent jurisdiction in the State of Delaware. Notices to **Surety** or Contractor may be mailed or delivered to them at their respective addresses shown below.

IN WITNESS WHEREOF, **Principal** and **Surety** have hereunto set their hand and seals, and such of them as are corporations have caused their corporate seal to be hereto affixed and these presents to be signed by their duly authorized officers, the day and year first above written.

PRINCIPAL

Name: _____

Witness or Attest:

Address: _____

Name:

By: _____ (SEAL)

Name:

Title:

(Corporate Seal)

SURETY

Name: _____

Witness or Attest:

Address: _____

Name:

By: _____ (SEAL)

Name:

Title:

(Corporate Seal)

STATE OF DELAWARE
OFFICE OF MANAGEMENT AND BUDGET

PAYMENT BOND

Bond Number: _____

KNOW ALL PERSONS BY THESE PRESENTS, that we, _____, as principal (“**Principal**”), and _____, a _____ corporation, legally authorized to do business in the State of Delaware, as surety (“**Surety**”), are held and firmly bound unto the Department of Natural Resources and Environmental Control (“**Owner**”), in the amount of _____ (\$_____), to be paid to **Owner**, for which payment well and truly to be made, we do bind ourselves, our and each and every of our heirs, executors, administrations, successors and assigns, jointly and severally, for and in the whole firmly by these presents.

Sealed with our seals and dated this _____ day of _____, 20____.

NOW THE CONDITION OF THIS OBLIGATION IS SUCH, that if **Principal**, who has been awarded by **Owner** that certain contract known as Contract No. **NAT17001-DAMCONST** dated the _____ day of _____, 20__ (the “**Contract**”), which Contract is incorporated herein by reference, shall well and truly pay all and every person furnishing materials or performing labor or service in and about the performance of the work under the Contract, all and every sums of money due him, her, them or any of them, for all such materials, labor and service for which **Principal** is liable, shall make good and reimburse **Owner** sufficient funds to pay such costs in the completion of the Contract as **Owner** may sustain by reason of any failure or default on the part of **Principal**, and shall also indemnify and save harmless **Owner** from all costs, damages and expenses arising out of or by reason of the performance of the Contract and for as long as provided by the Contract; then this obligation shall be void, otherwise to be and remain in full force and effect.

Surety, for value received, for itself and its successors and assigns, hereby stipulates and agrees that the obligation of **Surety** and its bond shall be in no way impaired or affected by any extension of time, modification, omission, addition or change in or to the Contract or the work to be performed thereunder, or by any payment thereunder before the time required therein, or by any waiver of any provisions thereof, or by any assignment, subletting or other transfer thereof or of any work to be performed or any monies due or to become due thereunder; and **Surety** hereby waives notice of any and all such extensions, modifications, omissions, additions, changes, payments, waivers, assignments, subcontracts and transfers and hereby expressly stipulates and agrees that any and all things done and omitted to be done by and in relation to assignees, subcontractors, and other transferees shall have the same effect as to **Surety** as though done or omitted to be done by or in relation to **Principal**.

Surety hereby stipulates and agrees that no modifications, omission or additions in or to the terms of the Contract shall in any way whatsoever affect the obligation of **Surety** and its bond.

Any proceeding, legal or equitable, under this Bond may be brought in any court of competent jurisdiction in the State of Delaware. Notices to **Surety** or Contractor may be mailed or delivered to them at their respective addresses shown below.

IN WITNESS WHEREOF, **Principal** and **Surety** have hereunto set their hand and seals, and such of them as are corporations have caused their corporate seal to be hereto affixed and these presents to be signed by their duly authorized officers, the day and year first above written.

PRINCIPAL

Name: _____

Witness or Attest:

Address: _____

Name:

(Corporate Seal)

By: _____(SEAL)
Name:
Title:

SURETY

Name: _____

Witness or Attest:

Address: _____

Name:

(Corporate Seal)

By: _____(SEAL)
Name:
Title:

APPLICATION AND CERTIFICATE FOR PAYMENT FORMS AIA G702 AND G703

The forms to be utilized on this project shall be the "Application and Certificate for Payment" AIA Document G702-1992 and "Continuation Sheet" AIA Document G703-1992.

AIA® Document G702™ - 1992

Application and Certificate for Payment

TO OWNER:

PROJECT: Division of Watershed

APPLICATION NO: 001

Distribution to:

FROM CONTRACTOR:

VIA ARCHITECT:

PERIOD TO: General Construction

CONTRACTOR FOR:

CONTRACT DATE: / /

PROJECT NOS: / /

OWNER:

ARCHITECT:

CONTRACTOR:

FIELD:

:

CONTRACTOR'S APPLICATION FOR PAYMENT

Application is made for payment, as shown below, in connection with the Contract Continuation Sheet, AIA Document G703, is attached.

1. ORIGINAL CONTRACT SUM.....\$0.00
2. NET CHANGE BY CHANGE ORDERS.....\$0.00
3. CONTRACT SUM TO DATE (Line 1 ± 2).....\$0.00
4. TOTAL COMPLETED & STORED TO DATE (Column G on G703).....\$0.00
5. RETAINAGE:

- a. 0 % of Completed Work
(Column D + E on G703): \$0.00)= \$0.00
- b. 0 % of Stored Material
(Column F on G703): \$0.00)= \$0.00

Total Retainage (Lines 5a + 5b or Total in Column I of G703).....\$0.00

6. TOTAL EARNED LESS RETAINAGE.....\$0.00

(Line 4 Less Line 5 Total)

7. LESS PREVIOUS CERTIFICATES FOR PAYMENT.....\$0.00

(Line 6 from prior Certificate)

8. CURRENT PAYMENT DUE.....\$0.00

9. BALANCE TO FINISH, INCLUDING RETAINAGE

(Line 3 less Line 6)

\$0.00

AMOUNT CERTIFIED.....

(Attach explanation if amount certified differs from the amount applied. Initial all figures on this Application and on the Continuation Sheet that are changed to conform with the amount certified.)

CHANGE ORDER SUMMARY	ADDITIONS	DEDUCTIONS
Total changes approved in previous months by Owner	\$0.00	\$0.00
Total approved this Month	\$0.00	\$0.00
TOTALS	\$0.00	\$0.00
NET CHANGES by Change Order		\$0.00

ARCHITECT'S CERTIFICATE FOR PAYMENT

In accordance with the Contract Documents, based on on-site observations and the data comprising this application, the Architect certifies to the Owner that to the best of the Architect's knowledge, information and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

AMOUNT CERTIFIED.....

(Attach explanation if amount certified differs from the amount applied. Initial all figures on this Application and on the Continuation Sheet that are changed to conform with the amount certified.)

ARCHITECT:

By: Date:

This Certificate is not negotiable. The AMOUNT CERTIFIED is payable only to the Contractor named herein. Issuance, payment and acceptance of payment are without prejudice to any rights of the Owner or Contractor under this Contract.

GENERAL CONDITIONS

TO THE

CONTRACT

The General Conditions of this Contract are as stated in the American Institute of Architects Document AIA A201 (2007 Edition) entitled General Conditions of the Contract for Construction and is part of this project manual as if herein written in full.

DRAFT AIA[®] Document A201[™] – 2007

General Conditions of the Contract for Construction

for the following PROJECT:

(Name and location or address)

«Division of Watershed»

« »

THE OWNER:

(Name, legal status and address)

« »« »

« »

THE ARCHITECT:

(Name, legal status and address)

« »« »

« »

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ADDITIONS AND DELETIONS:

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 BASIC DEFINITIONS

§ 1.1.1 THE CONTRACT DOCUMENTS

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of Addenda relating to bidding requirements.

§ 1.1.2 THE CONTRACT

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect's consultants or (4) between any persons or entities other than the Owner and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.

§ 1.1.3 THE WORK

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 THE PROJECT

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by separate contractors.

§ 1.1.5 THE DRAWINGS

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.

§ 1.1.6 THE SPECIFICATIONS

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.7 INSTRUMENTS OF SERVICE

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.8 INITIAL DECISION MAKER

The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2 and certify termination of the Agreement under Section 14.2.2.

§ 1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.3 CAPITALIZATION

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 INTERPRETATION

In the interest of brevity the Contract Documents frequently omit modifying words such as “all” and “any” and articles such as “the” and “an,” but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE

§ 1.5.1 The Architect and the Architect’s consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and will retain all common law, statutory and other reserved rights, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Architect’s or Architect’s consultants’ reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are authorized to use and reproduce the Instruments of Service provided to them solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers may not use the Instruments of Service on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect and the Architect’s consultants.

§ 1.6 TRANSMISSION OF DATA IN DIGITAL FORM

If the parties intend to transmit Instruments of Service or any other information or documentation in digital form, they shall endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Agreement or the Contract Documents.

ARTICLE 2 OWNER

§ 2.1 GENERAL

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner’s approval or authorization. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term “Owner” means the Owner or the Owner’s authorized representative.

§ 2.1.2 The Owner shall furnish to the Contractor within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of or enforce mechanic’s lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner’s interest therein.

§ 2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

§ 2.2.1 Prior to commencement of the Work, the Contractor may request in writing that the Owner provide reasonable evidence that the Owner has made financial arrangements to fulfill the Owner’s obligations under the Contract. Thereafter, the Contractor may only request such evidence if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) a change in the Work materially changes the Contract Sum; or (3) the Contractor identifies in writing a reasonable concern regarding the Owner’s ability to make payment when due. The Owner shall furnish such evidence as a condition precedent to commencement or continuation of the Work or

the portion of the Work affected by a material change. After the Owner furnishes the evidence, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

§ 2.2.2 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

§ 2.2.3 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.2.4 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.2.5 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.

§ 2.3 OWNER'S RIGHT TO STOP THE WORK

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

§ 2.4 OWNER'S RIGHT TO CARRY OUT THE WORK

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect or failure. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

ARTICLE 3 CONTRACTOR

§ 3.1 GENERAL

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

§ 3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.2.3, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall make Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner and Architect and shall not proceed with that portion of the Work without further written instructions from the Architect. If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Owner shall be solely responsible for any loss or damage arising solely from those Owner-required means, methods, techniques, sequences or procedures.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.4 LABOR AND MATERIALS

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other

facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

§ 3.4.2 Except in the case of minor changes in the Work authorized by the Architect in accordance with Sections 3.12.8 or 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

§ 3.5 WARRANTY

The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.6 TAXES

The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

§ 3.7 PERMITS, FEES, NOTICES AND COMPLIANCE WITH LAWS

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 **Concealed or Unknown Conditions.** If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature, that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 21 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor in writing, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may proceed as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume

the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 ALLOWANCES

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents,

- .1 Allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- .2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and
- .3 Whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 SUPERINTENDENT

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the name and qualifications of a proposed superintendent. The Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to the proposed superintendent or (2) that the Architect requires additional time to review. Failure of the Architect to reply within the 14 day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work.

§ 3.10.2 The Contractor shall prepare a submittal schedule, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, and shall submit the schedule(s) for the Architect's approval. The Architect's approval shall not unreasonably be delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect.

§ 3.11 DOCUMENTS AND SAMPLES AT THE SITE

The Contractor shall maintain at the site for the Owner one copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and one copy of approved Shop Drawings, Product Data, Samples and similar required submittals. These shall be available to the Architect and shall be delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. Their purpose is to demonstrate the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve and submit to the Architect Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Architect in writing of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or similar submittals, to revisions other than those requested by the Architect on previous submittals. In the absence of such written notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be

required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design 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 the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review, approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents.

§ 3.13 USE OF SITE

The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.14 CUTTING AND PATCHING

§ 3.14.1 The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting and patching shall be restored to the condition existing prior to the cutting, fitting and patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or separate contractors by cutting, patching or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner or a separate contractor except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate contractor the Contractor's consent to cutting or otherwise altering the Work.

§ 3.15 CLEANING UP

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials from and about the Project.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 ACCESS TO WORK

The Contractor shall provide the Owner and Architect access to the Work in preparation and progress wherever located.

§ 3.17 ROYALTIES, PATENTS AND COPYRIGHTS

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for such defense or loss when a particular design, process or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications or other documents prepared by the Owner or Architect. However, if the Contractor has reason to believe that the required design, process or product is an infringement of a copyright or a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Architect.

§ 3.18 INDEMNIFICATION

§ 3.18.1 To the fullest extent permitted by law the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

ARTICLE 4 ARCHITECT

§ 4.1 GENERAL

§ 4.1.1 The Owner shall retain an architect lawfully licensed to practice architecture or an entity lawfully practicing architecture in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 4.1.2 Duties, responsibilities and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified or extended without written consent of the Owner, Contractor and Architect. Consent shall not be unreasonably withheld.

§ 4.1.3 If the employment of the Architect is terminated, the Owner shall employ a successor architect as to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect.

§ 4.2 ADMINISTRATION OF THE CONTRACT

§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues the final Certificate for Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, except as provided in Section 3.3.1.

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and report to the Owner (1) known deviations from the Contract Documents and from the most recent construction schedule submitted by the Contractor, and (2) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 COMMUNICATIONS FACILITATING CONTRACT ADMINISTRATION

Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Architect about matters arising out of or relating to the Contract. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with separate contractors shall be through the Owner.

§ 4.2.5 Based on the Architect's evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.5.2 and 13.5.3, whether or not such Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5 and 3.12. The Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, of any construction means, methods, techniques, sequences or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may authorize minor changes in the Work as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more project representatives to assist in carrying out the Architect's responsibilities at the site. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in an exhibit to be incorporated in the Contract Documents.

§ 4.2.11 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.12 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either and will not be liable for results of interpretations or decisions rendered in good faith.

§ 4.2.13 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 DEFINITIONS

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a separate contractor or subcontractors of a separate contractor.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

§ 5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to any such proposed person or entity or (2) that the Architect requires additional time for review. Failure of the Owner or Architect to reply within the 14-day period shall constitute notice of no reasonable objection.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person or entity previously selected if the Owner or Architect makes reasonable objection to such substitution.

§ 5.3 SUBCONTRACTUAL RELATIONS

By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work, which the Contractor, by these Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may

be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

- .1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor in writing; and
- .2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon such assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. If the Owner assigns the subcontract to a successor contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor contractor's obligations under the subcontract.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 OWNER'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Article 15.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each separate contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with other separate contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to the construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, separate contractors and the Owner until subsequently revised.

§ 6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces, the Owner shall be deemed to be subject to the same obligations and to have the same rights that apply to the Contractor under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6 and Articles 10, 11 and 12.

§ 6.2 MUTUAL RESPONSIBILITY

§ 6.2.1 The Contractor shall afford the Owner and separate contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a separate contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Architect apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acknowledgment that

the Owner's or separate contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then reasonably discoverable.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a separate contractor because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of a separate contractor's delays, improperly timed activities, damage to the Work or defective construction.

§ 6.2.4 The Contractor shall promptly remedy damage the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or separate contractors as provided in Section 10.2.5.

§ 6.2.5 The Owner and each separate contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 OWNER'S RIGHT TO CLEAN UP

If a dispute arises among the Contractor, separate contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Architect will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 GENERAL

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor and Architect; a Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor; an order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive or order for a minor change in the Work.

§ 7.2 CHANGE ORDERS

§ 7.2.1 A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor and Architect stating their agreement upon all of the following:

- .1 The change in the Work;
- .2 The amount of the adjustment, if any, in the Contract Sum; and
- .3 The extent of the adjustment, if any, in the Contract Time.

§ 7.3 CONSTRUCTION CHANGE DIRECTIVES

§ 7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

- .1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- .2 Unit prices stated in the Contract Documents or subsequently agreed upon;
- .3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or

.4 As provided in Section 7.3.7.

§ 7.3.4 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed in a proposed Change Order or Construction Change Directive so that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 7.3.5 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.6 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.7 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the method and the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.7 shall be limited to the following:

- .1 Costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' compensation insurance;
- .2 Costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;
- .3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
- .4 Costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work; and
- .5 Additional costs of supervision and field office personnel directly attributable to the change.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 MINOR CHANGES IN THE WORK

The Architect has authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes will be effected by written order signed by the Architect and shall be binding on the Owner and Contractor.

ARTICLE 8 TIME

§ 8.1 DEFINITIONS

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term “day” as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 PROGRESS AND COMPLETION

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.3 DELAYS AND EXTENSIONS OF TIME

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner or Architect, or of an employee of either, or of a separate contractor employed by the Owner; or by changes ordered in the Work; or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor's control; or by delay authorized by the Owner pending mediation and arbitration; or by other causes that the Architect determines may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 CONTRACT SUM

The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.2 SCHEDULE OF VALUES

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit to the Architect, before the first Application for Payment, a schedule of values allocating the entire Contract Sum to the various portions of the Work and prepared in such form and supported by such data to substantiate its accuracy as the Architect may require. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 9.3 APPLICATIONS FOR PAYMENT

§ 9.3.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. Such application shall be notarized, if required, and supported by such data substantiating the Contractor's right to payment as the Owner or Architect may require, such as copies of requisitions from Subcontractors and material suppliers, and shall reflect retainage if provided for in the Contract Documents.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or material supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage and transportation to the site for such materials and equipment stored off the site.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.

§ 9.4 CERTIFICATES FOR PAYMENT

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Architect determines is properly due, or notify the Contractor and Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data comprising the Application for Payment, that, to the best of the Architect's knowledge, information and belief, the Work has progressed to the point indicated and that the quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Architect. The issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed construction means, methods, techniques, sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor's right to payment, or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 DECISIONS TO WITHHOLD CERTIFICATION

§ 9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

- .1 defective Work not remedied;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided by the Contractor;

- .3 failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;
- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- .5 damage to the Owner or a separate contractor;
- .6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- .7 repeated failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.3 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or material or equipment suppliers to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Architect will reflect such payment on the next Certificate for Payment.

§ 9.6 PROGRESS PAYMENTS

§ 9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect.

§ 9.6.2 The Contractor shall pay each Subcontractor no later than seven days after receipt of payment from the Owner the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and material and equipment suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay or to see to the payment of money to a Subcontractor, except as may otherwise be required by law.

§ 9.6.5 Contractor payments to material and equipment suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors and suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, shall create any fiduciary liability or tort liability on the part of the Contractor for breach of trust or shall entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.7 FAILURE OF PAYMENT

If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' written notice to the Owner and Architect,

stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shut-down, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 SUBSTANTIAL COMPLETION

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. Upon such acceptance and consent of surety, if any, the Owner shall make payment of retainage applying to such Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.9 PARTIAL OCCUPANCY OR USE

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Section 11.3.1.5 and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 FINAL COMPLETION AND FINAL PAYMENT

§ 9.10.1 Upon receipt of the Contractor's written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection and, when the

Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment and (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, 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 for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

- .1 liens, Claims, security interests or encumbrances arising out of the Contract and unsettled;
- .2 failure of the Work to comply with the requirements of the Contract Documents; or
- .3 terms of special warranties required by the Contract Documents.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 SAFETY PRECAUTIONS AND PROGRAMS

The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract.

§ 10.2 SAFETY OF PERSONS AND PROPERTY

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to

- .1 employees on the Work and other persons who may be affected thereby;
- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and
- .3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

§ 10.2.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss.

§ 10.2.3 The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3, except damage or loss attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 INJURY OR DAMAGE TO PERSON OR PROPERTY

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 HAZARDOUS MATERIALS

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner and Architect in writing.

§ 10.3.2 Upon receipt of the Contractor's written notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shut-down, delay and start-up.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 The Contractor shall indemnify the Owner for the cost and expense the Owner incurs (1) for remediation of a material or substance the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall indemnify the Contractor for all cost and expense thereby incurred.

§ 10.4 EMERGENCIES

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 CONTRACTOR'S LIABILITY INSURANCE

§ 11.1.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations and completed operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- .1 Claims under workers' compensation, disability benefit and other similar employee benefit acts that are applicable to the Work to be performed;
- .2 Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
- .3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
- .4 Claims for damages insured by usual personal injury liability coverage;
- .5 Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
- .6 Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;
- .7 Claims for bodily injury or property damage arising out of completed operations; and
- .8 Claims involving contractual liability insurance applicable to the Contractor's obligations under Section 3.18.

§ 11.1.2 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment, and, with respect to the Contractor's completed operations coverage, until the expiration of the period for correction

of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents.

§ 11.1.3 Certificates of insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work and thereafter upon renewal or replacement of each required policy of insurance. These certificates and the insurance policies required by this Section 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1.2. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness.

§ 11.1.4 The Contractor shall cause the commercial liability coverage required by the Contract Documents to include (1) the Owner, the Architect and the Architect's consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's completed operations.

§ 11.2 OWNER'S LIABILITY INSURANCE

The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance.

§ 11.3 PROPERTY INSURANCE

§ 11.3.1 Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all-risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract Modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.3 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project.

§ 11.3.1.1 Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect's and Contractor's services and expenses required as a result of such insured loss.

§ 11.3.1.2 If the Owner does not intend to purchase such property insurance required by the Contract and with all of the coverages in the amount described above, the Owner shall so inform the Contractor in writing prior to commencement of the Work. The Contractor may then effect insurance that will protect the interests of the Contractor, Subcontractors and Sub-subcontractors in the Work, and by appropriate Change Order the cost thereof shall be charged to the Owner. If the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain insurance as described above, without so notifying the Contractor in writing, then the Owner shall bear all reasonable costs properly attributable thereto.

§ 11.3.1.3 If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles.

§ 11.3.1.4 This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit.

§ 11.3.1.5 Partial occupancy or use in accordance with Section 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or

otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

§ 11.3.2 BOILER AND MACHINERY INSURANCE

The Owner shall purchase and maintain boiler and machinery insurance required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insureds.

§ 11.3.3 LOSS OF USE INSURANCE

The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused. The Owner waives all rights of action against the Contractor for loss of use of the Owner's property, including consequential losses due to fire or other hazards however caused.

§ 11.3.4 If the Contractor requests in writing that insurance for risks other than those described herein or other special causes of loss be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.

§ 11.3.5 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, the Owner shall waive all rights in accordance with the terms of Section 11.3.7 for damages caused by fire or other causes of loss covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

§ 11.3.6 Before an exposure to loss may occur, the Owner shall file with the Contractor a copy of each policy that includes insurance coverages required by this Section 11.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least 30 days' prior written notice has been given to the Contractor.

§ 11.3.7 WAIVERS OF SUBROGATION

The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees, each of the other, and (2) the Architect, Architect's consultants, separate contractors described in Article 6, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to this Section 11.3 or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Architect, Architect's consultants, separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

§ 11.3.8 A loss insured under the Owner's property insurance shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.3.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

§ 11.3.9 If required in writing by a party in interest, the Owner as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Owner's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Owner shall deposit in a separate account proceeds so received, which the

Owner shall distribute in accordance with such agreement as the parties in interest may reach, or as determined in accordance with the method of binding dispute resolution selected in the Agreement between the Owner and Contractor. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor after notification of a Change in the Work in accordance with Article 7.

§ 11.3.10 The Owner as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Owner's exercise of this power; if such objection is made, the dispute shall be resolved in the manner selected by the Owner and Contractor as the method of binding dispute resolution in the Agreement. If the Owner and Contractor have selected arbitration as the method of binding dispute resolution, the Owner as fiduciary shall make settlement with insurers or, in the case of a dispute over distribution of insurance proceeds, in accordance with the directions of the arbitrators.

§ 11.4 PERFORMANCE BOND AND PAYMENT BOND

§ 11.4.1 The Owner shall have the right to require the Contractor to furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the Contract.

§ 11.4.2 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 UNCOVERING OF WORK

§ 12.1.1 If a portion of the Work is covered contrary to the Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Architect, be uncovered for the Architect's examination and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense. If such Work is not in accordance with the Contract Documents, such costs and the cost of correction shall be at the Contractor's expense unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs.

§ 12.2 CORRECTION OF WORK

§ 12.2.1 BEFORE OR AFTER SUBSTANTIAL COMPLETION

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.2 AFTER SUBSTANTIAL COMPLETION

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.4.

§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 ACCEPTANCE OF NONCONFORMING WORK

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 GOVERNING LAW

The Contract shall be governed by the law of the place where the Project is located except that, if the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

§ 13.2 SUCCESSORS AND ASSIGNS

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to covenants, agreements and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate such assignment.

§ 13.3 WRITTEN NOTICE

Written notice shall be deemed to have been duly served if delivered in person to the individual, to a member of the firm or entity, or to an officer of the corporation for which it was intended; or if delivered at, or sent by registered or certified mail or by courier service providing proof of delivery to, the last business address known to the party giving notice.

§ 13.4 RIGHTS AND REMEDIES

§ 13.4.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law.

§ 13.4.2 No action or failure to act by the Owner, Architect or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach there under, except as may be specifically agreed in writing.

§ 13.5 TESTS AND INSPECTIONS

§ 13.5.1 Tests, inspections and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and (2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating their cost to the Contractor.

§ 13.5.2 If the Architect, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Section 13.5.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.5.3, shall be at the Owner's expense.

§ 13.5.3 If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure including those of repeated procedures and compensation for the Architect's services and expenses shall be at the Contractor's expense.

§ 13.5.4 Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.

§ 13.5.5 If the Architect is to observe tests, inspections or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.5.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.6 INTEREST

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at such rate as the parties may agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

§ 13.7 TIME LIMITS ON CLAIMS

The Owner and Contractor shall commence all claims and causes of action, whether in contract, tort, breach of warranty or otherwise, against the other arising out of or related to the Contract in accordance with the requirements of the final dispute resolution method selected in the Agreement within the time period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all claims and causes of action not commenced in accordance with this Section 13.7.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 TERMINATION BY THE CONTRACTOR

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, for any of the following reasons:

- .1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;
- .2 An act of government, such as a declaration of national emergency that requires all Work to be stopped;

- .3 Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or
- .4 The Owner has failed to furnish to the Contractor promptly, upon the Contractor's request, reasonable evidence as required by Section 2.2.1.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, repeated suspensions, delays or interruptions of the entire Work by the Owner as described in Section 14.3 constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' written notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, including reasonable overhead and profit, costs incurred by reason of such termination, and damages.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' written notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 TERMINATION BY THE OWNER FOR CAUSE

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- .1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
- .2 fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;
- .3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
- .4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

§ 14.2.2 When any of the above reasons exist, the Owner, upon certification by the Initial Decision Maker that sufficient cause exists to justify such action, may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

- .1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- .2 Accept assignment of subcontracts pursuant to Section 5.4; and
- .3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Initial Decision Maker, upon application, and this obligation for payment shall survive termination of the Contract.

§ 14.3 SUSPENSION BY THE OWNER FOR CONVENIENCE

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay or interruption as described in Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent

- .1 that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or
- .2 that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 TERMINATION BY THE OWNER FOR CONVENIENCE

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of written notice from the Owner of such termination for the Owner's convenience, the Contractor shall

- .1 cease operations as directed by the Owner in the notice;
- .2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and
- .3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination, along with reasonable overhead and profit on the Work not executed.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 CLAIMS

§ 15.1.1 DEFINITION

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim.

§ 15.1.2 NOTICE OF CLAIMS

Claims by either the Owner or Contractor must be initiated by written notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3 CONTINUING CONTRACT PERFORMANCE

Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents. The Architect will prepare Change Orders and issue Certificates for Payment in accordance with the decisions of the Initial Decision Maker.

§ 15.1.4 CLAIMS FOR ADDITIONAL COST

If the Contractor wishes to make a Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.5 CLAIMS FOR ADDITIONAL TIME

§ 15.1.5.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, written notice as provided herein shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary.

§ 15.1.5.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated and had an adverse effect on the scheduled construction.

§ 15.1.6 CLAIMS FOR CONSEQUENTIAL DAMAGES

The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

- .1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and
- .2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.6 shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 INITIAL DECISION

§ 15.2.1 Claims, excluding those arising under Sections 10.3, 10.4, 11.3.9, and 11.3.10, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim arising prior to the date final payment is due, unless 30 days have passed after the Claim has been referred to the Initial Decision Maker with no decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of such request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

§ 15.2.6.1 Either party may, within 30 days from the date of an initial decision, demand in writing that the other party file for mediation within 60 days of the initial decision. If such a demand is made and the party receiving the demand fails to file for mediation within the time required, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 15.2.8 If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

§ 15.3 MEDIATION

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.6 shall be subject to mediation as a condition precedent to binding dispute resolution.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

§ 15.3.3 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

§ 15.4 ARBITRATION

§ 15.4.1 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

§ 15.4.1.1 A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.

§ 15.4.2 The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

§ 15.4.3 The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

§ 15.4.4 CONSOLIDATION OR JOINDER

§ 15.4.4.1 Either party, at its sole discretion, may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

§ 15.4.4.2 Either party, at its sole discretion, may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an

additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

§ 15.4.4.3 The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as the Owner and Contractor under this Agreement.



SUPPLEMENTARY GENERAL CONDITIONS A201-2007

The following supplements modify the "General Conditions of the Contract for Construction," AIA Document A201-2007. Where a portion of the General Conditions is modified or deleted by the Supplementary Conditions, the unaltered portions of the General Conditions shall remain in effect.

TABLE OF ARTICLES

1. GENERAL PROVISIONS
2. OWNER
3. CONTRACTOR
4. ADMINISTRATION OF THE CONTRACT
5. SUBCONTRACTORS
6. CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS
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14. TERMINATION OR SUSPENSION OF THE CONTRACT
15. CLAIMS AND DISPUTES

ARTICLE 1: GENERAL PROVISIONS**1.1 BASIC DEFINITIONS****1.1.1 THE CONTRACT DOCUMENTS**

Delete the last sentence in its entirety and replace with the following:

“The Contract Documents also include Advertisement for Bid, Instructions to Bidder, sample forms, the Bid Form, the Contractor’s completed Bid and the Award Letter.”

Add the following Paragraph:

1.1.1.1 In the event of conflict or discrepancies among the Contract Documents, the Documents prepared by the State of Delaware, Division of Facilities Management shall take precedence over all other documents.

1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

Add the following Paragraphs:

1.2.4 In the case of an inconsistency between the Drawings and the Specifications, or within either document not clarified by addendum, the better quality or greater quantity of work shall be provided in accordance with the Architect’s interpretation.

1.2.5 The word “PROVIDE” as used in the Contract Documents shall mean “FURNISH AND INSTALL” and shall include, without limitation, all labor, materials, equipment, transportation, services and other items required to complete the Work.

1.2.6 The word “PRODUCT” as used in the Contract Documents means all materials, systems and equipment.

1.5 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE

Delete Paragraph 1.5.1 in its entirety and replace with the following:

“All pre-design studies, drawings, specifications and other documents, including those in electronic form, prepared by the Architect under this Agreement are, and shall remain, the property of the Owner whether the Project for which they are made is executed or not. Such documents may be used by the Owner to construct one or more like Projects without the approval of, or additional compensation to, the Architect. The Contractor, Subcontractors, Sub-subcontractors and Material or Equipment Suppliers are authorized to use and reproduce applicable portions of the Drawings, Specifications and other documents prepared by the Architect and the Architect’s consultants appropriate to and for use in the execution of their Work under the Contract Documents. They are not to be used by the Contractor or any Subcontractor, Sub-subcontractor or Material and Equipment Supplier on other Projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect and Architect’s consultants.

The Architect shall not be liable for injury or damage resulting from the re-use of drawings and specifications if the Architect is not involved in the re-use Project. Prior to re-use of construction documents for a Project in which the Architect is not also involved, the Owner will remove from such documents all identification of the original Architect, including name, address and professional seal or stamp.”

Delete Paragraph 1.5.2 in its entirety.

ARTICLE 2: OWNER

2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

To Subparagraph 2.2.3 – Add the following sentence:

“The Contractor, at their expense shall bear the costs to accurately identify the location of all underground utilities in the area of their excavation and shall bear all cost for any repairs required, out of failure to accurately identify said utilities.”

Delete Subparagraph 2.2.5 in its entirety and substitute the following:

2.2.5 The Contractor shall be furnished free of charge up to five (5) sets of the Drawings and Project Manuals. Additional sets will be furnished at the cost of reproduction, postage and handling.

ARTICLE 3: CONTRACTOR

3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

Amend Paragraph 3.2.2 to state that any errors, inconsistencies or omissions discovered shall be reported to the Architect and Owner immediately.

Delete the third sentence in Paragraph 3.2.3.

3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

Add the following Paragraphs:

3.3.2.1 The Contractor shall immediately remove from the Work, whenever requested to do so by the Owner, any person who is considered by the Owner or Architect to be incompetent or disposed to be so disorderly, or who for any reason is not satisfactory to the Owner, and that person shall not again be employed on the Work without the consent of the Owner or the Architect.

3.3.4 The Contractor must provide suitable storage facilities at the Site for the proper protection and safe storage of their materials. Consult the Owner and the Architect before storing any materials.

3.3.5 When any room is used as a shop, storeroom, office, etc., by the Contractor or Subcontractor(s) during the construction of the Work, the Contractor making use of these areas will be held responsible for any repairs, patching or cleaning arising from such use.

3.4 LABOR AND MATERIALS

Add the Following Paragraphs:

- 3.4.4 Before starting the Work, each Contractor shall carefully examine all preparatory Work that has been executed to receive their Work. Check carefully, by whatever means are required, to insure that its Work and adjacent, related Work, will finish to proper contours, planes and levels. Promptly notify the General Contractor/Construction Manager of any defects or imperfections in preparatory Work which will in any way affect satisfactory completion of its Work. Absence of such notification will be construed as an acceptance of preparatory Work and later claims of defects will not be recognized.
- 3.4.5 Under no circumstances shall the Contractor's Work proceed prior to preparatory Work having been completely cured, dried and/or otherwise made satisfactory to receive this Work. Responsibility for timely installation of all materials rests solely with the Contractor responsible for that Work, who shall maintain coordination at all times.

3.5 WARRANTY

Add the following Paragraphs:

- 3.5.1 The Contractor will guarantee all materials and workmanship against original defects, except injury from proper and usual wear when used for the purpose intended, for two years after Acceptance by the Owner, and will maintain all items in perfect condition during the period of guarantee.
- 3.5.2 Defects appearing during the period of guarantee will be made good by the Contractor at his expense upon demand of the Owner, it being required that all work will be in perfect condition when the period of guarantee will have elapsed.
- 3.5.3 In addition to the General Guarantee there are other guarantees required for certain items for different periods of time than the two years as above, and are particularly so stated in that part of the specifications referring to same. The said guarantees will commence at the same time as the General Guarantee.
- 3.5.4 If the Contractor fails to remedy any failure, defect or damage within a reasonable time after receipt of notice, the Owner will have the right to replace, repair, or otherwise remedy the failure, defect or damage at the Contractor's expense.

3.11 DOCUMENTS AND SAMPLES AT THE SITE

Add the following Paragraphs:

- 3.11.1 During the course of the Work, the Contractor shall maintain a record set of drawings on which the Contractor shall mark the actual physical location of all piping, valves, equipment, conduit, outlets, access panels, controls, actuators, including all appurtenances that will be concealed once construction is complete, etc., including all invert elevations.
- 3.11.2 At the completion of the project, the Contractor shall obtain a set of reproducible drawings from the Architect, and neatly transfer all information outlined in 3.11.1 to provide a complete record of the as-built conditions.

- 3.11.3 The Contractor shall provide two (2) prints of the as-built conditions, along with the reproducible drawings themselves, to the Owner and one (1) set to the Architect. In addition, attach one complete set to each of the Operating and Maintenance Instructions/Manuals.

3.17 In the second sentence of the paragraph, insert "indemnify" between "shall" and "hold".

ARTICLE 4: ADMINISTRATION OF THE CONTRACT

4.2 ADMINISTRATION OF THE CONTRACT

Delete the first sentence of Paragraph 4.2.7 and replace with the following:

The Architect will review and approve or take other appropriate action upon the Contractor's submittals such as Shop Drawings, Product Data and Samples for the purpose of checking for conformance with the Contract Documents.

Delete the second sentence of Paragraph 4.2.7 and replace with the following:

The Architect's action will be taken with such reasonable promptness as to cause no delay in the Work in the activities of the Owner, Contractor or separate Contractors, while allowing sufficient time in the Owner's professional judgment to permit adequate review.

Add the following Paragraph:

- 4.2.10.1 There will be no full-time project representative provided by the Owner or Architect on this project.

Add to Paragraph 4.2.13 "and in compliance with all local requirements." to the end of the sentence

ARTICLE 5: SUBCONTRACTORS

5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

Delete Paragraph 5.2.3 in its entirety and replace with the following:

- 5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection, subject to the statutory requirements of 29 Delaware Code § 6962(d)(10)b.3 and 4.

ARTICLE 6: CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

6.1 OWNER'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS

Delete Paragraph 6.1.4 in its entirety.

6.2 MUTUAL RESPONSIBILITY

- 6.2.3 In the second sentence, strike the word "shall" and insert the word "may".

ARTICLE 7: CHANGES IN THE WORK

(SEE ARTICLE 7: CHANGES IN WORK IN THE GENERAL REQUIREMENTS)

ARTICLE 8: TIME**8.2 PROGRESS AND COMPLETION**

Add the following Paragraphs:

8.2.1.1 Refer to Specification Section SUMMARY OF WORK for Contract time requirements.

8.2.4 If the Work falls behind the Progress Schedule as submitted by the Contractor, the Contractor shall employ additional labor and/or equipment necessary to bring the Work into compliance with the Progress Schedule at no additional cost to the Owner.

8.3 DELAYS AND EXTENSION OF TIME

8.3.1 Strike "arbitration" and insert "remedies at law or in equity".

Add the following Paragraph:

8.3.2.1 The Contractor shall update the status of the suspension, delay, or interruption of the Work with each Application for Payment. (The Contractor shall report the termination of such cause immediately upon the termination thereof.) Failure to comply with this procedure shall constitute a waiver for any claim for adjustment of time or price based upon said cause.

Delete Paragraph 8.3.3 in its entirety and replace with the following:

8.3.3 Except in the case of a suspension of the Work directed by the Owner, an extension of time under the provisions of Paragraph 8.3.1 shall be the Contractor's sole remedy in the progress of the Work and there shall be no payment or compensation to the Contractor for any expense or damage resulting from the delay.

Add the following Paragraph:

8.3.4 By permitting the Contractor to work after the expired time for completion of the project, the Owner does not waive their rights under the Contract.

ARTICLE 9: PAYMENTS AND COMPLETION**9.2 SCHEDULE OF VALUES**

Add the following Paragraphs:

9.2.1 The Schedule of Values shall be submitted using AIA Document G702, Continuation Sheet to G703.

9.2.2 The Schedule of Values is to include a line item for Project Closeout Document Submittal. The value of this item is to be no less than 1% of the initial contract amount.

9.3 APPLICATIONS FOR PAYMENT

Add the following Paragraph:

- 9.3.1.3 Application for Payment shall be submitted on AIA Document G702 "Application and Certificate for Payment", supported by AIA Document G703 "Continuation Sheet". Said Applications shall be fully executed and notarized.

Add the following Paragraphs:

- 9.3.4 Until Closeout Documents have been received and outstanding items completed the Owner will pay 95% (ninety-five percent) of the amount due the Contractor on account of progress payments.
- 9.3.5 The Contractor shall provide a current and updated Progress Schedule to the Architect with each Application for Payment. Failure to provide Schedule will be just cause for rejection of Application for Payment.

9.5 DECISIONS TO WITHHOLD CERTIFICATION

Add the following to 9.5.1:

- .8 failure to provide a current Progress Schedule;
- .9 a lien or attachment is filed;
- .10 failure to comply with mandatory requirements for maintaining Record Documents.

9.6 PROGRESS PAYMENTS

Delete Paragraph 9.6.1 in its entirety and replace with the following:

- 9.6.1 After the Architect has approved and issued a Certificate for Payment, payment shall be made by the Owner within 30 days after Owner's receipt of the Certificate for Payment.

9.7 FAILURE OF PAYMENT

In first sentence, strike "seven" and insert "thirty (30)". Also strike "binding dispute resolution" and insert "remedies at law or in equity".

9.8 SUBSTANTIAL COMPLETION

To Subparagraph 9.8.3 - Add the following sentence:

"If the Architect is required to make more than 2 inspections of the same portion of work, the Contractor shall be responsible for all costs associated with subsequent inspections including but not limited to any Architect's fees."

- 9.8.5 In the second sentence, strike "shall" and insert "may".

ARTICLE 10: PROTECTION OF PERSONS AND PROPERTY**10.1 SAFETY PRECAUTIONS AND PROGRAMS**

Add the following Paragraphs:

10.1.1.1.1 Each Contractor shall develop a safety program in accordance with the Occupational Safety and Health Act of 1970. A copy of said plan shall be furnished to the Owner and Architect prior to the commencement of that Contractor's Work.

10.1.2 Each Contractor shall appoint a Safety Representative. Safety Representatives shall be someone who is on site on a full time basis. If deemed necessary by the Owner or Architect, Contractor Safety meetings will be scheduled. The attendance of all Safety Representatives will be required. Minutes will be recorded of said meetings by the Contractor and will be distributed to all parties as well as posted in all job offices/trailers etc.

10.2 SAFETY OF PERSONS AND PROPERTY

Add the following Paragraph:

10.2.4.1 As required in the Hazardous Chemical Act of June 1984, all vendors supplying any material that may be defined as hazardous must provide Material Safety Data Sheets for those products. Any chemical product should be considered hazardous if it has a caution warning on the label relating to a potential physical or health hazard, if it is known to be present in the work place, and if employees may be exposed under normal conditions or in foreseeable emergency situations. Material Safety Data Sheets shall be provided directly to the Owner, along with the shipping slips that include those products.

10.3 HAZARDOUS MATERIALS

Delete Paragraph 10.3.3 in its entirety.

Delete Paragraph 10.3.6 in its entirety.

ARTICLE 11: INSURANCE AND BONDS**11.1 CONTRACTOR'S LIABILITY INSURANCE**

11.1.4 Strike "the Owner" immediately following "(1)" and strike "and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's completed operations."

11.2 OWNER'S LIABILITY INSURANCE

Delete Paragraph 11.2 in its entirety.

11.3 PROPERTY INSURANCE

Delete Paragraph 11.3 in its entirety and replace with the following:

11.3 The State will not provide Builder's All Risk Insurance for the Project. The Contractor and all Subcontractors shall provide property coverage for their tools and equipment, as necessary. Any mandatory deductible required by the Contractor's Insurance shall be the responsibility of the Contractor.

11.4 PERFORMANCE BOND AND PAYMENT BOND

- 11.4.1 Add the following sentence: "The bonds will conform to those forms approved by the Office of Management and Budget."

ARTICLE 12: UNCOVERING AND CORRECTION OF WORK**12.2.2 AFTER SUBSTANTIAL COMPLETION**

Add the following Paragraph:

- 12.2.2.1.1 At any time during the progress of the Work, or in any case where the nature of the defects will be such that it is not expedient to have corrected, the Owner, at its option, will have the right to deduct such sum, or sums, of money from the amount of the Contract as it considers justified to adjust the difference in value between the defective work and that required under contract including any damage to the structure.

- 12.2.2.1 Strike "one" and insert "two".

- 12.2.2.2 Strike "one" and insert "two".

- 12.2.2.3 Strike "one" and insert "two".

- 12.2.5 In second sentence, strike "one" and insert "two".

ARTICLE 13: MISCELLANEOUS PROVISIONS**13.1 GOVERNING LAW**

Strike "except that, if the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4."

13.6 INTEREST

Strike "the date payment is due at such rate as the parties may agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located." Insert "30 days of presentment of the authorized Certificate of Payment at the annual rate of 12% or 1% per month."

13.7 TIME LIMITS ON CLAIMS

Strike the last sentence.

Add the following Paragraph:

13.8 CONFLICTS WITH FEDERAL STATUTES OR REGULATIONS

- 13.8.1 If any provision, specifications or requirement of the Contract Documents conflict or is inconsistent with any statute, law or regulation of the government of the United State of America, the Contractor shall notify the Architect and Owner immediately upon discovery.

ARTICLE 14: TERMINATION OR SUSPENSION OF THE CONTRACT**14.4 TERMINATION BY THE OWNER FOR CONVENIENCE**

Delete Paragraph 14.4.3 in its entirety and replace with the following:

- 14.4.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, and cost incurred by reason of such termination along with reasonable overhead.

ARTICLE 15: CLAIMS AND DISPUTES

- 15.1.2 Throughout the Paragraph strike "21" and insert "45".

15.1.6 CLAIMS FOR CONSEQUENTIAL DAMAGES

Delete Paragraph 15.1.6 in its entirety.

15.2 INITIAL DECISION

Delete Paragraph 15.2.5 in its entirety and replace with the following:

- 15.2.5 The Architect will approve or reject Claims by written decision, which shall state the reasons therefore and shall notify the parties of any change in the Contract Sum or Contract Time or both. The approval or rejection of a Claim by the Architect shall be subject to mediation and other remedies at law or in equity.

Delete Paragraph 15.2.6 and its subparagraphs in their entirety.

15.3 MEDIATION

- 15.3.1 Strike "binding dispute resolution" and insert "any or all remedies at law or in equity".

- 15.3.2 In the first sentence, delete "administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedure in effect on the date of the Agreement," Strike "binding dispute resolution" and insert "remedies at law and in equity".

15.4 ARBITRATION

Delete Paragraph 15.4 and its sub-sections in its entirety.

END OF SUPPLEMENTARY GENERAL CONDITIONS

SECTION 00 73 46

WAGE RATE REQUIREMENTS

A. GENERAL

1. This project must be performed under prevailing wage guidelines. Prevailing wage documents are contained at the end of this Section.

END OF SECTION

STATE OF DELAWARE
DEPARTMENT OF LABOR
DIVISION OF INDUSTRIAL AFFAIRS
OFFICE OF LABOR LAW ENFORCEMENT
PHONE: (302) 451-3423

Mailing Address:
225 CORPORATE BOULEVARD
SUITE 104
NEWARK, DE 19702

Located at:
225 CORPORATE BOULEVARD
SUITE 104
NEWARK, DE 19702

PREVAILING WAGES FOR HEAVY CONSTRUCTION EFFECTIVE MARCH 15, 2016

CLASSIFICATION	NEW CASTLE	KENT	SUSSEX
ASBESTOS WORKERS	21.82	19.20	41.74
BOILERMAKERS	75.62	31.72	58.19
BRICKLAYERS	46.43	22.91	24.60
CARPENTERS	52.81	52.81	41.97
CEMENT FINISHERS	43.05	24.05	17.91
ELECTRICAL LINE WORKERS	72.73	27.89	63.84
ELECTRICIANS	65.10	65.10	65.10
GLAZIERS	20.17	17.51	11.85
INSULATORS	54.38	54.38	54.38
IRON WORKERS	60.19	60.19	57.58
LABORERS	43.60	43.60	43.60
MILLWRIGHTS	66.83	66.83	53.40
PAINTERS	75.26	75.26	75.26
PILEDRIVERS	72.97	38.86	30.25
PLASTERERS	18.99	16.49	11.15
PLUMBERS/PIPEFITTERS/STEAMFITTERS	82.03	76.87	17.67
POWER EQUIPMENT OPERATORS	61.36	61.36	61.36
SHEET METAL WORKERS	30.35	18.82	17.68
SPRINKLER FITTERS	32.70	12.38	10.25
TRUCK DRIVERS	31.56	20.36	21.99

CERTIFIED: 12/12/2016

BY: 

ADMINISTRATOR, OFFICE OF LABOR LAW ENFORCEMENT

NOTE: THESE RATES ARE PROMULGATED AND ENFORCED PURSUANT TO THE PREVAILING WAGE REGULATIONS ADOPTED BY THE DEPARTMENT OF LABOR ON APRIL 3, 1992.

CLASSIFICATIONS OF WORKERS ARE DETERMINED BY THE DEPARTMENT OF LABOR. FOR ASSISTANCE IN CLASSIFYING WORKERS, OR FOR A COPY OF THE REGULATIONS OR CLASSIFICATIONS, PHONE (302) 451-3423.

NON-REGISTERED APPRENTICES MUST BE PAID THE MECHANIC'S RATE.

PROJECT: NAT15003-FLOODP Improvements of DE Dams , Sussex County

PREVAILING WAGE DEBARMENT LIST

The following contractors have been debarred for violations of the prevailing wage law 29Del.C. §6960 or other applicable State statutes.

Therefore, no public construction contract in this State shall be bid on, awarded to, or received by contractors and individuals on this list for a period of (3) three years from the date of the judgment or as deemed by a court of competent jurisdiction.

Contractor	Address	Date of Debarment
Mullen Brothers, Inc. and Daniel Mullen, individually	3375 Garnett Road, Boothwyn, PA 19060	Indefinite/ Civil Contempt
MMR Associates DBA Peninsula Glass and Michael Rooney, individually	679 Horse Pond Road, Dover, DE 19901	1/20/2015
Site Work Safety Supplies, Inc. and Peter Coker, individually	4020 Seven Hickories Road Dover, DE 19904	1/12/2016
Green Granite and Jason Green, individually	604 Heatherbrooke Court Avondale, PA 19311	Indefinite/ Civil Contempt
DCS Staffing & Cleaning Professionals, LLC	4805 Garrison Blvd. Suite 200 Baltimore, MD 21821	Indefinite/ 19 Del.C. 2374(f)
Pro Image Landscaping, Inc. and Owner(s) individually	23 Commerce Street Wilmington, DE 19801 and/or 2 Cameo Road Claymont, DE 19703	Indefinite/19 Del.C. §108 & 10 Del.C. 542(c)
Liberty Mechanical, LLC and Owner(s), individually	2032 Duncan Road Wilmington, DE 19801	Indefinite/ 19 Del.C. 2374(f)
Integrated Mechanical and Fire Systems Inc. and Allison Sheldon, individually	4601 Governor Printz Boulevard Wilmington, DE 19809	Indefinite/19 Del.C. §108 & 10 Del.C. 542(c)

GENERAL REQUIREMENTS

TABLE OF ARTICLES

1. GENERAL PROVISIONS
2. OWNER
3. CONTRACTOR
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5. SUBCONTRACTORS
6. CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS
7. CHANGES IN THE WORK
8. TIME
9. PAYMENTS AND COMPLETION
10. PROTECTION OF PERSONS AND PROPERTY
11. INSURANCE AND BONDS
12. UNCOVERING AND CORRECTION OF WORK
13. MISCELLANEOUS PROVISIONS
14. TERMINATION OR SUSPENSION OF THE CONTRACT

ARTICLE 1: GENERAL**1.1 CONTRACT DOCUMENTS**

1.1.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary and what is required by one shall be as binding as if required by all. Performance by the Contractor shall be required to an extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the intended results.

1.1.2 Work including material purchases shall not begin until the Contractor is in receipt of a bonafide State of Delaware Purchase Order. Any work performed or material purchases prior to the issuance of the Purchase Order is done at the Contractor's own risk and cost.

1.2 EQUALITY OF EMPLOYMENT OPPORTUNITY ON PUBLIC WORKS

1.2.1 For Public Works Projects financed in whole or in part by state appropriation the Contractor agrees that during the performance of this contract:

1. The Contractor will not discriminate against any employee or applicant for employment because of race, creed, sex, color, sexual orientation, gender identity or national origin. The Contractor will take positive steps to ensure that applicants are employed and that employees are treated during employment without regard to their race, creed, sex, color, sexual orientation, gender identity or national origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places available to employees and applicants for employment notices to be provided by the contracting agency setting forth this nondiscrimination clause.
2. The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, creed, sex, color, sexual orientation, gender identity or national origin."

ARTICLE 2: OWNER

(NO ADDITIONAL GENERAL REQUIREMENTS – SEE SUPPLEMENTARY GENERAL CONDITIONS)

ARTICLE 3: CONTRACTOR

3.1 Schedule of Values: The successful Bidder shall within twenty (20) days after receiving notice to proceed with the work, furnish to the Owner a complete schedule of values on the various items comprising the work.

3.2 Subcontracts: Upon approval of Subcontractors, the Contractor shall award their Subcontracts as soon as possible after the signing of their own contract and see that all material, their own and those of their Subcontractors, are promptly ordered so that the work will not be delayed by failure of materials to arrive on time.

3.3 Before commencing any work or construction, the General Contractor is to consult with the Owner as to matters in connection with access to the site and the allocation of Ground Areas for the various features of hauling, storage, etc.

- 3.4 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for and have control over construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions.
- 3.5 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Contract. The Contractor shall not permit employment of unfit persons or persons not skilled in tasks assigned to them.
- 3.6 The Contractor warrants to the Owner that materials and equipment furnished will be new and of good quality, unless otherwise permitted, and that the work will be free from defects and in conformance with the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved, may be considered defective. If required by the Owner, the Contractor shall furnish evidence as to the kind and quality of materials and equipment provided.
- 3.7 Unless otherwise provided, the Contractor shall pay all sales, consumer, use and other similar taxes, and shall secure and pay for required permits, fees, licenses, and inspections necessary for proper execution of the Work.
- 3.8 The Contractor shall comply with and give notices required by laws, ordinances, rules, regulations, and lawful orders of public authorities bearing on performance of the Work. The Contractor shall promptly notify the Owner if the Drawings and Specifications are observed to be at variance therewith.
- 3.9 The Contractor shall be responsible to the Owner for the acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons performing portions of the Work under contract with the Contractor.
- 3.10 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work the Contractor shall remove from and about the Project all waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials. The Contractor shall be responsible for returning all damaged areas to their original conditions.
- 3.11 STATE LICENSE AND TAX REQUIREMENTS
- 3.11.1 Each Contractor and Subcontractor shall be licensed to do business in the State of Delaware and shall pay all fees and taxes due under State laws. In conformance with Section 2503, Chapter 25, Title 30, Delaware Code, "the Contractor shall furnish the Delaware Department of Finance within ten (10) days after entering into any contract with a contractor or subcontractor not a resident of this State, a statement of total value of such contract or contracts together with the names and addresses of the contracting parties."
- 3.12 The Contractor shall comply with all requirements set forth in Section 6962, Chapter 69, Title 29 of the Delaware Code.

- 3.13 During the contract Work, the Contractor and each listed Subcontractor, shall implement an Employee Drug Testing Program in accordance with OMB Regulation 4104-“Regulations for the Drug Testing of Contractor and Subcontractor Employees Working on “Large Public Works Projects”. “Large Public Works” is based upon the current threshold required for bidding Public Works as set by the Purchasing and Contracting Advisory Council.

ARTICLE 4: ADMINISTRATION OF THE CONTRACT

4.1 CONTRACT SURETY

4.1.1 PERFORMANCE BOND AND LABOR AND MATERIAL PAYMENT BOND

- 4.1.2 All bonds will be required as follows unless specifically waived elsewhere in the Bidding Documents.

- 4.1.3 Contents of Performance Bonds – The bond shall be in the form approved by the Office of Management and Budget. The bond shall be conditioned upon the faithful compliance and performance by the successful bidder of each and every term and condition of the contract and the proposal, plans, specifications, and bid documents thereof. Each term and condition shall be met at the time and in the manner prescribed by the Contract, Bid documents and the specifications, including the payment in full to every person furnishing material or performing labor in the performance of the Contract, of all sums of money due the person for such labor and material. (The bond shall also contain the successful bidder's guarantee to indemnify and save harmless the State and the agency from all costs, damages and expenses growing out of or by reason of the Contract in accordance with the Contract.)

- 4.1.4 Invoking a Performance Bond – The agency may, when it considers that the interest of the State so require, cause judgement to be confessed upon the bond.

- 4.1.5 Within twenty (20) days after the date of notice of award of contract, the Bidder to whom the award is made shall furnish a Performance Bond and Labor and Material Payment Bond, each equal to the full amount of the Contract price to guarantee the faithful performance of all terms, covenants and conditions of the same. The bonds are to be issued by an acceptable Bonding Company licensed to do business in the State of Delaware and shall be issued in duplicate.

- 4.1.6 Performance and Payment Bonds shall be maintained in full force (warranty bond) for a period of two (2) years after the date of the Certificate for Final Payment. The Performance Bond shall guarantee the satisfactory completion of the Project and that the Contractor will make good any faults or defects in his work which may develop during the period of said guarantees as a result of improper or defective workmanship, material or apparatus, whether furnished by themselves or their Sub-Contractors. The Payment Bond shall guarantee that the Contractor shall pay in full all persons, firms or corporations who furnish labor or material or both labor and material for, or on account of, the work included herein. The bonds shall be paid for by this Contractor. The Owner shall have the right to demand that the proof parties signing the bonds are duly authorized to do so.

4.2 FAILURE TO COMPLY WITH CONTRACT

- 4.2.1 If any firm entering into a contract with the State, or Agency that neglects or refuses to perform or fails to comply with the terms thereof, the Agency which signed the Contract may terminate the Contract and proceed to award a new contract in accordance with this Chapter 69, Title 29 of the Delaware Code or may require the Surety on the Performance Bond to complete the Contract in accordance with the terms of the Performance Bond. Nothing herein shall preclude the Agency from pursuing additional remedies as otherwise provided by law.

4.3 CONTRACT INSURANCE AND CONTRACT LIABILITY

- 4.3.1 In addition to the bond requirements stated in the Bid Documents, each successful Bidder shall purchase adequate insurance for the performance of the Contract and, by submission of a Bid, agrees to indemnify and save harmless and to defend all legal or equitable actions brought against the State, any Agency, officer and/or employee of the State, for and from all claims of liability which is or may be the result of the successful Bidder's actions during the performance of the Contract.

- 4.3.2 The purchase or nonpurchase of such insurance or the involvement of the successful Bidder in any legal or equitable defense of any action brought against the successful Bidder based upon work performed pursuant to the Contract will not waive any defense which the State, its agencies and their respective officers, employees and agents might otherwise have against such claims, specifically including the defense of sovereign immunity, where applicable, and by the terms of this section, the State and all agencies, officers and employees thereof shall not be financially responsible for the consequences of work performed, pursuant to said contract.

4.4 RIGHT TO AUDIT RECORDS

- 4.4.1 The Owner shall have the right to audit the books and records of a Contractor or any Subcontractor under any Contract or Subcontract to the extent that the books and records relate to the performance of the Contract or Subcontract.

- 4.4.2 Said books and records shall be maintained by the Contractor for a period of seven (7) years from the date of final payment under the Prime Contract and by the Subcontractor for a period of seven (7) years from the date of final payment under the Subcontract.

ARTICLE 5: SUBCONTRACTORS**5.1 SUBCONTRACTING REQUIREMENTS**

- 5.1.1 All contracts for the construction, reconstruction, alteration or repair of any public building (not a road, street or highway) shall be subject to the following provisions:
1. A contract shall be awarded only to a Bidder whose Bid is accompanied by a statement containing, for each Subcontractor category, the name and address (city or town and State only – street number and P.O. Box addresses not required) of the subcontractor whose services the Bidder intends to use in performing the Work and providing the material for such Subcontractor category.

2. A Bid will not be accepted nor will an award of any Contract be made to any Bidder which, as the Prime Contractor, has listed itself as the Subcontractor for any Subcontractor unless:
 - A. It has been established to the satisfaction of the awarding Agency that the Bidder has customarily performed the specialty work of such Subcontractor category by artisans regularly employed by the Bidder's firm;
 - B. That the Bidder is duly licensed by the State to engage in such specialty work, if the State requires licenses; and
 - C. That the Bidder is recognized in the industry as a bona fide Subcontractor or Contractor in such specialty work and Subcontractor category.
- 5.1.2 The decision of the awarding Agency as to whether a Bidder who list itself as the Subcontractor for a Subcontractor category shall be final and binding upon all Bidders, and no action of any nature shall lie against any awarding agency or its employees or officers because of its decision in this regard.
- 5.1.3 After such a Contract has been awarded, the successful Bidder shall not substitute another Subcontractor for any Subcontractor whose name was set forth in the statement which accompanied the Bid without the written consent of the awarding Agency.
- 5.1.4 No Agency shall consent to any substitution of Subcontractors unless the Agency is satisfied that the Subcontractor whose name is on the Bidders accompanying statement:
 - A. Is unqualified to perform the work required;
 - B. Has failed to execute a timely reasonable Subcontract;
 - C. Has defaulted in the performance on the portion of the work covered by the Subcontract; or
 - D. Is no longer engaged in such business.
- 5.1.5 Should a Bidder be awarded a contract, such successful Bidder shall provide to the agency the taxpayer identification license numbers of such subcontractors. Such numbers shall be provided on the later of the date on which such subcontractor is required to be identified or the time the contract is executed. The successful Bidder shall provide to the agency to which it is contracting, within 30 days of entering into such public works contract, copies of all Delaware Business licenses of subcontractors and/or independent contractors that will perform work for such public works contract. However, if a subcontractor or independent contractor is hired or contracted more than 20 days after the Bidder entered the public works contract the Delaware Business license of such subcontractor or independent contractor shall be provided to the agency within 10 days of being contracted or hired.

5.2 PENALTY FOR SUBSTITUTION OF SUBCONTRACTORS

- 5.2.1 Should the Contractor fail to utilize any or all of the Subcontractors in the Contractor's Bid statement in the performance of the Work on the public bidding, the Contractor shall be penalized in the amount of (project specific amount*). The Agency may determine to deduct payments of the penalty from the Contractor or have the amount paid directly to the Agency. Any penalty amount assessed against the Contractor may be remitted or refunded, in whole or in part, by the Agency awarding the Contract, only if it is established to the satisfaction of the Agency that the Subcontractor in question has defaulted or is no longer engaged in such business. No claim for the remission or refund of any penalty shall be granted unless an application is filed within one year after the liability of the successful Bidder accrues. All penalty amounts assessed and not refunded or remitted to the contractor shall be reverted to the State.

*one (1) percent of contract amount not to exceed \$10,000

5.3 ASBESTOS ABATEMENT

- 5.3.1 The selection of any Contractor to perform asbestos abatement for State-funded projects shall be approved by the Office of Management and Budget, Division of Facilities Management pursuant to Chapter 78 of Title 16.

5.4 STANDARDS OF CONSTRUCTION FOR THE PROTECTION OF THE PHYSICALLY HANDICAPPED

- 5.4.1 All Contracts shall conform with the standard established by the Delaware Architectural Accessibility Board unless otherwise exempted by the Board.

5.5 CONTRACT PERFORMANCE

- 5.5.1 Any firm entering into a Public Works Contract that neglects or refuses to perform or fails to comply with its terms, the Agency may terminate the Contract and proceed to award a new Contract or may require the Surety on the Performance Bond to complete the Contract in accordance with the terms of the Performance Bond.

ARTICLE 6: CONSTRUCTION BY OWNER OR SEPARATE CONTRACTORS

- 6.1 The Owner reserves the right to simultaneously perform other construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other Projects at the same site.
- 6.2 The Contractor shall afford the Owner and other Contractors reasonable opportunity for access and storage of materials and equipment, and for the performance of their activities, and shall connect and coordinate their activities with other forces as required by the Contract Documents.

ARTICLE 7: CHANGES IN THE WORK

- 7.1 The Owner, without invalidating the Contract, may order changes in the Work consisting of Additions, Deletions, Modifications or Substitutions, with the Contract Sum and Contract completion date being adjusted accordingly. Such changes in the Work shall be authorized by written Change Order signed by the Professional, as the duly authorized agent, the Contractor and the Owner.

- 7.2 The Contract Sum and Contract Completion Date shall be adjusted only by a fully executed Change Order.
- 7.3 The additional cost, or credit to the Owner resulting from a change in the Work shall be by mutual agreement of the Owner, Contractor and the Architect. In all cases, this cost or credit shall be based on the 'DPE' wages required and the "invoice price" of the materials/equipment needed.
- 7.3.1 "DPE" shall be defined to mean "direct personnel expense". Direct payroll expense includes direct salary plus customary fringe benefits (prevailing wage rates) and documented statutory costs such as workman's compensation insurance, Social Security/Medicare, and unemployment insurance (a maximum multiplier of 1.35 times DPE).
- 7.3.2 "Invoice price" of materials/equipment shall be defined to mean the actual cost of materials and/or equipment that is paid by the Contractor, (or subcontractor), to a material distributor, direct factory vendor, store, material provider, or equipment leasing entity. Rates for equipment that is leased and/or owned by the Contractor or subcontractor(s) shall not exceed those listed in the latest version of the "Means Building Construction Cost Data" publication.
- 7.3.3 In addition to the above, the General Contractor is allowed a fifteen percent (15%) markup for overhead and profit for additional work performed by the General Contractor's own forces. For additional subcontractor work, the Subcontractor is allowed a fifteen (15) percent overhead and profit on change order work above and beyond the direct costs stated previously. To this amount, the General Contractor will be allowed a mark-up not exceeding seven and one half percent (7.5%) on the subcontractors work. These mark-ups shall include all costs including, but not limited to: overhead, profit, bonds, insurance, supervision, etc. No markup is permitted on the work of the subcontractors subcontractor. No additional costs shall be allowed for changes related to the Contractor's onsite superintendent/staff, or project manager, unless a change in the work changes the project duration and is identified by the CPM schedule. There will be no other costs associated with the change order.

ARTICLE 8: TIME

- 8.1 Time limits, if any, are as stated in the Project Manual. By executing the Agreement, the Contractor confirms that the stipulated limits are reasonable, and that the Work will be completed within the anticipated time frame.
- 8.2 If progress of the Work is delayed at any time by changes ordered by the Owner, by labor disputes, fire, unusual delay in deliveries, abnormal adverse weather conditions, unavoidable casualties or other causes beyond the Contractor's control, the Contract Time shall be extended for such reasonable time as the Owner may determine.
- 8.3 Any extension of time beyond the date fixed for completion of the construction and acceptance of any part of the Work called for by the Contract, or the occupancy of the building by the Owner, in whole or in part, previous to the completion shall not be deemed a waiver by the Owner of his right to annul or terminate the Contract for abandonment or delay in the matter provided for, nor relieve the Contractor of full responsibility.

8.4 SUSPENSION AND DEBARMENT

8.4.1 Per Section 6962(d)(14), Title 29, Delaware Code, "Any Contractor who fails to perform a public works contract or complete a public works project within the time schedule established by the Agency in the Invitation To Bid, may be subject to Suspension or Debarment for one or more of the following reasons: a) failure to supply the adequate labor supply ratio for the project; b) inadequate financial resources; or, c) poor performance on the Project."

8.4.2 "Upon such failure for any of the above stated reasons, the Agency that contracted for the public works project may petition the Director of the Office of Management and Budget for Suspension or Debarment of the Contractor. The Agency shall send a copy of the petition to the Contractor within three (3) working days of filing with the Director. If the Director concludes that the petition has merit, the Director shall schedule and hold a hearing to determine whether to suspend the Contractor, debar the Contractor or deny the petition. The Agency shall have the burden of proving, by a preponderance of the evidence, that the Contractor failed to perform or complete the public works project within the time schedule established by the Agency and failed to do so for one or more of the following reasons: a) failure to supply the adequate labor supply ratio for the project; b) inadequate financial resources; or, c) poor performance on the project. Upon a finding in favor of the Agency, the Director may suspend a Contractor from Bidding on any project funded, in whole or in part, with public funds for up to 1 year for a first offense, up to 3 years for a second offense and permanently debar the Contractor for a third offense. The Director shall issue a written decision and shall send a copy to the Contractor and the Agency. Such decision may be appealed to the Superior Court within thirty (30) days for a review on the record."

8.5 RETAINAGE

8.5.1 Per Section 6962(d)(5) a.3, Title 29, Delaware Code: The Agency may at the beginning of each public works project establish a time schedule for the completion of the project. If the project is delayed beyond the completion date due to the Contractor's failure to meet their responsibilities, the Agency may forfeit, at its discretion, all or part of the Contractor's retainage.

8.5.2 This forfeiture of retainage also applies to the timely completion of the punchlist. A punchlist will only be prepared upon the mutual agreement of the Owner, Architect and Contractor. Once the punchlist is prepared, all three parties will by mutual agreement, establish a schedule for its completion. Should completion of the punchlist be delayed beyond the established date due to the Contractor's failure to meet their responsibilities, the Agency may hold permanently, at its discretion, all or part of the Contractor's retainage.

ARTICLE 9: PAYMENTS AND COMPLETION**9.1 APPLICATION FOR PAYMENT**

9.1.1 Applications for payment shall be made upon AIA Document G702. There will be a five percent (5%) retainage on all Contractor's monthly invoices until completion of the project. This retainage may become payable upon receipt of all required closeout documentation, provided all other requirements of the Contract Documents have been met.

9.1.2 A date will be fixed for the taking of the monthly account of work done. Upon receipt of Contractor's itemized application for payment, such application will be audited, modified, if found necessary, and approved for the amount. Statement shall be submitted to the Owner.

9.1.3 Section 6516, Title 29 of the Delaware Code annualized interest is not to exceed 12% per annum beginning thirty (30) days after the "presentment" (as opposed to the date) of the invoice.

9.2 PARTIAL PAYMENTS

9.2.1 Any public works Contract executed by any Agency may provide for partial payments at the option of the Owner with respect to materials placed along or upon the sites or stored at secured locations, which are suitable for use in the performance of the contract.

9.2.2 When approved by the agency, partial payment may include the values of tested and acceptable materials of a nonperishable or noncontaminative nature which have been produced or furnished for incorporation as a permanent part of the work yet to be completed, provided acceptable provisions have been made for storage.

9.2.2.1 Any allowance made for materials on hand will not exceed the delivered cost of the materials as verified by invoices furnished by the Contractor, nor will it exceed the contract bid price for the material complete in place.

9.2.3 If requested by the Agency, receipted bills from all Contractors, Subcontractors, and material, men, etc., for the previous payment must accompany each application for payment. Following such a request, no payment will be made until these receipted bills have been received by the Owner.

9.3 SUBSTANTIAL COMPLETION

9.3.1 When the building has been made suitable for occupancy, but still requires small items of miscellaneous work, the Owner will determine the date when the project has been substantially completed.

9.3.2 If, after the Work has been substantially completed, full completion thereof is materially delayed through no fault of the Contractor, and without terminating the Contract, the Owner may make payment of the balance due for the portion of the Work fully completed and accepted. Such payment shall be made under the terms and conditions governing final payment that it shall not constitute a waiver of claims.

9.3.3 On projects where commissioning is included, the commissioning work as defined in the specifications must be complete prior to the issuance of substantial completion.

9.4 FINAL PAYMENT

9.4.1 Final payment, including the five percent (5%) retainage if determined appropriate, shall be made within thirty (30) days after the Work is fully completed and the Contract fully performed and provided that the Contractor has submitted the following closeout documentation (in addition to any other documentation required elsewhere in the Contract Documents):

9.4.1.1 Evidence satisfactory to the Owner that all payrolls, material bills, and other indebtedness connected with the work have been paid,

9.4.1.2 An acceptable RELEASE OF LIENS,

9.4.1.3 Copies of all applicable warranties,

9.4.1.4 As-built drawings,

- 9.4.1.5 Operations and Maintenance Manuals,
- 9.4.1.6 Instruction Manuals,
- 9.4.1.7 Consent of Surety to final payment.
- 9.4.1.8 The Owner reserves the right to retain payments, or parts thereof, for its protection until the foregoing conditions have been complied with, defective work corrected and all unsatisfactory conditions remedied.

ARTICLE 10: PROTECTION OF PERSONS AND PROPERTY

- 10.1 The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract. The Contractor shall take all reasonable precautions to prevent damage, injury or loss to: workers, persons nearby who may be affected, the Work, materials and equipment to be incorporated, and existing property at the site or adjacent thereto. The Contractor shall give notices and comply with applicable laws ordinances, rules regulations, and lawful orders of public authorities bearing on the safety of persons and property and their protection from injury, damage, or loss. The Contractor shall promptly remedy damage and loss to property at the site caused in whole or in part by the Contractor, a Subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable.
- 10.2 The Contractor shall notify the Owner in the event any existing hazardous material such as lead, PCBs, asbestos, etc. is encountered on the project. The Owner will arrange with a qualified specialist for the identification, testing, removal, handling and protection against exposure or environmental pollution, to comply with applicable regulation laws and ordinances. The Contractor and Architect will not be required to participate in or to perform this operation. Upon completion of this work, the Owner will notify the Contractor and Architect in writing the area has been cleared and approved by the authorities in order for the work to proceed. The Contractor shall attach documentation from the authorities of said approval.
- 10.3 As required in the Hazardous Chemical Information Act of June 1984, all vendors supplying any materials that may be defined as hazardous, must provide Material Safety Data Sheets for those products. Any chemical product should be considered hazardous if it has a warning caution on the label relating to a potential physical or health hazard, if it is known to be present in the work place, and if employees may be exposed under normal conditions or in any foreseeable emergency situation. Material Safety Data Sheets must be provided directly to the Owner along with the shipping slips that include those products.
- 10.4 The Contractor shall certify to the Owner that materials incorporated into the Work are free of all asbestos. This certification may be in the form of Material Safety Data Sheet (MSDS) provided by the product manufacturer for the materials used in construction, as specified or as provided by the Contractor.

ARTICLE 11: INSURANCE AND BONDS

- 11.1 The Contractor shall carry all insurance required by law, such as Unemployment Insurance, etc. The Contractor shall carry such insurance coverage as they desire on their own property such as a field office, storage sheds or other structures erected upon the project site that belong to them and for their own use. The Subcontractors involved with this project shall carry whatever insurance protection they consider necessary to cover the loss of any of their personal property, etc.

- 11.2 Upon being awarded the Contract, the Contractor shall obtain a minimum of two (2) copies of all required insurance certificates called for herein, and submit one (1) copy of each certificate, to the Owner, within 20 days of contract award.
- 11.3 Bodily Injury Liability and Property Damage Liability Insurance shall, in addition to the coverage included herein, include coverage for injury to or destruction of any property arising out of the collapse of or structural injury to any building or structure due to demolition work and evidence of these coverages shall be filed with and approved by the Owner.
- 11.4 The Contractor's Property Damage Liability Insurance shall, in addition to the coverage noted herein, include coverage on all real and personal property in their care, custody and control damaged in any way by the Contractor or their Subcontractors during the entire construction period on this project.
- 11.5 Builders Risk (including Standard Extended Coverage Insurance) on the existing building during the entire construction period, shall not be provided by the Contractor under this contract. The Owner shall insure the existing building and all of its contents and all this new alteration work under this contract during entire construction period for the full insurable value of the entire work at the site. Note, however, that the Contractor and their Subcontractors shall be responsible for insuring building materials (installed and stored) and their tools and equipment whenever in use on the project, against fire damage, theft, vandalism, etc.
- 11.6 Certificates of the insurance company or companies stating the amount and type of coverage, terms of policies, etc., shall be furnished to the Owner, within 20 days of contract award.
- 11.7 The Contractor shall, at their own expense, (in addition to the above) carry the following forms of insurance:

11.7.1 Contractor's Contractual Liability Insurance

Minimum coverage to be:

Bodily Injury	\$500,000	for each person
	\$1,000,000	for each occurrence
	\$1,000,000	aggregate
Property Damage	\$500,000	for each occurrence
	\$1,000,000	aggregate

11.7.2 Contractor's Protective Liability Insurance

Minimum coverage to be:

Bodily Injury	\$500,000	for each person
	\$1,000,000	for each occurrence
	\$1,000,000	aggregate
Property Damage	\$500,000	for each occurrence
	\$500,000	aggregate

11.7.3 Automobile Liability Insurance

Minimum coverage to be:

Bodily Injury	\$1,000,000	for each person
	\$1,000,000	for each occurrence
Property Damage	\$500,000	per accident

11.7.4 Prime Contractor's and Subcontractors' policies shall include contingent and contractual liability coverage in the same minimum amounts as 11.7.1 above.

11.7.5 Workmen's Compensation (including Employer's Liability):

11.7.5.1 Minimum Limit on employer's liability to be as required by law.

11.7.5.2 Minimum Limit for all employees working at one site.

11.7.6 Certificates of Insurance must be filed with the Owner guaranteeing fifteen (15) days prior notice of cancellation, non-renewal, or any change in coverages and limits of liability shown as included on certificates.

11.7.7 Social Security Liability

11.7.7.1 With respect to all persons at any time employed by or on the payroll of the Contractor or performing any work for or on their behalf, or in connection with or arising out of the Contractor's business, the Contractor shall accept full and exclusive liability for the payment of any and all contributions or taxes or unemployment insurance, or old age retirement benefits, pensions or annuities now or hereafter imposed by the Government of the United States and the State or political subdivision thereof, whether the same be measured by wages, salaries or other remuneration paid to such persons or otherwise.

11.7.7.2 Upon request, the Contractor shall furnish Owner such information on payrolls or employment records as may be necessary to enable it to fully comply with the law imposing the aforesaid contributions or taxes.

11.7.7.3 If the Owner is required by law to and does pay any and/or all of the aforesaid contributions or taxes, the Contractor shall forthwith reimburse the Owner for the entire amount so paid by the Owner.

ARTICLE 12: UNCOVERING AND CORRECTION OF WORK

12.1 The Contractor shall promptly correct Work rejected by the Owner or failing to conform to the requirements of the Contract Documents, whether observed before or after Substantial Completion and whether or not fabricated, installed or completed, and shall correct any Work found to be not in accordance with the requirements of the Contract Documents within a period of two years from the date of Substantial Completion, or by terms of an applicable special warranty required by the Contract Documents. The provisions of this Article apply to work done by Subcontractors as well as to Work done by direct employees of the Contractor.

12.2 At any time during the progress of the work, or in any case where the nature of the defects shall be such that it is not expedient to have them corrected, the Owner, at their option, shall have the right to deduct such sum, or sums, of money from the amount of the contract as they consider justified to adjust the difference in value between the defective work and that required under contract including any damage to the structure.

ARTICLE 13: MISCELLANEOUS PROVISIONS**13.1 CUTTING AND PATCHING**

13.1.1 The Contractor shall be responsible for all cutting and patching. The Contractor shall coordinate the work of the various trades involved.

13.2 DIMENSIONS

13.2.1 All dimensions shown shall be verified by the Contractor by actual measurements at the project site. Any discrepancies between the drawings and specifications and the existing conditions shall be referred to the Owner for adjustment before any work affected thereby has been performed.

13.3 LABORATORY TESTS

13.3.1 Any specified laboratory tests of material and finished articles to be incorporated in the work shall be made by bureaus, laboratories or agencies approved by the Owner and reports of such tests shall be submitted to the Owner. The cost of the testing shall be paid for by the Contractor.

13.3.2 The Contractor shall furnish all sample materials required for these tests and shall deliver same without charge to the testing laboratory or other designated agency when and where directed by the Owner.

13.4 ARCHAEOLOGICAL EVIDENCE

13.4.1 Whenever, in the course of construction, any archaeological evidence is encountered on the surface or below the surface of the ground, the Contractor shall notify the authorities of the Delaware Archaeological Board and suspend work in the immediate area for a reasonable time to permit those authorities, or persons designated by them, to examine the area and ensure the proper removal of the archaeological evidence for suitable preservation in the State Museum.

13.5 GLASS REPLACEMENT AND CLEANING

13.5.1 The General Contractor shall replace without expense to the Owner all glass broken during the construction of the project. If job conditions warrant, at completion of the job the General Contractor shall have all glass cleaned and polished.

13.6 WARRANTY

13.6.1 For a period of two (2) years from the date of substantial completion, as evidenced by the date of final acceptance of the work, the contractor warrants that work performed under this contract conforms to the contract requirements and is free of any defect of equipment, material or workmanship performed by the contractor or any of his subcontractors or suppliers. However, manufacturer's warranties and guarantees, if for a period longer than two (2) years, shall take precedence over the above warranties. The contractor shall remedy, at his own expense, any such failure to conform or any such defect. The protection of this warranty shall be included in the Contractor's Performance Bond.

ARTICLE 14: TERMINATION OF CONTRACT

- 14.1 If the Contractor defaults or persistently fails or neglects to carry out the Work in accordance with the Contract Documents or fails to perform a provision of the Contract, the Owner, after seven days written notice to the Contractor, may make good such deficiencies and may deduct the cost thereof from the payment then or thereafter due the Contractor. Alternatively, at the Owner's option, and the Owner may terminate the Contract and take possession of the site and of all materials, equipment, tools, and machinery thereon owned by the Contractor and may finish the Work by whatever method the Owner may deem expedient. If the costs of finishing the Work exceed any unpaid compensation due the Contractor, the Contractor shall pay the difference to the Owner.
- 14.2 "If the continuation of this Agreement is contingent upon the appropriation of adequate state, or federal funds, this Agreement may be terminated on the date beginning on the first fiscal year for which funds are not appropriated or at the exhaustion of the appropriation. The Owner may terminate this Agreement by providing written notice to the parties of such non-appropriation. All payment obligations of the Owner will cease upon the date of termination. Notwithstanding the foregoing, the Owner agrees that it will use its best efforts to obtain approval of necessary funds to continue the Agreement by taking appropriate action to request adequate funds to continue the Agreement."

END OF GENERAL REQUIREMENTS

EMPLOYEE DRUG TESTING REPORT FORM**Period Ending:**_____

4104 Regulations for the Drug Testing of Contractor and Subcontractor Employees Working on Large Public Works Projects requires that Contractors and Subcontractors who work on Large Public Works Contracts funded all or in part with public funds submit Testing Report Forms to the Owner no less than quarterly.

Project Number: _____

Project Name: _____

Contractor/Subcontractor Name: _____

Contractor/Subcontractor Address: _____

Number of employees who worked on the jobsite during the report period:_____

Number of employees subject to random testing during the report period:_____

Number of Negative Results _____ Number of Positive Results _____

Action taken on employee(s) in response to a failed or positive random test:

Authorized Representative of Contractor/Subcontractor: _____
(typed or printed)Authorized Representative of Contractor/Subcontractor: _____
(signature)

Date: _____

**EMPLOYEE DRUG TESTING
REPORT OF POSITIVE RESULTS**

4104 Regulations for the Drug Testing of Contractor and Subcontractor Employees Working on Large Public Works Projects requires that Contractors and Subcontractors who work on Large Public Works Contracts funded all or in part with public funds to notify the Owner in writing of a positive random drug test.

Project Number: _____

Project Name: _____

Contractor/Subcontractor Name: _____

Contractor/Subcontractor Address: _____

Name of employee with positive test result: _____

Last 4 digits of employee SSN: _____

Date test results received: _____

Action taken on employee in response to a positive test result:

Authorized Representative of Contractor/Subcontractor: _____
(typed or printed)

Authorized Representative of Contractor/Subcontractor: _____
(signature)

Date: _____

This form shall be sent by mail to the Owner within 24 hours of receipt of test results.

Enclose this test results form in a sealed envelope with the notation "Drug Testing Form – DO NOT OPEN" on the face thereof and place in a separate mailing envelope.

DIVISION 01 – GENERAL REQUIREMENTS

SECTION 01 11 00
SUMMARY OF WORK

PART 1 – GENERAL**1.1 DESCRIPTION****A. This Section includes:**

1. Project information.
2. Work covered by Contract Documents.
3. Access to site.
4. Work restrictions.
5. Specification and drawing conventions.
6. Miscellaneous provisions – Notifying owners of adjacent properties and utilities

1.2 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections apply to this Section.**

1.3 PROJECT INFORMATION**A. Project Identification: Improvements to Chipmans Pond Dam**

1. Project Location: Adjacent to 12099 Chipmans Pond Road (Rd 465) , Laurel, DE 19956
2. Owner: State of Delaware, Department of Natural Resources and Environmental Control (DNREC), Division of Fish and Wildlife and State of Delaware Department of Transportation (DelDOT)
3. Project Design Engineer: O'Brien & Gere Engineers, Inc., 301 East Germantown Pike/ 3rd Floor, East Norriton, PA 19401

B. Project Identification: Improvements to Concord Pond Dam

1. Project Location: Adjacent to 24621 Concord Pond Road (Rd 516), Seaford, DE 19973
2. Owner: State of Delaware, Department of Natural Resources and Environmental Control (DNREC), Division of Fish and Wildlife and State of Delaware Department of Transportation (DelDOT)
3. Project Design Engineer: O'Brien & Gere Engineers, Inc., 301 East Germantown Pike/ 3rd Floor, East Norriton, PA 19401

C. Project Identification: Improvements to Craigs Pond Dam

1. Project Location: Adjacent to 152 Craigs Mill Road (Rd 516), Seaford, DE 19973
2. Owner: State of Delaware, Department of Natural Resources and Environmental Control (DNREC), Division of Fish and Wildlife and State of Delaware Department of Transportation (DelDOT)
3. Project Design Engineer: O'Brien & Gere Engineers, Inc., 301 East Germantown Pike/ 3rd Floor, East Norriton, PA 19401

D. Completion of all the Work shall be within 500 calendar days from the Notice to Proceed.

1.4 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of Project is defined by the Contract Documents and generally includes, but is not limited to, constructing the Work described below and all appurtenances related to the work. The Work shall be as follows:
1. Project Identification: Improvements to Chipmans Pond Dam
 - a. The project includes construction of the following: a dam outlet structure consisting of a pile foundation, fabricated steel structure with one slide gate and two weir gates for hydraulic control, access bridge, trash racks and associated site work
 2. Project Identification: Improvements to Concord Pond Dam
 - a. The project includes construction of the following: two dam outlet structures consisting of forebay foundations, fabricated steel frameworks for slide gates and weir gates for hydraulic control, trash racks and associated site work including spillway modifications with supplemental riprap.
 3. Project Identification: Improvements to Craigs Pond Dam
 - a. The project includes construction of the following: a dam outlet structure consisting of a pile foundation, precast concrete structures with one slide gate and one weir gate for hydraulic control, access bridge and trash racks. Associated site work includes concrete slab embankment protection, shoreline sheetpile protection, spillway modifications with supplemental riprap and a new boat ramp.
 4. Reference the Payment Items for additional Summary of Work.
- B. Type of Contract:
1. Project will be constructed under a single prime contract.
 - a. Improvements to Delaware Dams

1.5 ACCESS TO SITE

- A. General: Contractor shall have full use of Project site for construction operations during construction period.
- B. Use of Site: Limit use of Project site to work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1.6 WORK RESTRICTIONS

- A. Work Restrictions, General: Comply with restrictions on construction operations.
1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.
- B. On-Site Work Hours: In accordance with Contracting Requirements and local ordinances.

1.7 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
 2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
- C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
 2. Abbreviations: Materials and products are identified by abbreviations scheduled on Contract Drawings.
 3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

1.8 MISCELLANEOUS PROVISIONS

- A. Notify owners of adjacent property and utilities when prosecution of the Work may affect their property, facilities, or use of property.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01 21 00**ALLOWANCES****PART 1 – GENERAL****1.1 DESCRIPTION**

- A. Section includes administrative and procedural requirements governing allowances.
 - 1. Certain items are specified in the Contract Documents by allowances. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when direction will be provided to Contractor. If necessary, additional requirements will be issued by Change Order.
- B. Types of allowances include the following:
 - 1. Contingency allowances.

1.2 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections apply to this Section.

1.3 RELATED SECTIONS

- A. Section 01 22 00 "Unit Prices" for procedures for using unit prices.
- B. Section 01 45 00 "Quality Requirements" for procedures governing the use of allowances for testing and inspecting.

1.4 SELECTION AND PURCHASE

- A. At the earliest practical date after award of the Contract, advise Engineer of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.
- B. At Engineer's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.
- C. Purchase products and systems selected by Engineer from the designated supplier.

1.5 ACTION SUBMITTALS

- A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

1.6 INFORMATIONAL SUBMITTALS

- A. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.
- B. Submit time sheets and other documentation to show labor time and cost for installation of allowance items that include installation as part of the allowance.
- C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.7 COORDINATION

- A. Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.

1.8 CONTINGENCY ALLOWANCES

- A. Use the contingency allowance only as directed by Engineer for Owner's purposes and only by Change Orders that indicate amounts to be charged to the allowance.
- B. Contractor's overhead, profit, and related costs for products and equipment ordered by Owner under the contingency allowance are included in the allowance and are not part of the Contract Sum. These costs include delivery, installation, taxes, insurance, equipment rental, and similar costs.
- C. Change Orders authorizing use of funds from the contingency allowance will include Contractor's related costs and reasonable overhead and profit margins.

1.9 ADJUSTMENT OF ALLOWANCES

- A. Allowance Adjustment: To adjust allowance amounts, prepare a Change Order proposal based on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place where applicable. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.
 - 1. Include installation costs in purchase amount only where indicated as part of the allowance.
 - 2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other margins claimed.
 - 3. Submit substantiation of a change in scope of work, if any, claimed in Change Orders.
 - 4. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.
- B. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the purchase order amount or Contractor's handling, labor, installation, overhead, and profit.
 - 1. Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of work has changed from what could have been foreseen from information in the Contract Documents.
 - 2. No change to Contractor's indirect expense is permitted for selection of higher- or lower-priced materials or systems of the same scope and nature as originally indicated.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION**3.1 EXAMINATION**

- A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

- A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF ALLOWANCES

- A. Allowance No. 1: Contingency Allowance: Include the sum of seventy-five thousand dollars (\$75,000): Include additional work and repairs at Chipmans Pond Dam, Concord Pond Dam and Craigs Pond Dam not indicated on the Contract Drawings but performed at the direction of the Owner.
 - 1. This allowance is intended to address potential repairs, rehabilitation or additional work that will be identified only after control of water measures have been installed and the work areas dewatered.
 - 2. The Engineer will inspect the existing conditions of the outlet works at each project site after dewatering has been completed. This inspection will identify additional work items that will be required to accomplish the work included in the Contract Documents and shown on the Contract Drawings.
 - 3. This allowance may include, but is not limited to, the following items:
 - a. Concrete patching and crack injection repairs to the existing concrete outlet structure currently underwater at Chipmans Pond Dam.
 - b. Additional landscape materials requested by private property owners at Chipmans Pond Dam and agreed to by DNREC in the interests of maintaining a good working relationship. Restoration of areas disturbed by the Contractor during the performance of the work is not included in this item.
 - c. Patching, repair or partial replacement of steel sheet piling at the gate outlet bays at Chipmans Pond Dam.
 - d. Additional work due to unforeseen subsurface conditions at the existing outlet structure and concrete slope protection at Craigs Pond Dam.
 - 4. This allowance includes material cost, receiving, handling, and installation and Contractor overhead and profit.
 - 5. This allowance is not to be used for items listed in Section 01 22 00 "Unit Prices."

END OF SECTION

SECTION 01 22 00**UNIT PRICES****PART 1 – GENERAL****1.1 DESCRIPTION**

- A. This Section includes administrative and procedural requirements for unit prices.

1.2 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections apply to this Section.

1.3 RELATED SECTIONS

- A. Section 01 26 00 “Contract Modification Procedures” for procedures for submitting and handling Change Orders.
- B. Section 01 40 00 “Quality Requirements” for general testing and inspecting requirements.

1.4 DEFINITIONS

- A. Unit price is an amount incorporated in the Agreement, applicable during the duration of the Work as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased.

1.5 PROCEDURES

- A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.
- B. Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.
- C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.
- D. List of Unit Prices: A schedule of unit prices is included in Part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION**3.1 SCHEDULE OF UNIT PRICES**

- A. Unit Price No. 1 – Steel H-Piles driven below tip elevations indicated on Contract Drawings:
 - 1. Description: This item includes the materials, equipment and labor necessary, including all splices, to install Steel H-Piles according to Section 31 62 16.16 “Steel H-Piles” to a tip elevation

below those indicated on the Contract Drawings to achieve the required pile capacity as directed by the Engineer.

2. Unit of Measurement: Linear foot of pile.
- B. Unit Price No. 2 – Splice Steel H-Piles as required when driven below tip elevations indicated on the Contract Drawings under Unit Price Item No. 1:
1. Description: This item includes the materials, equipment and labor necessary, to splice Steel H-Piles according to Section 31 62 16.16 “Steel H-Piles” when driven to tip elevations below those indicated on the Contract Drawings to achieve the required pile capacity as directed by the Engineer.
 2. Unit of Measurement: Each splice.
- C. Unit Price No. 3 – Concrete-Filled Steel Piles driven below tip elevations indicated on Contract Drawings:
1. Description: This item includes the materials, equipment and labor necessary, including all splices, to install Concrete-Filled Steel Pipe Piles according to Section 31 62 23.13 “Concrete-Filled Steel Pipe Piles” to a tip elevation below those indicated on the Contract Drawings to achieve the required pile capacity as directed by the Engineer.
 2. Unit of Measurement: Linear foot of pile.
- D. Unit Price No. 4 – Splice Concrete-Filled Steel Piles as required when driven below tip elevations indicated on Contract Drawings under Unit Price Item No. 3:
1. Description: This item includes the materials, equipment and labor necessary, including all splices, to splice Concrete-Filled Steel Pipe Piles according to Section 31 62 23.13 “Concrete-Filled Steel Pipe Piles” when to a tip elevation below those indicated on the Contract Drawings to achieve the required pile capacity as directed by the Engineer.
 2. Unit of Measurement: Each splice.
- E. Unit Price No. 5 – Additional R7 Riprap:
1. Description: This item includes the materials, equipment and labor necessary to install additional R7 riprap at locations not shown on the Contract Drawings or to depths greater than those shown on the Contract Drawings according to Section 31 37 00 “Riprap” as directed by the Owner or the Engineer.
 2. Unit of Measurement: Ton of Riprap delivered and installed.
- F. Unit Price No. 6 – Additional DelDOT Type B Graded Aggregate:
1. Description: This item includes the materials, equipment and labor necessary to install additional DelDOT Type B Graded Aggregate according to Section 31 05 16 “Aggregates for Earthwork” for the purposes of performing full-depth pavement reconstruction in areas not indicated on the Contract Drawings and not damaged by the Contractor during the course of the work as directed by the Owner or the DelDOT Engineer. Full-depth pavement restoration required by Section 32 01 00.91 “Restoration of Surfaces” is not included in this item.
 2. Unit of Measurement: Cubic Yard of Type B Graded Aggregate in place.

G. Unit Price No. 7 – Additional DelDOT Type B Hot Mix Asphalt:

1. Description: This item includes the materials, equipment and labor necessary to install additional DelDOT Type B Hot Mix Asphalt according to Section 32 12 16 “Asphalt Paving” for the purposes of performing pavement repairs to areas not indicated on the Contract Drawings and not damaged by the Contractor during the course of the work as directed by the Owner or the DelDOT Engineer. Full-depth pavement restoration required by Section 32 01 00.91 “Restoration of Surfaces” is not included in this item.
2. Unit of Measurement: Tons of Type B Hot Mix Asphalt in place.

H. Unit Price No. 8 – Additional DelDOT Type C Hot Mix Asphalt:

1. Description: This item includes the materials, equipment and labor necessary to install additional DelDOT Type C Hot Mix Asphalt according to Section 32 12 16 “Asphalt Paving” for the purposes of performing pavement repairs to areas not indicated on the Contract Drawings and not damaged by the Contractor during the course of the work as directed by the Owner or the DelDOT Engineer. Overlay of existing pavement and full-depth pavement restoration required by Section 32 01 00.91 “Restoration of Surfaces” is not included in this item.
2. Unit of Measurement: Tons of Type C Hot Mix Asphalt in place.

I. Unit Price No. 9 – Additional DelDOT Class A Concrete:

1. Description: This item includes the materials, equipment and labor necessary to install additional cast-in-place concrete in volumes exceeding those shown on the Contract Drawings or in locations not indicated on the Contract Drawings according to Section 03 30 00 “Cast-in-Place Concrete” for the purposes of repairs to existing structures, modifications due to unforeseen field conditions or as otherwise directed by the Engineer.
2. Unit of Measurement: Cubic Yard of Class A Concrete in place.

J. Unit Price No. 10 – Additional Excavation:

1. Description: This item includes the materials, equipment and labor necessary to excavate earth material in locations not indicated on the Contract Drawings or in depths exceeding those shown on the Contract Drawings, i.e. excavation below subgrade, according to Section 31 23 16 “Excavation” as directed by the Engineer.
2. Unit of Measurement: Cubic Yard of Excavation.

K. Unit Price No. 11 – Additional Non-Woven Geotextiles:

1. Description: This item includes the materials, equipment and labor necessary to install additional geotextile underlayment in areas not indicated on the Contract Drawings according to Section 31 32 19 “Geotextiles” as directed by the Engineer.
2. Unit of Measurement: Square Yards covered by Geotextile, not including overlaps at seams.

END OF SECTION

SECTION 01 22 01**LUMP SUM PRICES****PART 1 – GENERAL****1.1 DESCRIPTION**

- A. This Section includes administrative and procedural requirements for the measurement and payment of Lump Sum payment items listed in the Bid Form.

1.2 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections apply to this Section.

1.3 CONTRACT NO. NAT17001-DAMCONST - IMPROVEMENTS TO DELAWARE DAMS**A. Item 1 – Mobilization and Demobilization****1. Measurement: Work under this item shall generally be comprised of:**

- a. Set up of the necessary shops, storage areas, offices and such sanitary and other facilities as are required by local or state law or regulations.
- b. Set up of the Field Office trailer for the Owner and Engineer's use at Chipmans Pond Dam.
- c. The cost of required insurance and bonds.
- d. The cost of initiation of the Contract Work.
- e. Removal of all unused material and equipment including field offices, trash and debris upon completion of the Work.
- f. Completion of all record drawings and documents required for project closeout.

2. Payment: The fixed maximum lump sum payment for Item 1 shall be full compensation for completing the Work shown and specified under this Item.

- a. Fifty percent (50%) of the amount bid shall be made payable to the Contractor whenever he shall have completed five percent (5%) of the Contract Work. 5% of the Work shall be considered complete when the total of payments earned, as reflected by estimates of work done, not including the amount bid for this item, nor payments for materials delivered to the site exceeds five percent (5%) of the total amount bid for this Contract.
- b. Fifty percent (50%) of the amount bid shall be made payable to the Contractor upon completion of the Work and Demobilization.
- c. The Owner does not represent that the fixed maximum lump sum price for this item reflects the actual value of the work involved. Such price merely represents the maximum fixed amount which will be paid to the Contractor for this work. If Contractor wishes, a lower lump sum price may be written in the space provided on the Bid Form and the given fixed maximum lump sum price may be voided.
- d. Payment for the work of this item will be made at the Owner's fixed maximum lump sum price or the Contractor's bid price, whichever is lower.

B. Item 2 – Improvements to Chipmans Pond Dam

1. **Measurement:** Under this Item, the Contractor shall furnish all labor, materials and equipment required to construct, test, place into satisfactory operation and maintain until final acceptance the Improvements to Chipmans Pond Dam as shown on the Contract Drawings, as specified or as directed by the Engineer. Work under this item shall generally be comprised of, but not limited to, the following:
 - a. Installation and maintenance of control of water measures according to the Contractor's approved Control of Water Plan
 - b. Installation and maintenance of erosion and sediment control measures according to the Contract Drawings
 - c. Installation and maintenance of traffic control measures according to the approved DelDOT Detour Plan
 - d. Selective demolition of the existing low level outlet structure, trees and shrubs, and site features as indicated on the Contract Drawings or as directed
 - e. Clearing of vegetation, grubbing, and stripping and stockpiling of topsoil within the limits shown on the Contract Drawings or as directed
 - f. Excavation above the limiting subgrades and within the limits shown on the Contract Drawings or as directed
 - g. Steel H-Piles as indicated on the Contract Drawings, including all materials, labor and testing
 - h. Cast-in-place concrete, including formwork and falsework, reinforcement, accessories and quality control testing
 - i. Structural steel framing, metal gratings, handrails, stairs and other metal fabrications for the installation of the access walkway and gates and connection of the gate structure to the existing concrete outlet structure as indicated on the Contract Drawings or as directed
 - j. Stainless steel gates, including all hardware and accessories as indicated on the Contract Drawings or as specified
 - k. Miscellaneous items required to construct the improvements not specifically included under other items.
2. **Payment:** The Contractor's lump sum price stated on the Bid Form for the Improvements to Chipmans Pond Dam shall be full compensation for completing the Work shown and specified under this Item.

C. Item 3 – Improvements to Concord Pond Dam

1. **Measurement:** Under this Item, the Contractor shall furnish all labor, materials and equipment required to construct, test, place into satisfactory operation and maintain until final acceptance the Improvements to Concord Pond Dam as shown on the Contract Drawings, as specified or as directed by the Engineer. Work under this item shall generally be comprised of , but not limited to, the following:
 - a. Installation and maintenance of control of water measures according to the Contractor's approved Control of Water Plan

- b. Installation and maintenance of erosion and sediment control measures according to the Contract Drawings
 - c. Installation and maintenance of traffic control measures according to the approved DelDOT Detour Plan
 - d. Selective demolition of stop log structures as indicated on the Contract Drawings or as directed
 - e. Excavation above the limiting subgrade and within the limits shown on the Contract Drawings or as directed
 - f. Steel H-Piles used as Gate Mounting Columns as indicated on the Contract Drawings, including all materials, labor and testing
 - g. Cast-in-place concrete, including formwork and falsework, reinforcement, accessories and quality control testing
 - h. Structural steel framing and other metal fabrications for installation of new gates
 - i. Stainless steel gates, including all hardware and accessories as indicated on the Contract Drawings or as specified
 - j. Selective clearing of trees and large shrubs downstream of the existing sheet pile wall as indicated on the Contract Drawings or as directed.
 - k. Supplemental riprap as indicated on the Contract Drawings or as directed
 - l. Dam warning buoys as indicated on the Contract Drawings
 - m. Miscellaneous items required to construct the improvements not specifically included under other items.
2. Payment: The Contractor's lump sum price stated on the Bid Form for the Improvements to Concord Pond Dam shall be full compensation for completing the Work shown and specified under this Item.

D. Item 4 – Improvements to Craigs Pond Dam

1. Measurement: Under this Item, the Contractor shall furnish all labor, materials and equipment required to construct, test, place into satisfactory operation and maintain until final acceptance the Improvements to Craigs Pond Dam as shown on the Contract Drawings, as specified or as directed by the Engineer. Work under this item shall generally be comprised of , but not limited to, the following:
- a. Installation and maintenance of control of water measures according to the Contractor's approved Control of Water Plan
 - b. Installation and maintenance of erosion and sediment control measures according to the approved Erosion and Sediment Control Plan
 - c. Installation and maintenance of traffic control measures according to the approved Traffic Management Plan
 - d. Selective demolition of the existing low level outlet, sheet pile wall, and site features as indicated on the Contract Drawings or as directed
 - e. Clearing of vegetation, grubbing, and stripping and stockpiling of topsoil within the limits shown on the Contract Drawings or as directed

- f. Excavation above the limiting subgrades and within the limits shown on the Contract Drawings or as directed
 - g. Concrete-filled Steel Pipe Piles as indicated on the Contract Drawings, including all materials, labor and testing
 - h. Cast-in-place concrete, including formwork and falsework, reinforcement, accessories and quality control testing
 - i. Precast Concrete structures, including all accessories, waterstops, and grouting required for installation as indicated on the Contract Drawings or as directed
 - j. Structural steel framing, metal gratings and handrails, and other metal fabrications for the access walkway, connection of precast concrete structures to the existing steel sheet pile and railings as indicated on the Contract Drawings or as directed
 - k. Stainless steel gates, including all hardware and accessories as indicated on the Contract Drawings or as specified
 - l. Supplemental riprap as indicated on the Contract Drawings or as directed
 - m. Asphalt pavement within the limits indicated on the Contract Drawings or as directed
 - n. Steel sheet pile for shoreline protection as indicated on the Contract Drawings or as directed
 - o. New boat ramp as indicated on the Contract Drawings or as directed
 - p. Earth fill, grading, topsoiling and seeding within the limits indicated on the Contract Drawings or as directed
 - q. Dam warning buoys as indicated on the Contract Drawings
 - r. Miscellaneous items required to construct the improvements not specifically included under other items.
2. Payment: The Contractor's lump sum price stated on the Bid Form for the Improvements to Craigs Pond Dam shall be full compensation for completing the Work shown and specified under this Item.

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

Not Used.

END OF SECTION

SECTION 01 23 00**ALTERNATES****PART 1 – GENERAL****1.1 DESCRIPTION**

- A. This Section includes administrative and procedural requirements for alternates.

1.2 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections apply to this Section.

1.3 DEFINITIONS

- A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
 2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.4 PROCEDURES

- A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated revisions to alternates.
- C. Execute accepted alternates under the same conditions as other work of the Contract.
- D. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION**3.1 SCHEDULE OF ALTERNATES****A. Alternate No. 1: Reduced Scope of Outlet Works Improvements at Concord Pond Dam.**

1. Base Bid: Perform improvements to all bays of the outlet works at Concord Pond Dam, including concrete foundations, structural steel, stainless steel gates and other metal fabrications as indicated on the Contract Drawings.
2. Alternate: Only perform improvements to the Northeast Gates (Bays 1 through 4) of the outlet works at Concord Pond Dam as indicated on the Contract Drawings. The Southwest Gates (Bays 5 through 8) shall be left in their existing condition.

END OF SECTION

SECTION 01 25 00**SUBSTITUTION PROCEDURES****PART 1 – GENERAL****1.1 DESCRIPTION**

- A. This Section includes administrative and procedural requirements for substitutions.

1.2 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections apply to this Section.

1.3 RELATED SECTIONS

- A. Section 01 21 00 "Allowances" for products selected under an allowance.
- B. Section 01 23 00 "Alternates" for products selected under an alternate.
- C. Section 01 66 00 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.4 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
 2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.5 ACTION SUBMITTALS

- A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
1. Substitution Request Form: Use CSI Form 13.1A 13.0B, OMB provided form, or facsimile of form provided in Project Manual.
 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
 - b. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.

- d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. Certificates and qualification data, where applicable or requested.
 - g. List of similar installations for completed projects with project names and addresses and names and addresses of Engineers and owners.
 - h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - i. Research reports evidencing compliance with building code in effect for Project.
 - j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
 - k. Cost information, including a proposal of change, if any, in the Contract Sum.
 - l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
 - m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
3. Engineer's Action: If necessary, Engineer will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Engineer will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
- a. Forms of Acceptance: Change Order, Construction Change Directive, or Engineer's Supplemental Instructions for minor changes in the Work.
 - b. Use product specified if Engineer does not issue a decision on use of a proposed substitution within time allocated.

1.6 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.7 PROCEDURES

- A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION**3.1 SUBSTITUTIONS**

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.
 - 1. Conditions: Engineer will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Engineer will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - b. Substitution request is fully documented and properly submitted.
 - c. Requested substitution will not adversely affect Contractor's construction schedule.
 - d. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - e. Requested substitution is compatible with other portions of the Work.
 - f. Requested substitution has been coordinated with other portions of the Work.
 - g. Requested substitution provides specified warranty.
 - h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
- B. Substitutions for Convenience: Not allowed unless otherwise indicated.

END OF SECTION

SECTION 01 26 00**CONTRACT MODIFICATION PROCEDURES****PART 1 – GENERAL****1.1 DESCRIPTION**

- A. This Section includes administrative and procedural requirements for handling and processing Contract Modifications.

1.2 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections apply to this Section.

1.3 RELATED SECTIONS

- A. Section 01 25 00 "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.

1.4 MINOR CHANGES IN THE WORK

- A. Engineer will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, "Engineer's Supplemental Instructions."

1.5 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Engineer will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. Work Change Proposal Requests issued by Engineer are not instructions either to stop work in progress or to execute the proposed change.
 - 2. Within time specified in Proposal Request or 20 days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include costs of labor and supervision directly attributable to the change.
 - d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 - e. Quotation Form: Use CSI Form 13.6D, "Proposal Worksheet Summary," and Form 13.6C, "Proposal Worksheet Detail." or forms provided by Owner or acceptable to Engineer.

- B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Engineer.
1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
 2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 4. Include costs of labor and supervision directly attributable to the change.
 5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 6. Comply with requirements in Section 01 25 00 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
 - a. Proposal Request Form: Use CSI Form 13.6A, "Change Order Request (Proposal)," with attachments CSI Form 13.6D, "Proposal Worksheet Summary," and Form 13.6C, "Proposal Worksheet Detail" or forms provided by Owner or acceptable to Engineer.

1.6 ADMINISTRATIVE CHANGE ORDERS

- A. Allowance Adjustment: See Section 01 21 00 "Allowances" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect actual costs of allowances.
- B. Unit-Price Adjustment: See Section 01 22 00 "Unit Prices" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect measured scope of unit-price work.

1.7 CHANGE ORDER PROCEDURES

- A. On Owner's approval of a Work Change Proposal Request, Engineer will issue a Change Order for signatures of Owner and Contractor on AIA Document G701 or form included in Project Manual.

1.8 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Engineer may issue a Construction Change Directive on AIA Document G714 or form included in Project Manual. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 01 29 00**PAYMENT PROCEDURES****PART 1 – GENERAL****1.1 DESCRIPTION**

- A. This Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

1.2 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections apply to this Section.

1.3 RELATED SECTIONS

- A. Section 01 21 00 "Allowances" for procedural requirements governing the handling and processing of allowances.
- B. Section 01 22 00 "Unit Prices" for administrative requirements governing the use of unit prices.
- C. Section 01 26 00 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
- D. Section 01 32 00 "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.

1.4 DEFINITIONS

- A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.5 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule. A Cost-loaded Critical Path Method Schedule may serve to satisfy requirements for the schedule of values.
 - 1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:
 - a. Application for Payment forms with continuation sheets.
 - b. Submittal schedule.
 - c. Items required to be indicated as separate activities in Contractor's construction schedule.
 - 2. Submit the schedule of values to Engineer at earliest possible date, but no later than **fourteen** days before the date scheduled for submittal of initial Applications for Payment.
 - 3. Subschedules for Phased Work: Where the Work is separated into phases requiring separately phased payments, provide subschedules showing values coordinated with each phase of payment.
 - 4. Subschedules for Separate Elements of Work: Where the Contractor's construction schedule defines separate elements of the Work, provide subschedules showing values coordinated with each element.

- B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
1. Identification: Include the following Project identification on the schedule of values:
 - a. Project name and location.
 - b. Name of Engineer.
 - c. Engineer's project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
 2. Arrange schedule of values consistent with format of AIA Document G703 or EJCDC Document C-620.
 3. Arrange the schedule of values in tabular form with separate sheets to indicate line items associated with each independent dam site.
 4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
 5. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
 6. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance, bill of sale and affidavit with photographs of stored material.
 7. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
 8. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
 9. Purchase Contracts: Provide a separate line item in the schedule of values for each purchase contract. Show line-item value of purchase contract. Indicate owner payments or deposits, if any, and balance to be paid by Contractor.
 10. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.
 11. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.
 12. Construction Schedule Update: Submit an updated construction schedule with each Application for Payment.

1.6 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Engineer and paid for by Owner.
 - 1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
- C. Application for Payment Forms: Use forms acceptable to Engineer and Owner for Applications for Payment. Submit forms for approval with initial submittal of schedule of values.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Engineer will return incomplete applications without action.
 - 1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
 - 2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
 - 3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
 - 4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.
- E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.
 - 1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
 - 2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
 - 3. Provide summary documentation for stored materials indicating the following:
 - a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
 - b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
 - c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.
- F. Transmittal: Submit three signed and notarized original copies of each Application for Payment to Engineer by a method ensuring receipt. One copy shall include waivers of lien and similar attachments if required.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.
1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
 2. When an application shows completion of an item, submit conditional final or full waivers.
 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 4. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.
- H. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's liens from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.
1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
 2. When an application shows completion of an item, submit conditional final or full waivers.
 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 4. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
 5. Waiver Forms: Submit executed waivers of lien on forms, acceptable to Owner.
- I. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of subcontractors.
 2. Schedule of values.
 3. Contractor's construction schedule (preliminary if not final).
 4. Combined Contractor's construction schedule (preliminary if not final) incorporating Work of multiple contracts, with indication of acceptance of schedule by each Contractor, and specific timeline for the submittal, approval, fabrication, delivery, installation, testing and commissioning of long lead time items, such as the Stainless Steel Hydraulic Gates.
 5. Products list (preliminary if not final).
 6. Schedule of unit prices.
 7. Submittal schedule (preliminary if not final).
 8. List of Contractor's staff assignments.
 9. List of Contractor's principal consultants.
 10. Copies of building permits.
 11. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work, including the "Miss Utility" authorization number for each work site.

12. Initial progress report, including field verification report that field conditions are consistent with the Contract Documents.
 13. Report of preconstruction conference.
 14. Certificates of insurance and insurance policies.
 15. Performance and payment bonds.
 16. Data needed to acquire Owner's insurance.
- J. Application for Payment at Substantial Completion: After Engineer issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- K. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Consult Owner about the need for additional affidavits and other requirements.
 2. Evidence of completion of Project closeout requirements.
 3. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 4. Updated final statement, accounting for final changes to the Contract Sum.
 5. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
 6. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
 7. AIA Document G707, "Consent of Surety to Final Payment."
 8. Evidence that claims have been settled.
 9. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
 10. Final liquidated damages settlement statement.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01 31 00**PROJECT MANAGEMENT AND COORDINATION****PART 1 – GENERAL****1.1 DESCRIPTION**

- A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. General coordination procedures.
 - 2. Coordination drawings.
 - 3. Requests for Information (RFIs).
 - 4. Project meetings.

1.2 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections apply to this Section.

1.3 RELATED SECTIONS

- A. Section 01 32 00 "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
- B. Section 01 73 00 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
- C. Section 01 77 00 "Closeout Procedures" for coordinating closeout of the Contract.

1.4 DEFINITIONS

- A. RFI: Request from Owner, Engineer or Contractor seeking information required by or clarifications of the Contract Documents.

1.5 INFORMATIONAL SUBMITTALS

- A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
 - 1. Name, address, and telephone number of entity performing subcontract or supplying products.
 - 2. Number and title of related Specification Section(s) covered by subcontract.
 - 3. Drawing number and detail references, as appropriate, covered by subcontract.
- B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.
 - 1. Post copies of list in project meeting room, in temporary field office and by each temporary telephone. Keep list current at all times.

1.6 GENERAL COORDINATION PROCEDURES

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - 2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
 - 3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
 - 1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 - 1. Preparation of Contractor's construction schedule.
 - 2. Preparation of the schedule of values.
 - 3. Installation and removal of temporary facilities and controls.
 - 4. Delivery and processing of submittals.
 - 5. Progress meetings.
 - 6. Preinstallation conferences.
 - 7. Project closeout activities.
 - 8. Startup and adjustment of systems.
- D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.
 - 1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

1.7 COORDINATION DRAWINGS

- A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.
 - 1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:

- a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
- b. Coordinate the addition of trade-specific information to the coordination drawings by multiple contractors in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.
- c. Indicate functional and spatial relationships of components of structural, civil, mechanical, and electrical systems.
- d. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
- e. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
- f. Indicate required installation sequences.
- g. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Engineer indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

B. Organization: Organize coordination drawings as follows:

1. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
2. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.

1.8 REQUESTS FOR INFORMATION (RFIs)

- A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
 1. Engineer will return RFIs submitted to Engineer by other entities controlled by Contractor with no response.
 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
 1. Project name.
 2. Project number.
 3. Date.
 4. Name of Contractor.
 5. Name of Engineer.
 6. RFI number, numbered sequentially.
 7. RFI subject.

8. Specification Section number and title and related paragraphs, as appropriate.
 9. Drawing number and detail references, as appropriate.
 10. Field dimensions and conditions, as appropriate.
 11. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 12. Contractor's signature.
 13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
 - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- C. RFI Forms: AIA Document G716, Form bound in Project Manual, or Software-generated form with substantially the same content as indicated above, acceptable to Engineer.
1. Attachments shall be electronic files in Adobe Acrobat PDF format.
- D. Engineer's Action: Engineer will review each RFI, determine action required, and respond. Allow seven working days for Engineer's response for each RFI. RFIs received by Engineer after 1:00 p.m. will be considered as received the following working day.
1. The following Contractor-generated RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for approval of Contractor's means and methods.
 - d. Requests for coordination information already indicated in the Contract Documents.
 - e. Requests for adjustments in the Contract Time or the Contract Sum.
 - f. Requests for interpretation of Engineer's actions on submittals.
 - g. Incomplete RFIs or inaccurately prepared RFIs.
 2. Engineer's action may include a request for additional information, in which case Engineer's time for response will date from time of receipt of additional information.
 3. Engineer's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 01 26 00 "Contract Modification Procedures."
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Engineer in writing within 10 days of receipt of the RFI response.
- E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Include the following:
1. Project name.
 2. Name and address of Contractor.
 3. Name and address of Engineer.

4. RFI number including RFIs that were returned without action or withdrawn.
 5. RFI description.
 6. Date the RFI was submitted.
 7. Date Engineer's response was received.
- F. On receipt of Engineer's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Engineer within seven days if Contractor disagrees with response.
1. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
 2. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.

1.9 PROJECT MEETINGS

- A. General: The Engineer will schedule and conduct meetings and conferences at Project site unless otherwise indicated.
1. Attendees: Engineer will inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Contractor of scheduled meeting dates and times.
 2. Agenda: Engineer will prepare the meeting agenda. Distribute the agenda to all invited attendees.
 3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Engineer, within three days of the meeting.
- B. Preconstruction Conference: Engineer will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Contractor, but no later than 15 days after execution of the Agreement.
1. Conduct the conference to review responsibilities and personnel assignments.
 2. Attendees: Authorized representatives of Owner, Engineer, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 3. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Tentative construction schedule.
 - b. Phasing.
 - c. Critical work sequencing and long-lead items.
 - d. Designation of key personnel and their duties.
 - e. Lines of communications.
 - f. Procedures for processing field decisions and Change Orders.
 - g. Procedures for RFIs.

- h. Procedures for testing and inspecting.
 - i. Procedures for processing Applications for Payment.
 - j. Distribution of the Contract Documents.
 - k. Submittal procedures.
 - l. Preparation of record documents including field verification report based on contractor-established survey control.
 - m. Use of the premises.
 - n. Work restrictions.
 - o. Working hours.
 - p. Owner's occupancy requirements.
 - q. Responsibility for temporary facilities and controls.
 - r. Procedures for disruptions and shutdowns.
 - s. Construction waste management and recycling.
 - t. Parking availability.
 - u. Office, work, and storage areas.
 - v. Equipment deliveries and priorities.
 - w. First aid including a Health and Safety Plan (HASP) with emergency response protocol for accidents.
 - x. Security.
 - y. Progress cleaning.
4. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.
- C. Project Closeout Conference: The Engineer will schedule and conduct a project closeout conference, at a time convenient to Owner and Engineer, but no later than 90 days prior to the scheduled date of Substantial Completion.
- 1. Conduct the conference to review requirements and responsibilities related to Project closeout.
 - 2. Attendees: Authorized representatives of Owner, Engineer, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
 - 3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:
 - a. Preparation of record documents.
 - b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
 - c. Submittal of written warranties.
 - d. Requirements for preparing operations and maintenance data.

- e. Requirements for delivery of material samples, attic stock, and spare parts.
 - f. Requirements for demonstration and training.
 - g. Preparation of Contractor's punch list.
 - h. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
 - i. Submittal procedures.
 - j. Responsibility for removing temporary facilities and controls.
- 4. Minutes: Entity conducting meeting will record and distribute meeting minutes.
- D. Progress and Coordination Meetings: The Engineer will conduct progress meetings at regular intervals.
 - 1. Attendees: In addition to representatives of Owner and Engineer, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
 - 2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - (1) Review schedule for next period.
 - b. Review present and future needs of each entity present, including the following:
 - (1) Interface requirements.
 - (2) Sequence of operations.
 - (3) Status of submittals.
 - (4) Deliveries.
 - (5) Off-site fabrication.
 - (6) Access.
 - (7) Site utilization.
 - (8) Temporary facilities and controls.
 - (9) Progress cleaning.
 - (10) Quality and work standards.
 - (11) Status of correction of deficient items.
 - (12) Field observations.

- (13) Status of RFIs.
 - (14) Status of proposal requests.
 - (15) Pending changes.
 - (16) Status of Change Orders.
 - (17) Pending claims and disputes.
 - (18) Documentation of information for payment requests.
3. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.
- a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01 32 00**CONSTRUCTION PROGRESS DOCUMENTATION****PART 1 – GENERAL****1.1 DESCRIPTION**

- A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Startup construction schedule.
 - 2. Contractor's construction schedule.
 - 3. Construction schedule updating reports.
 - 4. Daily construction reports.
 - 5. Material location reports.
 - 6. Site condition reports.
 - 7. Special reports.

1.2 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections apply to this Section.

1.3 RELATED SECTIONS

- A. Section 01 33 00 "Submittal Procedures" for submitting schedules and reports.
- B. Section 01 45 00 "Quality Requirements" for submitting a schedule of tests and inspections.

1.4 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
 - 1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
 - 2. Predecessor Activity: An activity that precedes another activity in the network.
 - 3. Successor Activity: An activity that follows another activity in the network.
- B. Cost Loading: The allocation of the schedule of values for the completion of an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum unless otherwise approved by Engineer.
- C. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.
- D. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- E. Event: The starting or ending point of an activity.

- F. Float: The measure of leeway in starting and completing an activity.
 - 1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
 - 2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
 - 3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.
- G. Resource Loading: The allocation of manpower and equipment necessary for the completion of an activity as scheduled.

1.5 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:
 - 1. PDF electronic file.
- B. Startup construction schedule.
 - 1. Approval of cost-loaded, startup construction schedule will not constitute approval of schedule of values for cost-loaded activities.
- C. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
 - 1. Submit a working electronic copy of schedule, using software indicated, and labeled to comply with requirements for submittals. Include type of schedule (initial or updated) and date on label.
- D. CPM Reports: Concurrent with CPM schedule, submit each of the following reports. Format for each activity in reports shall contain activity number, activity description, cost and resource loading, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.
 - 1. Activity Report: List of all activities sorted by activity number and then early start date, or actual start date if known.
 - 2. Logic Report: List of preceding and succeeding activities for all activities, sorted in ascending order by activity number and then early start date, or actual start date if known.
 - 3. Total Float Report: List of all activities sorted in ascending order of total float.
 - 4. Earnings Report: Compilation of Contractor's total earnings from the Notice to Proceed until most recent Application for Payment.
- E. Construction Schedule Updating Reports: Submit with Applications for Payment.
- F. Site Condition Reports: Submit at time of discovery of differing conditions.
- G. Special Reports: Submit at time of unusual event.

1.6 QUALITY ASSURANCE

- A. Scheduling Consultant Qualifications: An experienced specialist in CPM scheduling and reporting, with capability of producing CPM reports and diagrams within 24 hours of Engineer's request.

- B. Prescheduling Conference: Review methods and procedures related to the preliminary construction schedule and Contractor's construction schedule, including, but not limited to, the following:
1. Review software limitations and content and format for reports.
 2. Verify availability of qualified personnel needed to develop and update schedule.
 3. Discuss constraints, including interim milestones.
 4. Review delivery dates for Owner-furnished products.
 5. Review schedule for work of Owner's separate contracts.
 6. Review submittal requirements and procedures.
 7. Review time required for review of submittals and resubmittals.
 8. Review requirements for tests and inspections by independent testing and inspecting agencies.
 9. Review time required for Project closeout and startup procedures.
 10. Review and finalize list of construction activities to be included in schedule.
 11. Review procedures for updating schedule.

1.7 COORDINATION

- A. Coordinate Contractor's construction schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other required schedules and reports.
1. Secure time commitments for performing critical elements of the Work from entities involved.
 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 – PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Time Frame: Extend schedule from date established for the Notice to Proceed to date of final completion.
1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- B. Activities: Treat each separate area as a separate numbered activity for each main element of the Work. Comply with the following:
1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Engineer.
 2. Procurement Activities: Include procurement process activities for the long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
 3. Submittal Review Time: Include review and resubmittal times indicated in Section 01 33 00 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.

4. Startup and Testing Time: Include appropriate durations for startup and testing.
 5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Engineer's administrative procedures necessary for certification of Substantial Completion.
 6. Punch List and Final Completion: Include preparation of punch list items and final completion.
- C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
1. Phasing: Arrange list of activities on schedule by phase.
 2. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Section 01 11 00 "Summary of Work." Delivery dates indicated stipulate the earliest possible delivery date.
 3. Work Restrictions: Show the effect of the following items on the schedule:
 - a. Coordination with existing construction.
 - b. Limitations of continued occupancies.
 - c. Uninterruptible services.
 - d. Partial occupancy before Substantial Completion.
 - e. Use of premises restrictions.
 - f. Provisions for future construction.
 - g. Seasonal variations.
 - h. Environmental control.
 4. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
 - a. Subcontract awards.
 - b. Submittals and review cycles.
 - c. Purchases.
 - d. Mockups.
 - e. Fabrication.
 - f. Sample testing.
 - g. Deliveries.
 - h. Installation.
 - i. Tests and inspections.
 - j. Adjusting.
 - k. Curing.
 - l. Startup and placement into final use and operation.
 5. Construction Areas: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:
 - a. Structural completion.
 - b. Substantial Completion.
 6. Other Constraints: As may apply
- D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion.

- E. Cost Correlation: Superimpose a cost correlation timeline, indicating planned and actual costs. On the line, show planned and actual dollar volume of the Work performed as of planned and actual dates used for preparation of payment requests.
 - 1. See Section 01 29 00 "Payment Procedures" for cost reporting and payment procedures.
- F. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:
 - 1. Unresolved issues.
 - 2. Unanswered Requests for Information.
 - 3. Rejected or unreturned submittals.
 - 4. Notations on returned submittals.
 - 5. Pending modifications affecting the Work and Contract Time.
- G. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, and equipment required to achieve compliance, and date by which recovery will be accomplished.
- H. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.

2.2 STARTUP CONSTRUCTION SCHEDULE

- A. Bar-Chart Schedule: Submit startup, horizontal, bar-chart-type construction schedule within seven days of date established for the Notice to Proceed.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first 90 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

2.3 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)

- A. General: Prepare network diagrams using AON (activity-on-node) format.
- B. CPM Schedule: Prepare Contractor's construction schedule using a time-scaled CPM network analysis diagram for the Work.
 - 1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than 30 days after date established for the Notice to Proceed.
 - a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates, regardless of Engineer's approval of the schedule.
 - 2. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
 - 3. Use "one workday" as the unit of time for individual activities. Indicate nonworking days and holidays incorporated into the schedule in order to coordinate with the Contract Time.
- C. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the startup network diagram, prepare a skeleton network to identify probable critical paths.

1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:
 - a. Preparation and processing of submittals.
 - b. Mobilization and demobilization.
 - c. Purchase of materials.
 - d. Delivery.
 - e. Fabrication.
 - f. Utility interruptions.
 - g. Installation.
 - h. Testing
 - i. Punch list and final completion.
 - j. Activities occurring following final completion.
2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.
 - a. Subnetworks on separate sheets are permissible for activities clearly off the critical path.
- D. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using a network fragment to demonstrate the effect of the proposed change on the overall project schedule.
- E. Initial Issue of Schedule: Prepare initial network diagram from a sorted activity list indicating straight "early start-total float." Identify critical activities. Prepare tabulated reports showing the following:
 1. Contractor or subcontractor and the Work or activity.
 2. Description of activity.
 3. Main events of activity.
 4. Immediate preceding and succeeding activities.
 5. Early and late start dates.
 6. Early and late finish dates.
 7. Activity duration in workdays.
 8. Total float or slack time.
 9. Average size of workforce.
 10. Dollar value of activity (coordinated with the schedule of values).
- F. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:
 1. Identification of activities that have changed.

2. Changes in early and late start dates.
 3. Changes in early and late finish dates.
 4. Changes in activity durations in workdays.
 5. Changes in the critical path.
 6. Changes in total float or slack time.
 7. Changes in the Contract Time.
- G. Value Summaries: Prepare two cumulative value lists, sorted by finish dates.
1. In first list, tabulate activity number, early finish date, dollar value, and cumulative dollar value.
 2. In second list, tabulate activity number, late finish date, dollar value, and cumulative dollar value.
 3. In subsequent issues of both lists, substitute actual finish dates for activities completed as of list date.
 4. Prepare list for ease of comparison with payment requests; coordinate timing with progress meetings.
 - a. In both value summary lists, tabulate "actual percent complete" and "cumulative value completed" with total at bottom.
 - b. Submit value summary printouts one week before each regularly scheduled progress meeting.

2.4 REPORTS

- A. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.5 SPECIAL REPORTS

- A. General: Submit special reports directly to Owner within **one** day of an occurrence. Distribute copies of report to parties affected by the occurrence.
- B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

PART 3 – EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Scheduling Consultant: Engage a consultant to provide planning, evaluation, and reporting using CPM scheduling.
1. In-House Option: Owner may waive the requirement to retain a consultant if Contractor employs skilled personnel with experience in CPM scheduling and reporting techniques. Submit qualifications.

2. Meetings: Scheduling consultant shall attend all meetings related to Project progress, alleged delays, and time impact.
- B. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
 3. As the Work progresses, indicate final completion percentage for each activity.
- C. Distribution: Distribute copies of approved schedule to Engineer, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
1. Post copies in Project meeting rooms and temporary field offices.
 2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION

SECTION 01 33 00**SUBMITTAL PROCEDURES****PART 1 – GENERAL****1.1 DESCRIPTION**

- A. This section includes requirements for the submittal schedule and the administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals. Contractor shall provide submittals in accordance with the General Conditions as modified by the Supplementary Conditions, and this Section.

1.2 SCOPE

- A. Provide submittals well in advance of need for the material or equipment, or procedure (as applicable), in the Work and with ample time required for delivery of material or equipment and to implement procedures following Engineer's approval or acceptance of the associated submittal. Work covered by a submittal will not be included in progress payments until approval or acceptance of related submittals has been obtained in accordance with the Contract Documents.
- B. Contractor is responsible for dimensions to be confirmed and corrected at the Site, for information pertaining solely to the fabrication processes and to techniques of construction, and for coordinating the work of all trades. Contractor's signature of submittal's stamp and letter of transmittal shall be Contractor's representation that Contractor has met his obligations under the Contract Documents relative to that submittal.
- C. Samples:
 - 1. Conform submittal of Samples to the General Conditions as modified by the Supplementary Conditions, this Section, and the Specification Section in which the Sample is specified.
 - 2. Furnish at the same time Samples and submittals that are related to the same unit of Work or Specification Section. Engineer will not review submittals without associated Samples, and will not review Samples without associated submittals.
 - 3. Samples shall clearly illustrate functional characteristics of product, all related parts and attachments, and full range of color, texture, pattern, and material.

1.3 DEFINITIONS

- A. Submittals are classified as follows: 1) Action Submittals, 2) Informational Submittals, 3) Closeout Submittals, and 4) Operations and Maintenance Material submittals. Type of each required submittal is designated in the respective Specification Sections; when type of submittal is not specified in the associated Specification Section, submittal will be classified as follows:
 - 1. Action Submittals:
 - a. Written/graphic information and physical samples that require Engineer's responsive action, such as shop drawings, product data, testing plans, procedures, and testing limitations.
 - b. Delegated design submittals, which include documents prepared, sealed, and signed by a design professional retained by Contractor, Subcontractor, or Supplier for materials and equipment to be incorporated into the completed Work.

2. Informational Submittals:

- a. Written/graphic information and physical samples that do not require Engineer's responsive action. Submittals may be rejected for not complying with requirements.
- b. Pre-construction test and evaluation reports, such as reports on pilot testing, subsurface investigations, potential Hazardous Environmental Condition, and similar reports.
- c. Supplier instructions, including installation data, and instructions for handling, storage, starting-up and troubleshooting.
- d. Source quality control submittals (other than testing plans, procedures, and testing limitations), including results of shop testing.
- e. Field or Site quality control submittals (other than testing plans, procedures, and testing limitations), including results of installation, start-up, operating and acceptability tests at the Site.
- f. Special procedure submittals, including health and safety plans and other procedural submittals.
- g. Design data not sealed and signed by a design professional retained by Contractor, Subcontractor, or Supplier.

3. Closeout Submittals:

- a. Maintenance contracts.
- b. Operations and maintenance data.
- c. Bonds, such as maintenance bonds and bonds for a specific product or system.
- d. Warranty documentation.
- e. Record documentation.
- f. Software

4. Maintenance Material Submittals include:

- a. Spare parts. Where the Technical Specification Sections of this Contract require spare parts to be furnished by the Contractor, said spare parts for each item of equipment shall be kept separate and tagged to identify the specific item of equipment to which they belong, shall be packaged so as to preclude damage from handling and storage, and shall be bagged or packaged together where items are small in dimension.
- b. Extra stock materials.
- c. Tools. The Contractor shall, unless otherwise stated, furnish with each type, kind, and size of equipment, one complete set of any special tools and appliances which may be needed to adjust, operate, maintain, or repair the equipment.
- d. Each piece of equipment shall be provided with a substantial nameplate, which is securely fastened in place and clearly inscribed with the manufacturer's name, year of manufacture, and principal rating data.

5. When type of submittal is not specified and is not included in the list above, Engineer will determine the type of submittal

- B. File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An

FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.

- C. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

1.4 SUBMITTALS REQUIRED, THIS SECTION

A. Informational Submittals: Provide the following:

1. Schedule of Submittals:

- a. Submit a schedule of submittals, arranged in chronological order by dates required by the construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or modifications to submittals noted by the Engineer and additional time for handling and reviewing submittals required by those corrections.

b. Timing:

- (1) Initial Submittal shall be submitted concurrently with the start-up construction schedule prior to the required Preconstruction Meeting. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.

- (2) Provide updated Schedule of Submittals with each submittal of the updated Progress Schedule.

c. Format: Arrange the following information in a tabular format:

- (1) Scheduled date for first submittal.
- (2) Specification Section number and title.
- (3) Submittal category: Action, Informational.
- (4) Name of subcontractor.
- (5) Description of the Work covered.
- (6) Scheduled date for Engineer's final release or approval.
- (7) Scheduled dates for purchasing.
- (8) Scheduled dates for installation.

d. Content: Identify on Schedule of Submittals all submittals required in the Contract Documents. Updates of Schedule of Submittals shall show scheduled dates and actual dates for completed tasks. Indicate submittals that are on the Project's critical path. Indicate the following, at a minimum, for each submittal:

- (1) Date by which submittal will be provided to Engineer.
- (2) Whether submittal will be for a "substitution" or "equal". Procedures for substitutions and "or equals" are specified in the General Conditions and the Division 01 Specifications.

(3) Date by which Engineer's response is required. At least fifteen (15) days shall be allowed from Engineer's receipt of each submittal. Allow increased time for large or complex submittals.

(4) For submittals for materials or equipment, date by which material or equipment must be at the Site to avoid delaying the Work and to avoid delaying the work of other contractors.

e. Prepare and coordinate the Schedule of Submittals using same software, and in same format, as specified for Progress Schedules.

1.5 SUBMITTAL PROCEDURES

A. Submittal Identification and Information: Identify and incorporate information in each electronic submittal file as follows:

1. Assemble complete submittal package into a single indexed file with links enabling navigation to each item.

2. Name each file with submittal number or other unique identifier, including revision identifier.

a. File name shall use project identifier and Specification Section number followed by a decimal point and then a sequential number. Re-submittals shall include an alphabetic suffix after another decimal point.

3. Provide means to permanently record the Contractor's review and approval markings and action taken by the Engineer.

4. Include the following information on an inserted cover sheet:

a. Project name.

b. Date.

c. Name and address of Engineer.

d. Name of Contractor.

e. Name of firm or entity that prepared submittal.

f. Name of subcontractor.

g. Name of supplier.

h. Name of manufacturer.

i. Number and title of appropriate Specification Section.

j. Drawing number and detail references, as appropriate.

k. Location(s) where product is to be installed, as appropriate.

l. Related physical samples submitted directly.

m. Other necessary identification.

5. Include the following information as keywords in the electronic file metadata:

a. Project name.

b. Number and title of appropriate Specification Section.

c. Manufacturer name.

d. Product name.

B. Contractor's Review and Stamp:

1. Before transmitting submittals to Engineer, review submittals to:

a. Assure proper coordination of the Work;

b. Determine that each submittal is in accordance with Contractor's desires;

- c. Verify that submittal contains sufficient information for Engineer to determine compliance with the Contract Documents.
2. Each submittal provided shall bear Contractor's stamp of approval and signature, as evidence that submittal has been reviewed by Contractor and verified as complete and in accordance with the Contract Documents.
3. Submittals that are incomplete, inadequate, or without Contractor's stamp and signature will be returned without review. Signatures that appear to be computer-generated will be regarded as unsigned and the associated submittal will be returned without review.
- C. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 1. Coordinate the preparation and processing of submittals with the performance of construction activities.
 2. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 3. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
 4. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
 5. Coordinate the transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of the need to review submittals concurrently for coordination.
 - a. Engineer reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- D. Processing Time: Time for review shall commence on Engineer's receipt of submittal. The failure to transmit submittals in sufficient notice of the Work to permit processing, including re-submittals, shall not serve as authorization for an extension of Contract Time. Allow time for submittal review, including time for re-submittals as follows:
 1. Initial Review: Allow fifteen (15) days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Engineer will advise Contractor when a submittal being processed must be delayed for coordination.
 2. Intermediate Review: If intermediate submittal is necessary, process it in the same manner as the initial submittal.
 3. Re-submittal Review: Allow fifteen (15) days for review of each re-submittal.
- E. Options: Identify options requiring selection by the Engineer.
- F. Deviations: Identify deviations from the Contract Documents on submittals.
- G. Transmittal: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Engineer will return submittals without review, received from sources other than Contractor.

1. Transmittal Form: Provide locations on form for the following information:

- a. Project name.
- b. Date.
- c. Destination (To:).
- d. Source (From:).
- e. Names of subcontractor, manufacturer, and supplier.
- f. Category and type of submittal.
- g. Submittal purpose and description.
- h. Specification Section number and title.
- i. Indication of full or partial submittal.
- j. Drawing number and detail references, as appropriate.
- k. Transmittal number, numbered consecutively.
- l. Submittal and transmittal distribution record.
- m. Remarks.
- n. Signature of transmitter.

2. On an attached separate sheet, prepared on the Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by the Engineer on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.

H. Re-submittals shall be in the same form and number of copies as initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block and clearly indicate extent of revision.
3. Resubmit submittals until they are marked with approval notation from Engineer's action stamp.

I. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction and any others as necessary for performance of construction activities. Show distribution on transmittal forms.

J. Use for Construction: Use only final submittals that are marked with approval notation from Engineer's action stamp.

1.6 SUBMITTAL REQUIREMENTS

A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1. Submit electronic submittals as PDF files via Project FTP site or as otherwise directed by the Engineer.
 - a. Engineer will return annotated file. Annotate and retain one copy of the file as an electronic Project record document file.
2. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in the Section entitled "Closeout Procedures."
3. Certificates and Certifications Submittals: Provide a statement that includes the signature of the entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
 - a. Provide a digital signature with digital certificate on electronically-submitted certificates and certifications where indicated.

- b. Provide a notarized statement on original paper copy certificates and certifications where indicated.
 4. Test and Inspection Reports Submittals: Comply with requirements specified in the Section entitled "Quality Requirements."
 - B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
 1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
 2. Mark each copy of each submittal to show which products and options are applicable.
 3. Include the following information, as applicable:
 - a. Manufacturer's catalog cuts.
 - b. Manufacturer's product specifications.
 - c. Standard color charts.
 - d. Statement of compliance with specified referenced standards.
 - e. Testing by recognized testing agency.
 - f. Application of testing agency labels and seals.
 - g. Notation of coordination requirements.
 - h. Availability and delivery time information.
 4. For equipment, include the following in addition to the above, as applicable:
 - a. Wiring diagrams showing factory-installed wiring.
 - b. Printed performance curves.
 - c. Operational range diagrams.
 - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
 5. Submit Product Data before or concurrent with Samples.
 6. Submit Product Data in the following format:
 - a. PDF electronic file.
 - C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data, unless the submittal based upon the Engineer's digital data drawing files is otherwise permitted.
 1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Identification of products.
 - b. Schedules.
 - c. Compliance with specified standards.
 - d. Notation of coordination requirements.
 - e. Notation of dimensions established by field measurement.
 - f. Relationship and attachment to adjoining construction clearly indicated.
 - g. Seal and signature of professional engineer if specified.
 2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 30 by 42 inches.

3. Submit Shop Drawings in the following format:
 - a. PDF electronic file.
- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
 1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 2. Identification: Attach label on unexposed side of Samples that includes the following:
 - a. Generic description of Sample.
 - b. Product name and name of manufacturer.
 - c. Sample source.
 - d. Number and title of applicable Specification Section.
 3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
 4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
 - a. Number of Samples: Submit two full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Engineer will return submittal with options selected.
 5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 6. Number of Samples: Submit three sets of Samples. Engineer will retain two Sample sets; remainder will be returned.
 - a. Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - b. If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.
- E. Product Schedule: As required in individual Specification Sections, a written summary shall be prepared, indicating the types of products required for the Work and their intended location. Include the following information in tabular form:

1. Type of product, including a unique identifier for each product indicated in the Contract Documents.
 2. Manufacturer's name, product name and model number if applicable.
 3. Number and name of the room or space in which product will be installed.
 4. Location within room or space, in which product will be installed.
 5. Submit product schedule in PDF format.
- F. Contractor's Construction Schedule: Comply with requirements specified in the Section entitled "Construction Progress Documentation."
- G. Application for Payment: Comply with requirements specified in General Conditions.
- H. Schedule of Values: Comply with requirements specified in General Conditions.
- I. Subcontract List: Prepare a written summary identifying individuals or firms responsible for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
1. Name, address, and telephone number of the entity performing subcontract or supplying products.
 2. Number and title of related Specification Section(s) covered by the subcontract.
 3. Drawing number and detail references, as appropriate, covered by the subcontract.
 4. Submit subcontract list in PDF format.
- J. Qualification Data: Prepare written information that demonstrates capabilities and experience of the firm or person. Include lists of completed projects with project names and addresses, contact information of Engineer and Owner, and other information specified.
- K. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on American Welding Society (AWS) forms. Include names of firms and personnel certified.
- L. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that the Installer complies with the requirements in the Contract Documents and, where required, is authorized by the manufacturer for this specific Project.
- M. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that the manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- N. Product Certificates: Submit written statements on manufacturer's letterhead certifying that the product complies with requirements in the Contract Documents.
- O. Material Certificates: Submit written statements on manufacturer's letterhead certifying that the material complies with requirements in the Contract Documents.
- P. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of the material for compliance with the requirements in the Contract Documents.
- Q. Product Test Reports: Submit written reports indicating that the current product produced by the manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of

tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

- R. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for the Project. Include the following information:
 - 1. Name of evaluation organization.
 - 2. Date of evaluation.
 - 3. Time period when report is in effect.
 - 4. Product and manufacturers' names.
 - 5. Description of product.
 - 6. Test procedures and results.
 - 7. Limitations of use.
- S. Schedule of Tests and Inspections: Comply with requirements specified in the Section entitled "Quality Requirements."
- T. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
- U. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
- V. Field Test Reports: Submit reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
- W. Maintenance Data: Comply with requirements specified in Division 01 Section "Operation and Maintenance Data."
- X. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

1.7 DELEGATED-DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request to the Engineer for additional information.
- B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit a digitally-signed PDF electronic file and three paper copies of the certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to the Contractor to be designed or certified by a design professional.

1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

1.8 ENGINEER'S ACTION

- A. General: Engineer will not review submittals that do not bear the Contractor's approval stamp and will return them without action.
- B. The Engineer's review of shop drawings is for general compliance with the Contract Documents only and is not a complete check of the method of assembly, erection, construction or detailed review of the specifications. Such review shall in no way be construed as permitting any departure whatsoever from the Contract Documents, except where the Contractor has previously requested and received written approval of the Engineer for such departure. When requested by Contractor, proposed departures from the Contract Documents will be considered by Engineer at Contractor's expense, whether or not accepted. The cost of Engineer's conflict review and any revisions made as a result of Contractor's requested departure shall be at the expense of Contractor. Contractor shall reimburse Owner for the referenced costs and expenses of Engineer upon demand.
- C. Review of shop drawings by the Engineer will be limited to complete submittals except where review of a partial submittal is specifically requested by the Contractor and where such review of a partial submittal is necessary for timely completion of the Work of the Contract. Where shop drawings of related items are necessary for review of a particular submittal, the Engineer will so inform the Contractor, who will promptly submit such shop drawing of said related items.
- D. Action Submittals: Engineer will review each submittal, make marks to indicate corrections or modifications required, and return it. Engineer will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action, as follows:
 1. "Reviewed," if no change or rejection is made. All but four copies of the submitted data will be returned.
 2. "Reviewed and Noted," if minor changes or additions are made but resubmittal is not considered necessary. All but four copies of the submitted data will be returned and all copies will bear the corrective marks.
 3. "Resubmit," if the changes requested are extensive or if retransmittal of the submittal to another Contractor, after correction, is required. In this case, the Contractor shall resubmit the items after correction, and the same number of copies shall be included in the resubmittal as in the first submittal. One copy of the first submittal will be retained by the Engineer and two copies will be returned to the Contractor.
 4. "Rejected," if it is considered that the data submitted cannot, with reasonable revision, meet the requirements of the Contract Drawings and Specifications.
- E. Informational Submittals will be reviewed by the Engineer and will be forwarded on to the appropriate party if it complies with requirements. If it does not comply with requirements, the submittal will be returned for re-submittal.
- F. After their use has received approval from the Engineer, partial submittals prepared for a portion of the Work will be reviewed.
- G. Incomplete submittals are not acceptable and will be returned without review.
- H. Any submittals not required by the Contract Documents may not be reviewed and may be discarded.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

SECTION 01 42 00**REFERENCES****PART 1 – GENERAL****1.1 RELATED DOCUMENTS**

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections apply to this Section.

1.2 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": When used to convey Engineer's action on Contractor's submittals, applications, and requests, "approved" is limited to Engineer's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by Engineer. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.
- C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
 - 1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.4 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States."
- B. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.
1. AABC - Associated Air Balance Council; www.aabc.com.
 2. AAMA - American Architectural Manufacturers Association; www.aamanet.org.
 3. AAPFCO - Association of American Plant Food Control Officials; www.aapfco.org.
 4. AASHTO - American Association of State Highway and Transportation Officials; www.transportation.org.
 5. AATCC - American Association of Textile Chemists and Colorists; www.aatcc.org.
 6. ABMA - American Bearing Manufacturers Association; www.americanbearings.org.
 7. ACI - American Concrete Institute; (Formerly: ACI International); www.concrete.org.
 8. ACPA - American Concrete Pipe Association; www.concrete-pipe.org.
 9. AEIC - Association of Edison Illuminating Companies, Inc. (The); www.aeic.org.
 10. AF&PA - American Forest & Paper Association; www.afandpa.org.
 11. AGA - American Gas Association; www.aga.org.
 12. AI - Asphalt Institute; www.asphaltinstitute.org.
 13. AIA - American Institute of Architects (The); www.aia.org.
 14. AISC - American Institute of Steel Construction; www.aisc.org.
 15. AISI - American Iron and Steel Institute; www.steel.org.
 16. AITC - American Institute of Timber Construction; www.aitc-glulam.org.
 17. AMCA - Air Movement and Control Association International, Inc.; www.amca.org.
 18. ANSI - American National Standards Institute; www.ansi.org.
 19. AOSA - Association of Official Seed Analysts, Inc.; www.aosaseed.com.
 20. APA - APA - The Engineered Wood Association; www.apawood.org.
 21. APA - Architectural Precast Association; www.archprecast.org.
 22. API - American Petroleum Institute; www.api.org.
 23. ARI - Air-Conditioning & Refrigeration Institute; (See AHRI).
 24. ASCE - American Society of Civil Engineers; www.asce.org.
 25. ASCE/SEI - American Society of Civil Engineers/Structural Engineering Institute; (See ASCE).
 26. ASME - ASME International; (American Society of Mechanical Engineers); www.asme.org.
 27. ASSE - American Society of Safety Engineers (The); www.asse.org.
 28. ASSE - American Society of Sanitary Engineering; www.asse-plumbing.org.
 29. ASTM - ASTM International; (American Society for Testing and Materials International); www.astm.org.
 30. AWPA - American Wood Protection Association; (Formerly: American Wood-Preservers' Association); www.awpa.com.
 31. AWS - American Welding Society; www.aws.org.
 32. AWWA - American Water Works Association; www.awwa.org.
 33. BHMA - Builders Hardware Manufacturers Association; www.buildershardware.com.
 34. BIA - Brick Industry Association (The); www.gobrick.com.
 35. BICSI - BICSI, Inc.; www.bicsi.org.
 36. BOCA - BOCA; (Building Officials and Code Administrators International Inc.); (See ICC).
 37. CFFA - Chemical Fabrics & Film Association, Inc.; www.chemicalfabricsandfilm.com.
 38. CFSEI - Cold-Formed Steel Engineers Institute; www.cfsei.org.

39. CGA - Compressed Gas Association; www.cganet.com.
40. CISPI - Cast Iron Soil Pipe Institute; www.cispi.org.
41. CLFMI - Chain Link Fence Manufacturers Institute; www.chainlinkinfo.org.
42. CRSI - Concrete Reinforcing Steel Institute; www.crsi.org.
43. CSI - Construction Specifications Institute (The); www.csinet.org.
44. CWC - Composite Wood Council; (See CPA).
45. EJMA - Expansion Joint Manufacturers Association, Inc.; www.ejma.org.
46. EVO - Efficiency Valuation Organization; www.evo-world.org.
47. FM Approvals - FM Approvals LLC; www.fmglobal.com.
48. FM Global - FM Global; (Formerly: FMG - FM Global); www.fmglobal.com.
49. FSC - Forest Stewardship Council U.S.; www.fscus.org.
50. GA - Gypsum Association; www.gypsum.org.
51. GANA - Glass Association of North America; www.glasswebsite.com.
52. GS - Green Seal; www.greenseal.org.
53. HI - Hydraulic Institute; www.pumps.org.
54. HMMA - Hollow Metal Manufacturers Association; (See NAAMM).
55. HPVA - Hardwood Plywood & Veneer Association; www.hpva.org.
56. HPW - H. P. White Laboratory, Inc.; www.hpwhite.com.
57. IAPSC - International Association of Professional Security Consultants; www.iapsc.org.
58. IAS - International Approval Services; (See CSA).
59. ICBO - International Conference of Building Officials; (See ICC).
60. ICC - International Code Council; www.iccsafe.org.
61. ICEA - Insulated Cable Engineers Association, Inc.; www.icea.net.
62. ICPA - International Cast Polymer Alliance; www.icpa-hq.org.
63. ICRI - International Concrete Repair Institute, Inc.; www.icri.org.
64. IEST - Institute of Environmental Sciences and Technology; www.iest.org.
65. ILI - Indiana Limestone Institute of America, Inc.; www.iliai.com.
66. Intertek - Intertek Group; (Formerly: ETL SEMCO; Intertek Testing Service NA); www.intertek.com.
67. ISA - International Society of Automation (The); (Formerly: Instrumentation, Systems, and Automation Society); www.isa.org.
68. ISAS - Instrumentation, Systems, and Automation Society (The); (See ISA).
69. ISFA - International Surface Fabricators Association; (Formerly: International Solid Surface Fabricators Association); www.isfanow.org.
70. ISO - International Organization for Standardization; www.iso.org.
71. ISSFA - International Solid Surface Fabricators Association; (See ISFA).
72. LPI - Lightning Protection Institute; www.lightning.org.
73. MBMA - Metal Building Manufacturers Association; www.mbma.com.
74. MCA - Metal Construction Association; www.metalconstruction.org.
75. MFMA - Metal Framing Manufacturers Association, Inc.; www.metalframingmfg.org.
76. MHIA - Material Handling Industry of America; www.mhia.org.
77. MPI - Master Painters Institute; www.paintinfo.com.
78. MSS - Manufacturers Standardization Society of The Valve and Fittings Industry Inc.; www.mss-hq.org.
79. NAAMM - National Association of Architectural Metal Manufacturers; www.naamm.org.
80. NACE - NACE International; (National Association of Corrosion Engineers International); www.nace.org.
81. NBGQA - National Building Granite Quarries Association, Inc.; www.nbgqa.com.
82. NCMA - National Concrete Masonry Association; www.ncma.org.
83. NEBB - National Environmental Balancing Bureau; www.nebb.org.
84. NECA - National Electrical Contractors Association; www.necanet.org.
85. NeLMA - Northeastern Lumber Manufacturers Association; www.nelma.org.
86. NEMA - National Electrical Manufacturers Association; www.nema.org.

87. NETA - InterNational Electrical Testing Association; www.netaworld.org.
 88. NFPA - NFPA; (National Fire Protection Association); www.nfpa.org.
 89. NFPA - NFPA International; (See NFPA).
 90. NHLA - National Hardwood Lumber Association; www.nhla.com.
 91. NLGA - National Lumber Grades Authority; www.nlga.org.
 92. NOMMA - National Ornamental & Miscellaneous Metals Association; www.nomma.org.
 93. NRMCA - National Ready Mixed Concrete Association; www.nrmca.org.
 94. NSF - NSF International; (National Sanitation Foundation International); www.nsf.org.
 95. NSPE - National Society of Professional Engineers; www.nspe.org.
 96. NSSGA - National Stone, Sand & Gravel Association; www.nssga.org.
 97. NTMA - National Terrazzo & Mosaic Association, Inc. (The); www.ntma.com.
 98. PCI - Precast/Prestressed Concrete Institute; www.pci.org.
 99. PDI - Plumbing & Drainage Institute; www.pdionline.org.
 100. RCSC - Research Council on Structural Connections; www.boltcouncil.org.
 101. RIS - Redwood Inspection Service; www.redwoodinspection.com.
 102. SAE - SAE International; (Society of Automotive Engineers); www.sae.org.
 103. SDI - Steel Deck Institute; www.sdi.org.
 104. SDI - Steel Door Institute; www.steeldoor.org.
 105. SEI/ASCE - Structural Engineering Institute/American Society of Civil Engineers; (See ASCE).
 106. SIA - Security Industry Association; www.siaonline.org.
 107. SJI - Steel Joist Institute; www.steeljoist.org.
 108. SMA - Screen Manufacturers Association; www.smainfo.org.
 109. SMACNA - Sheet Metal and Air Conditioning Contractors' National Association; www.smacna.org.
 110. SPIB - Southern Pine Inspection Bureau; www.spib.org.
 111. SPRI - Single Ply Roofing Industry; www.spri.org.
 112. SSINA - Specialty Steel Industry of North America; www.ssina.com.
 113. SSPC - SSPC: The Society for Protective Coatings; www.sspc.org.
 114. SWPA - Submersible Wastewater Pump Association; www.swpa.org.
 115. TCA - Tilt-Up Concrete Association; www.tilt-up.org.
 116. TMS - The Masonry Society; www.masonrysociety.org.
 117. TPI - Truss Plate Institute; www.tpinst.org.
 118. TPI - Turfgrass Producers International; www.turfgrasssod.org.
 119. UBC - Uniform Building Code; (See ICC).
 120. UL - Underwriters Laboratories Inc.; www.ul.com.
 121. UNI - Uni-Bell PVC Pipe Association; www.uni-bell.org.
 122. USGBC - U.S. Green Building Council; www.usgbc.org.
 123. WASTEC - Waste Equipment Technology Association; www.wastec.org.
 124. WCLIB - West Coast Lumber Inspection Bureau; www.wclib.org.
 125. WI - Woodwork Institute; (Formerly: WIC - Woodwork Institute of California); www.wicnet.org.
 126. WPA - Western Wood Products Association; www.wwpa.org.
- C. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is believed to be accurate as of the date of the Contract Documents.
1. IAPMO - International Association of Plumbing and Mechanical Officials; www.iapmo.org.
 2. ICC - International Code Council; www.iccsafe.org.
 3. ICC-ES - ICC Evaluation Service, LLC; www.icc-es.org.

- D. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Information is subject to change and is up-to-date as of the date of the Contract Documents.

1. COE - Army Corps of Engineers; www.usace.army.mil.
2. CPSC - Consumer Product Safety Commission; www.cpsc.gov.
3. DOC - Department of Commerce; National Institute of Standards and Technology; www.nist.gov.
4. DOD - Department of Defense; <http://dodssp.daps.dla.mil>.
5. DOE - Department of Energy; www.energy.gov.
6. EPA - Environmental Protection Agency; www.epa.gov.
7. FAA - Federal Aviation Administration; www.faa.gov.
8. FG - Federal Government Publications; www.gpo.gov.
9. GSA - General Services Administration; www.gsa.gov.
10. HUD - Department of Housing and Urban Development; www.hud.gov.
11. LBL - Lawrence Berkeley National Laboratory; Environmental Energy Technologies Division; <http://eetd.lbl.gov>.
12. OSHA - Occupational Safety & Health Administration; www.osha.gov.
13. SD - Department of State; www.state.gov.
14. TRB - Transportation Research Board; National Cooperative Highway Research Program; www.trb.org.
15. USDA - Department of Agriculture; Agriculture Research Service; U.S. Salinity Laboratory; www.ars.usda.gov.
16. USDA - Department of Agriculture; Rural Utilities Service; www.usda.gov.
17. USDJ - Department of Justice; Office of Justice Programs; National Institute of Justice; www.ojp.usdoj.gov.
18. USP - U.S. Pharmacopeia; www.usp.org.
19. USPS - United States Postal Service; www.usps.com.

- E. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. CFR - Code of Federal Regulations; Available from Government Printing Office; www.gpo.gov/fdsys.
2. DOD - Department of Defense; Military Specifications and Standards; Available from Department of Defense Single Stock Point; <http://dodssp.daps.dla.mil>.
3. DSCC - Defense Supply Center Columbus; (See FS).
4. FED-STD - Federal Standard; (See FS).
5. FS - Federal Specification; Available from Department of Defense Single Stock Point; <http://dodssp.daps.dla.mil>.
 - a. Available from Defense Standardization Program; www.dsp.dla.mil.
 - b. Available from General Services Administration; www.gsa.gov.
 - c. Available from National Institute of Building Sciences/Whole Building Design Guide; www.wbdg.org/ccb.
6. MILSPEC - Military Specification and Standards; (See DOD).
7. USAB - United States Access Board; www.access-board.gov.
8. USATBCB - U.S. Architectural & Transportation Barriers Compliance Board; (See USAB).

F. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. DelDOT – The State of Delaware Department of Transportation; www.deldot.gov
2. DNREC – The State of Delaware Department of Natural Resources and Environmental Control; www.dnrec.delaware.gov

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

Not used.

END OF SECTION

SECTION 01 45 00**QUALITY REQUIREMENTS****PART 1 – GENERAL****1.1 DESCRIPTION**

- A. This Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve the Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit the Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for the Contractor to provide quality-assurance and quality-control services required by the Engineer, Owner, Construction Manager, or other authorities having jurisdiction are not limited by provisions of this Section.

1.2 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by the Engineer.
- C. Mockups: Full size physical assemblies that are constructed on-site. Mockups are constructed to verify selections made under sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.
- D. Preconstruction Testing: Tests and inspections performed specifically for the Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.
- E. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- F. Source Quality-Control Testing: Tests and inspections that are performed at the source, i.e., plant, mill, factory, or shop.
- G. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

- H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- I. Installer/Applicator/Erector: Contractor or another entity engaged by the Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
 - 1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade or trades.
- J. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.3 CONFLICTING REQUIREMENTS

- A. Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to the Engineer for a decision before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to the Engineer for a decision before proceeding.

1.4 INFORMATIONAL SUBMITTALS

- A. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.
- B. Contractor's Quality-Control Manager Qualifications: For supervisory personnel.
- C. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- D. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
 - 1. Specification Section number and title.
 - 2. Entity responsible for performing tests and inspections.
 - 3. Description of test and inspection.
 - 4. Identification of applicable standards.
 - 5. Identification of test and inspection methods.
 - 6. Number of tests and inspections required.
 - 7. Time schedule or time span for tests and inspections.
 - 8. Unique characteristics of each quality-control service.

1.5 CONTRACTOR'S QUALITY CONTROL PLAN

- A. General: Submit quality-control plan within 10 days following Notice to Proceed, and not less than five days prior to preconstruction conference. Submit in format acceptable to the Engineer. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out the Contractor's quality-assurance and quality-control responsibilities. Coordinate with the Contractor's construction schedule.
- B. Quality-Control Personnel Qualifications: Engage qualified full-time personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for the Project.
 - 1. Project quality-control manager may also serve as the Project superintendent.
- C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of the submittal process. Indicate qualifications of personnel responsible for the submittal review.
- D. Testing and Inspection: Include in the quality-control plan a comprehensive schedule of Work requiring testing or inspection, including the following:
 - 1. Contractor-performed tests and inspections including subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections.
 - 2. Owner-performed tests and inspections indicated in the Contract Documents.
- E. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring work into compliance with standards of workmanship established by the Contract requirements.
- F. Monitoring and Documentation: Maintain testing and inspection reports including log of approved and rejected results. Include work the Engineer has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.6 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
 - 1. Date of issue.
 - 2. Project title and number.
 - 3. Name, address, and telephone number of testing agency.
 - 4. Dates and locations of samples and tests or inspections.
 - 5. Names of individuals making tests and inspections.
 - 6. Description of the Work and test and inspection method.
 - 7. Complete test or inspection data.
 - 8. Test and inspection results and an interpretation of test results.
 - 9. Record of temperature and weather conditions at time of sample taking and testing and inspecting.

10. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 11. Name and signature of laboratory inspector.
 12. Recommendations on retesting and reinspecting.
- B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, and telephone number of technical representative making report.
 2. Statement on condition of substrates and their acceptability for installation of product.
 3. Statement that products at the Project site comply with requirements.
 4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 5. Results of operational and other tests and a statement of whether the observed performance complies with requirements.
 6. Statement whether conditions, products, and installation will affect warranty.
 7. Other required items indicated in individual Specification Sections.
- C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, and telephone number of factory-authorized service representative making report.
 2. Statement that equipment complies with requirements.
 3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 4. Statement whether conditions, products, and installation will affect warranty.
 5. Other required items indicated in individual Specification Sections.
- D. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.7 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

- D. **Installer Qualifications:** A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- E. **Professional Engineer Qualifications:** A professional engineer who is legally qualified to practice in jurisdiction where the Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar to those indicated for this Project in material, design, and extent.
- F. **Specialists:** Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
 - 1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.
- G. **Testing Agency Qualifications:** An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.
 - 1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
 - 2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
- H. **Manufacturer's Technical Representative Qualifications:** An authorized representative of the manufacturer who is trained and approved by the manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. **Factory-Authorized Service Representative Qualifications:** An authorized representative of the manufacturer who is trained and approved by the manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- J. **Preconstruction Testing:** Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
 - 1. Contractor responsibilities include the following:
 - a. Provide test specimens representative of proposed products and construction.
 - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 - c. Provide sizes and configurations of test assemblies and mockups to adequately demonstrate capability of products to comply with performance requirements.
 - d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for the Project.
 - e. When testing is complete, remove test specimens, assemblies, and mockups. Do not reuse products on the Project.
 - 2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to the Engineer, through the Construction Manager, with copy

to the Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

- K. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
1. Build mockups in location and of size indicated or, if not indicated, as directed by the Engineer.
 2. Notify the Engineer seven days in advance of dates and times when mockups will be constructed.
 3. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed during the construction at the Project.
 4. Demonstrate the proposed range of aesthetic effects and workmanship.
 5. Obtain the Engineer's approval of mockups before starting work, fabrication, or construction.
 6. Allow seven days for initial review and each re-review of each mockup.
 7. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 8. Demolish and remove mockups when directed, unless otherwise indicated.

1.8 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
1. Owner will furnish the Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
 2. Costs for retesting and re-inspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to the Contractor.
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to the Owner are the Contractor's responsibility. Contractor shall perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.
1. Unless otherwise indicated, Contractor shall provide quality-control services specified and those required by authorities having jurisdiction. Contractor shall perform quality-control services required by authorities having jurisdiction, whether specified or not.
 2. Where services are indicated as the Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
 - a. Contractor shall not employ same entity engaged by the Owner, unless agreed to in writing by the Owner.
 3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
 4. Where quality-control services are indicated as the Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 5. Testing and inspecting requested by the Contractor and not required by the Contract Documents are the Contractor's responsibility.

6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 01 Section "Submittal Procedures."
- D. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.
- E. Retesting/Re-inspecting: Regardless of whether original tests or inspections were the Contractor's responsibility, provide quality-control services, including retesting and re-inspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- F. Testing Agency Responsibilities: Cooperate with the Engineer and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
 1. Notify the Engineer and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
 3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through the Contractor.
 5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
 6. Do not perform any duties of the Contractor.
- G. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
 1. Access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
 4. Facilities for storage and field curing of test samples.
 5. Delivery of samples to testing agencies.
 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 7. Security and protection for samples and for testing and inspecting equipment at Project site.
- H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- I. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents as a component of the Contractor's quality-control plan. Coordinate and submit concurrently with the Contractor's construction schedule. Update as the Work progresses.
 1. Distribution: Distribute schedule to the Owner, Engineer, Construction Manager, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

PART 2 – PRODUCTS

Not used.

PART 3 – EXECUTION

3.1 TEST AND INSPECTION LOG

- A. Prepare a record of tests and inspections. Include the following:
 1. Date test or inspection was conducted.
 2. Description of the Work tested or inspected.
 3. Date test or inspection results were transmitted to the Engineer.
 4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and modifications as they occur. Provide access to test and inspection log for the Engineer's and Construction Manager's reference during normal working hours.

3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
 1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 01 73 00 "Execution."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are the Contractor's responsibility, regardless of the assignment of responsibility for quality-control services

END OF SECTION

SECTION 01 51 00**TEMPORARY UTILITIES****PART 1 – GENERAL****1.1 DESCRIPTION**

- A. This Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Contractor shall provide all temporary utilities required for the Project.
 - 1. Make all arrangements with utility service companies for temporary services and obtain required permits and approvals for temporary utilities.
 - 2. Pay all utility service costs, including cost of electricity, water, fuel, and other utility services required for the Work.
 - a. Continuously maintain adequate utilities for all purposes during the Project, until removal of temporary utilities and temporary facilities. At minimum, provide and maintain temporary utilities through Substantial Completion and removal of temporary field offices and sheds.
 - 3. Should Owner occupy part of the Project prior to Substantial Completion of the entire Work, cost of utilities consumed via temporary utilities serving the portion occupied by Owner will be shared proportionately between Owner and Contractor as mutually agreed to by the parties.
 - 4. Maintain, including cleaning, temporary utilities and continuously provide consumables as required.
 - 5. Temporary utilities and temporary facilities shall be adequate for personnel using the Site and requirements of Project.
 - 6. Provide temporary utilities and temporary facilities in compliance with Laws and Regulations and, when applicable, requirements of utility owners.
 - 7. Provide the following temporary utilities:
 - a. Electricity
 - b. Lighting.
 - c. Telephone and communications.
 - d. Heating, ventilating, and temporary enclosures.
 - e. Water.
 - f. Sanitary facilities.
 - g. First-aid facilities.
 - h. Fire protection.

1.2 USE CHARGES

- A. General: Installation and removal of and use charges for temporary facilities shall be included in the Contract Price unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Owner's personnel and Engineer, testing agencies, and authorities having jurisdiction.

1.3 REQUIREMENTS FOR TEMPORARY UTILITIES AND TEMPORARY FACILITIES

A. Electrical:

1. Provide temporary electrical service required for the Work, including continuous power for temporary field offices and sheds. Provide temporary outlets with circuit breaker protection and ground fault protection.

B. Telephone and Communications:

1. Provide temporary telephone and communications required for Contractor's operations at the DNREC-owned Chipmans Pond Boat Ramp Area field office and for summoning emergency medical assistance.

C. Water:

1. Provide water for temporary sanitary facilities, field offices, Site maintenance and cleaning and, when applicable, disinfecting and testing of systems.
2. Continuously maintain adequate water flow and pressure for all purposes during the Project, until removal of temporary water system.
3. Where the public water supply is owned or controlled by a private company, corporation or individual or municipality other than the Owner, the Contractor shall make such arrangements at its cost for service with the owners thereof as he requires.

D. Sanitary Facilities:

1. Provide suitably-enclosed chemical or self-contained toilets for Contractor's employees and visitors at each dam. Location of temporary toilets shall be acceptable to Owner.
2. Provide supply of potable drinking water and related facilities and consumables for all personnel using the Site.
3. Provide suitable temporary washing facilities for employees and visitors.
4. Sanitary conveniences in sufficient numbers and convenient locations for the use of all persons employed on the Work, properly screened from public observation, shall be provided, maintained, and removed by the Contractor. The contents of the same shall be removed and disposed of in accordance with applicable laws codes and regulations. The Contractor shall rigorously prohibit the committance of nuisances within, on, or about the Work.
5. The Contractor shall also obey and enforce such other sanitary regulations and orders and shall take such precautions against infectious diseases as may be deemed necessary by the responsible authority.

E. First-aid Facilities

1. Provide temporary first-aid stations at or immediately adjacent to the Site's major work areas, and inside Contractor's temporary field office. Locations of first-aid stations shall be determined by Contractor's safety representative.
2. Provide list of emergency telephone numbers at each hardwired telephone at the Site. List shall be in accordance with the list of emergency contact information required in Section entitled "Pre-Construction Conference"

F. Fire Protection:

1. Provide temporary fire protection, including portable fire extinguishers rated not less than 2A or 5B in accordance with NFPA 10, Portable Fire Extinguishers, for each temporary building and for every 3,000 square feet of floor area under construction.
2. Comply with NFPA 241, Safeguarding Building Construction, Alteration, and Demolition Operations, and requirements of fire marshals and authorities having jurisdiction at the Site.

G. Water For Testing:

1. Unless otherwise specified, water of acceptable quality for testing shall be furnished by the Contractor.

1.4 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

PART 2 – PRODUCTS**2.1 MATERIALS AND EQUIPMENT**

- A. Materials and equipment for temporary systems may be new or used, but shall be adequate for purposes intended and shall not create unsafe conditions, and shall comply with Laws and Regulations.
- B. Provide required materials, equipment, and facilities, including piping, wiring, and controls
- C. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

PART 3 – EXECUTION**3.1 INSTALLATION, GENERAL**

- A. Location of Temporary Utilities and Temporary Facilities:
 1. Locate temporary systems for proper function and service.
 2. Temporary systems shall not interfere with or provide hazards or nuisances to: the Work under this and other contracts, movement of personnel, traffic areas, materials handling, hoisting systems, storage areas, finishes, and work of utility companies.
 3. Do not install temporary utilities on the ground, with the exception of temporary extension cords, hoses, and similar systems in place for short durations.
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.
- C. Modify and extend temporary systems as required by progress of the Work.

3.2 USE

- A. Maintain temporary systems to provide safe, continuous service as required.
- B. Properly supervise operation of temporary systems:
 - 1. Enforce compliance with Laws and Regulations.
 - 2. Enforce safe practices.
 - 3. Prevent abuse of services.
 - 4. Prevent nuisances and hazards caused by temporary systems and their use.
 - 5. Prevent damage to finishes.
 - 6. Ensure that temporary systems and equipment do not interrupt continuous progress of construction.
- C. At end of each work day, check temporary systems and verify that sufficient consumables are available to maintain operation until work is resumed at the Site. Provide additional consumables if the supply on hand is insufficient.

3.3 REMOVAL

- A. Completely remove temporary utilities, facilities, equipment, and materials when no longer required. Repair damage caused by temporary systems and their removal and restore the Site to condition required by the Contract Documents; if restoration of damaged areas is not specified, restore to preconstruction condition.
- B. Where temporary utilities are disconnected from existing utility, provide suitable, watertight or gastight (as applicable) cap or blind flange, as applicable, on service line, in accordance with requirements of utility owner.

END OF SECTION

SECTION 01 51 50**ENGINEER'S FIELD OFFICE TRAILER****PART 1 – GENERAL****1.1 DESCRIPTION**

- A. This Section includes providing separate field office trailers for the exclusive use of Engineer and his assistants. All components supplied under this specification section shall be removed from the Project area at Final Completion of the Work.
 - 1. A Primary field office trailer at the DNREC-owned Chipmans Pond Boat Ramp Area for the duration of the Contract.
 - 2. Secondary field office trailers at Concord Pond and Craigs Pond for the duration of construction activities at each site. Secondary field office trailers shall be installed upon mobilization to each site and shall be removed prior to demobilization. Locations to be determined by the Contractor in the field.

1.2 SUBMITTALS

- A. In addition to those submittals identified in the General Conditions, the following items shall be submitted:
 - 1. Proposed layout of the trailers
 - 2. Proposed method of furnishing the utilities
 - 3. Proposed Office Equipment
 - 4. Proposed computer and networking equipment

PART 2 – PRODUCTS**2.1 PRIMARY FIELD OFFICE TRAILER AT CHIPMANS POND**

- A. The field office shall be of trailer type conforming to the standards of Mobile Office Manufacturer's Association and National Fire Protection Association as set forth in ANSI A119.1 and NFPA 501B. The trailer shall be a new single-wide trailer, with a minimum of 360 total interior square feet, not less than 10 feet by 36 feet.
- B. Structural, electrical, and mechanical design shall conform to the local Building Code. The trailer shall be set on blocks and skirted with closure panels. A covered entrance stoop with steps and handrails of metal or pressure treated wood shall be provided.
- C. The Contractor shall connect the office facilities to power and high speed internet service, including any initial set-up and equipment costs. The Contractor shall disconnect and reconnect these services if relocation of the office trailer is required during the contract duration. Contractor shall provide any necessary repair and maintenance of these services. The Contractor shall cover the monthly cost of power, internet service and sanitary units.
- D. The field office shall be located as close to the work site as possible without obstructing the Contractor's work area or normal traffic operations within the boat ramp area. The office shall be separated from the Contractor's office facilities. The office shall be available for the Engineer's use during the entire life of the Contract and shall not be disturbed, moved, or interrupted without the Engineer's approval. The Contractor shall be responsible for removal.

- E. Parking with a minimum of three (3) spaces shall be provided. Parking area shall be adjacent to the office and shall be graded and maintained until completion of the Contract.
- F. The Contractor shall protect the Engineer's office against theft and shall be responsible for all loss of Engineer's property and personal property of the employees housed therein due to either fire, theft or other causes.
- G. The Contractor's liability insurance shall include coverage for loss or damage to the office contents including office records, supplies, instruments, equipment and personal property of the personnel using the field office.
- H. Sanitary and potable water services are not available on or near the site. The Contractor shall provide two (2) portable sanitary facilities for the exclusive use of the Engineer, one each designated for men and women, and including hand-washing stations, keyed locks and all supplies.
- I. The field office trailer shall be provided with the following:
 - 1. Obtain prior approval from the Engineer for floor plan. Each room shall have doors with integral locks, keyed alike.
 - 2. Mini blinds and screens for all windows
 - 3. At least two (2) four-foot single tube fluorescent fixtures in each small room and six (6) in the larger room. Provide incandescent fixtures in the washrooms, if provided. Provide incandescent architectural desk lamps for each desk in each room. Provide one wall switch for each room.
 - 4. Provide two duplex convenience outlets in each small room and six in the large room.
 - 5. Computer network connections in all rooms.
 - 6. Built-in Items
 - a. Full width double desk on each end with two-drawer file cabinets, pencil drawers and overhead shelves.
 - b. Drafting table, minimum 36 inch by 72 inch with double storage below.
 - c. Forced air heat and air-conditioning. Provide thermostatically controlled heaters capable of maintaining 70-degrees (F) when outside temperature is zero degrees (F). The field office shall be equipped with AC capable of maintaining 72 degrees (F) or less with ambient temperature of 100 degrees (F). Provide minimum of two air conditioning units - rated not less than 8,000 BTU/hr each.
 - 7. Movable Items
 - a. Two (2) flat top desks, minimum 60 inch x 30 inch, with filing and storage drawers.
 - b. Four (4) office chairs.
 - c. Two (2) wall-mounted dry chemical fire extinguishers.
 - d. Electric water cooler with bottled water supply having hot and cold spigots, with continuous service during the contract period.
 - e. One (1) 18.1 cu. ft. capacity refrigerator with self-defrosting freezer.
 - f. One microwave oven with not less than 1.5 cubic foot oven space.
 - g. Ten (10) stacking chairs (conference room).

- h. Two (2) folding utility tables with minimum top dimensions of 30 inches by 60 inches.
- i. Two large waste baskets

J. Office Equipment

- 1. One (1) digital all-in-one printer/copier/fax machine, Hewlett-Packard HP Officejet 7612 or equal, with all supplies and services except paper provided during the contract period. Printer shall be connected to the trailer computer network.

K. Telephone and Communication Service

- 1. The Contractor shall include the set-up and initial equipment costs for high speed internet service from a provider approved by the Engineer. System shall be DSL or cable if available. A connection for internet service shall be provided in every room. A router shall be provided and installed which will allow each computer to connect through the computer network.

2.2 SECONDARY FIELD OFFICE TRAILERS AT CONCORD POND AND CRAIGS POND

- A. The Secondary field offices shall be of trailer type conforming to the standards of Mobile Office Manufacturer's Association and National Fire Protection Association as set forth in ANSI A119.1 and NFPA 501B. Each trailer shall be a new single-wide trailer, with a minimum of 160 total interior square feet, not less than 8 feet by 20 feet.
- B. If work at Concord Pond and Craigs Pond is to be performed in series, Contractor may elect to relocate the Secondary field office trailer from one site to the other rather than provide a new trailer at each site.
- C. Structural, electrical, and mechanical design shall conform to the local Building Code. The trailer shall be set on blocks and skirted with closure panels. A covered entrance stoop with steps and handrails of metal or pressure treated wood shall be provided if required.
- D. The Contractor shall connect the office facilities to power, including any initial set-up and equipment costs. The Contractor shall disconnect and reconnect electrical services if relocation of the office trailer is required during the contract duration. Contractor shall provide any necessary repair and maintenance of these services. The Contractor shall cover the monthly cost of power and sanitary units.
- E. Secondary field office trailers do not require connection to telephone or high-speed internet lines.
- F. The field office shall be located as close to the work site as possible without obstructing the Contractor's work area or normal operations. The office shall be separated from the Contractor's office facilities. The office shall be available for the Engineer's use during the duration of Contractor's activities at the project site and shall not be disturbed, moved, or interrupted without the Engineer's approval. The Contractor shall be responsible for removal.
- G. The Contractor shall protect the Engineer's office against theft and shall be responsible for all loss of Engineer's property and personal property of the employees housed therein due to either fire, theft or other causes.
- H. The Contractor's liability insurance shall include coverage for loss or damage to the office contents including office records, supplies, instruments, equipment and personal property of the personnel using the field office.
- I. Sanitary and potable water services are not available on or near the site. Separate sanitary facilities for the Engineer are not required, provided that the Contractor provides a minimum of two (2) portable sanitary facilities for his employees including hand-washing stations, keyed locks and all supplies.

- J. The field office trailer shall be provided with the following:
1. Obtain prior approval from the Engineer for floor plan. Each room shall have doors with integral locks, keyed alike.
 2. Mini blinds and screens for all windows
 3. At least two (2) four-foot single tube fluorescent fixtures in each small room and six (6) in the larger room. Provide incandescent architectural desk lamps for each desk in each room. Provide one wall switch for each room.
 4. Built-in Items
 - a. Full width double desk on each end with two-drawer file cabinets, pencil drawers and overhead shelves.
 - b. Drafting table, minimum 36 inch by 72 inch with double storage below.
 - c. Forced air heat and air-conditioning. Provide thermostatically controlled heaters capable of maintaining 70-degrees (F) when outside temperature is zero degrees (F). The field office shall be equipped with AC capable of maintaining 72 degrees (F) or less with ambient temperature of 100 degrees (F).
 5. Movable Items
 - a. Two (2) office chairs.
 - b. Two (2) wall-mounted dry chemical fire extinguishers.
 - c. Electric water cooler with bottled water supply having hot and cold spigots, with continuous service during the contract period.
 - d. One (1) folding utility table with minimum top dimensions of 30 inches by 60 inches.
 - e. Two large waste baskets

PART 3 – EXECUTION

3.1 INSTALLATION

- A. The trailer shall be located on an approved site convenient to the work.
1. The Contractor shall mobilize the Primary field office trailer within 30 days after the Notice to Proceed. The Primary and Secondary office trailers shall be ready for occupancy a minimum of 10 days prior to starting work in the field.
 2. The office trailers shall be furnished and maintained until the acceptance of the Contract.
 3. Relocate once, if directed, during the period of the Contract.
 4. Upon substantial completion of the work at Concord Pond and Craigs Pond, the Contractor shall remove the Secondary field office trailers and restore the areas in accordance with the Contract Documents.
 5. Upon the completion and acceptance of the Contract, the Contractor shall remove the Primary field office trailer and restore the area in accordance with the Contract Documents.

3.2 MAINTENANCE

- A. The maintenance of the trailers shall include but not be limited to:
1. Adequate heating and cooling including a continual supply of fuel.
 2. Electric power and lights.
 3. Portable sanitary service cleaning not less than weekly.
 4. Internet Service at the Primary field office trailer.
 5. Snow removal and de-icing in winter
 6. Janitorial services not less than weekly
 7. Pest control
 8. Daily trash pickup
 9. Immediate replacement or repair of any items that break or are otherwise rendered inoperable for their intended function.

END OF SECTION

SECTION 01 55 19**ACCESS ROADS AND PARKING AREAS****PART 1 – GENERAL****1.1 DESCRIPTION**

- A. Contractor shall provide temporary parking areas, and appurtenances required during the Project for use by Contractor, Owner's operations, other contractors working on the Project, and emergency vehicles. Temporary parking areas shall be designed and maintained by Contractor and be fully usable in all weather conditions.
 - 1. Paved parking areas owned by the Owner are available at each Project Site. The Contractor shall utilize existing paved parking areas to the greatest extent practical before constructing additional temporary parking areas.
 - 2. Construction of additional temporary parking areas must be approved, in writing, by the Owner.
- B. Use of Existing Access Roads
 - 1. Contractor will utilize existing DelDOT roadways and DNREC-owned driveways and parking areas for access to the Project Sites.
 - 2. Prevent interference with traffic on existing roads and parking areas. Unless a road closure is authorized, the Contractor shall keep access roads and entrances serving the Project Sites clear and available to DelDOT, Owner, Owner's employees, emergency vehicles, and other contractors at all times. Do not use these areas for parking or storage of materials.
 - 3. Contractor shall indemnify and hold harmless Owner from expenses caused by Contractor's operations over existing roads and parking areas.
 - 4. Schedule deliveries to minimize use of privately owned driveways and entrances.
 - 5. Chipmans Pond Boat Ramp Area – Leave adequate access for use of the boat ramp and parking facilities.

1.2 CONTRACTOR PARKING

- A. Contractor's employee vehicles shall be parked in areas specifically designated by the Owner.
- B. Construction vehicles and equipment shall not be parked on permanent roads and parking areas unless within a roadway closure as shown on the Detour Plan or Traffic Management Plan. Contractor shall park construction vehicles and equipment in the designated construction staging areas.

1.3 MAINTENANCE OF ROADS

- A. General:
 - 1. Contractor shall maintain roads and parking to continuously provide at the Site access for construction vehicles and trucks, Owner vehicles, deliveries for Owner, emergency vehicles, and parking areas for Owner's personnel.
 - 2. Public roads shall be passable at all times unless a road closure is allowed in writing by authority having jurisdiction.
 - 3. When temporary roads and parking without hard surfacing become contaminated with soil and create a nuisance, remove contaminated material and replace with clean aggregate as required.

4. Provide snow and ice removal for access roads and parking areas when construction activities are taking place on site.
- B. Clean paved roads and parking areas over which Contractor's vehicles travel. Cleaning shall be done a minimum two times per week or more frequently as directed by Engineer, and shall be by mechanical sweeper. Roads to be cleaned include:
 1. Roads within limits of the Project.
 2. Permanent roads at Site from Site entrance to work areas and construction parking and staging areas.
 3. Public roads that require sweeping and cleaning due to Contractor's operations.
- C. Dust resulting from Contractor's activities shall be controlled by Contractor to prevent nuisances at Site and nearby areas. Apply water or use other methods subject to Engineer's acceptance that will minimize airborne dust. Do not use water when water will cause hazardous or objectionable conditions such as ice, mud, ponds, and pollution.
- D. Provide temporary, heavy-duty steel roadway plates to protect existing manholes, handholes, valve boxes, vaults, and similar buried facilities.

1.4 REMOVALS AND RESTORATION

A. Removals:

1. Remove any temporary parking areas that are not intended for, or acceptable for, integration into permanent pavement. Return areas of temporary roads, walks, and parking to pre-construction condition unless otherwise required by the Contract Documents. Remove temporary gates, fencing, and traffic controls associated with temporary roads and parking areas.
2. Where areas of temporary roads and parking will be permanently landscaped, remove pavement, aggregate, soil and other material that does not comply with requirements for fill or subsoil and landscaping. Remove and properly dispose of materials contaminated with oil, bitumen, and other petrochemical compounds, and other substances that might impair growth of plants and lawns

B. Restoration:

1. Repair or replace paving, curbs, gutters, and sidewalks affected by temporary roads and parking, and restore to required conditions, per authorities having jurisdiction.
2. Restore to pre-construction conditions existing roads, walks, and parking areas damaged by Contractor, subject to approval of owner of roads, walks, and parking areas.

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

Not Used.

END OF SECTION

SECTION 01 55 26**TRAFFIC CONTROL****PART 1 – GENERAL****1.1 DESCRIPTION**

- A. This Section includes the requirements for furnishing, installing, maintaining and/or relocating necessary temporary traffic control devices used to maintain vehicular, bicycle and pedestrian traffic, including persons with disabilities in accordance with the Americans with Disabilities Act, as amended.
- B. All Work shall be performed in a manner that will provide safe passage with the least practicable obstruction to all users, including vehicle, bicycle and pedestrian traffic.

1.2 REFERENCES

- A. Materials and installation shall be in accordance with the latest revisions of the following codes, standards and specifications:
 - 1. Delaware Department of Transportation (DelDOT)
 - a. Delaware Manual on Uniform Traffic Control Devices (MUTCD), Part 6
 - b. Standard Specifications for Road and Bridge Construction, including all Supplemental Specifications
 - 2. American Traffic Safety Services Association (ATSSA)

1.3 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections apply to this Section.
- B. DelDOT Approved Detour Plan for Chipmans Pond Road
- C. DelDOT Approved Detour Plan for Concord Pond Road
- D. DelDOT Approved Traffic Management Plan (TMP) for Craigs Mill Road

1.4 TRAFFIC CONTROL PLANS

- A. The Contractor shall submit a Temporary Traffic Control Plan (TTCP) or a Letter of Intent to use the TMP-recommended Delaware MUTCD Case Diagram(s) at or prior to the pre-construction meeting.
 - 1. The Contractor shall submit the TTCP for all Contractor and subcontractor work to be performed on the Project to DelDOT for approval.
 - 2. The Contractor shall be aware that the Case Diagrams and safety measures outlined in the Delaware MUTCD are for common construction situations and modifications may be warranted based on the complexity of the job.
 - 3. The Contractor shall submit justification for modifications to the TTCP to the Engineer for approval prior to implementation.
 - 4. DelDOT reserves the right to impose additional restrictions, as needed, for the operational movement and safety of the traveling public.
 - 5. DelDOT reserves the right to suspend the Contractor's operations until compliance with the Engineer's directive for remedial action, based on but not limited to the following reasons:

- a. The Contractor's operations are not in compliance with the Delaware MUTCD, the Specifications or the Plans.
- b. The Contractor's operations have been deemed unsafe by the DelDOT Traffic Safety Engineer or District Safety Officer.

PART 2 – PRODUCTS

2.1 TEMPORARY TRAFFIC CONTROL DEVICES

- A. Temporary traffic control devices used on all highways open to the public shall conform to the Delaware MUTCD.
- B. All devices shall be crashworthy in accordance with the National Cooperative Highway Research Program (NCHRP) Report 350, the memorandum issued August 28, 1998, by the USDOT Federal Highway Administration, and/or in accordance with the latest edition of the Manual for Assessing Safety Hardware (MASH), published by the American Association of State Highway Officials (AASHTO).
 1. The Contractor shall submit certification for temporary traffic control devices or vendors used specifically on this Project at or prior to the pre-construction meeting.
 2. Certification of compliance with NCHRP Report 350 and/or MASH is required for the following categories of devices:
 - a. Category I – contains small and lightweight channelizing and delineating control devices which includes cones, tubular markers, flexible delineator posts and drums, all without any accessories or attachments.
 - b. Category II – includes temporary traffic control devices that are not expected to produce significant velocity changes to impacting vehicles. These devices, which shall weigh 45 kg or less, include Type I, II and III barricades, portable sign supports with signs and intrusion alarms. Also included are drums, cones and vertical panels with accessories or attachments.
 - c. Category III – includes temporary traffic control devices that are expected to cause significant velocity changes to impacting vehicles. These devices, which weigh more than 45 kg, include temporary barrier, temporary impact attenuators, and truck mounted attenuators.
 - d. Category IV – includes portable or trailer-mounted devices such as arrow panels, variable message signs, temporary traffic signals and temporary area lighting.
 3. For Category I devices, the manufacturer or Contractor may self-certify that the devices meet the NCHRP-350 and/or MASH criteria. The Contractor shall supply the Federal Highway Administration's NCHRP-350 and/or MASH acceptance letter for each type of device that falls under Category II and III devices.
- C. All temporary traffic control devices shall be maintained in good condition in accordance with the brochure entitled "Quality Guidelines for Temporary Traffic Control Devices," published by the ATSSA.
 1. Any traffic control devices that do not meet the quality guidelines shall be removed and replaced immediately with acceptable devices.

PART 3 – EXECUTION**3.1 GENERAL**

- A. Any existing signs that conflict with any temporary or permanent construction signs shall be covered as needed or as directed by DelDOT.
- B. Access to all transit stops located within the project limits shall be maintained unless otherwise directed by the Plans or the DelDOT Engineer.
- C. The Contractor shall notify the Engineer and DelDOT, in writing, no less than fourteen (14) calendar days prior to the start of any detour(s) and road closure(s). The DelDOT Engineer will notify the following entities:
 - 1. Local 911 center
 - 2. Local school districts
 - 3. Local post offices
 - 4. DelDOT's Transportation Management Center (TMC)
 - 5. Town Managers
 - 6. Local Police
 - 7. DelDOT's Public Relations
 - 8. Delaware Transit Corporation (DTC).
- D. Immediately prior to the implementation of any lane or road closures, the Contractor shall notify the DelDOT TMC at (302) 659-4600. Notifications shall also be provided when the closures are lifted. The Contractor shall notify the TMC and the District Safety Officer if any lane closures cannot be removed prior to the end of the allowable work hours.
- E. The Contractor shall notify the local 911 center if access to a fire hydrant is temporarily restricted. The Contractor shall provide written confirmation to the engineer that the local 911 center has been notified.
- F. If a detour is required during any part or the entire period of this Contract, an approved detour plan shall be obtained from the DelDOT Traffic Safety Section.
 - 1. All signs, barricades and other temporary traffic control devices required as part of the detour plan shall be installed and maintained by the Contractor on the route that is closed and the detour route.
 - 2. Road closures without a detour plan shall not be allowed. If a road is closed without an approved detour plan, the Contractor's operations shall be immediately stopped.
- G. The Contractor shall maintain ingress and egress for each property abutting the construction area and each property located between the diversion points of any detour and the actual construction site. Construction activities which may temporarily or otherwise interfere with property access shall be coordinated in advance with the affected property owners.
- H. The Contractor shall conduct construction operations in a manner which will minimize delays to traffic and shall meet the following requirements:
 - 1. If work is being performed within 200 feet in any direction of an intersection that is controlled by a traffic signal, the flagger(s) shall direct the flow of traffic in concert with the traffic signals in construction areas to avoid queuing, unless active work prohibits such action. The flagger

shall direct traffic to prevent traffic from queuing through (i.e. blocking) an intersection. Only a Traffic Officer may direct traffic against the operation of a traffic signal and only until the operation occurring within the intersection is completed.

2. When a lane adjacent to an open lane is closed to travel, the temporary traffic control devices shall be set 2 feet into the closed lane from the edge of the open travel lane, unless an uncured patch exists or actual work is being performed closer to the open lane with minimum restriction to traffic.
 3. Except for "buffer lanes" on high volume and/or high speed roads, lanes shall not be closed unless construction activity requiring lane closure is taking place or will take place within the next hour. Lanes shall be reopened immediately upon completion of the work. Moving operations will require the lane closures to be shortened as the work progresses and as traffic conditions warrant to minimize the length of closure. The Contractor shall conduct construction operations in a manner to minimize disruption to traffic during peak hours and periods of heavy flow. DelDOT reserves the right to stop or change the Contractor's operations if, in the opinion of the DelDOT engineer, such operations are unnecessary at that time or the operations are unnecessarily impeding traffic.
 4. Work in the vicinity of traffic signals shall be scheduled to minimize the time during which the signal is operated without detectors, and prior approval from DelDOT is required. The TMC shall be notified in advance of cutting a loop detector, and be immediately notified once the loop detector has been reinstalled.
- I. Any deficiencies related to temporary traffic control that are reported to the Contractor in writing shall be corrected within 24 hours or as directed by the DelDOT engineer. Failure to comply will result in non-payment for those devices which are found to be deficient for the duration of the deficiency. Serious deficiencies that are not corrected immediately shall result in suspension of work until items identified are brought back into compliance.
 - J. At the end of each day's work, the Contractor shall correct all pavement edge drop-offs in accordance with Table 6G-1 of the Delaware MUTCD. All ruts and potholes shall be filled with Temporary Roadway Material (TRM) as soon as possible, but no later than the end of each work day. If temporary elimination of a drop-off hazard cannot be accomplished, then the area should be properly marked and protected with temporary traffic control devices such as temporary barricades, warning signs, flashing lights, etc. as required by Section 6G.21 of the Delaware MUTCD.
 - K. Travel lane and ramp closings on multilane highways and Interstates shall not be permitted during the following holiday periods:
 1. December 24 through December 27 (Christmas Day)
 2. December 31 through January 3 (New Years Day)
 3. Friday prior to Easter through Easter Sunday
 4. Thursday prior to Memorial Day through the Tuesday following Memorial Day
 5. Dover International Speedway Race Weekends (Thursday prior to the race event through the day after the race event)
 6. July 3 through July 5 (Independence Day)
 7. Thursday prior to Labor Day through the Tuesday following Labor Day
 8. Wednesday prior to Thanksgiving Day through the Monday following Thanksgiving Day
 - L. Additional time restrictions may apply as noted in the project plans or as directed by the DelDOT Engineer. Any requests to waive any restrictions must be made in writing to the DelDOT District Safety Officer for review and approval.

END OF SECTION

SECTION 01 66 00**PRODUCT DELIVERY, STORAGE AND HANDLING REQUIREMENTS****PART 1 – GENERAL****1.1 DESCRIPTION**

- A. This Section includes general requirements for delivering, storing and protecting materials and equipment.

1.2 GENERAL

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

1.3 DELIVERY AND HANDLING

- A. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
- B. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
- C. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
- D. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

1.4 STORAGE

- A. Store and protect materials and equipment in accordance with manufacturer's recommendations and the Contract Documents.
- B. Contractor shall make all arrangements and provisions necessary for, and pay all costs for, storing materials and equipment. Excavated materials, construction equipment, and materials and equipment to be incorporated into the Work shall be placed to avoid injuring the Work and existing facilities and property, and so that free access is maintained at all times to all parts of the Work and to public utility installations in vicinity of the Work. Store materials and equipment neatly and compactly in locations that cause minimum inconvenience to Owner, other contractors, public travel, and owners, tenants, and occupants of adjoining property. Arrange storage in manner to allow easy access for inspection.
- C. Areas available at the Site for storing materials and equipment are shown or indicated in the Contract Documents, or as approved by Engineer.
- D. Store materials and equipment to become Owner's property to facilitate their inspection and ensure preservation of quality and fitness of the Work, including proper protection against damage by freezing, moisture, and high temperatures with ambient temperatures as high as (105) degrees F. Store in indoor, climate-controlled storage areas all materials and equipment subject to damage by moisture, humidity, heat, cold, and other elements, unless otherwise acceptable to Owner. When placing orders to Suppliers for equipment and controls containing computer chips, electronics, and solid-state devices, Contractor shall obtain, coordinate, and comply with specific temperature and humidity limitations on materials and equipment, because temperature inside cabinets and components stored in warm temperatures can approach 200 degrees F.

- E. Contractor shall be fully responsible for loss or damage (including theft) to stored materials and equipment.
- F. Do not open manufacturer's containers until time of installation, unless recommended by the manufacturer or otherwise specified in the Contract Documents.
- G. Do not store materials or equipment in structures being constructed unless approved by Engineer in writing.
- H. Do not use lawns or other private property for storage without written permission of the owner or other person in possession or control of such premises.

1.5 PROTECTION

- A. Equipment to be incorporated into the Work shall be boxed, crated, or otherwise completely enclosed and protected during shipping, handling, and storage.
- B. Store all materials and equipment off the ground (or floor) on raised supports such as skids or pallets.
- C. Protect painted surfaces against impact, abrasion, discoloration, and other damage. Painted equipment surfaces that are damaged or marred shall be repainted in their entirety in accordance with equipment manufacturer and paint manufacturer requirements, to the satisfaction of Engineer.
- D. Protect electrical equipment, controls, and instrumentation against moisture, water damage, heat, cold, and dust. Space heaters provided in equipment shall be connected and operating at all times until equipment is placed in operation and permanently connected.

1.6 UNCOVERED STORAGE

- A. The following types of materials may be stored outdoors without cover on supports so there is no contact with the ground:
 - 1. Reinforcing steel.
 - 2. Precast concrete materials.
 - 3. Structural steel.
 - 4. Metal stairs.
 - 5. Handrails and railings.
 - 6. Grating.
 - 7. Checker plate.
 - 8. Metal access hatches.
 - 9. Castings.
 - 10. Fiberglass products.
 - 11. Rigid electrical conduit.
 - 12. Piping, except polyvinyl chloride (PVC) or chlorinated PVC (CPVC) pipe.

1.7 COVERED STORAGE

- A. The following materials and equipment may be stored outdoors on supports and completely covered with covering impervious to water:
 - 1. Grout and mortar materials.
 - 2. Masonry units.
 - 3. Rough lumber.
 - 4. Soil materials and granular materials such as aggregate.
 - 5. PVC and CPVC pipe.
 - 6. Filter media.
- B. Tie down covers with rope, and slope covering to prevent accumulation of water.
- C. Store loose granular materials, with covering impervious to water, in well-drained area or on solid surfaces to prevent mixing with foreign matter.

1.8 FULLY PROTECTED STORAGE

- A. Store all material and equipment not named in Articles 1.6 and 1.7 of this Section on supports in buildings or trailers that have concrete or wooden flooring, roof, and fully closed walls on all sides. Covering with visquine plastic sheeting or similar material in space without floor, roof, and walls is not acceptable. Comply with the following:
 - 1. Provide heated storage for materials and equipment that could be damaged by low temperatures or freezing.
 - 2. Provide air-conditioned storage for materials and equipment that could be damaged by high temperatures.
 - 3. Protect mechanical and electrical equipment from being contaminated by dust, dirt, and moisture.
 - 4. Maintain humidity at levels recommended by manufacturers for electrical and electronic equipment.

1.9 HAZARDOUS PRODUCTS

- A. In general, hazardous products shall not be stored at the Site.
- B. If hazardous materials are to be stored at the Site, prevent contamination of personnel, storage area, and the Site. Comply with Laws and Regulations, manufacturer's instructions.

1.10 MAINTENANCE OF STORAGE

- A. On scheduled basis, periodically inspect stored materials and equipment to ensure that:
 - 1. Condition and status of storage facilities is adequate to provide required storage conditions.
 - 2. Required environmental conditions are maintained on continuing basis.
 - 3. Materials and equipment exposed to elements are not adversely affected.
- B. Mechanical and electrical equipment requiring long-term storage shall have complete manufacturer's instructions for servicing each item, with notice of enclosed instructions shown on exterior of container or package.

1. Comply with manufacturer's instructions on scheduled basis.
2. Space heaters that are part of electrical equipment shall be connected and operated continuously until equipment is placed in service and permanently connected.

1.11 RECORDS

- A. Keep up-to-date account of materials and equipment in storage to facilitate preparation of Applications for Payment, if the Contract Documents provide for payment for materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing.

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

Not Used.

END OF SECTION

SECTION 01 71 13**MOBILIZATION AND DEMOBILIZATION****PART 1 – GENERAL****1.1 DESCRIPTION**

- A. Mobilization shall include the purchase of Contract bonds and all necessary permits; transportation of all personnel, equipment and operating supplies to the site; establishment of offices, buildings, sanitary facilities, and other necessary facilities at the site; construction and maintenance of temporary access roads, bridges; and other preparatory work at the site.
- B. Demobilization shall include removal of all unused material and equipment including field offices, and the topsoil and seeding of all vegetated areas which have been disturbed during construction activities. Existing access roads at the site shall be restored to their condition prior to the work. Any salvaged material not specified to be disposed of otherwise shall become the property of the Contractor and removed from the site. All trash shall be removed as directed by the Engineer and disposed of according to local regulations. All work shall be neatly cleaned, upon completion.
- C. At the completion of the project, the Contractor shall remove all temporary facilities and structures unless expressly directed otherwise, and shall remove remaining waste materials of all kinds from the site and structures occupied during the progress of the work. The Contractor shall leave the site and any adjacent properties which may have been affected by his operation in a neat and satisfactory condition.

1.2 RELATED DOCUMENTS

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

1.3 RELATED SECTIONS

- A. Section 01 11 01 "Summary of Work"
- B. Section 01 51 00 "Temporary Utilities"
- C. Section 01 51 50 "Engineer's Field Office Trailer"
- D. Section 01 55 19 "Access Roads and Parking Areas"
- E. Section 01 55 26 "Traffic Control"
- F. Section 01 71 23 "Field Engineering"
- G. Section 01 77 00 "Closeout Procedures"

PART 2 – PRODUCTS**2.1 MATERIALS**

- A. Provide materials as necessary to complete the items included in this Section and referenced in Related Sections.

PART 3 - EXECUTION

3.1 MOBILIZATION

- A. Provide the services and installation of facilities described in this Section and referenced in Subsection 1.3, applicable to mobilization activities.

3.2 DEMOBILIZATION

- A. Remove equipment, supplies, facilities, debris and other items noted above and referenced in Subsection 1.3, applicable to demobilization activities.

END OF SECTION

SECTION 01 71 23**FIELD ENGINEERING****PART 1 – GENERAL****1.1 DESCRIPTION**

- A. Contractor shall provide field engineering services and professional services of the types indicated for the Project, including:
1. Furnishing civil, structural, and other professional engineering services specified or required to execute Contractor's construction methods.
 2. Developing and making all detail surveys and measurements required for construction; including slope stakes, batter boards, and all other working lines, elevations, and cut sheets.
 3. Providing materials required for benchmarks, control points, batter boards, grade stakes, structure and pipeline elevation stakes, and other items.
 4. Keeping a transit or total station; leveling instrument; and related implements such as survey rods and other measurement devices, at the Site at all times, and having a skilled instrument person available when necessary for laying out the Work.
 5. Being solely responsible for all locations, dimensions and levels. No data other than Change Order, Work Change Directive, or Field Order shall justify departure from dimensions and levels required by the Contract Documents.
 6. Rectifying all Work improperly installed because of not maintaining, not protecting, or removing without authorization established reference points, stakes, marks, and monuments.
 7. Providing such facilities and assistance necessary for Engineer to check lines and grade points placed by Contractor. Do not perform excavation or embankment work until all cross-sectioning necessary for determining payment quantities for Unit Price Work have been completed and accepted by Engineer.

1.2 CONTRACTOR'S FIELD ENGINEER

- A. Employ and retain at the Site a field engineer with experience and capability of performing all field engineering tasks required of Contractor, including:
1. Preparing and maintaining daily reports of activity on the Work. Submit reports to Engineer including the following information, at minimum:
 2. Number of employees at the Site.
 3. Number employees at the Site for each Subcontractor.
 4. Breakdown of employees by trades.
 5. Major equipment and materials installed as part of the Work.
 6. Major construction equipment utilized.
 7. Location of areas in which construction was performed.
 8. Materials and equipment received.
 9. Work performed, including field quality control measures and testing.
 10. Weather conditions.

11. Safety.

12. Delays encountered, amount of delay incurred, and the reasons for the delay.

13. Instructions received from Engineer or Owner.

- B. Submit two (2) copies of Contractor daily reports at Engineer's field office by 9:00 a.m. the next working day after the day covered in the associated report. Daily report shall be signed by responsible member of Contractor's staff, such as Contractor's project manager or superintendent, or foreman designated by Contractor as having authority to sign daily reports.
- C. Check all formwork, reinforcing, inserts, structural steel, bolts, sleeves, piping, other materials and equipment for compliance with the Contract Documents.
- D. Maintain field office files and drawings, record documents, and coordinate field engineering services with Subcontractors and Suppliers as appropriate. Prepare layout and coordination drawings for construction operations.
- E. Check and coordinate the Work for conflicts and interferences, and immediately advise Engineer and Resident Project Representative, if any, of all discrepancies of which Contractor is aware.
- F. Cooperate as required with Engineer and Resident Project Representative, if any, in observing the Work and performing field inspections.
- G. Review and coordinate the Work with Shop Drawings and Contractor's other submittals.
- H. Contractor's engineer shall be a registered, professional engineer of discipline required for specific service on the Project, licensed in the same state as the Site.

1.3 CONTRACTOR'S SURVEYOR

- A. Employ or retain the services, as needed, at the Site a surveyor with experience and capability of performing surveying and layout tasks required in the Contract Documents and as required for the Work. Surveyor shall be a professional land surveyor registered and licensed in the jurisdiction where the Project is located, or a professional engineer registered and licensed as a professional engineer in the jurisdiction where the Project is located and authorized under Laws and Regulations to practice surveying. Surveyor's tasks include, but are not necessarily limited to, the following:
 - 1. Providing required surveying equipment, including transit or theodolite, level, stakes, and surveying accessories.
 - 2. Establishing required lines and grades for constructing all facilities, structures, pipelines, and site improvements.
 - 3. Preparing and maintaining professional-quality, accurate, well organized, legible notes of all measurements and calculations made while surveying and laying out the Work.
 - 4. Prior to backfilling operations, survey, locate, and record on a copy of the Contract Documents accurate representation of buried Work and Underground Facilities encountered.
 - 5. Complying with requirements of the Contract Documents relative to surveying and related work.

1.4 SUBMITTALS

- A. Informational Submittals: Submit the following:
 - 1. Field Engineering:
 - a. Submit daily reports as indicated in this Section.

- b. When requested by Engineer, submit documentation verifying accuracy of field engineering.
- 2. Surveying:
 - a. Complete plan for conducting survey work, submitted ten days prior to beginning survey Work.
 - b. Example of proposed survey field books to be maintained by Contractor's surveyor.
 - c. Submit original field books within two days after completing survey Work.
 - d. Submit certified field verification survey in accordance with this Section prior to starting work.
- 3. Certificates: Submit certificate signed by professional engineer or professional surveyor, as applicable, certifying that elevations and locations of the Work comply with the Contract Documents. Explain all deviations, if any.
- 4. Qualifications Statements:
 - a. Field Engineer: Name and address. When requested by Engineer, submit qualifications.
 - b. Surveyor: Name and address of firm, and resumes of each professional land surveyor and crew chief conducting the survey Work. Submit at least ten days prior to beginning survey Work. During the Project, submit resume for each new registered land surveyor and crew chief employed by or retained by Contractor at least ten (10) days prior to starting on the survey Work.

1.5 RECORDS

- A. Maintain at the Site a complete and accurate log of control and survey Work as it progresses.
 - 1. Survey data shall be in accordance with recognized professional surveying standards, Laws and Regulations, and prevailing standards of practice in the locality where the Site is located. Completeness and accuracy of survey Work, and completeness and accuracy of survey records, including field books, shall be responsibility of Contractor.
 - 2. Illegible notes or data, and erasures on any page of field books, are unacceptable. Do not submit copied notes or data. Corrections by ruling or lining out errors will be unacceptable unless initialed by the surveyor.
- B. Upon completion of foundation walls and major Site improvements, prepare a certified survey, signed and sealed by professional surveyor. The survey shall show all dimensions, locations, angles and elevations of construction and locations and elevations of Underground Facilities encountered during the Work.

PART 2 - PRODUCTS

Not Used.

PART 3 – EXECUTION**3.1 SURVEYING****A. Reference Points:**

1. Refer to the General Conditions, as may be modified by the Supplementary Conditions, regarding reference points.
2. Owner's established reference points damaged or destroyed by Contractor shall be re-established by Contractor at no expense to Owner.
3. Establish, place, and replace as required, such additional stakes, markers, and other reference points necessary for control, intermediate checks, and guidance of construction operations.

B. Construction Surveying: Comply with the following at a minimum, unless additional surveying is required to accomplish the work:

1. Alignment Staking: Provide alignment stakes at 25-foot intervals on tangent, and at 10-foot intervals on curves.
2. Slope Staking: Provide slope staking at 25-foot intervals on tangent, and at 10-foot intervals on curves. Re-stake at every ten-foot difference in elevation.
3. Structure: Stake out structures, including elevations, and check prior to and during construction.
4. Pipelines: Stake out pipelines including elevations, and check prior to and during construction.
5. Road: Stake out roadway elevations at 25-foot intervals on tangent, and at 15-foot intervals on curves.
6. Cross-sections: Provide original, intermediate, and final staking as required, for site work other locations as necessary for quantity surveys.
7. Easement Staking: Provide easement staking at 25-foot intervals on tangent, and at 15-foot intervals on curves. Also provide wooden laths with flagging at 50-foot maximum intervals.
8. Record Staking: Provide permanent stake at each blind flange and each utility cap is provided for future connections. Stakes for record staking shall be material acceptable to Engineer.

C. Accuracy:

1. Establish Contractor's temporary survey references points for Contractor's use to at least second-order accuracy (e.g., 1:10000). Construction staking used as a guide for the Work shall be set at least third-order accuracy (e.g., 1:5000). Basis on which such orders are established shall provide the absolute margin for error specified below.
2. Horizontal accuracy of easement staking shall be plus or minus 0.1 feet. Accuracy of other staking shall be plus or minus 0.04 feet horizontally and plus or minus 0.02 feet vertically.
3. Survey calculations shall include an error analysis sufficient to demonstrate required accuracy.

END OF SECTION

SECTION 01 73 00**EXECUTION****PART 1 – GENERAL****1.1 DESCRIPTION**

- A. This Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. Construction layout.
 - 2. Field engineering and surveying.
 - 3. Installation of the Work.
 - 4. Cutting and patching.
 - 5. Progress cleaning.
 - 6. Starting and adjusting.
 - 7. Protection of installed construction.

1.2 RELATED DOCUMENTS

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

1.3 RELATED SECTIONS

- A. Section 01 11 00 "Summary" for limits on use of Project site.
- B. Section 01 33 00 "Submittal Procedures" for submitting surveys.
- C. Section 01 71 23 "Field Engineering" for field engineering and surveying services.
- D. Section 01 77 00 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.
- E. Section 02 41 19 "Selective Demolition" for demolition and removal of selected portions of the structures.

1.4 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.
- B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For land surveyor.
- B. Certificates: Submit certificate signed by land surveyor certifying that location and elevation of improvements comply with requirements.
- C. Cutting and Patching Plan: Submit plan describing procedures at least 10 days prior to the time cutting and patching will be performed. Include the following information:

1. Extent: Describe reason for and extent of each occurrence of cutting and patching.
 2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.
 3. Products: List products to be used for patching and firms or entities that will perform patching work.
 4. Dates: Indicate when cutting and patching will be performed.
 5. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.
 - a. Include description of provisions for temporary services and systems during interruption of permanent services and systems.
- D. Certified Surveys: Submit two copies of field verification and project control survey signed by land surveyor.

1.6 QUALITY ASSURANCE

- A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.
- B. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
1. Structural Elements: When cutting and patching structural elements, notify Engineer of locations and details of cutting and await directions from Engineer before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection
 2. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety
 3. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Engineer's opinion, reduce the aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- C. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.

- B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
 - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Engineer for the visual and functional performance of in-place materials.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction affecting the Work.
 - 1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services, and other utilities.
 - 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- B. Written Field Verification Report: Submit a written report with the Control Survey data and indicate any inconsistencies that are detrimental, include the following:
 - 1. Description of the Work.
 - 2. List of detrimental conditions, including substrates.
 - 3. List of unacceptable installation tolerances.
 - 4. Recommended corrections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Existing Utility Information: Furnish information to Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Engineer according to requirements in Section 01 31 00 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Engineer promptly.
- B. General: Engage qualified personnel to lay out the Work using accepted surveying practices from baseline control points and benchmarks established by the land surveyor.
 - 1. Refer to Section 01 71 23 "Field Engineering."
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Engineer.

3.4 FIELD ENGINEERING

- A. Identification: The Contract Drawings identify existing benchmarks, control points, and property corners.
- B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
 - 1. Do not change or relocate existing benchmarks or control points without prior written approval of Engineer. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Engineer before proceeding.
 - 2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
- C. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
 - 1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
 - 2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
 - 3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.
- D. Certified Survey: On completion major improvements prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.

3.5 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb and make horizontal work level.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- E. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- F. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
 - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Engineer.
 - 2. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- G. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- H. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.6 CUTTING AND PATCHING

- A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.
- C. Temporary Support: Provide temporary support of work to be cut.
- D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

- E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Section 01 10 00 "Summary."
- F. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 - 3. Concrete: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 - 4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
 - 5. Proceed with patching after construction operations requiring cutting are complete.
- G. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
 - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
 - 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
- H. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.7 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
 - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 - 2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F (27 deg C).
 - 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
 - a. Use containers intended for holding waste materials of type to be stored.
 - 4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.
 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- F. Waste Disposal: Refer to Section 01 74 19 "Construction Waste Management and Disposal."
- G. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- H. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- I. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.8 STARTING AND ADJUSTING

- A. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- B. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- C. Manufacturer's Field Service: Comply with qualification requirements in Section 01 45 00 "Quality Requirements."

3.9 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION

SECTION 01 74 19**CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL****PART 1 – GENERAL****1.1 DESCRIPTION**

- A. This Section includes administrative and procedural requirements for the following:
 - 1. Salvaging nonhazardous demolition and construction waste.
 - 2. Recycling nonhazardous demolition and construction waste.
 - 3. Disposing of nonhazardous demolition and construction waste.

1.2 RELATED DOCUMENTS

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

1.3 RELATED SECTIONS

- A. Section 02 41 19 "Selective Demolition" for disposition of waste resulting from partial demolition of buildings, structures, and site improvements.
- B. Section 31 11 00 "Clearing and Grubbing" for disposition of waste resulting from site clearing and removal of above- and below-grade improvements.

1.4 DEFINITIONS

- A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
- C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
- E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
- F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.5 PERFORMANCE REQUIREMENTS

- A. General: Practice efficient waste management in the use of materials in the course of the Work. Use all reasonable means to divert construction and demolition waste from landfills and incinerators. Facilitate recycling and salvage of materials including the following:
 - 1. Demolition Waste:
 - a. Asphalt paving.
 - b. Concrete.
 - c. Concrete reinforcing steel.

- d. Structural and miscellaneous steel.
- e. Rough hardware.
- f. Piping.

2. Construction Waste:

- a. Lumber.
- b. Wood sheet materials.
- c. Metals.
- d. Piping.

3. Packaging: Regardless of salvage/recycle goal indicated in "General" Paragraph above, salvage or recycle 100 percent of the following uncontaminated packaging materials:

- a. Paper.
- b. Cardboard.
- c. Boxes.
- d. Wood crates.

1.6 ACTION SUBMITTALS

- A. Waste Management Plan: Submit plan within 7 days of date established for commencement of the Work.

1.7 INFORMATIONAL SUBMITTALS

- A. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.
- B. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.
- C. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- D. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

1.8 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION**3.1 PLAN IMPLEMENTATION**

- A. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.
 - 1. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.
- B. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
 - 2. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
 - a. Inspect containers and bins for contamination and remove contaminated materials if found.
 - 3. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 4. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
 - 5. Store components off the ground and protect from the weather.
 - 6. Remove recyclable waste from Owner's property and transport to recycling receiver or processor.

3.2 RECYCLING DEMOLITION WASTE

- A. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.
- B. Metals: Separate metals by type.
 - 1. Structural Steel: Stack members according to size, type of member, and length.
 - 2. Remove and dispose of bolts, nuts, washers, and other rough hardware.
- C. Piping: Reduce piping to straight lengths and store by type and size.

3.3 RECYCLING CONSTRUCTION WASTE

- A. Packaging:
 - 1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
 - 2. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
 - 3. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

3.4 DISPOSAL OF WASTE

- A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
 - 1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Burning of waste materials is strictly prohibited.
- C. Disposal: Remove waste materials from Owner's property and legally dispose of them.

END OF SECTION

SECTION 01 77 00**CLOSEOUT PROCEDURES****PART 1 – GENERAL****1.1 DESCRIPTION**

- A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
 - 1. Substantial Completion procedures.
 - 2. Final completion procedures.
 - 3. Warranties.
 - 4. Final cleaning.
- B. Requirements in this Section are in addition to those specified in the General Conditions.

1.2 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following.
 - 1. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 - 2. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 - 3. Prepare and submit Project Record Documents including, but not limited to, electronic and hard copies of final "Reviewed" and "Reviewed and Noted" shop drawings and Operation and Maintenance Manuals, final completion construction photographic documentation, damage or settlement surveys, and similar final record information.
 - 4. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
 - 5. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 - 6. Complete testing of systems.
 - 7. Terminate and remove temporary facilities from Project site, along with construction tools, and similar elements.
 - 8. Complete final cleaning requirements, including touchup painting.
 - 9. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
 - 10. Schedule a walk through with the Owner and Engineer. A Certificate of Substantial Completion, including a list of items identified during the walk through to be completed and corrected (punch list) shall be prepared by the Engineer.

1.3 FINAL COMPLETION

- A. Preliminary Procedures: Before requesting final inspection for determining final completion, complete the following:
 - 1. Submit a final Application for Payment according to General Conditions.

2. Submit a certified copy of the Engineer's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Engineer. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 4. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.
- B. Final Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. Engineer will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.4 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. List will include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
1. List of spaces will be organized in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
 2. Items applying to each space will be organized by major element, including categories for ceiling, individual walls, floors, equipment, and systems.
 3. List will include the estimated value of each item to be completed or corrected.

1.5 WARRANTIES

- A. Submittal Time: Submit written warranties on request of Engineer for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.
- B. Organize warranty documents into an orderly sequence based on the table of contents of the Contract Documents.
1. Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide table of contents at beginning of document.
- C. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION**3.1 FINAL CLEANING**

- A. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Employ experienced workers for final cleaning. Comply with manufacturer's written instructions.
- C. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
 - 1. Clean Project site and areas disturbed by construction activities of rubbish, waste material, litter, and other foreign substances.
 - 2. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - 3. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
 - 4. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - 5. Remove snow and ice to provide safe access.
 - 6. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces.
 - 7. Remove debris and surface dust from limited access spaces, including outlet structures.
 - 8. Remove labels that are not permanent.
 - 9. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
 - a. Do not paint over "UL" and other required labels and identification.
 - 10. Wipe surfaces of equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - 11. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
 - 12. Leave Project clean and ready for occupancy.
- D. Construction Waste Disposal: Comply with waste disposal requirements in Section 01 74 19 "Construction Waste Management and Disposal."

END OF SECTION

SECTION 01 78 23**OPERATIONS AND MAINTENANCE DATA****PART 1 – GENERAL****1.1 DESCRIPTION**

- A. Provide operation and maintenance data for each dam site, in accordance with this Section and in accordance with requirements elsewhere in the Contract Documents, for use as instructional and reference manuals by operations and maintenance personnel at the Site.
- B. The required operation and maintenance data is specified in individual Sections of the Contract Documents, at a minimum, provide operation and maintenance data for:
 - 1. All equipment and systems.
 - 2. Slide (sluice) and Weir Gates and related accessories.
 - 3. Structural steel fabrications.
- C. For each operation and maintenance manual, submit the following:
 - 1. Preliminary Submittal: Printed and bound copy of entire operation and maintenance manual, except for test data, service reports by Supplier, and electronic copies.
 - 2. Final Submittal: Printed and bound copy of complete operations and maintenance manual, including test data and service reports by Supplier, with electronic copies.
- D. Prepare each operations and maintenance manual specifically for the Project. Include in each manual all pertinent instructions, as-built drawings (as applicable), bills of materials, installation and handling requirements, maintenance and repair instructions, and other printed materials required to provide accurate and comprehensive information for safe and proper operation, maintenance, and repair of equipment furnished for this Project. Include specific information required by applicable Specification Sections, and all data required by Laws and Regulations.

1.2 NUMBER OF COPIES AND TIMING OF SUBMITTALS

- A. Preliminary Submittal:
 - 1. Printed Copies: Three (3) copies, exclusive of copies required by Contractor.
 - 2. Electronic Copies: Three (3) copies, comply with requirements of Section 01 33 00 Submittal Procedures for electronic format.
 - 3. Provide submittal to Engineer ten (10) days prior to starting training of operations and maintenance personnel, or ten days prior to field quality control testing at the Site; whichever is sooner
 - 4. Furnish preliminary operation and maintenance data submittal in acceptable form and content, as determined by Engineer, before associated materials and equipment will be eligible for payment.
- B. Final Submittal:
 - 1. Provide final submittal prior to Final Completion, unless otherwise specified in the Contract Documents.
 - 2. Printed Copies: Five (5) copies, exclusive of copies required by Contractor.

3. Electronic Copies: Five (5) copies, comply with requirements of Section 01 33 00 Submittal Procedures for electronic format.

1.3 FORMAT OF HARD COPIES

A. Binding and Cover:

1. Bind each operation and maintenance manual in durable, permanent, stiff-cover binder(s), comprising one or more volumes per copy as required. Binders shall be minimum one-inch wide and maximum of three-inch wide. Binders for each copy of each volume shall be identical.
2. Binders shall be locking three-ring or three-post type. Three-ring binders shall be riveted to back cover and include plastic sheet lifter (page guard) at front of each volume.
3. Do not overfill binders.
4. Covers shall be oil, moisture, and wear resistant, and include identifying information on the cover and spine of the manual.
5. Provide the following information on the cover of each volume:
 - a. Title, "OPERATING AND MAINTENANCE INSTRUCTIONS".
 - b. Name or type of equipment covered in the manual.
 - c. Volume number, if more than one volume is required.
 - d. Name of Project and, if applicable, contract name and number.
 - e. Name of Project Site where equipment is installed (e.g. "CHIPMANS POND DAM," "CONCORD POND DAM" or "CRAIGS POND DAM")
6. Provide the following information on the spine of each volume:
 - a. Title, "OPERATING AND MAINTENANCE INSTRUCTIONS".
 - b. Name or type of equipment covered in the manual.
 - c. Volume number, if more than one volume is required.
 - d. Name of Project Site where equipment is installed (e.g. "CHIPMANS POND DAM," "CONCORD POND DAM" or "CRAIGS POND DAM")

B. Pages:

1. Print pages in manual on 30-pound (minimum) paper, 8.5 inches by 11 inches.
2. Provide each page with binding margin of at least one inch wide. Punch each page with holes suitable for the associated binding.

C. Drawings:

1. Bind drawings, diagrams, and illustrations into the manual using paper 11 by 17 inches in size, or smaller.
2. Documents larger than 11 inches by 17 inches shall be folded and inserted into clear plastic pockets bound into the manual. Mark pockets with printed text indicating content and drawing numbers. Provide no more than three drawings per pocket.

D. Copy Quality and Document Clarity:

1. Material shall be either original manufacturer-printed materials or first-generation photocopies indistinguishable from originals. Manuals that contain copies that are not clear, not completely legible, off-center, skewed, or where text or drawings are cut by binding holes, will be rejected. Pages that contain approval or date stamps, comments, or other markings that cover text or drawing are unacceptable. Faxed copies are unacceptable.
2. Clearly mark in ink all components of equipment on catalog pages for ease of identification. In standard or pre-printed documents, indicate options provided or cross out inapplicable material. Use of highlighters is unacceptable.

E. Organization:

1. Table of Contents:
 - a. Provide a table of contents in each volume of each operations and maintenance manual.
 - b. In the table of contents and at least once in each chapter or section, identify products by their functional names. Thereafter, abbreviations and acronyms may be used if their meaning is explained in a table bound at or near the end of each volume. Using product model or catalog designations for identification is not acceptable.
2. Use dividers and indexed tabs between major categories of information, such as operating instructions, preventive maintenance instructions, and other major subdivisions of data in each manual.

1.4 FORMAT OF ELECTRONIC COPIES

A. Electronic Copies of Manuals:

1. The electronic copy shall include all the information provided in the hardcopy.
2. Provide each electronic copy on a separate compact disc (CD).
3. CD shall be labeled in the same manner as the Cover of the hardcopy.

B. File Format:

1. Files shall be in "portable document format (PDF)". Files shall be electronically searchable.
2. Provide a separate file for each separate document in the hardcopy.
3. Within each file, provide bookmarks for the following:
 - a. Each chapter and subsection listed in the hardcopy's table of contents.
 - b. Each figure.
 - c. Each table.
 - d. Each appendix.

C. Copies of Programming and Configuration Files:

1. Provide a CD copy of all software programming, such as programmable logic controller programs, prepared specifically for the Project. Third-party, commercially available software is excluded from requirements of this article; provide copies of commercially-available, third-party software as specified in the Contract Documents.

2. Provide CD copies of system configuration prepared specifically for the Project, such as SCADA display configurations.
3. Number of copies shall be as specified for electronic copies of operation and maintenance data.

1.5 CONTENT

- A. Provide complete, detailed, written operating instructions for each equipment including: function; operating characteristics; limiting conditions; operating instructions for start-up, normal conditions and emergency conditions; regulation and control; operational troubleshooting; and shutdown. Also, include, as applicable, written descriptions of alarms generated by the equipment and proper responses to such alarm conditions.
- B. Provide written explanations of all safety considerations relating to operation and maintenance procedures.
- C. Provide complete, detailed, written preventive maintenance instructions including all information and instructions to keep the equipment or system properly lubricated, adjusted, and maintained so that the equipment functions economically throughout its design life. Instructions shall include:
 1. Written explanations with illustrations for each preventive maintenance task such as inspection, adjustment, lubrication, calibration, and cleaning. Provide pre-startup checklists for each equipment item and maintenance requirements for long-term shutdowns.
 2. Recommended schedule for each preventive maintenance task.
 3. The Contractor shall furnish the Owner a lubrication chart(s) for all equipment furnished or installed by the Contractor.
 - a. The chart(s) shall include the following for each item of equipment:
 - (1) Name of the item;
 - (2) Location of the item;
 - (3) Each point of lubrication on the item;
 - (4) For each point of lubrication, the identification of the lubricant recommended and the recommended frequency of lubrication.
 - b. The information on the chart(s) shall be developed from manufacturers' printed data or from manufacturers' specific recommendations.
 - c. The identification of the lubricant by manufacturer's name and product identification number (such as Mobil X421) shall be furnished. Unless otherwise stated the name of the manufacturer to be used will be furnished to the Owner by the Contractor.
 - d. Following the initial operation of the equipment the Contractor shall relubricate, changing and adding lubricants, at the intervals or frequency as recommended by the manufacturer until acceptance.
 4. Table of alternative lubricants.
 5. Troubleshooting instructions.
 6. List of required maintenance tools and equipment.
- D. Complete bills of material or parts lists for equipment provided. Lists or bills of material may be provided on a per-drawing or per-equipment assembly basis. Bills of material shall indicate:
 1. Manufacturer's name, address, telephone number, fax number, and Internet website address.

2. Manufacturer's local service representative's or local parts supplier's name, address, phone number, fax number, and e-mail address, if applicable.
3. The following information for each part or piece provided:
 - a. Parts cross-reference number. Cross-reference number shall be used to identify the part on the assembly drawing, Shop Drawing, or other type of illustration where the part is clearly shown.
 - b. Part name or description.
 - c. Manufacturer's part number, serial number and shop order number.
 - d. Quantity of each part used in the assembly.
 - e. Current unit price of the part at the time the operations and maintenance manual is submitted. Price list shall be dated.
- E. Complete instructions for ordering replacement parts, including reference numbers (e.g., shop order or serial number) that will expedite the ordering process.
- F. Manufacturer's recommended inventory levels for spare parts and consumable supplies for the first two years of operation. Consumable supplies are those items consumed or worn during the operation of the equipment, and items used in maintaining the equipment such as lubricants and seals.
- G. Provide manufacturer's installation and operation bulletins, diagrams, schematics, and equipment cutaways. Avoid providing catalog excerpts unless they are the only material available showing the equipment. Where materials pertain to multiple models or types, mark the literature to indicate specific equipment supplied.
- H. Provide original-quality copies of each approved and accepted Shop Drawing and submittal, updated to as-installed condition.
- I. Copy of warranty and/or service contract as applicable.
- J. When copyrighted material is used in the operations and maintenance manual, obtain the copyright holder's written permission to use such material in the operation and maintenance manual.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

SECTION 01 78 39**PROJECT RECORD DOCUMENTS****PART 1 – GENERAL****1.1 DESCRIPTION**

- A. This Section includes administrative and procedural requirements for project record documents, including the following:
 - 1. Record Drawings
 - 2. Miscellaneous record submittals
- B. Requirements in this Section are in addition to those specified in the General Conditions.

1.2 RECORD DOCUMENT SUBMITTALS

- A. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit copies of record Drawings as follows:
 - a. Initial Submittal: Submit one paper copy set of marked-up record prints. Engineer will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
 - b. Final Submittal: Submit PDF electronic files of marked-up record prints. Print each Drawing, whether or not changes and additional information were recorded.
- B. Miscellaneous Record Submittals: Refer to other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit annotated PDF electronic files and directories of each submittal.

PART 2 – PRODUCTS**2.1 RECORD DRAWINGS**

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings.
 - 1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
 - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Accurately record information in an acceptable drawing technique.
 - c. Record data as soon as possible after obtaining it.
 - d. Record and check the markup before enclosing concealed installations.
 - e. Cross-reference record prints to corresponding archive photographic documentation.
 - 2. Content: Types of items requiring marking include, but are not limited to:
 - a. Dimensional changes to Contract Drawings.

- b. Revisions to details shown on Contract Drawings.
 - c. Depths of foundations.
 - d. Locations and depths of underground utilities.
 - e. Changes made by Change Order or Work Change Directive.
 - f. Changes made following the Engineer's written orders.
 - g. Details not on the original Contract Drawings.
 - h. Field records for variable and concealed conditions.
 - i. Record information on the Work that is shown only schematically.
- 3. Mark the Contract Drawings and Shop Drawings completely and accurately. Utilize personnel proficient at recording graphic information in production of marked-up record prints.
- 4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
- 5. Mark important additional information that was either shown schematically or omitted from original Contract Drawings.
- 6. Note Work Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Newly Prepared Record Drawings: Prepare new Drawings instead of preparing record Drawings where the Engineer determines that neither the original Contract Drawings nor Shop Drawings are suitable to show actual installation.
 - 1. New Drawings may be required when a Change Order is issued as a result of accepting an alternate, substitution, or other modification.
 - 2. Consult the Engineer for proper scale and scope of detailing and notations required to record the actual physical installation and its relation to other construction. Integrate newly prepared record Drawings into record Drawing sets; comply with procedures for formatting, organizing, copying, binding, and submitting.
- C. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
 - 1. Record Prints: Organize record prints and newly prepared record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
 - 2. Format: Annotated PDF electronic file with comment function enabled.
 - 3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
 - 4. Identification: As follows:
 - a. Project name.
 - b. Date.
 - c. Designation "PROJECT RECORD DRAWINGS."
 - d. Name of Engineer and Construction Manager

e. Name of Contractor

2.2 MISCELLANEOUS RECORDS

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.
- B. Format: Submit miscellaneous record submittals as PDF electronic file.
 - 1. Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.

PART 3 – EXECUTION

3.1 RECORDING AND MAINTENANCE OF RECORDS

- A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and modifications to project record documents as they occur; do not wait until the end of the Project.
- B. Maintenance of Record Documents and Samples: Store record documents in the field office apart from the Contract Documents used for construction. Do not use Project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project record documents for the Engineer's reference during normal working hours.

END OF SECTION

DIVISION 02 – EXISTING CONDITIONS

SECTION 02 41 19**SELECTIVE DEMOLITION****PART 1 – GENERAL****1.1 DESCRIPTION****A. This Section includes:**

1. Demolition and removal of selected portions of structures.
2. Demolition and removal of selected site elements.
3. Salvage of existing items to be reused or recycled.

1.2 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Salvage: Carefully detach from existing construction, in a manner to prevent damage, and deliver to the Owner ready for reuse.
- C. Remove and Reinstall: Detach items from existing construction, prepare for reuse, and reinstall where indicated on the Contract Drawings.
- D. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.3 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes the property of the Contractor.
- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition shall remain the property of the Owner.
 1. Carefully salvage in a manner to prevent damage and promptly return to owner.
 2. Historic items are not anticipated to be encountered during demolition. Should any item of potential interest be encountered, notify Engineer for determination.

1.4 PREINSTALLATION MEETINGS

- A. Pre-demolition Conference: Conduct a pre-demolition conference at each project site.
 1. Inspect and discuss condition of construction to be selectively demolished.
 2. Review structural load limitations of existing structure.
 3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment and facilities needed to make progress and avoid delays.
 4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
 5. Review areas where existing construction is to remain and requires protection.
 6. Verify items to be Removed and Salvaged and confirm method for delivery to Owner.

1.5 INFORMATIONAL SUBMITTALS

- A. Proposed Protection Measures: Submit report, including drawings as necessary, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and for noise control. Indicate proposed locations and construction of barriers.
- B. Schedule of Selective Demolition Activities: Indicate the following items.
 - 1. Detailed sequence of selective demolition and removal work, with starting and end dates for each activity.
- C. Inventory: Submit a list of items to be removed and salvaged and delivered to the Owner prior to the start of demolition.
- D. Pre-Demolition Photographs or Video: Submit before demolition work begins.
- E. All testing, including field and laboratory services, required to document compliance with these specifications shall be performed at the Contractor's sole expense.
- F. The Contractor shall arrange for the Engineer to have entry to any quarry furnishing riprap under this Contract upon request.

1.6 FIELD CONDITIONS

- A. Conditions existing at time of inspection for bidding purposes will be maintained by the Owner as far as practical.
- B. Notify the Engineer of discrepancies between existing conditions and Contract Drawings before proceeding with selective demolition.
- C. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
 - 1. If suspected hazardous materials are encountered, do not disturb; immediately notify the Engineer and Owner. Hazardous materials will be removed by the Owner under a separate Contract.
- D. Storage or sale of removed items or materials on-site is not permitted.

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION**3.1 EXAMINATION**

- A. Review record documents of existing construction provided by the Owner. Owner does not guarantee that existing conditions are the same as those indicated in record documents.
- B. Survey existing conditions and correlate with requirements indicated to determine the extent of selective demolition required.
- C. If unanticipated mechanical, electrical, or structural elements that conflict with the intended function or design are encountered, investigate and measure the nature and extent of the conflict. Promptly submit a written report to the Engineer.
- D. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs.

3.2 PREPARATION

- A. Site Access and Temporary Controls: Conduct selective demolition and debris removal operations to ensure minimum interference with roads, streets, walks, walkways and other adjacent occupied and used facilities.
- B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

3.3 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 - 1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
 - 2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
 - 3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 - 4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
 - 5. Maintain adequate ventilation when using cutting torches.
 - 6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
 - 7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
 - 8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 - 9. Dispose of demolished items and materials promptly.
- B. Removed and Salvaged Items:
 - 1. Clean salvaged items.
 - 2. Pack or crate items after cleaning. Identify contents of containers.
 - 3. Store items in a secure area until delivery to Owner.
 - 4. Transport items to Owner's storage area designated by Owner.
 - 5. Protect items from damage during transport and storage.

C. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition.

3.4 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. General: Selective demolition methods shall not injure the existing concrete feature that is to remain. Injury to the existing concrete features includes undermining or removal of foundations, inducing micro-cracks in the structure, and any other condition that reduces the serviceability and structural integrity of the concrete feature.
- B. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power driven saw, wire saw, or other similar method, then remove concrete between saw cuts.
- C. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, then break up and remove.

3.5 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them. Materials shall be recycled to the greatest extent practical.
 1. Do not allow demolished materials to accumulate on-site.
 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn demolished materials.

3.6 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to the conditions existing before selective demolition operations began.

END OF SECTION

DIVISION 03 – CONCRETE

SECTION 03 01 30.71**REHABILITATION OF CAST-IN-PLACE CONCRETE****PART 1 – GENERAL****1.1 DESCRIPTION**

A. This Section includes the following:

1. Removal of deteriorated concrete and subsequent patching and rebuilding with cementitious patching mortar and/or new concrete, reinforcing steel and dowel bars, as shown on the Contract Drawings.
2. Epoxy crack injection.
3. Corrosion-inhibiting treatments.
4. Polymer overlays, including preparation.
5. Epoxy sealers.
6. Epoxy Coatings

1.2 RELATED SECTIONS

A. Section 03 30 00 – Cast-in-Place Concrete

1.3 SUBMITTALS

- A. Product Data: Include material descriptions, chemical composition, physical properties, test data, and mixing and application instructions.
1. Include Material Safety Data Sheets, if applicable.
- B. Shop Drawings: For formwork and temporary shoring and supports, prepared by a qualified Professional Engineer who is licensed in the State of Delaware. Design and engineering of formwork and temporary shoring and supports are Contractor's responsibility. Indicate proposed schedule and sequence for removal of formwork and temporary shoring and supports.
- C. Samples: Cured samples of overlay and patching materials.
- D. Product Certificates: Signed by manufacturers certifying that products furnished comply with requirements and are recommended by manufacturer for uses indicated.
- E. Qualification Data: For installers, manufacturers, and testing agency to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
1. For products required to be installed by workers approved by product manufacturers, include letters of acceptance by product manufacturers certifying that installers are approved to apply their products.
- F. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of bonding agents, patching mortars, epoxy adhesives, and composite structural reinforcement with requirements indicated.
- G. Rehabilitation program for each phase of the rehabilitation process, including protection of surrounding materials and Project site during operations. Describe in detail the materials, methods, equipment, and sequence of operations to be used for each phase of the Work.

1. If alternative materials and methods to those indicated are proposed for any phase of rehabilitation work, submit substitution request and provide a written description of proposed materials and methods, including evidence of successful use on other comparable projects, and a testing program to demonstrate their effectiveness for this Project.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Retain installers that employ workers trained and approved by manufacturer to apply corrosion-inhibiting treatments, concrete patching and rebuilding materials, epoxy crack injection materials, polymer overlays, polymer sealers, and composite structural reinforcement.
- B. Manufacturer Qualifications: Manufacturers shall have factory-trained representatives who are available for consultation and Project site inspection at no additional cost.
- C. Source Limitations: Obtain concrete patching and rebuilding materials, epoxy crack injection materials, and composite structural reinforcement materials through one source from a single manufacturer.
- D. Source Limitations: Obtain each of the following through one source from a single manufacturer.
 1. Concrete patching and rebuilding materials.
 2. Epoxy crack injection materials.
 3. Composite structural reinforcement materials.
- E. Mockups: Build mockups for concrete removal and patching, epoxy crack injection, polymer overlays, polymer sealers, and composite structural reinforcement to demonstrate qualities of materials and execution.
 1. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to Project site in manufacturer's original and unopened containers, labeled with type and name of products and manufacturers.
- B. Comply with manufacturer's written instructions for minimum and maximum temperature requirements and other conditions for storage.
- C. Store cementitious materials off the ground, under cover, and in a dry location.
- D. Store aggregates, covered and in a dry location, where grading and other required characteristics can be maintained and contamination avoided.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations for Epoxies: Do not apply when air and substrate temperatures are outside limits permitted by manufacturer. During hot weather, cool epoxy components before mixing, store mixed products in shade, and cool unused mixed products to retard setting. Do not apply to wet substrates unless approved by manufacturer.
 1. Use only Class A epoxies when substrate temperatures are below or are expected to go below 40 deg F within 8 hours.
 2. Use only Class A or B epoxies when substrate temperatures are below or are expected to go below 60 deg F within 8 hours.

3. Use only Class C epoxies when substrate temperatures are above 60 deg F.
- B. Cold-Weather Requirements for Cementitious Materials: Do not apply unless air temperature is between 40 and 90 deg F and will remain so for at least 48 hours after completion of Work.
- C. Cold-Weather Requirements for Cementitious Materials: Comply with the following procedures.
 1. When air temperature is below 40 deg F, heat patching material ingredients and existing concrete to produce temperatures between 40 and 90 deg F.
 2. When mean daily air temperature is between 25 and 40 deg F, cover completed Work with weather-resistant insulating blankets for 48 hours after repair.
 3. When mean daily air temperature is below 25 deg F, provide enclosure and heat to maintain temperatures above 32 deg F within the enclosure for 48 hours after repair.
- D. Hot-Weather Requirements for Cementitious Materials: Protect repair work when temperature and humidity conditions produce excessive evaporation of water from patching materials. Provide artificial shade and wind breaks, and use cooled materials as required. Do not apply to substrates with temperatures of 90 deg F and above.
- E. Environmental Limitations for High-Molecular-Weight Methacrylate Sealers: Do not apply when concrete surface temperature is below 55 deg F or above 90 deg F. Apply only to dry substrates.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Products: Subject to compliance with requirements, provide one of the following.
 1. Epoxy-Modified, Cementitious Bonding and Anticorrosion Agent:
 - a. Euclid Chemical Company; Dural Prep AC
 - b. Sika Corporation; Armatec 110 EpoCem
 - c. or approved equal.
 2. Epoxy Bonding Agent:
 - a. Euclid Chemical Company; UCO #452 EPOXY SYSTEM, or EUCOPOXY LPL MV
 - b. Sika Corporation; Sikadur 31 Hi-Mod Gel, Sikadur 32 Hi-Mod, Sikadur 32 Hi-Mod LPL, Sikadur 35 Hi-Mod LV, or Sikadur 35 Hi-Mod LV LPL
 - c. Tamons: Dural Bond
 - d. or approved equal.
 3. Latex Bonding Agent, Type II:
 - a. Euclid Chemical Company; FLEX-CON. TAMMS WELD
 - b. Sonneborn, Div. of ChemRex, Inc.; Acrylic Additive
 - c. or approved equal.
 4. Latex Bonding Agent, Type I:
 - a. Euclid Chemical Company; TAMMS WELD
 - b. Sika Corporation; SikaLatex
 - c. or approved equal
 5. Cementitious Patching Mortar:
 - a. (BASF) Master Builders, Inc.; EMACO S66 CI, EMACO S77 CI, or EMACO S88 CI

- b. Sika Corporation; SikaRepair 223 or SikaRepair SHB
 - c. or approved equal.
- 6. Cementitious Patching Mortar, Rapid Setting:
 - a. Euclid Chemical Company; TAMMS WELD
 - b. Sika Corporation; Sikaset Roadway Patch
 - c. or approved equal.
- 7. Polymer-Modified, Cementitious Patching Mortar:
 - a. Euclid Chemical Company; TAMMS SPEEDCRETE TM, TAMMS THIN-PATCH, or VERTICOAT
 - b. Sika Corporation; SikaTop 121 Plus, SikaTop 122 Plus, SikaTop 123 Plus, or SikaTop 126 Plus
 - c. or approved equal.
- 8. Polymer-Modified, Silica-Fume-Enhanced, Cementitious Patching Mortar:
 - a. Euclid Chemical Company; Verticoat Supreme
 - b. Sika Corporation; Sika MonoTop 615
 - c. or approved equal.
- 9. Epoxy-Modified, Cementitious Patching Mortar:
 - a. Sika Corporation; Sikadur 45 EpoCem
 - b. Or approved equal.
- 10. Epoxy Joint Filler:
 - a. Euclid Chemical Company; EUCO 700
 - b. Sika Corporation; Sikadur 51 NS or Sikadur 51 SL
 - c. or approved equal.
- 11. Epoxy Crack Injection Adhesive:
 - a. Euclid Chemical Company; EUCO #452 LV
 - b. Sika Corporation; Sikadur 35 Hi-Mod LV, Sikadur 35 Hi-Mod LV LPL, Sikadur 52, or Sikadur Injection Gel
 - c. or approved equal.
- 12. Corrosion-Inhibiting Treatments:
 - a. CORTEC Corp.; MCI 2005 or MCI 2020
 - b. Sika Corporation; Sika FerroGard 903
 - c. Sonneborn, Div. of BASF
 - d. Or approved equal.
- 13. Polymer Overlays:
 - a. Fosroc International Limited; Nitobond 881-33
 - b. Kaufman Products, Inc.; SurePox VLM or SurePox VLM-Class B
 - c. or approved equal.
- 14. Epoxy Sealers:
 - a. Euclid Chemical Company; EUCO #512 Epoxy Sealer. Baracade WB 297
 - b. Master Builders, Inc.; MASTERSEAL GP
 - c. or approved equal.

15. High-Molecular-Weight Methacrylate Sealers:

- a. Sika Corporation; SikaPronto 19
- b. Transpo Industries, Inc.; Transpo Sealate (T-70/T70 MX-30 Sealate)
- c. or approved equal.

16. Methylmethacrylate Sealer/Brighteners:

- a. Dayton Superior Corporation; Day-Chem Aggre-Glass (J-25-OTC)
- b. Kaufman Products, Inc.; Krystal 15 Emulsion EF
- c. or approved equal.

17. Structural Epoxy Paste Adhesive/Epoxy Capping Adhesive

- a. Sika Corporation; Sikadur 31 Hi-Mod Gel (1:1 Mix Ratio)
- b. Kaufman Products, Inc.; SurePoxy HM GEL
- c. or approved equal.

18. Epoxy Coatings

- a. Sika Corporation; Sikaguard 62
- b. or approved equal.

2.2 BONDING AGENTS

- A. Epoxy-Modified, Cementitious Bonding and Anticorrosion Agent: Product that consists of water-insensitive epoxy adhesive, portland cement, and water-based solution of corrosion-inhibiting chemicals that forms a protective film on steel reinforcement.
- B. Epoxy Bonding Agent: ASTM C 881, Type II.
 - 1. Thin Film Open Time: Not less than 24 hours.
- C. Latex Bonding Agent: ASTM C 1059, Type II at exterior locations and where indicated, Type I at other locations.
- D. Mortar Scrub-Coat: 1 part portland cement complying with ASTM C 150, Type I, II, or III and 1 part fine aggregate complying with ASTM C 144, except 100 percent passing a No. 16 sieve.

2.3 PATCHING MORTAR

- A. Patching Mortar: Unless otherwise indicated, use one of the following:
 - 1. Job-Mixed Patching Mortar: 1 part portland cement complying with ASTM C 150, Type I, II, or III and 2-1/2 parts fine aggregate complying with ASTM C 144, except 100 percent passing a No. 16 sieve.
 - 2. Cementitious Patching Mortar: Packaged, dry mix complying with ASTM C 928.
 - 3. Polymer-Modified, Cementitious Patching Mortar: Packaged, dry mix complying with ASTM C 928, that contains a non-redispersible latex additive as either a dry powder or a separate liquid that is added during mixing.
 - 4. Polymer-Modified, Silica-Fume-Enhanced, Cementitious Patching Mortar: Packaged, dry mix complying with ASTM C 928, that contains silica fume complying with ASTM C 1240 and a non-redispersible latex additive as either a dry powder or a separate liquid that is added during mixing.
 - 5. Epoxy-Modified, Cementitious Patching Mortar: Mixture of water-insensitive epoxy adhesive, portland cement, and graded aggregates.

- B. Vertical and Overhead Patching Mortar: For vertical and overhead repairs, use patching mortar recommended by manufacturer for vertical and overhead use and as specified above.
- C. Coarse Aggregate for Adding to Patching Mortar: Washed aggregate complying with ASTM C 33, Size No. 8, Class 5S. Add only as permitted by patching mortar manufacturer.

2.4 CONCRETE

- A. Concrete Materials and Admixtures: Comply with Section 03 30 00 - Cast-in-Place Concrete.
- B. Steel Reinforcement and Reinforcement Accessories: Comply with Section 03 21 00 – Reinforcing Steel.

2.5 MISCELLANEOUS MATERIALS

- A. Epoxy Joint Filler: 2-component, semirigid, 100 percent solids, epoxy resin with a Shore A hardness of at least 80 per ASTM D 2240.
- B. Epoxy Crack Injection Adhesive: ASTM C 881, Type I, Grade 1, except for gel time, solvent free.
- C. Epoxy Capping Adhesive: Product manufactured for use with crack injection adhesive by same manufacturer.
- D. Crack Injection Ports: As recommended by epoxy crack injection adhesive manufacturer.
- E. Corrosion-Inhibiting Treatment Materials: Water-based solution of alkaline corrosion-inhibiting chemicals that penetrates concrete by diffusion and forms a protective film on steel reinforcement.
- F. Polymer Overlay: Epoxy adhesive complying with ASTM C 881, Type III.
 - 1. Aggregate: Oven-dried, washed silica sand complying with ACI 503.3.
- G. Polymer Sealer: Low-viscosity epoxy or high-molecular-weight methacrylate penetrating sealer recommended by manufacturer for application to exterior concrete traffic surfaces.
- H. Methylmethacrylate Sealer/Brighteners: Clear low-viscosity sealer recommended by manufacturer for sealing exterior exposed-aggregate concrete, and formulated to bring out color of aggregates and give concrete a wet look.
- I. Joint Sealant: Seal repaired joints with joint sealant as indicated on the Contract Drawings. Joint sealants shall be in accordance with Section 07 92 00 "Joint Sealants."

2.6 MIXES

- A. Mix products in clean containers according to manufacturer's written instructions.
 - 1. Add clean silica sand and coarse aggregates to products only as recommended by manufacturer.
 - 2. Do not add water, thinners, or additives unless recommended by manufacturer.
 - 3. When practical, use manufacturer's premeasured packages to ensure that materials are mixed in proper proportions. When premeasured packages are not used, measure ingredients using graduated measuring containers; do not estimate quantities or use shovel or trowel as unit of measure.
 - 4. Do not mix more materials than can be used within recommended open time. Discard materials that have begun to set.
- B. Mortar Scrub-Coat: Mix with enough water to provide a consistency of thick cream.

- C. Dry-Pack Mortar: Mix with just enough liquid to form a damp cohesive mixture that can be squeezed by hand into a ball but is not plastic.
- D. Concrete: Comply with Section 03 30 00 - Cast-in-Place Concrete.
- E. Grout for Use with Preplaced Aggregate: Proportion according to ASTM C 938. Add grout fluidifier to mixing water followed by cementitious materials and then fine aggregate.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. The Contractor shall notify the Engineer of any pre-existing conditions of deterioration or under design in areas of work that are uncovered or exposed during construction.
- B. Notify the Engineer seven days in advance of dates when areas of delaminated concrete and reinforcing bars will be located.
- C. Locate areas of delamination using hammer or chain drag sounding and mark boundaries. Mark areas for removal by simplifying and squaring off boundaries of delaminated areas as directed by the Engineer.
- D. Locate at least three reinforcing bars using a pachometer, and drill test holes to determine depth of cover. Calibrate pachometer, using depth of cover measurements, and verify depth of cover in removal areas using pachometer.

3.2 PREPARATION

- A. Protect people, motor vehicles, equipment, surrounding construction, Project site, plants, and surrounding buildings from injury resulting from concrete rehabilitation work.
 - 1. Protect adjacent equipment and surfaces by covering them with heavy polyethylene film and waterproof masking tape or a liquid strippable masking agent. If practical, remove items, store, and reinstall after potentially damaging operations are complete.
 - 2. Neutralize and collect alkaline and acid wastes for disposal off Owner's property.
 - 3. Dispose of runoff from wet operations by legal means and in a manner that prevents soil erosion, undermining of paving and foundations, damage to landscaping, and water penetration into building interiors.
- B. Shoring: Install temporary supports before beginning concrete removal.
- C. Concrete Removal: Use high-pressure water blasting (10 KSI) to remove deteriorated concrete. Saw-cut perimeter of areas indicated for removal to a depth of at least 1/2 inch. Make cuts perpendicular to concrete surfaces and no deeper than cover on reinforcing. Remove loose and deteriorated concrete by breaking up and dislodging from reinforcing.
 - 1. Remove concrete between cuts to a depth of at least 1/2 inch.
 - 2. Where half or more of the perimeter of reinforcing bar is exposed, bond between reinforcing bar and surrounding concrete is broken, or reinforcing bar is corroded, remove concrete from entire perimeter of bar to provide at least a 3/4-inch clearance.
 - 3. Test areas where concrete has been removed by tapping with hammer, and remove additional concrete until unsound concrete is completely removed.
 - 4. Provide fractured aggregate surfaces with a profile of at least 1/8 inch that are approximately perpendicular or parallel to original concrete surfaces. At columns and walls, make top and bottom surfaces level.

5. Thoroughly clean removal areas of loose concrete, dust, and debris.
- D. Reinforcing Bar Preparation: Remove loose and flaking rust from reinforcing bars by high-pressure water cleaning, abrasive blast cleaning or wire brushing until only tightly bonded light rust remains.
 1. Where section loss of reinforcing bar is more than 25 percent, or 20 percent in 2 or more adjacent bars, cut bars and remove and replace as directed by the Engineer. Remove additional concrete as necessary to provide at least a 3/4-inch clearance at existing and replacement bars. Splice replacement bars to existing bars according to ACI 318, by lapping, welding, or using mechanical couplings.
- E. Surface Preparation for Corrosion-Inhibiting Treatment: Clean concrete by low-pressure water cleaning, detergent scrubbing, or sand blasting to remove dirt and other materials detrimental to treatment application. Allow surface to dry before applying corrosion-inhibiting treatment.
- F. Surface Preparation for Overlays: Remove delaminated material and deteriorated concrete surface material. Roughen surface of concrete by sand blasting, shot blasting, scarifying, high-pressure water jetting, scabbling, flame blasting, or milling to produce a surface profile matching CSP 3 per ICRI 03732. Sweep and vacuum roughened surface to remove debris followed by low-pressure water cleaning.
- G. Surface Preparation for Sealers: Clean concrete by shot blasting, low-pressure water cleaning, or detergent scrubbing to remove dirt, oils, films, and other materials detrimental to sealer application.
- H. Surface Preparation for Sealers: Acid etch surface of concrete to produce a surface profile matching CSP 1 per ICRI 03732. Prepare surface for acid etching by detergent scrubbing to remove oils and films that may prevent penetration of acid.
 1. Remove excess acid solution, reaction products, and debris by squeegeeing or vacuuming.
 2. Scrub surface with an alkaline detergent, rinse, and squeegee or vacuum.
 3. Check acidity of surface with pH test paper and continue rinsing until pH is acceptable.
 4. When pH is acceptable and surface is clean, vacuum dry.
- I. Surface Preparation for Composite Structural Reinforcement: Remove delaminated material and deteriorated concrete surface material. Clean concrete where reinforcement and epoxy patching mortar is to be applied by low-pressure water cleaning or detergent scrubbing to remove dirt, oils, films, and other materials detrimental to epoxy application. Roughen surface of concrete by sand blasting.

3.3 APPLICATION

- A. Epoxy-Modified, Cementitious Bonding and Anticorrosion Agent: Apply to reinforcing bars and concrete by stiff brush or hopper spray according to manufacturer's written instructions. Apply to reinforcing bars in two coats, allowing first coat to dry two to three hours before applying second coat. Allow to dry before placing patching mortar or concrete.
- B. Epoxy Bonding Agent: Apply to reinforcing bars and concrete by brush, roller, or spray according to manufacturer's written instructions, leaving no pinholes or other uncoated areas. Apply to reinforcing bars in at least two coats, allowing first coat to dry before applying second coat. Apply patching mortar or concrete while epoxy is still tacky. If bonding agent dries, recoat before placing patching mortar or concrete.
- C. Latex Bonding Agent, Type II: Mix with portland cement and scrub into concrete surface according to manufacturer's written instructions. If bonding agent dries, recoat before placing patching mortar or concrete.

- D. Latex Bonding Agent, Type I: Apply to concrete by brush roller or spray. Allow to dry before placing patching mortar or concrete.
- E. Mortar Scrub-Coat: Dampen repair area and surrounding concrete 6 inches beyond repair area. Remove standing water and apply scrub-coat with a brush, scrubbing it into surface and thoroughly coating repair area. If scrub-coat dries, recoat before applying patching mortar or concrete.
- F. Patching Mortar: Place according to manufacturer's written instructions and as follows.
 - 1. Wet substrate thoroughly and then remove standing water. Scrub a slurry of neat patching mortar mixed with latex bonding agent into substrate, filling pores and voids.
 - 2. Place patching mortar by troweling toward edges of patch to force intimate contact with edge surfaces. For large patches, fill edges first and then work toward center, always troweling toward edges of patch. At fully exposed reinforcing bars, force patching mortar to fill space behind bars by compacting with trowel from sides of bars.
 - 3. For vertical patching, place materials in lifts of not more than 2 inches nor less than 1/4 inch. Do not feather edge.
 - 4. For overhead patching, place material in lifts of not more than 1 inch nor less than 1/4 inch. Do not feather edge.
 - 5. After each lift is placed, consolidate material and screed surface.
 - 6. Where multiple lifts are used, score surface of lifts to provide a rough surface for application of subsequent lifts. Allow each lift to reach final set before placing subsequent lifts.
 - 7. Allow surfaces of lifts that are to remain exposed to become firm and then finish to a smooth rough surface with a broom or burlap drag.
 - 8. Wet-cure cementitious patching materials, including polymer-modified, cementitious patching materials, for not less than seven days by water-fog spray or water-saturated absorptive cover.
- G. Dry-Pack Mortar: Use for deep cavities and where indicated. Place according to manufacturer's written instructions and as follows.
 - 1. Provide forms where necessary to confine patch to required shape.
 - 2. Wet substrate and forms thoroughly and then remove standing water.
 - 3. Place dry-pack mortar into cavity by hand, and compact into place with a hardwood drive stick and mallet or hammer. Do not place more material at a time than can be properly compacted. Continue placing and compacting until patch is approximately level with surrounding surface.
 - 4. After cavity is filled and patch is compacted, trowel surface to match profile and finish of surrounding concrete. A thin coat of patching mortar may be troweled into the surface of patch to help obtain required finish.
 - 5. Wet-cure patch for not less than seven days by water-fog spray or water-saturated absorptive cover.
- H. Concrete: Place according to Section 03 30 00 - Cast-in-Place Concrete and as follows.
 - 1. Apply epoxy-modified, cementitious bonding and anticorrosion agent to reinforcing and concrete substrate.
 - 2. Apply latex bonding agent to concrete substrate.
 - 3. Use vibrators to consolidate concrete as it is placed.

4. At unformed surfaces, screed concrete to produce a surface that when finished with patching mortar will match required profile and surrounding concrete.
 5. Where indicated place concrete by form and pump method.
 - a. Design and construct forms to resist pumping pressure in addition to weight of wet concrete. Seal joints and seams in forms and junctions of forms with existing concrete.
 - b. Pump concrete into place, releasing air from forms as concrete is introduced. When formed space is full, close air vents and pressurize to 14 psi.
 6. Wet-cure concrete for not less than seven days by leaving forms in place or keeping surfaces continuously wet by water-fog spray or water-saturated absorptive cover.
 7. Fill placement cavities with dry-pack mortar and repair voids with patching mortar. Finish to match surrounding concrete.
- I. Epoxy Joint Filler: Install in nonmoving slab or wall joints where indicated.
1. Install filler to a depth of at least 1 inch. Use fine silica sand no more than 1/4 inch deep to close base of joint. Do not use sealant backer rods or compressible fillers below joint filler.
 2. Install filler so that when cured, it is flush at top surface of adjacent concrete. If necessary, overfill joint and remove excess when filler has cured.
- J. Epoxy Crack Injection: Comply with manufacturer's written instructions and the following:
1. Clean areas to receive epoxy capping adhesive of oil, dirt, and other substances that would interfere with bond, and clean cracks with oil-free compressed air or low-pressure water to remove loose particles.
 2. Epoxy capping adhesive shall be a structural epoxy paste adhesive as recommended by the crack injection epoxy manufacturer.
 3. Drill diagonal holes along both sides of the crack, oriented to intercept the crack at a minimum depth of 3 inches. Injection holes shall be of sufficient diameter to be compatible with injection ports and the epoxy adhesive. Space injection holes as recommended by the epoxy manufacturer, but spaced no farther apart than the thickness of the member being injected.
 4. Place an injection port at each injection hole. Seal injection ports in place with capping adhesive.
 5. Seal cracks at exposed surfaces with a ribbon of epoxy capping adhesive at least 1/4 inch thick by 1 inch wider than crack.
 6. Inject cracks of widths between 0.010" and 1/4", unless noted otherwise on the Contract Drawings.
 7. Inject epoxy adhesive, beginning at widest part of crack and working toward narrower parts. Inject adhesive into ports to refusal, capping adjacent ports when they extrude epoxy. Cap injected ports and inject through adjacent ports until crack is filled.
 8. Injection pressures shall not exceed those recommended by the injection epoxy adhesive manufacturer.
 9. After epoxy adhesive has set, remove injection ports and grind surfaces smooth.
- K. Corrosion-Inhibiting Treatment: Apply by brush, roller, or airless spray in two coats at manufacturer's recommended application rate. Remove film of excess treatment by high-pressure washing before patching treated concrete or applying a sealer or overlay.

- L. Polymer Overlay: Apply according to ACI 503.3.
 - 1. Apply to traffic-bearing surfaces, including parking areas and walks.
- M. Polymer Sealer: Apply by brush, roller, or airless spray at manufacturer's recommended application rate.
 - 1. Apply to traffic-bearing surfaces, including parking areas and walks.
- N. Methylmethacrylate Sealer/Brighteners: Apply by brush, roller, or airless spray at manufacturer's recommended application rate.
 - 1. Apply to exterior concrete surfaces that are exposed to view, excluding traffic-bearing surfaces.
- O. Composite Structural Reinforcement Using Preimpregnated Fiber Sheet: Unless otherwise recommended by manufacturer, apply as follows.
 - 1. Patch surface defects with epoxy mortar and allow to set before beginning reinforcement application.
 - 2. Apply epoxy adhesive with trowel or spatula to a thickness of 1/16 inch to prepared concrete surfaces in areas where composite structural reinforcement will be applied.
 - 3. Clean preimpregnated fiber sheet with acetone or other suitable solvent, and apply epoxy adhesive with a roof-shaped spatula to a thickness of 1/16 inch.
 - 4. Apply adhesive-coated fiber sheet to adhesive-coated concrete within open time of epoxy adhesive, and roll with a hard rubber roller until fiber sheet is fully embedded in adhesive and adhesive is forced out from beneath fiber sheet at edges.
 - 5. Apply additional layers as indicated using same procedure.
- P. Composite Structural Reinforcement Using Fiber Tow Sheet and Saturant: Unless otherwise recommended by manufacturer, apply as follows.
 - 1. Apply epoxy primer using brush or short nap roller to prepared concrete surfaces in areas where composite structural reinforcement will be applied.
 - 2. After primer has set, patch surface defects with epoxy filler and allow to set before beginning reinforcement application.
 - 3. Apply epoxy saturant to fiber tow sheet with 3/8-inch- nap roller to fully saturate tow sheet. Apply fiber tow sheet to primed and patched surface while saturant is still wet, using pressure roller to remove air pockets. Remove paper backing from fiber tow sheet and apply additional epoxy as needed to fully saturate tow sheet.
 - 4. Apply epoxy saturant to primed and patched surface with 3/8-inch- nap roller. Apply fiber tow sheet while saturant is still wet, using pressure roller to remove air pockets. Remove paper backing from fiber tow sheet and apply additional epoxy to fully saturate tow sheet.
 - 5. Apply additional layers as indicated, fully saturating each with epoxy.
 - 6. After saturant has cured, apply protective topcoat by brush, roller, or spray.
- Q. Epoxy Coatings - Apply according to manufacturer's written instructions and as follows.
 - 1. Apply two coats using a high-quality roller, brush or spray. Apply second coat as soon as the first coat is tack-free and traffic of application will not damage the first coat.
 - 2. The second coat must be applied within 48 hours. A longer delay will require additional surface preparation in accordance with manufacturer's instructions.

3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to sample materials and perform tests specified in Section 03 30 00 "Cast-in-Place Concrete" and as follows:
1. Patching Mortar, Packaged Mixes: 3 randomly selected samples tested according to ASTM C 928.
 2. Patching Mortar, Field Mixed: 3 randomly selected samples tested for compressive strength according to ASTM C 109.
 3. Grouted Preplaced Aggregate: Tested for compressive strength of grout according to ASTM C 942.
 - a. Testing Frequency: 1 sample for each 25 cu. yd. of grout or fraction thereof, but not less than 1 sample for each day's work.
 4. Epoxy Joint Filler: Core drilled samples to verify proper installation.
 - a. Testing Frequency: One sample for each 100 feet of joint filled.
 - b. Where samples are taken, fill holes with epoxy joint filler.
 5. Epoxy Crack Injection: Core drilled samples to verify proper installation.
 - a. Testing Frequency: 3 samples from mockup and 1 sample for each 100 feet of crack injected.
 - b. Where samples are taken, fill holes with epoxy mortar.
- B. The Engineer shall provide visual inspection of product application and may reject the work or direct Contractor to stop applying the product if results show materials being used do not comply with product requirements. Contractor shall remove noncomplying materials from Project site and repair surfaces or cracks that received application of rejected materials. Rejected work shall be required to be repaired with complying products.

END OF SECTION

SECTION 03 10 00**FORMWORK****PART 1 – GENERAL****1.1 DESCRIPTION**

- A. This Section includes requirements for providing form materials, form ties, form coatings, design of formwork and form removal. The Contractor shall be responsible for designing and constructing suitable and adequate falsework, centering and formwork.

1.2 REFERENCES

- A. Materials and installation shall be in accordance with the latest revisions of the following codes, standards and specifications, except where more stringent requirements are specified herein:
 - 1. American Concrete Institute (ACI)
 - 2. American Society for Testing and Materials (ASTM)

PART 2 – PRODUCTS**2.1 MATERIALS**

- A. Forms for plain-faced finish concrete shall be of plywood, steel or other approved material and shall be mortar tight. Furnish in largest practicable sizes to minimize number of joints.
- B. The forms and associated falsework shall be substantial and unyielding and shall be constructed so that the finished concrete will conform to the specified dimensions and contours. Tolerances shall be as specified in ACI Manual of Concrete Practice ACI 347, Chapter 2, Part 2.4. Form surfaces shall be smooth and free from holes, dents, sags or other irregularities. Forms shall be coated with a nonstaining form oil before being set into place. Care shall be taken to avoid splashing oil on reinforcing steel or existing concrete.
- C. Metal ties or anchorages within the forms shall be equipped with cones, she-bolts or other devices that permit their removal to a depth of at least one-inch without injury to the concrete. Ties designed to break off below the surface of the concrete shall not be used without cones. All internal form support steel shall be positioned to provide minimum clearances as shown on the drawings.
- D. Form joint Tape: Compressible foam tape, pressure sensitive, AAMA 810.1, minimum ¼ inch thick.
- E. Form Joint Sealant: Elastomeric sealant complying with ASTM C920, Type M or S, Grade NS, that adheres to form joint substrates.
- F. Sealer: Penetrating, clear polyurethane wood form sealer formulated to reduce absorption of bleed water and prevent migration from wood of set-retarding materials.

PART 3 – EXECUTION**3.1 PREPARATION OF FORMS AND SUBGRADE**

- A. Forms shall be filleted at all sharp corners. All edges that will be exposed to view when the structure is completed shall be chamfered, unless finished with molding tools.

- B. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast-in-place surfaces. Kerf wood rustications, keyways, reglets, recesses, and the like for easy removal.
 - 1. Do not use rust-stained, steel form-facing material.
- C. Prior to placement of concrete, the forms and subgrade shall be free of chips, sawdust, debris, ice, snow, extraneous oil, mortar, or other harmful substances or coatings. Any oil on the reinforcing steel or other surfaces that are required to be bonded to the concrete shall be removed. Rock surfaces shall be cleaned by air-water cutting, wet sandblasting or wire brush scrubbing, as necessary, and all exposed rock surfaces shall be kept in a wetted condition from the time of exposure continuously through the time of placement of concrete. The method used for continuous wetting shall employ clean water free from injurious amounts of deleterious materials and shall be subject to review by the Engineer.
- D. Seal form joints and penetrations at form ties with form joint tape or form joint sealant to prevent mortar leaks.
- E. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- F. Coat contact surfaces with form-release agent, according to manufacturer's written instructions, prior to placing steel reinforcement.
- G. Forms shall be inspected by the Engineer prior to concreting. Notice shall be given twenty-four (24) hours in advance of the concrete placement so that inspection can be scheduled. No concreting shall be done in the absence of the Engineer without written permission of the Engineer.

3.2 REMOVAL OF FORMS

- A. Forms shall be removed only when the Engineer is present and shall not be removed without his approval. Forms shall be removed in such a way as to prevent damage to the concrete. Supports shall be removed in a manner that will permit the concrete to take the stresses due to its own weight uniformly and gradually. The safety and appearance of the structures shall be the sole responsibility of the Contractor.
- B. Forms shall not be removed prior to the expiration of the following minimum time intervals after placement of the concrete, exclusive of days when the minimum temperature of air adjacent to the concrete is below 40° F.
 - 1. Footings and Slabs 3 days
 - 2. Walls 7 days
 - 3. Dam Sections 7 days

END OF SECTION

SECTION 03 15 13**WATERSTOPS****PART 1 – GENERAL****1.1 DESCRIPTION**

- A. This Section includes the requirements for furnishing and installing internal and swell-type waterstops as shown on the Contract Drawings and as required by the Work.
- B. The Contractor shall furnish and install waterstops of the shape, size and dimensions and at the locations shown on the Contract Drawings and as specified herein. Waterstops shall be installed to the limits shown on the drawing or as approved by the Engineer. Adequate provisions shall be made to support and protect the waterstops during the work.

1.2 REFERENCES

- A. The Work shall be in accordance with the latest revisions of the following codes, standards, and specifications except where more stringent requirements have been specified herein.
 - 1. American Society for Testing and Materials (ASTM)
 - 2. United States Federal Test Method Standard Number 601 - Test Methods for Testing Waterstop.
 - 3. U.S. Army Corps of Engineers Specifications CRD-C572-74.

1.3 SUBMITTALS

- A. The Contractor shall submit for review by the Engineer, samples, manufacturer's specifications and installation instructions and recommendations along with necessary sketches for each type of waterstop required.
- B. Certifications and laboratory test reports indicating that each material complies with the requirements shall be included.
- C. Complete testing shall be performed by an independent testing laboratory to show compliance with the specifications if so directed by the Engineer. All such testing shall be at the Contractor's expense.
- D. PVC Waterstop Samples: Prior to use of the waterstop material in the field, a sample of a prefabricated (shop made fitting) mitered cross and a tee constructed of each size or shape of material to be used shall be submitted. These samples shall be prefabricated (shop made fitting) so that the material and workmanship represent in all respects the fittings to be provided. Field samples of prefabricated (shop made fitting) fittings (crosses, tees, etc.) will also be selected at random by the Engineer for testing by a laboratory at the Owner's expense. When tested, tensile strength across the joints shall be at least 1120 psi.

1.4 QUALIFICATIONS AND TESTING

- A. All test methods for testing waterstop shall be in accordance with the United States Federal Test Method Standard Number 601.
- B. PVC waterstop shall be of the highest grade polyvinyl chloride compound meeting U.S. Army Corps of Engineers Specifications CRD-C572-74.

1.5 PRODUCT DELIVERY, HANDLING AND STORAGE

- A. Coils of waterstop shall be packaged and delivered to the job site in pallet boxes to eliminate kinks, twists, or depressions. The waterstop supplier and/or distributor shall certify that the coils have

not been exposed to direct sunlight. Coils stored on the job site shall not be exposed to direct sunlight prior to installation.

1.6 QUALITY ASSURANCE

- A. Waterstop Inspection: It is required that all waterstop field joints shall be subject to rigid inspection, and no such Work shall be scheduled or started without having made prior arrangements with the Engineer for the required inspections. Not less than 24 hours' notice shall be given for scheduling such inspections.
- B. Field joints in waterstops shall be subject to rigid inspection for misalignment, bubbles, inadequate bond, porosity, cracks, offsets, and other defects which would reduce the potential resistance of the material to water pressure at any point. Defective joints shall be replaced with material which passes inspection; faulty material shall be removed from the Site and disposed of.
- C. The following waterstop defects represent a partial list of defects which shall be grounds for rejection:
 - 1. Offsets at joints greater than 1/16-inch or 15 percent of material thickness, at any point, whichever is less.
 - 2. Exterior crack at joint, due to incomplete bond, which is deeper than 1/16-inch or 15 percent of material thickness, at any point, whichever is less.
 - 3. Any combination of offset or exterior crack which will result in a net reduction in the cross section of the waterstop in excess of 1/16-inch or 15 percent of material thickness at any point, whichever is less.
 - 4. Misalignment of joint which results in misalignment of the waterstops in excess of 1/2-inch in 10 feet.
 - 5. Porosity in the welded joint as evidenced by visual inspection.
 - 6. Bubbles or inadequate bonding which can be detected with a penknife test. (If, while prodding the entire joint with the point of a pen knife, the knife breaks through the outer portion of the weld into a bubble, the joint shall be considered defective.)
 - 7. Visible signs of separation when the cooled splice is bent by hand at any sharp angle.
 - 8. Any evidence of burned material.

PART 2 - PRODUCTS

2.1 POLYVINYL CHLORIDE WATERSTOP

- A. PVC Waterstops shall be extruded from an elastomeric polyvinyl chloride compound containing the plasticizers, resins, stabilizers, and other materials necessary to meet the requirements of this Section. No reclaimed or scrap material shall be used.
- B. Flat-strip and Center-Bulb Waterstops:
 - 1. Flat-strip and center-bulb waterstops shall be as manufactured by Sika Greenstreak Group Profiles 646, 679, 706, 732, and 735; Durajoint Types 5A, 9, 10, 11, and 11A ; or approved equal; provided, that at no place shall the thickness of flat strip waterstops, including the center bulb type, be less than 3/8-inch. Waterstops shall be provided with factory installed hog rings at 12 inches on centers along the waterstops.

C. Multi-Rib Waterstops:

1. Multi-rib waterstops, where required, shall be as manufactured Sika Greenstreak Group Profiles 789 and 790; Durajoint Types 25 and 26; or equal. Prefabricated (shop made fitting) joint fittings shall be used at all intersections of the ribbed-type waterstops.

D. Retrofit Waterstops:

1. Retrofit waterstops and batten bars shall be as manufactured by Sika Greenstreak Group Style #609, or equal. Waterstops shall be supplied as a complete system including waterstop, stainless steel (SS) batten bar, SS anchor bolts, and epoxy gel.

E. Waterstop Testing Requirements: When tested in accordance with the test standards, the waterstop material shall meet or exceed the following requirements:

Physical Property, Sheet Material	Value	ASTM Std
Tensile Strength-min (psi)	2000	D 638, Type IV
Ultimate Elongation-min (percent)	350	D 638, Type IV
Low Temp Brittleness-max (degrees F)	-35	D 746
Stiffness in Flexure-min (psi)	600	D 747
Accelerated Extraction (CRD-C572)		
Tensile Strength-min (psi)	1500	D 638, Type IV
Ultimate Elongation-min (percent)	300	D 638, Type IV
Effect of Alkalis (CRD-C572)		
Change in Weight (percent)	plus 0.25/minus 0.10	
Change in Durometer, Shore A	plus and minus 5	D 2240
Finished Waterstops		
Tensile Strength-min (psi)	1400	D 638, Type IV
Ultimate Elongation-min (percent)	280	D 638, Type IV

2.2 HYDROPHILIC WATERSTOP

A. Hydrophilic waterstops shall be the type which expands in the presence of water to form a watertight joint seal without damaging the concrete in which it is cast.

B. Pre-formed Hydrophilic Waterstops:

1. Hydrophilic (bentonite-free) waterstops shall be Hydrotite CJ-0725-3K-ADH as manufactured by Sika Greenstreak Group, or Adeka Ultraseal MC-2010MN as distributed by OCM Inc., or approved equal.

C. Waterstops shall be manufactured from chloroprene rubber and modified chloroprene rubber with hydrophilic properties. Waterstops shall have a delay coating to inhibit initial expansion due to moisture present in fresh concrete. The minimum expansion ratio of modified chloroprene shall be not less than 2 to 1 volumetric change in distilled water at 70 degrees F.

D. Waterstop Testing Requirements: When tested in accordance with the test standards, the waterstop material shall meet or exceed the following requirements:

Physical Property, Chloroprene	Value	ASTM Std.
Tensile Strength-min (psi)	1275	D 412
Ultimate Elongation-min (percent)	350	D 412
Hardness, Shore A	55 plus and minus 5	D 2240
Physical Property, Modified Chloroprene	Value	ASTM Std.
Tensile Strength-min (psi)	300	D 412
Ultimate Elongation-min (percent)	600	D 412
Hardness, Shore A	55 plus and minus 5	D 2240

- E. Bonding agent for hydrophilic waterstops shall be the manufacturer's recommended adhesive for wet, rough concrete.

PART 3 - EXECUTION

3.1 GENERAL

- A. Waterstops shall be embedded in the concrete across joints as indicated. Waterstops shall be fully continuous for the extent of the joint. Splices necessary to provide such continuity shall be accomplished in conformance to printed instructions of manufacturer of the waterstops. The Contractor shall take suitable precautions and means to support and protect the waterstops during the progress of the work and shall repair or replace at its own expense any waterstops damaged during the progress of the work. Waterstops shall be stored so as to permit free circulation of air around the waterstop material.
- B. When any waterstop is installed in the concrete on one side of a joint, while the other half or portion of the waterstop remains exposed to the atmosphere for more than 2 days, suitable precautions shall be taken to shade and protect the exposed waterstop from direct rays of the sun during the entire exposure and until the exposed portion of the waterstop is embedded in concrete.

3.2 JOINT CONSTRUCTION

- A. Setting Waterstops: To eliminate faulty installation that may result in joint leakage, particular care shall be taken of the correct positioning of the waterstops during installation. Adequate provisions must be made to support and anchor the waterstops during the progress of the work and to ensure the proper embedment in the concrete. The symmetrical halves of the waterstops shall be equally divided between the concrete pours at the joints. The center axis of the waterstops shall be coincident with the joint openings. Maximum density and imperviousness of the concrete shall be insured by thoroughly working it in the vicinity of all joints.
- B. In placing PVC waterstops in the forms, means shall be provided to prevent them from being folded over by the concrete as it is placed. Waterstops shall be held in place with light wire ties on 12-inch centers which shall be passed through hog rings at the edge of the waterstop and tied to the curtain of reinforcing steel. Horizontal waterstops, with their flat face in a vertical plane, shall be held in place with continuous supports to which the top edge of the waterstop shall be tacked. In placing concrete around horizontal waterstops, with their flat face in a horizontal plane, concrete shall be worked under the waterstops by hand so as to avoid the formation of air and rock pockets.
- C. In placing center-bulb waterstops in expansion joints, the center-bulb shall be centered on the joint filler material.

- D. Waterstops in vertical wall joints shall stop 6 inches from the top of the wall where such waterstop does not connect with any other waterstop and is not to be connected to a future concrete placement.
- E. Splices in PVC waterstops shall be performed by heat sealing the adjacent waterstop sections in accordance with the manufacturer's printed recommendations. It is essential that:
 - 1. The material not be damaged by heat sealing.
 - 2. The splices have a tensile strength of not less than 80 percent of the un-spliced material tensile strength.
 - 3. The continuity of the waterstop ribs and of its tubular center axis be maintained. No edge welding is allowed.
- F. Butt joints of the ends of 2 identical waterstop sections may be made while the material is in the forms. Butt joints shall be heat sealed and conform to requirements of Paragraph 3.2.E of this Section.
- G. All joints with waterstops involving more than 2 ends to be jointed together, and all joints which involve an angle cut, alignment change, or the joining of 2 dissimilar waterstop sections shall be prefabricated (shop made fitting) prior to placement in the forms, allowing not less than 24-inch long strips of waterstop material beyond the joint. Upon being inspected and approved, such prefabricated (shop made fitting) waterstop joint assemblies shall be installed in the forms and the ends of the 24-inch strips and shall be butt welded to the straight run portions of waterstops in place in the forms.
- H. Where a center-bulb waterstop intersects and is jointed with a non-center-bulb waterstop, care shall be taken to seal the end of the center-bulb, using additional PVC material if needed.
- I. Hydrophilic Waterstops
 - 1. Where a hydrophilic waterstop is called for in the Contract Documents, it shall be installed with the manufacturer's instructions and recommendations except as modified herein.
 - 2. When requested by the Engineer, the Contractor shall arrange for the manufacturer to furnish technical assistance in the field.
 - 3. Hydrophilic waterstops shall only be used where complete confinement by concrete is provided. Hydrophilic waterstops shall not be used in expansion or contraction joints nor in the first 6 inches of any non-intersecting joint.
 - 4. Hydrophilic waterstops shall be located as near as possible to the center of the joint and shall be continuous around the entire joint. The minimum distance from the edge of the waterstop to the face of the member shall be 5 inches.
 - 5. Where the thickness of the concrete member to be placed on the hydrophilic waterstop is less than 12 inches, the waterstop shall be placed in grooves formed or ground into the concrete. The groove shall be at least 3/4 inch deep and 1-1/4 inches wide. When placed in the groove, the minimum distance from the edge of the waterstop to the face of the member shall be 2.5 inches.
 - 6. Where a hydrophilic waterstop is used in combination with a PVC waterstop, the hydrophilic waterstop shall overlap the PVC waterstop for a minimum of 6 inches and shall be adhered to the PVC waterstop with single component water-swelling sealant as recommended by manufacturer.

7. Hydrophilic waterstops shall not be installed where the air temperature falls outside the manufacturer's recommended range.
8. The concrete surface under hydrophilic waterstops shall be smooth and uniform. The concrete shall be ground smooth if needed. Alternately, hydrophilic waterstops shall be bonded to the surface using an epoxy grout which completely fills all voids and irregularities beneath the waterstop material. Prior to installation, the concrete surface shall be wire brushed to remove any laitance or other materials that may interfere with the bonding of epoxy.
9. Hydrophilic waterstops shall be secured in place with concrete nails and washers at 12-inch maximum spacing. This shall be in addition to the adhesive recommended by the manufacturer.
- J. Retrofit Waterstops: Retrofit waterstops shall be set in a bed of epoxy over a sandblasted surface with stainless steel batten bars and 1/4-inch diameter stainless steel anchors at 6 inches on center, staggered, and in accordance with the manufacturer's written recommendations.

END OF SECTION

SECTION 03 21 00
REINFORCING STEEL

PART 1 – GENERAL**1.1 DESCRIPTION**

- A. This Section includes requirements for furnishing and placing steel reinforcement for concrete.

1.2 REFERENCES

- A. Materials and installation shall be in accordance with the latest revisions of the following codes, standards and specifications, except where more stringent requirements are specified herein:

1. American Concrete Institute (ACI)

- a. ACI 315 Manual of Standard Practice for Detailing Reinforced Concrete Structures

- b. ACI 318 Building Code Requirements for Reinforced Concrete

2. American Society for Testing and Materials (ASTM)

- a. ASTM A615 Grade 60 Steel Reinforcement for Concrete

3. Concrete Reinforcement Steel Institute (CRSI)

- a. CRSI-59 Recommended Practice for Placing Reinforcing Bar

- b. CRSI-63 Recommended Practice for Placing Bar Supports

1.3 DELIVERY AND STORAGE

- A. All reinforcing bars shall be delivered to the job site cut to exact length, bent, securely bundled and tagged with metal tags corresponding to the bar schedules and diagrams.
- B. All bars shall be stored off the ground a minimum height of six (6) inches and protected from mechanical injury, surface deterioration and moisture.

1.4 SUBMITTALS

- A. All bar schedules required to accomplish the fabrication and placement of reinforcement shall be approved by the Contractor. Prior to placement of reinforcement, the Contractor shall furnish four (4) copies of any such lists or diagrams to the Engineer. The shop drawings shall also include the dimension for the geometry of the structure and shall also indicate the clear cover required as noted or by ACI standards. The final acceptance of the reinforcement will be based on the field installation of the bars which will be inspected by the resident engineer.

PART 2 – PRODUCTS**2.1 MATERIALS**

- A. Steel reinforcement for concrete shall be deformed bars of new billet steel conforming to ASTM A615, Grade 60.

2.2 FABRICATION

- A. All details for fabrication shall conform to the Manual of Standard Practice for Detailing Reinforced Concrete Structures, ACI 315, and in accordance with details shown on the

drawings. When bending is required, it shall be done accurately without the use of heat, and bars having cracks, kinks, or splits at the bends shall be rejected. All hooks and bends shall be in conformance with ACI Standard 318. Splicing of steel shall be as specified in ACI Standard 318.

PART 3 – EXECUTION

3.1 PREPARATION AND PLACEMENT

- A. Before reinforcement is placed, the surfaces of the bars, fabric or any metal supports shall be cleaned to remove any loose, flaky rust, mill scale, oil, grease or other coatings or foreign substances. After placement, the reinforcement shall be maintained in a clean condition until it is completely embedded in the concrete. Reinforcing accessories, bar supports, chairs, spacers, etc. shall be in accordance with ACI 315.
- B. When placed in the work, all steel shall be free from loose rust, scale, grease, oil, dirt, or other materials which impair the bond with concrete.
- C. If concreting is delayed for more than five consecutive calendar days after reinforcing is placed in position, it shall be protected by covering with canvas, polyethylene sheeting or other satisfactory covering. Any bars or fabric having loose scaly rust shall be cleaned before concrete is placed.
- D. All placement of steel reinforcing and supports shall conform to the Recommended Practice for Placing Reinforcing Bars, CRSI 59; and the Recommended Practice for Placing Bar Supports, CRSI 63. Reinforcement shall be accurately placed and secured in position in a manner that will prevent its displacement during the placement of concrete. Tack welding of bars will not be permitted. Metal chairs, metal hangers, metal spacers and concrete chairs shall be used to support the reinforcement. Metal hangers, spacers and ties shall be placed in such a manner that they will not be exposed in the finished concrete surface. The legs of metal chairs that will be exposed at the lower face of slabs or beams shall be galvanized. Precast concrete chairs shall be manufactured of the same class of concrete as that specified for the structure and shall have tie wires securely anchored in the chair or a V-shaped groove at least 3/4-inch in depth molded into the upper surface to receive the steel bar at the point of support. Precast concrete chairs shall be moist at the time concrete is placed. Reinforcement shall not be placed until the prepared site has been inspected and approved by the Engineer. Concrete protection for reinforcement shall be as shown on the drawings.

END OF SECTION

SECTION 03 30 00**CAST-IN-PLACE CONCRETE****PART 1 – GENERAL****1.1 DESCRIPTION**

- A. This Section includes cast-in place concrete as shown on the Contract Drawings, complete including formwork, steel and fiber reinforcing, swept-in grout, admixtures, accessories, mix design, placement procedures, and finishes for foundations and footings, slabs-on-grade, walls, columns, and other site concrete.
- B. Additional information for Cast-In-Place Concrete is shown on the Contract Drawings.

1.2 RELATED SECTIONS

- A. Section 03 01 30.71 – Rehabilitation of Cast-in-Place Concrete
- B. Section 03 10 00 – Formwork
- C. Section 03 15 13 - Waterstops
- D. Section 03 21 00 – Reinforcing Steel
- E. Section 03 41 00 – Precast Structural Concrete
- F. Section 07 92 00 – Joint Sealants

1.3 REFERENCES

- A. Materials and installation shall be in accordance with the latest revisions of the following codes, standards and specifications, except where more stringent requirements are specified herein:
 - 1. American Concrete Institute (ACI)
 - a. ACI 117 – Specifications for Tolerances for Concrete Construction and Materials.
 - b. ACI 211.1 – Standard Practice for Selecting Proportions for Normal, Heavyweight and Mass Concrete.
 - c. ACI 301 – Structural Concrete for Buildings.
 - d. ACI 302 – Guide for Concrete Floor and Slab Construction.
 - e. ACI 304 – Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete.
 - f. ACI 305R – Hot Weather Concreting.
 - g. ACI 306R – Cold Weather Concreting.
 - h. ACI 308 – Standard Practice for Curing Concrete.
 - i. ACI 315 – Details and Detailing of Concrete Reinforcement
 - j. ACI 318 – Building Code Requirements for Reinforced Concrete.
 - k. ACI 350 – Environmental Engineering Concrete Structures.
 - l. ACI 350.1 and 350.1R – Tightness Testing of Environmental Engineering Concrete Structures and Commentary.
 - m. ACI 350.3R – Seismic Design of Liquid Containing Concrete Structures and Commentary.
 - 2. American National Standards Institute (ANSI)
 - a. ANSI/ASTM A185 – Welded Steel Wire Fabric for Concrete Reinforcement.
 - 3. American Society for Testing and Materials (ASTM)
 - a. ASTM A615 – Deformed and Plain Billet Steel for Concrete Reinforcement.

- b. ASTM A706 – Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcing
 - c. ASTM C33 – Concrete Aggregates.
 - d. ASTM C94 – Ready-Mixed Concrete.
 - e. ASTM C150 – Portland Cement.
 - f. ASTM C260 – Air Entraining Admixtures for Concrete.
 - g. ASTM C309 – Liquid membrane-forming compounds for curing concrete.
 - h. ASTM C494 – Chemical Admixtures for Concrete.
 - i. ASTM C1116 – Standard Specification for Fiber-Reinforced Concrete and Shotcrete
- 4. Concrete Reinforcing Steel Institute (CRSI)
 - a. Manual of Standard Practice.
- 5. Delaware Department of Transportation (DelDOT)
 - a. Standard Specifications for Road and Bridge Construction, including all Supplemental Specifications

1.4 SUBMITTALS

- A. In addition to those submittals identified in the General Requirements, the following items shall also be submitted:
 - 1. Product data for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, waterstops, joint systems, curing compounds, dry-shake finish materials, fiber reinforcement, and others if requested by Engineer.
 - 2. Shop drawings for reinforcement detailing fabricating, bending, and placing concrete reinforcement. Comply with ACI 315 “Manual of Standard Practice for Detailing Reinforced Concrete Structures” showing bar schedules, stirrup spacing, bent bar diagrams, and arrangement of concrete reinforcement. Include special reinforcing required for openings through concrete structures.
 - 3. Written mix design report for each type of concrete if using other than a DelDOT Standard Mix Design. Mix designs shall be based on field experience or trial mixtures. Submit documentation in accordance with ACI 301, Section 4.
 - 4. Laboratory test reports for concrete materials and mix designs.
 - 5. Material certificates in lieu of material laboratory test reports when permitted by Engineer. Material certificates shall be signed by manufacturer and Contractor, certifying that each material item complies with or exceeds specified requirements. Provide certification from admixture manufacturers that chloride content complies with specification requirements.
 - 6. Proposed method of concrete curing.
 - 7. Manufacturer’s literature for admixtures used in concrete mix.
 - 8. Name and location of concrete supplier.

1.5 QUALITY ASSURANCE

- A. All cast-in-place concrete shall be provided by a DelDOT certified supplier.
- B. Testing Agency Qualifications: An independent agency retained and paid by the Contractor under the lump sum bid, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.

1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.
 2. Personnel performing laboratory tests shall be an ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.
- C. Design Basis: In the event that the Contractor elects to perform a custom mix design in lieu of the specified DelDOT Standard Mix Design, the Contractor shall do the following tasks.
1. Make trial mixes and computations for each class of concrete, including the molding and curing of test specimens.
 2. Prepare and compute designs in the presence of the Engineer or his assigned representative. Make arrangements with the Engineer at least one week in advance of the concrete design.
 3. Submit each design for review, prior to its use in the work. Do not change an accepted design unless reviewed by the Engineer.
 4. Base the concrete design on the materials to be used in the work. If the specified requirements cannot be met, furnish other acceptable materials and/or make necessary changes in the mixing procedure to meet the specified requirements.
 5. At the start of construction, mix a full-sized batch, using the type of mixer and the mixing procedure planned for the project. This batch will provide the basis for final adjustment of the accepted design.
- D. The Engineer will have the authority to inspect concrete supplier's plant and will have the authority to inspect delivery trucks to verify that plant conforms to the "Check List for Certification of Ready Mixed Concrete Production Facilities" published by the National Ready Mixed Concrete Association, and to verify delivery trucks conform to requirements specified in ASTM C 94.
- E. Contractor shall engage a testing agency acceptable to Engineer to perform material evaluation tests and to design concrete mixes.
- F. Materials and installed work may require testing and retesting at any time during progress of Work. Tests, including retesting of rejected materials for installed Work, shall be done at Contractor's expense.
- G. Qualify welding quality procedures and personnel according to AWS D1.4, "Structural Welding Code – Reinforced Steel."

PART 2 – PRODUCTS

2.1 FORM MATERIALS

- A. Formwork shall be in accordance with Section 03 10 00 – Formwork.

2.2 REINFORCING STEEL

- A. Steel reinforcing shall be in accordance with Section 03 21 00 – Reinforcing Steel.

2.3 CONCRETE

- A. Cements: Only one brand and manufacturer of approved cement shall be used. Cement type shall be Type I/II or Type II, Moderate Sulfate Resistance Portland Cement conforming to ASTM C 150. Use one brand of cement throughout Project unless otherwise acceptable to Engineer.

- B. Normal Weight Concrete Aggregates: Processed coarse and fine aggregates meeting requirements of ASTM C 33 and conforming to the requirements of the DelDOT Standard Specifications for Road and Bridge Construction.
- C. Water: Clear and free from deleterious amounts of acids, alkalis, and organic substances.
- D. Classes of Concrete:
 - 1. Concrete shall be DelDOT Class A meeting all requirements of the DelDOT Standard Specifications for Road and Bridge Construction, including all Supplemental Specifications.
 - 2. Lean concrete fill shall be DelDOT Class C meeting all requirements of the DelDOT Standard Specifications for Road and Bridge Construction, including all Supplemental Specifications. Lean concrete fill shall be used as shown on the Contract Drawings.
- E. Admixtures
 - 1. Provide admixtures produced and serviced by established, reputable manufacturers and use such admixtures in compliance with the individual product manufacturer's recommendations and printed instructions.
 - a. Calcium Chloride: Not permitted in admixtures.
 - 2. Water-Reducing Admixture: Conforming to ASTM C 494 Type A and a product that is free of chloride.
 - a. Unless high temperatures occur or placing conditions dictate a change, use concrete containing a water-reducing admixture.
 - 3. Water-Reducing and Retarding Admixture: Conforming to ASTM C 494 Type D and a product that is free of chloride.
 - a. When high temperatures occur or placing conditions dictate, a change from the water-reducing admixture (Type A) to a water-reducing and retarding admixture (Type D) may be required.
 - 4. Water-Reducing and Accelerating Admixture: Conforming to ASTM C 494 Type E and a product that is free of chloride.
 - a. When low temperatures occur or placing conditions dictate, a change from the water-reducing admixture (Type A) to a water-reducing and accelerating admixture (Type E) may be required.
 - 5. Use air-entraining admixture in all concrete unless otherwise indicated. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having total air content within the following limits:
 - a. 4 to 7 percent for DelDOT Classes A and C Concretes.
 - 6. Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant, as accepted by Engineer. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Engineer before using in Work.
 - 7. Air-entraining admixture shall comply with ASTM C260 and shall be certified by manufacturer to be compatible with other admixtures.
 - 8. High-range water-reducing admixture shall meet ASTM C494, Type F or Type G.
 - 9. Pozzolan, other than Silica Fume: Pozzolan shall conform to ASTM C618 class C or F.

10. Ground Granulated Blast-furnace Slag: Ground Granulated Blast-furnace Slag shall conform to ASTM C989, Grade 80.

2.4 RELATED MATERIALS

- A. Waterstops shall be in accordance with Section 03 15 13 - Waterstops.
- B. Joint sealant shall be in accordance with Section 07 92 00 – Joint Sealants.
- C. Absorptive cover shall consist of burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M182, Class 2.
- D. Moisture-retaining cover shall be one of the following, complying with ASTM C171.
 1. Waterproof paper.
 2. Polyethylene film.
 3. Polyethylene-coated burlap.
- E. Liquid-type membrane-forming curing compound shall comply with ASTM C309, Type I, Class A. Moisture loss not more than 0.55 kg/sq. meter when applied at 200 sq. ft./gal.
- F. Water-based acrylic membrane curing compound shall comply with ASTM C309, Type I, Class B.
 1. Provide material that has a maximum volatile organic compound (VOC) rating of 350 g/L.
- G. Evaporation control shall consist of monomolecular film-forming compound applied to exposed concrete slab surfaces for temporary protection from rapid moisture loss.
- H. Bonding agent shall be epoxy base adhesive meeting ASTM C881, as a two-component material suitable for use on dry or damp surfaces. Provide material type, grade, and class to suit Project requirements. Bonding agent shall be equal to Sikadur 32, Hi-Mod LPL by the Sika Corporation.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Coordinate the installation of joint materials, and other related materials with placement of forms and reinforcing steel.
- B. Forms
 1. Design, erect, support, brace, and maintain formwork to support vertical, lateral, static, and dynamic loads that might be applied until concrete structure can support such loads. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation, and position. Maintain formwork construction tolerances and surface irregularities complying with the following ACI 347 limits:
 - a. Provide Class A tolerances for concrete surfaces exposed to view.
 - b. Provide Class C tolerances for other concrete surfaces.
 2. Construct forms to sizes, shapes, lines, and dimensions shown and to obtain accurate alignment, location, grades, level, and plumb work in finished structures. Provide for openings, offsets, sinkages, keyways, recesses, moldings, rustications, reglets, form liners, chamfers, blocking, screeds, bulkheads, anchorages and inserts, and other features required in the Work. Use selected materials to obtain required finishes. Solidly butt joints and provide backup at joints to prevent cement paste from leaking.

3. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses, and the like for easy removal.
4. Provide temporary openings for clean-outs and inspections where interior area of formwork is inaccessible before and during concrete placement. Securely brace temporary openings and set tightly to forms to prevent losing concrete mortar. Locate temporary openings in forms at inconspicuous locations.
5. Chamfer exposed corners and edges as indicated, using wood, metal, PVC, or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.
6. Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses, and chases from trades providing such items. Accurately place and securely support items built into forms.
7. Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, or other debris just before placing concrete. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

C. Placing Steel Reinforcing

1. Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars," for details and methods of reinforcement placement and supports and as specified.
2. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials that reduce or destroy bond with concrete.
3. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcing by metal chairs, runners, bolsters, spacers, and hangers, as accepted by Engineer.
4. Place reinforcement to maintain minimum coverage as indicated for concrete protection. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.

D. Joints

1. Construction joints not indicated in the Contract Documents shall be located and installed so they do not impair strength or appearance of the structure, as acceptable to Engineer.
2. Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints except as indicated otherwise. Do not continue reinforcement through sides of strip placements.
3. Use bonding agent on old (existing concrete at the commencement of construction of this project) concrete surfaces that will be joined with new concrete and wherever a concrete topping is required, unless otherwise indicated on the Contract Drawings.
4. Provide PVC waterstops in all construction joints, unless indicated otherwise on the Contract Drawings. Install waterstops to form continuous diaphragm in each joint. Protect exposed waterstops during progress of Work. Provide either pre-fabricated joints at intersecting waterstops. Splices in straight runs of waterstops may be field-fabricated and shall be executed according to manufacturer's printed instructions.

5. Construct isolation joints in slabs-on-grade at points of contact between slabs-on-grade and vertical surfaces, such as foundation walls, and other locations, as indicated.
6. Construct control joints in slabs-on-grade to form panels of patterns as shown. Use saw cuts 3/16 inch wide by one-fourth of slab depth unless otherwise indicated.
7. Control joints in slabs-on-grade shall be formed as soon as possible after slab finishing as may be safely done without dislodging aggregate.

E. Installing Embedded Items

1. Set and build into formwork anchorage devices and other embedded items required for other work that is attached to or supported by cast-in-place concrete. Use setting drawings, diagrams, instructions, and directions provided by suppliers of items to be attached.
2. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and contours in finished surfaces. Provide and secure units to support screed strips using strike-off templates or compacting-type screeds.

F. Preparing Formed Surfaces

1. Coat contact surfaces of forms with an approved, non-residual, low-VOC, form-coating compound before placing reinforcement.
2. Do not allow excess form-coating material to accumulate in forms or come into contact with in-place concrete surfaces against which fresh concrete will be placed. Apply according to manufacturer's instructions.
3. Coat steel forms with a non-staining, rust-preventative material. Rust-stained steel formwork is not acceptable.

G. Concrete Placement

1. Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast in. Notify other trades to permit installation of their work.
2. Comply with ACI 304, "Guide for Measuring, Mixing, Transporting, and Placing Concrete," and as specified.
3. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened sufficiently to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation at its final location. Free fall of concrete shall not exceed five feet.
4. Deposit concrete in forms in horizontal layers no deeper than 18 inches and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.
 - a. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete complying with ACI 309.
 - b. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the machine. Place vibrators to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mix to segregate.

5. Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until completing placement of a panel or section.
 - a. Consolidate concrete during placement operations so that concrete is thoroughly worked around reinforcement, other embedded items and into corners.
 - b. Bring surfaces to correct level with a straightedge and strike off. Use bull floats or darbies to smooth surface free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.
 - c. Maintain reinforcing in proper position on chairs during concrete placement.
- H. Cold-weather placement shall comply with the provisions of ACI 306 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
 1. When air temperature has fallen to or is expected to fall below 40 deg F (4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F (10 deg C) and not more than 80 deg F (27 deg C) at point of placement.
 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise accepted in mix designs.
- I. When hot weather conditions exist that would impair quality and strength of concrete, place concrete complying with ACI 305 and as specified.
 1. Cool ingredients before mixing to maintain concrete temperature at time of placement to below 90 deg F (32 deg C). Mixing water may be chilled or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
 2. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedding in concrete.
 3. Fog spray forms, reinforcing steel, and subgrade just before placing concrete. Keep subgrade moisture uniform without puddles or dry areas.
 4. Use water-reducing retarding admixture when required by high temperatures, low humidity, or other adverse placing conditions, as acceptable to Engineer.
- J. Finishing Formed Surfaces
 1. Provide a rough-formed finish on formed concrete surfaces not exposed to view in the finished Work or concealed by other construction. This is the concrete surface having texture imparted by form-facing material used, with tie holes and defective areas repaired and patched, and fins and other projections exceeding 1/4 inch in height rubbed down or chipped off.
 2. Provide a smooth-formed finish on formed concrete surfaces exposed to view or to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete, such as painting, or another similar system. This is an as-cast concrete surface obtained with selected form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch defective areas with fins and other projections completely removed and smoothed.
- K. At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike-off smooth and finish with a texture matching adjacent formed surfaces. Continue final

surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

- L. Apply a non-slip rough broom finish to exterior concrete platforms, walkways, ramps, steps, and elsewhere as indicated.
 - 1. Immediately after float finishing, slightly roughen concrete surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Engineer before application.
- M. Apply a non-slip grooved finish to exterior concrete pavement for boat or vehicle ramps and elsewhere as indicated.
 - 1. Immediately after float finishing, the plastic concrete shall be textured transversely for the full width of the pavement using a mechanized texturing device. The texturing device shall ride on forms or be guided electronically by stringline and shall utilize use a wire comb consisting of 3/32" (2.5 mm) wide flat steel tines, 5 to 6" (125 to 150 mm) long, with a 1/2" (13 mm) spacing between tines. The tines shall form rectangular shaped grooves approximately 3/32 to 3/16" (2.5 to 5 mm) in width and approximately 3/16" (5 mm), but not less than 1/8" (3 mm), in depth. The wire comb shall meet the approval of the Engineer. The texture shall be produced by drawing the approved comb across the pavement in a transverse direction in one pass without tearing or dragging the mortar. The concrete shall be dry enough to prevent the plastic concrete from flowing back into the grooves being formed. The method used shall produce a uniform finish. The texturing device shall be kept free of hardened concrete particles. Hand brooms about 4' (1.2 m) wide and made of wire comb as specified above shall be made available by the Contractor for use where mechanical tining cannot be performed.

3.2 QUALITY CONTROL

- A. The Contractor shall employ a testing agency, approved by the Engineer, to perform tests and to submit test reports. Field testing to be performed by an ACI certified concrete field testing technician Grade I.
- B. Sampling and testing for quality control during concrete placement may include the following, as directed by Engineer.
 - 1. Sampling Fresh Concrete: ASTM C172, except modified for slump to comply with ASTM C94.
 - a. Slump testing shall be in accordance with ASTM C143; one test at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.
 - b. Air content testing shall be in accordance with ASTM C173, volumetric method for lightweight or normal weight concrete; ASTM C231, pressure method for normal weight concrete; one for each day's pour of each type of air-entrained concrete.
 - c. Testing of concrete temperature shall be in accordance with ASTM C1064; one test hourly when air temperature is 40 deg F and below, when 80 deg F and above, and one test for each set of compressive-strength specimens.
 - d. Molding of cylinders for compression testing shall be in accordance with ASTM C31; one set of four standard cylinders for each compressive-strength test, unless otherwise directed. All cylinders shall be field-cured unless otherwise directed by the Engineer.
 - e. Compressive-strength testing shall be in accordance with ASTM C 39; one set for each 50 cu. yd. or fraction thereof, of each concrete mix placed in any one day; one specimen tested at 7 days, two specimens tested at 28 days, and one specimen retained in reserve for later testing if required.

2. When frequency of testing will provide fewer than five strength tests for a given class of concrete, conduct testing from at least five randomly selected batches or from each batch if fewer than five are used.
3. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
4. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive strength test results equal or exceed specified compressive strength and no individual strength test result falls below specified compressive strength by more than 500 psi.
5. Test results will be reported in writing to Engineer, ready-mix producer, and Contractor within 24 hours after tests. Reports of compressive strength tests shall contain the Project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-day tests and 28-day tests.
6. Nondestructive testing may consist of impact hammer, sonoscope, or other nondestructive device but shall not be used as the sole basis for acceptance or rejection.
7. The testing agency will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Engineer. Testing agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42, or by other methods as directed.

3.3 MISCELLANEOUS CONCRETE ITEMS

- A. Fill in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place, and cure concrete as specified to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete Work.
- B. Provide machine and equipment bases and foundations as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with diagrams or templates of manufacturer furnishing machines and equipment.

3.4 CONCRETE CURING AND PROTECTION

- A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. In hot, dry, and windy weather protect concrete from rapid moisture loss before and during finishing operations with an evaporation-control material. Apply according to manufacturer's instructions after screeding and bull floating, but before power floating and troweling.
- B. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Weather permitting, keep continuously moist for not less than 7 days.
- C. Cure concrete by curing compound, by moist curing, by moisture-retaining cover curing, or by combining these methods, as specified.
- D. Provide moisture curing by one of the following methods:
 1. Keep concrete surface continuously wet by covering with water.
 2. Use continuous water-fog spray.

3. Cover concrete surface with specified absorptive cover, thoroughly saturate cover with water, and keep continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with a 4-inch lap over adjacent absorptive covers.
- E. Provide moisture-retaining cover curing as follows:
 1. Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3 inches and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
- F. Apply curing compound on exposed interior slabs and on exterior slabs as follows:
 1. Apply curing compound to concrete slabs as soon as final finishing operations are complete (within 2 hours and after surface water sheen has disappeared). Apply uniformly in continuous operation by power spray or roller according to manufacturer's directions. Recoat areas subjected to heavy rainfall within 3 hours after initial application. Maintain continuity of coating and repair damage during curing period.
 2. Use membrane curing compounds that will not affect surfaces to be covered with finish materials applied directly to concrete.
- G. Cure formed concrete surfaces, including supported slabs and other similar surfaces, by moist curing with forms in place for the full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.
- H. Cure unformed surfaces, including slabs and other flat surfaces, by applying the appropriate curing method.

3.5 REMOVING FORMS

- A. Formwork not supporting weight of concrete, such as sides of walls, and similar parts of the work, may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form-removal operations, and provided curing and protection operations are maintained.
- B. Formwork supporting weight of concrete, such as slabs and other structural elements, may not be removed in less than 14 days or until concrete has attained at least 75 percent of design minimum compressive strength at 28 days, unless otherwise noted. Determine representative compressive strength of in-place concrete by testing field-cured specimens representative of concrete location or members.
- C. Form-facing material may be removed 4 days after placement only if shores and other vertical supports have been arranged to permit removal of form-facing material without loosening or disturbing shores and supports.

3.6 REUSING FORMS

- A. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-coating compound as specified for new formwork.
- B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use patched forms for exposed concrete surfaces except as acceptable to Engineer.

3.7 CONCRETE SURFACE REPAIRS

- A. Repair and patch defective areas with cement mortar immediately after removing forms, when acceptable to Engineer.
- B. Mix dry-pack mortar, consisting of 1 part portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing.
 - 1. Cut out honeycombs, rock pockets, voids over 1/4 inch in any dimension, and holes left by tie rods and bolts down to solid concrete but in no case to a depth less than 1 inch. Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water, and brush-coat the area to be patched with bonding agent. Place patching mortar before bonding agent has dried.
 - 2. For surfaces exposed to view, blend white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Provide test areas at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.
- C. Remove and replace formed concrete having defective surfaces if defects cannot be repaired to satisfaction of Engineer. Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes and fill with dry-pack mortar or precast cement cone plugs secured in place with bonding agent.
 - 1. Repair concealed formed surfaces, where possible, containing defects that affect the concrete's durability. If defects cannot be repaired, remove and replace the concrete.
- D. Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface tolerances specified for each surface and finish. Correct low and high areas as specified. Test unformed surfaces sloped to drain for trueness of slope and smoothness by using a template having the required slope.
 - 1. Repair finished unformed surfaces containing defects that affect the concrete's durability. Surface defects include crazing and cracks in excess of 0.01 inch wide or that penetrate to the reinforcement or completely through non-reinforced sections regardless of width, spalling, pop-outs, honeycombs, rock pockets, and other objectionable conditions.
 - 2. Correct high areas in unformed surfaces by grinding after concrete has cured at least 14 days.
 - 3. Correct low areas in unformed surfaces during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete. Proprietary underlayment compounds may be used when acceptable to Engineer.
 - 4. Repair defective areas, except random cracks and single holes not exceeding 1 inch in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose reinforcing steel with at least 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
- E. Repair isolated random cracks and single holes 1 inch or less in diameter by dry-pack method. Groove top of cracks and cut out holes to sound concrete and clean of dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Place dry-pack before bonding agent has dried. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.
- F. Perform structural repairs with prior acceptance by Engineer for method and procedure, using specified epoxy adhesive and mortar.

- G. Repair methods not specified above may be used, subject to acceptance of Engineer.

END OF SECTION

SECTION 03 41 00**PRECAST STRUCTURAL CONCRETE****PART 1 – GENERAL****1.1 RELATED DOCUMENTS**

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Plant precast structural concrete.
- B. Related Sections:
 - 1. Section 01 45 00 – Quality Requirements
 - 2. Section 03 15 13 - Waterstops
 - 3. Section 03 21 00 – Reinforcing Steel
 - 4. Section 03 30 00 – Cast-in-Place Concrete
 - 5. Section 07 92 00 – Joint Sealants

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Design Mixtures: For each precast concrete mixture. Include compressive strength and, if required, water-absorption tests.
- C. Shop Drawings:
 - 1. Include member locations, plans, elevations, dimensions, shapes and sections, openings, support conditions, and types of reinforcement, including special reinforcement.
 - 2. Detail fabrication and installation of precast structural concrete units, including connections at member ends and to adjoining construction.
 - 3. Indicate joints, reveals, drips, chamfers, and extent and location of each surface finish.
 - 4. Indicate separate face and backup mixture locations and thicknesses.
 - 5. Indicate type, size, and length of welded connections by AWS standard symbols.
 - 6. Detail loose and cast-in hardware, lifting and erection inserts, connections, and joints.
 - 7. Indicate locations, tolerances, and details of anchorage devices to be embedded in or attached to structure or other construction.
 - 8. Include and locate openings larger than 10 inches. Where additional structural support is required, include header design.
 - 9. Indicate shim sizes and grouting sequence.
 - 10. If design modifications are proposed to meet performance requirements and field conditions, submit design calculations and Shop Drawings. Do not adversely affect the appearance,

durability, or strength of units when modifying details or materials, and maintain the general design concept.

- D. Delegated-Design Submittal: For precast structural concrete indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified Professional Engineer responsible for their preparation.

1. Show precast structural concrete unit types, connections, types of reinforcement, including special reinforcement, and concrete cover on reinforcement. Indicate location, type, magnitude, and direction of loads imposed on the building structural frame from precast structural concrete.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For fabricator.
- B. Welding certificates.
- C. Material Certificates: For the following:
 1. Cementitious materials.
 2. Reinforcing materials and prestressing tendons.
 3. Admixtures.

1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: A firm that assumes responsibility for engineering precast structural concrete units to comply with performance requirements. Responsibility includes preparation of Shop Drawings and comprehensive engineering analysis by a qualified Professional Engineer.
 1. DelDOT certified to produce precast structures.
- B. Testing Agency Qualifications: Qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
- C. Quality-Control Standard: For manufacturing procedures, testing requirements, and quality-control recommendations for types of units required, comply with PCI MNL 116, "Manual for Quality Control for Plants and Production of Structural Precast Concrete Products."

1.6 COORDINATION

- A. Furnish loose connection hardware and anchorage items to be embedded in or attached to other construction before starting that Work. Provide locations, setting diagrams, templates, instructions, and directions, as required, for installation.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Support units during shipment on non-staining shock-absorbing material in same position as during storage.
- B. Store units with adequate bracing and protect units to prevent contact with soil, to prevent staining, and to prevent cracking, distortion, warping or other physical damage.
 1. Store units with dunnage across full width of each bearing point unless otherwise indicated.
 2. Place adequate dunnage of even thickness between each unit.
 3. Place stored units so identification marks are clearly visible, and units can be inspected.

- C. Handle and transport units in a manner that avoids excessive stresses that cause cracking or damage.
- D. Lift and support units only at designated points indicated on Shop Drawings.

1.8 PERFORMANCE REQUIREMENTS

- A. Design Standards: Comply with ACI 318 and with design recommendations in PCI MNL 120, "PCI Design Handbook - Precast and Prestressed Concrete," applicable to types of precast structural concrete units indicated.

1.9 CONCRETE MIXTURES

- A. Prepare design mixtures for each type of precast concrete required.
 - 1. Limit use of fly ash to 20 percent replacement of portland cement by weight and ground granulated blast-furnace slag to 20 percent of portland cement by weight; metakaolin and silica fume to 10 percent of portland cement by weight.
- B. Design mixtures may be prepared by a qualified independent testing agency or by qualified precast plant personnel at precast structural concrete fabricator's option.
- C. Limit water-soluble chloride ions to maximum percentage by weight of cement permitted by ACI 318 or PCI MNL 116 when tested according to ASTM C 1218.
- D. Normal-Weight Concrete Mixtures: Proportion by either laboratory trial batch or field test data methods according to ACI 211.1, with materials to be used on Project, to provide normal-weight concrete with the following properties:
 - 1. Compressive Strength (28 Days): 5,000 psi
 - 2. Maximum Water-Cementitious Materials Ratio: 0.45.
- E. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content complying with PCI MNL 116.
- F. When included in design mixtures, add other admixtures to concrete mixtures according to manufacturer's written instructions.
- G. Concrete Mix Adjustments: Concrete mix design adjustments may be proposed if characteristics of materials, Project conditions, weather, test results, or other circumstances warrant.

PART 2 – PRODUCTS

2.1 MOLD MATERIALS

- A. Molds: Rigid, dimensionally stable, non-absorptive material, warp and buckle free, that provides continuous precast concrete surfaces within fabrication tolerances indicated; nonreactive with concrete and suitable for producing required finishes.
- B. Mold-Release Agent: Commercially produced form-release agent that does not bond with, stain, or adversely affect precast concrete surfaces and does not impair subsequent surface or joint treatments of precast concrete.

2.2 REINFORCING MATERIALS

- A. Reinforcing Bars: ASTM A 615, Grade 60, deformed.
- B. Steel Bar Mats: ASTM A 184, fabricated from ASTM A 615, Grade 60, deformed bars, assembled with clips.
- C. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, fabricated from as-drawn steel wire into flat sheets.
- D. Deformed-Steel Welded Wire Reinforcement: ASTM A 497 or ASTM A 1064, flat sheet.
- E. Supports: Suspend reinforcement from back of mold or use bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place according to PCI MNL 116.

2.3 CONCRETE MATERIALS

- A. Regional Materials: Precast structural concrete shall be manufactured from aggregates that have been extracted or recovered, as well as manufactured, within 500 miles of Project site.
- B. Portland Cement: ASTM C 150, Type I or Type III, gray, unless otherwise indicated.
 - 1. For surfaces exposed to view in finished structure, use gray or white cement, of same type, brand, and mill source.
- C. Supplementary Cementitious Materials:
 - 1. Metakaolin: ASTM C 618, Class N.
 - 2. Silica Fume: ASTM C 1240, with optional chemical and physical requirement.
 - 3. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.
- D. Water: Potable; free from deleterious material that may affect color stability, setting, or strength of concrete and complying with chemical limits of PCI MNL 116.
- E. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.
- F. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and to not contain calcium chloride, or more than 0.15 percent chloride ions or other salts by weight of admixture.
 - 1. Water-Reducing Admixtures: ASTM C 494, Type A.
 - 2. Retarding Admixture: ASTM C 494, Type B.
 - 3. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.
 - 4. Water-Reducing and Accelerating Admixture: ASTM C 494, Type E.
 - 5. High-Range, Water-Reducing Admixture: ASTM C 494, Type F.
 - 6. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494, Type G.
 - 7. Plasticizing Admixture: ASTM C 1017, Type I.
 - 8. Plasticizing and Retarding Admixture: ASTM C 1017, Type II.
 - 9. Corrosion-Inhibiting Admixture: ASTM C 1582.

2.4 STEEL CONNECTION MATERIALS

- A. Carbon-Steel Plates, Bar, Rod, and Angles: ASTM A 36.
- B. Carbon-Steel-Headed Studs: ASTM A 108, Grade 1010 through 1020, cold finished, AWS D1.1, Type A or B, with arc shields and with minimum mechanical properties of PCI MNL 116.
- C. Malleable-Iron Castings: ASTM A 47, Grade 32510 or Grade 35028.
- D. Carbon-Steel Castings: ASTM A 27, Grade 60-30.
- E. High-Strength, Low-Alloy Structural Steel: ASTM A 992.
- F. Carbon-Steel Structural Tubing: ASTM A 500, Grade B or Grade C.
- G. Wrought Carbon-Steel Bars: ASTM A 675, Grade 65.
- H. Deformed-Steel Wire or Bar Anchors: ASTM A 496 or ASTM A 706.
- I. Carbon-Steel Bolts and Studs: ASTM A 307, Grade A; carbon-steel, hex-head bolts and studs; carbon-steel nuts, ASTM A 563; and flat, unhardened steel washers, ASTM F 844.
- J. High-Strength Bolts and Nuts: ASTM A 325 or ASTM A 490, Type 1, heavy hex steel structural bolts; heavy hex carbon-steel nuts, ASTM A 563; and hardened carbon-steel washers, ASTM F 436.
 - 1. Do not zinc coat ASTM A 490 bolts.
- K. Welding Electrodes: Comply with AWS standards.
- L. Precast Accessories: Provide clips, hangers, plastic or steel shims, and other accessories required to install precast structural concrete units.

2.5 ACCESSORIES

- A. Precast Accessories: Provide clips, hangers, high-density plastic or steel shims, and other accessories required to install structural precast concrete units.

2.6 GROUT MATERIALS

- A. Sand-Cement Grout: Portland cement, ASTM C 150, Type I, and clean, natural sand, ASTM C 144 or ASTM C 404. Mix at ratio of 1 part cement to 2-1/2 to 3 parts sand, by volume, with minimum water required for placement and hydration. Water-soluble chloride ion content less than 0.06 percent by weight of cement when tested according to ASTM C 1218.
- B. Nonmetallic, Non-shrink Grout: Packaged, non-metallic, non-corrosive, non-staining grout containing selected silica sands, portland cement, shrinkage-compensating agents, plasticizing and water-reducing agents, complying with ASTM C 1107, Grade A for drypack and Grades B and C for flowable grout and of consistency suitable for application within a 30-minute working time. Water-soluble chloride ion content less than 0.06 percent by weight of cement when tested according to ASTM C 1218.
- C. Epoxy-Resin Grout: Two-component, mineral-filled epoxy resin; ASTM C 881, of type, grade, and class to suit requirements.

PART 3 – EXECUTION**3.1 MOLD FABRICATION**

- A. Molds: Accurately construct molds, mortar tight, of sufficient strength to withstand pressures due to concrete-placement operations and temperature changes and for prestressing and detensioning operations. Coat contact surfaces of molds with release agent before reinforcement is placed. Avoid contamination of reinforcement and prestressing tendons by release agent.
- B. Maintain molds to provide completed precast structural concrete units of shapes, lines, and dimensions indicated, within fabrication tolerances specified.
 - 1. Edge and Corner Treatment: Uniformly chamfered unless indicated otherwise on the Contract Drawings.

3.2 FABRICATION

- A. Cast-in Anchors, Inserts, Plates, Angles, and Other Anchorage Hardware: Fabricate anchorage hardware with sufficient anchorage and embedment to comply with design requirements. Accurately position for attachment of loose hardware, and secure in place during precasting operations. Locate anchorage hardware where it does not affect position of main reinforcement or concrete placement.
 - 1. Weld-headed studs and deformed bar anchors used for anchorage according to AWS D1.1/D1.1M and AWS C5.4, "Recommended Practices for Stud Welding."
- B. Furnish loose hardware items including steel plates, clip angles, seat angles, anchors, dowels, cramps, hangers, and other hardware shapes for securing precast structural concrete units to supporting and adjacent construction.
- C. Cast-in reglets, slots, holes, and other accessories in precast structural concrete units as indicated on the Contract Drawings.
- D. Cast-in openings larger than 10 inches in any dimension. Do not drill or cut openings without Engineer's approval.
- E. Reinforcement: Comply with recommendations in PCI MNL 116 for fabricating, placing, and supporting reinforcement.
 - 1. Clean reinforcement of loose rust and mill scale, earth, and other materials that reduce or destroy the bond with concrete.
 - 2. Accurately position, support, and secure reinforcement against displacement during concrete-placement and consolidation operations. Completely conceal support devices to prevent exposure on finished surfaces.
 - 3. Place reinforcing steel to maintain cover requirements for reinforcing steel to 1-1/2 inches. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position while placing concrete. Direct wire tie ends away from finished, exposed concrete surfaces.
 - 4. Install welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one full mesh spacing and wire tie laps, where required by design. Offset laps of adjoining widths to prevent continuous laps in either direction.
- F. Reinforce precast structural concrete units to resist handling, transportation, and erection stresses and specified in-place loads.
- G. Comply with requirements in PCI MNL 116 and in this Section for measuring, mixing, transporting, and placing concrete. After concrete batching, no additional water may be added.

- H. Place concrete in a continuous operation to prevent cold joints or planes of weakness from forming in precast concrete units.
- I. Thoroughly consolidate placed concrete by vibration without dislocating or damaging reinforcement and built-in items, and minimize pour lines, honeycombing, or entrapped air voids on surfaces. Use equipment and procedures complying with PCI MNL 116.
- J. Comply with PCI MNL 116 procedures for hot- and cold-weather concrete placement.
- K. Identify pickup points of precast structural concrete units and orientation in structure with permanent markings, complying with markings indicated on Shop Drawings. Imprint or permanently mark casting date on each precast structural concrete unit on a surface that does not show in finished structure.
- L. Cure concrete, according to requirements in PCI MNL 116, by moisture retention without heat or by accelerated heat curing using live steam or radiant heat and moisture. Cure units until compressive strength is high enough to ensure that stripping does not have an effect on performance or appearance of final product.
- M. Discard and replace precast structural concrete units that do not comply with requirements, including structural, manufacturing tolerance, and appearance, unless repairs meet requirements in PCI MNL 116 and meet Engineer's approval.

3.3 FABRICATION TOLERANCES

- A. Fabricate precast structural concrete units to shapes, lines, and dimensions indicated so each finished unit complies with PCI MNL 116 product dimension tolerances as well as position tolerances for cast-in items.

3.4 COMMERCIAL FINISHES

- A. Standard Grade: Normal plant-run finish produced in molds that impart a smooth finish to concrete. Surface holes smaller than 1/2 inch caused by air bubbles, normal color variations, form joint marks, and minor chips and spalls are permitted. Fill air holes greater than 1/4 inch in width that occur more than once per 2 sq. in. Major or unsightly imperfections, honeycombs, or structural defects are not permitted. Limit joint offsets to 1/8 inch.
- B. Screed or float finish unformed surfaces. Strike off and consolidate concrete with vibrating screeds to a uniform finish. Hand screed at projections. Normal color variations, minor indentations, minor chips, and spalls are permitted. Major imperfections, honeycombing, or defects are not permitted.

3.5 SOURCE QUALITY CONTROL

- A. Testing: Test and inspect precast structural concrete according to PCI MNL 116 requirements and ASTM C 1610, ASTM C 1611, ASTM C 1621, and ASTM C 1712.
- B. Strength of precast structural concrete units is considered deficient if units fail to comply with ACI 318 requirements for concrete strength.
- C. Defective Units: Discard and replace precast structural concrete units that do not comply with requirements, including strength, manufacturing tolerances, and color and texture range. Chipped, spalled, or cracked units may be repaired, subject to Engineer's approval. Engineer reserves the right to reject precast units that do not match approved samples, sample panels, and mockups. Replace unacceptable units with precast concrete units that comply with requirements.

3.6 EXAMINATION

- A. Examine supporting structural frame or foundation and conditions for compliance with requirements for installation tolerances, bearing surface tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. Do not install precast concrete units until supporting, cast-in-place concrete has attained minimum allowable design compressive strength and until supporting steel or other structure is structurally ready to receive loads from precast concrete units.

3.7 INSTALLATION

- A. Install clips, hangers, bearing pads, and other accessories required for connecting precast structural concrete units to supporting members and backup materials.
- B. Erect precast structural concrete level, plumb, and square within specified allowable tolerances. Provide temporary structural framing, shoring, and bracing as required to maintain position, stability, and alignment of units until permanent connections are complete.
 - 1. Install temporary steel or plastic spacing shims or bearing pads as precast structural concrete units are being erected. Tack weld steel shims to each other to prevent shims from separating.
 - 2. Maintain horizontal and vertical joint alignment and uniform joint width as erection progresses.
 - 3. Remove projecting lifting devices and use plastic patch caps or sand-cement grout to fill voids within recessed lifting devices flush with surface of adjacent precast surfaces when recess is exposed.
- C. Connect precast structural concrete units in position by bolting, welding, grouting, or as otherwise indicated on Shop Drawings. Remove temporary shims, wedges, and spacers as soon as practical after connecting and grouting are completed.
- D. Field cutting of precast units is not permitted without approval of Engineer.
- E. Fasteners: Do not use drilled or powder-actuated fasteners for attaching accessory items to precast, prestressed concrete units.
- F. Welding: Comply with applicable requirements in AWS D1.1 and AWS D1.4 for welding, welding electrodes, appearance, quality of welds, and methods used in correcting welding work.
 - 1. Protect precast structural concrete units and bearing pads from damage by field welding or cutting operations, and provide noncombustible shields as required.
 - 2. Clean weld-affected steel surfaces with chipping hammer followed by brushing, and apply a minimum 4.0-mil thick coat of galvanized repair paint to galvanized surfaces according to ASTM A 780.
 - 3. Clean weld-affected steel surfaces with chipping hammer followed by brushing, and reprime damaged painted surfaces.
 - 4. Visually inspect welds and remove, reweld, or repair incomplete and defective welds.
- G. At bolted connections, use lock washers, tack welding, or other approved means to prevent loosening of nuts after final adjustment.
 - 1. Where slotted connections are used, verify bolt position and tightness. For sliding connections, properly secure bolt but allow bolt to move within connection slot.

2. For slip-critical connections, use one of the following methods to assure proper bolt pretension:
 - a. Turn-of-Nut: According to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
 - b. Calibrated Wrench: According to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
 - c. Twist-off Tension Control Bolt: ASTM F 1852.
 - d. Direct-Tension Control Bolt: ASTM F 1852.
 3. For slip-critical connections, use method and inspection procedure approved by Engineer and coordinated with inspection agency.
- H. Grouting or Dry-Packing Connections and Joints: Grout connections and joints and open spaces at keyways, connections, and joints where required or indicated on Shop Drawings. Retain flowable grout in place until hard enough to support itself. Alternatively, pack spaces with stiff dry-pack grout material, tamping until voids are completely filled.
1. Place grout and finish smooth, level, and plumb with adjacent concrete surfaces.
 2. Fill joints completely without seepage to other surfaces.
 3. Trowel top of grout joints on roofs smooth and uniform. Finish transitions between different surface levels not steeper than 1 to 12.
 4. Retain first subparagraph below if end grouting hollow-core slabs is required.
 5. Place grout end cap or dam in voids at ends of hollow-core slabs.
 6. Promptly remove grout material from exposed surfaces before it affects finishes or hardens.
 7. Keep grouted joints damp for not less than 24 hours after initial set.

3.8 ERECTION TOLERANCES

- A. Erect precast structural concrete units level, plumb, square, and in alignment without exceeding the noncumulative erection tolerances of PCI MNL 135.
- B. Minimize variations between adjacent slab members by jacking, loading, or other method recommended by fabricator and approved by Engineer.

3.9 FIELD QUALITY CONTROL

- A. Visually inspect field welds and test according to ASTM E 165 or to ASTM E 709 and ASTM E 1444. High-strength bolted connections are subject to inspections.
- B. Repair or remove and replace work where tests and inspections indicate that it does not comply with specified requirements.
- C. Additional testing and inspecting, at Contractor's expense, shall be performed to determine compliance of replaced or additional work with specified requirements.

3.10 REPAIRS

- A. Repair precast structural concrete units if permitted by Engineer.
 1. Repairs may be permitted if structural adequacy, serviceability, durability, and appearance of units have not been impaired.

2. Mix patching materials and repair units so cured patches blend with color, texture, and uniformity of adjacent exposed surfaces and show no apparent line of demarcation between original and repaired work, when viewed in typical daylight illumination from a distance of 20 feet.

- B. Wire brush, clean, and paint damaged prime-painted components with same type of shop primer.
- C. Remove and replace damaged precast structural concrete units that cannot be repaired or when repairs do not comply with requirements as determined by Engineer.

3.11 CLEANING

- A. Clean mortar, plaster, fireproofing, weld slag, and other deleterious material from concrete surfaces and adjacent materials immediately.
- B. Clean exposed surfaces of precast concrete units after erection and completion of joint treatment to remove weld marks, other markings, dirt, and stains.
 1. Perform cleaning procedures, if necessary, according to precast concrete fabricator's written recommendations. Protect other work from staining or damage due to cleaning operations.
 2. Do not use cleaning materials or processes that could change the appearance of exposed concrete finishes or damage adjacent materials.

END OF SECTION

DIVISION 05 – METALS

SECTION 05 12 00**STRUCTURAL STEEL FRAMING****PART 1 – GENERAL****1.1 DESCRIPTION**

- A. This Section includes structural steel, as shown on the Contract Drawings, complete including framing members, base and anchor plates, connections, grouting under base and anchor plates, fabrication, delivery, and installation.

1.2 REFERENCES

- A. Materials and installation shall be in accordance with the latest revisions of the following codes, standards and specifications, except where more stringent requirements are specified herein:
1. American Society for Testing and Materials (ASTM)
 - a. ASTM A6 - General Requirements for Rolled Structural Steel Bars, Plates, Shapes and Sheet Piling.
 - b. ASTM A36 - Carbon Structural Steel.
 - c. ASTM A53 - Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
 - d. ASTM A108 - Steel Bars, Carbon, Cold-Finished, Standard Quality.
 - e. ASTM A123 - Zinc (Hot Dipped Galvanized) Coatings on Iron and Steel Products.
 - f. ASTM A153 - Zinc Coating (Hot Dip) on Iron and Steel Hardware.
 - g. ASTM A307 - Carbon Steel Bolts and Studs, 60,000 psi Tensile Strength.
 - h. ASTM A325 – Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
 - i. ASTM A500 - Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Round and Shapes.
 - j. ASTM A992, Grade 50 - Structural Steel Shapes.
 - k. ASTM F959 - Compressible - Washer - Type Direct Tension Indicators for Use with Structural Fasteners.
 - l. ASTM F1554 - Anchor Bolts, Steel, 36, 55 and 105 KSI Yield Strength.
 2. American Welding Society
 - a. AWS D1.1 - Structural Welding Code.
 - b. AWS A2.0 - Standard Welding Symbols.
 3. American Institute of Steel Construction
 - a. ANSI/AISC 360 - Specification for Structural Steel for Buildings.
 4. SSPC - Steel Structures Painting Council.
 5. Research Council on Structural Connections (RCSC) Specification for Structural Joints Using High Strength Bolts.

1.3 SUBMITTALS

- A. In addition to those submittals identified in the General Conditions, the following items shall also be submitted:
1. Product data for each type of product indicated.
 2. Shop drawings showing fabrication of structural steel components.
 - a. Include profiles, sizes, spacing and locations of structural members, details of cuts, connections, splices, camber, holes, and other pertinent data.
 - b. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld.
 - c. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pre-tensioned and slip-critical, high-strength bolted connections.
 3. Manufacturer's certificates, certifying welders employed on the Work, verifying AWS qualifications within the previous 12 months.
 4. Mill test reports signed by manufacturers certifying that the following products comply with requirements:
 - a. Structural steel including chemical and physical properties.
 - b. Bolts, nuts, and washers including mechanical properties and chemical analysis.
 - c. Direct-tension indicators.
 - d. Tension-control, high-strength bolt-nut-washer assemblies.
 - e. Shop primers.
 - f. Non-shrink grout.

1.4 QUALITY ASSURANCE

- A. Fabricator qualifications: Engage a firm experienced in fabricating structural steel similar to that indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to fabricate structural steel without delaying the Work. Fabricator shall have AISC Category I, II, or III Quality Certification.
- B. Installer qualifications: Engage an experienced Installer who has completed structural steel work similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance.
- C. Perform work in accordance with the applicable provisions of the most recent editions of the following specifications and documents:
1. ANSI/AISC 360, "Specification for Structural Steel for Buildings."
 - a. Connections, unless noted otherwise on the Contract Documents, shall be designed for standard end loads as determined by the uniform load constants indicated in the AISC Manual of Steel Construction, Allowable Strength Design Method. Connections shall be made with double clip angles unless otherwise indicated on the Contract documents. Shop standards shall be used to the largest extent possible.
 - b. Design connections not detailed on the Contract Drawings under direct supervision of a Professional Engineer experienced in design of this work and licensed in the State of Delaware.

2. ANSI/AISC 341, "Seismic Provisions for Structural Steel Buildings."
 3. ASTM A6, "Specification for General Requirements for Rolled Steel Plates, Shapes, and Bars for Structural Use."
 4. Research Council on Structural Connections (RCSC), "Specification for Structural Joints Using High Strength Bolts."
 5. AWS D1.1, "Structural Welding Code".
- D. Professional Engineer shall be a licensed engineer legally authorized to practice in the State of Delaware and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for projects with structural steel framing that are similar to that indicated for this Project in material, design, and extent.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver structural steel to project site in such quantities and at such times to ensure continuity of installation.
- B. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from erosion and deterioration.
 1. Store fasteners in a protected place. Clean and relubricate bolts and nuts that become dry or rusty before use.
 2. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

1.6 FIELD MEASUREMENTS

- A. Verify that field measurements are as shown on Contract Drawings.

1.7 SEQUENCING

- A. Supply anchorage items to be embedded in, or attached to, other construction without delaying the Work. Provide setting diagrams, templates, instructions, and directions, as required, for installation.

PART 2 – PRODUCTS

2.1 MATERIALS AND CONSTRUCTION

- A. W-Shapes, channels, WT's, HP's, and other structural shapes shall comply with ASTM A992, Grade 50, high strength steel.
- B. Steel angles, plates, bar, and threaded rods shall comply with ASTM A36, carbon steel.
- C. Pipe shall comply with ASTM A53, Grade B.
- D. Hollow Structural Sections (square or rectangular) shall comply with ASTM A500, Grade B.
- E. Hollow Structural Sections (round) shall comply with ASTM A501.
- F. Anchor rods shall comply with ASTM F1554, Grade 36, headed-type, and hot-dip galvanized per ASTM F2329. Hooked anchor rods are not permitted.
- G. Bolts, nuts, and washers shall meet ASTM A325-N.

1. Direct Tension Indicators (DTI's) shall comply with ASTM F959 Type 325 compressible washer type with colored silicone.
 2. Provide beveled washers for bolted connections on the flanges of S-shapes and channels.
 3. Hot-dip galvanize all bolts, nuts, and washers.
- H. Welding materials shall meet AWS D1.1, type required for materials being welded.
- I. Grout shall be a non-shrink type, pre-mixed compound consisting of non-metallic aggregate, cement, water-reducing and plasticizing additives, capable of developing a minimum compressive strength of 7,000 psi at 28 days.
- J. Primer shall be fast curing, lead and chromate free, universal primer with good resistance to normal atmospheric corrosion, complying with performance requirements of FS-TT-P-664. Primer shall be compatible with finish paint system.
- K. Hot-dip galvanizing: ASTM A123.
- L. Galvanizing repair paint: High zinc-rich dust content paint complying with SSPC-Paint 20.

2.2 FABRICATION

- A. Fabricate and assemble in shop to greatest extent possible. Fabricate items according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC specifications referenced in this section, and as indicated on final shop drawings.
1. Properly mark and match-mark materials for field assembly. Fabricate for delivery sequence which will expedite erection and minimize field handling of materials. Coordinate with Owner's Representative for fabrication sequence.
 2. Identify high-strength structural steel according to ASTM A6 and maintain markings until structural steel has been erected.
 3. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.
 4. Comply with fabrication tolerance limits of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for structural steel.
 5. Provide cambered structural-steel members where indicated.
- B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1.
- C. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.
- D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.
- E. Holes: Provide holes required for securing other work to structural steel and for passage of other work through steel framing members.
1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning. Drill holes in bearing plates.
 2. Weld threaded nuts to framing and other specialty items indicated to receive other work.
- F. Where finishing is required, complete assembly, including welding of units, before start of finishing operations. Provide finish surfaces of members exposed in final structure, free of marking, burns and other defects.

2.3 FINISH

- A. Prepare structural component surfaces in accordance with SSPC specifications. Exposed structural steel shall receive a finish paint system.
- B. All steel framing and connections shall be hot-dip galvanized unless noted otherwise on the Contract Drawings.

2.4 SHOP CONNECTIONS

- A. High Strength Bolts: Shop-install high strength bolts according to RCSC's "Specification for Structural Joints Using High Strength Bolts" for type of bolt and type of joint specified.
- B. Welded Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.
 - 1. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.
 - 2. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.

PART 3 - EXECUTION**3.1 INSTALLATION**

- A. Examination
 - 1. Verify that field conditions are acceptable and are ready to receive work.
 - 2. Beginning of installation means erector accepts existing conditions.
- B. Setting Bases and Bearing Plates
 - 1. Remove bond-reducing materials from all concrete and masonry bearing surfaces and roughen to improve bond to surfaces. Clean the bottom surface of base and bearing plates.
 - 2. Set loose and attached base plates and bearing plates for structural members or wedges or other adjusting devices. A minimum of 4 anchor bolts shall be used for column base plates.
 - 3. Weld plate washers to top of base plate.
 - 4. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of base or bearing plate before packing with grout.
 - 5. Promptly pack grout solidly between bearing surfaces and base or bearing plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow it to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.
- C. Erection
 - 1. Allow for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in true alignment until completion of erection and installation of permanent bracing.
 - 2. Erect structural steel accurately in locations and to elevations indicated and according to AISC specifications referenced in this section.

3. Field weld components indicated on Contract Drawings. Components shall be free of primer and paint prior to field welding.
4. Do not field cut or alter structural members without prior notification to Owner's Representative.
5. After erection, prime welds, abrasions, and surfaces not shop primed except surfaces to be in contact with concrete.
6. Level and plumb individual members of structures within specified AISC tolerances.
7. Align and plumb edges of roof edge angle as dimensioned on contract drawings.

D. Field Connections

1. High Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using High Strength Bolts" for type of bolt and type of joint specified.
2. Standard Bolted Connections: Snug-tightened bolts, 3/4 inch diameter A325-N, unless noted otherwise on the Contract Drawings.
3. Slip-Critical Bolted Connections: Indicated as "S.C." on the Contract Drawings. Slip-critical connections shall use fully pre-tensioned and tightened 7/8 inch diameter A325-N bolts. Minimum pre-tension force for fully tightened 7/8 inch diameter bolts shall be 39 kips, in accordance with Table J3.1 of ANSI/AISC 360. Direct tension indicators shall be used at these connections to assure that bolts are properly installed and tensioned. Since all structural steel is hot-dip galvanized, the faying surfaces of all slip-critical connections shall be visibly roughened to meet RCSC's Section 3.2.2(c) requirements.
4. Welded Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work. Field weld components indicated on Contract Drawings. Components shall be free of primer and paint prior to field welding. Apply galvanizing paint to all field-welded connections.

3.2 QUALITY CONTROL

- A. Bolted Connections: Bolted connections shall be tested and inspected according to RCSC's "Specification for Structural Joints Using High Strength Bolts."
- B. Welded Connections: Welded connections shall be inspected according to AWS D1.1.
- C. Correct deficiencies in Work that test reports and inspections indicate do not comply with the Contract Documents.

END OF SECTION

SECTION 05 50 00
METAL FABRICATIONS

PART 1 – GENERAL

1.1 DESCRIPTION

A. Section Includes:

1. Steel framing and supports for mechanical and electrical equipment.
2. Steel framing and supports for applications where framing and supports are not specified in other Sections.
3. Metal ladders.
4. Ladder safety cages.
5. Metal ships' ladders
6. Metal floor plate and supports.
7. Miscellaneous steel trim including steel angle corner guards and steel edgings.
8. Metal bollards.
9. Abrasive metal nosings and treads.
10. Loose bearing and leveling plates for applications where they are not specified in other Sections.

B. Products furnished, but not installed, under this Section include the following:

1. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.
2. Steel weld plates and angles for casting into concrete for applications where they are not specified in other Sections.

C. Related Requirements:

1. Section 03 30 00 "Cast-in-Place Concrete" for installing anchor bolts, steel pipe sleeves, slotted-channel inserts, wedge-type inserts, and other items cast into concrete.
2. Section 05 12 00 "Structural Steel Framing."

1.2 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of metal fabrications that are anchored to or that receive other work. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.3 ACTION SUBMITTALS

A. Product Data: For the following:

1. Metal nosings and treads.

2. Paint products.
3. Grout.
- B. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide Shop Drawings for the following:
 1. Steel framing and supports for mechanical and electrical equipment.
 2. Steel framing and supports for applications where framing and supports are not specified in other Sections.
 3. Metal ladders.
 4. Ladder safety cages.
 5. Metal ships' ladders.
 6. Metal floor plate and supports.
 7. Miscellaneous steel trim including steel angle corner guards and steel edgings.
 8. Metal bollards.
 9. Abrasive metal nosings and treads.
- C. Samples for Verification: For each type and finish of extruded nosing and tread.
- D. Delegated-Design Submittal: For ladders, including analysis data signed and sealed by the qualified Professional Engineer responsible for their preparation.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Professional Engineer.
 1. The qualified Professional Engineer shall be licensed in the State of Delaware and shall have experience in the design, fabrication, and installation of the types of metal fabrications specified in this Section.
- B. Mill Certificates: Signed by stainless-steel manufacturers, certifying that products furnished comply with requirements.
- C. Welding certificates.
- D. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
- E. Research/Evaluation Reports: For post-installed anchors, from ICC-ES.

1.5 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to the latest edition of AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Welding Qualifications: Qualify procedures and personnel according to the latest editions of the following documents:
 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."

3. AWS D1.6/D1.6M, "Structural Welding Code - Stainless Steel."

1.6 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 – PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified Professional Engineer, as defined in Section 014000 "Quality Requirements," to design ladders.
- B. Structural Performance of Aluminum Ladders: Aluminum ladders, including landings, shall withstand the effects of loads and stresses within limits and under conditions specified in ANSI A14.3.
- C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
 - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 METALS

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.
- B. Steel Angles, plates, bars and threaded rod: ASTM A36.
- C. Stainless-Steel Sheet, Strip, and Plate: ASTM A240 or ASTM A666, Type 316L.
- D. Stainless-Steel Bars and Shapes: ASTM A276, Type 316L.
- E. Rolled-Steel Floor Plate: ASTM A786, rolled from plate complying with ASTM A36 or ASTM A283, Grade C or D.
- F. Rolled-Stainless-Steel Floor Plate: ASTM A793.
- G. Abrasive-Surface Floor Plate: Steel plate with abrasive granules rolled into surface or with abrasive material metallurgically bonded to steel.
 - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - a. IKG Industries, a division of Harsco Corporation.
 - b. SlipNOT Metal Safety Flooring.
- H. Hollow Structural Shapes (square or rectangular): ASTM A500, Grade B.
- I. Hollow Structural Shapes (round): ASTM A501.
- J. Steel Pipe: ASTM A53, Standard Weight (Schedule 40) unless otherwise indicated.
- K. Zinc-Coated Steel Wire Rope: ASTM A741.

1. Wire-Rope Fittings: Hot-dip galvanized-steel connectors with capability to sustain, without failure, a load equal to minimum breaking strength of wire rope with which they are used.
- L. Cast Iron: Either gray iron, ASTM A48, or malleable iron, ASTM A47, unless otherwise indicated.
- M. Aluminum Plate and Sheet: ASTM B209, Alloy 6061-T6.
- N. Aluminum Extrusions: ASTM B221, Alloy 6063-T6.
- O. Aluminum-Alloy Rolled Tread Plate: ASTM B632, Alloy 6061-T6.
- P. Aluminum Castings: ASTM B26, Alloy 443.0-F.
- Q. Bronze Extrusions: ASTM B455, Alloy UNS No. C38500 (extruded architectural bronze).
- R. Bronze Castings: ASTM B584, Alloy UNS No. C83600 (leaded red brass) or No. C84400 (leaded semired brass).
- S. Nickel Silver Extrusions: ASTM B151, Alloy UNS No. C74500.
- T. Nickel Silver Castings: ASTM B584, Alloy UNS No. C97600 (20 percent leaded nickel bronze).

2.3 FASTENERS

- A. General: Unless otherwise indicated, provide Type 316 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B633 or ASTM F1941, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
 1. Provide stainless-steel fasteners for fastening aluminum.
 2. Provide stainless-steel fasteners for fastening stainless steel.
 3. Provide stainless-steel fasteners for fastening nickel silver.
 4. Provide bronze fasteners for fastening bronze.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A307, Grade A; with hex nuts, ASTM A563; and, where indicated, flat washers.
- C. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A325, Type 3; with hex nuts, ASTM A563, Grade C3; and, where indicated, flat washers.
- D. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, ASTM F593; with hex nuts, ASTM F594; and, where indicated, flat washers; Alloy Group 2 (A4).
- E. Anchor Bolts: ASTM F1554, Grade 36, of dimensions indicated; with nuts, ASTM A563; and, where indicated, flat washers.
 1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.
- F. Anchors, General: Anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
- G. Cast-in-Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A47 malleable iron or ASTM A 27 cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F 2329.
- H. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.

1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941, Class Fe/Zn 5, unless otherwise indicated.
2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 2 (A4) stainless-steel bolts, ASTM F593, and nuts, ASTM F594.

2.4 MISCELLANEOUS MATERIALS

- A. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.
 1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.
- B. Water-Based Primer: Emulsion type, anticorrosive primer for mildly corrosive environments that is resistant to flash rusting when applied to cleaned steel, complying with MPI#107 and compatible with topcoat.
- C. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.
- D. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.
- E. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- F. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.
- G. Non-shrink, Non-metallic Grout: Factory-packaged, non-staining, non-corrosive, non-gaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- H. Concrete: Comply with requirements in Section 03 30 00 "Cast-in-Place Concrete" for normal-weight, air-entrained, concrete with a minimum 28-day compressive strength of 4,000 psi.

2.5 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Form exposed work with accurate angles and surfaces and straight edges.
- E. Weld corners and seams continuously to comply with the following:
 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.
 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.
- G. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
- J. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches, with a minimum 6-inch embedment and 2-inch hook, not less than 8 inches from ends and corners of units and 24 inches o.c., unless otherwise indicated.

2.6 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
 - 1. Furnish inserts for units installed after concrete is placed.
 - 2. Drill or punch girders and plates for field-bolted connections where indicated.
- C. Galvanize miscellaneous framing and supports where indicated.
- D. Prime miscellaneous framing and supports with zinc-rich primer where indicated.

2.7 METAL LADDERS

- A. General:
 - 1. Comply with ANSI A14.3.
- B. Steel Ladders:
 - 1. Space side rails 18 inches apart unless otherwise indicated.
 - 2. Side rails: Continuous, 1/2-by-2-1/2-inch steel flat bars, with eased edges.
 - 3. Rungs: 1-inch-square steel bars.
 - 4. Fit rungs in centerline of side rails; plug-weld and grind smooth on outer rail faces.
 - 5. Provide nonslip surfaces on top of each rung by coating with abrasive material metallurgically bonded to rung.
 - a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Harsco Industrial IKG, a division of Harsco Corporation; Mebac.
 - 2. SlipNOT Metal Safety Flooring, a division of W. S. Molnar Company; SlipNOT.

6. Provide platforms as indicated fabricated from welded or pressure-locked steel bar grating, supported by steel angles.
7. Support each ladder at top and bottom and not more than 60 inches o.c. with welded or bolted steel brackets.
8. Galvanize ladders, including brackets.

C. Aluminum Ladders:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. ACL Industries, Inc.
 - b. Alco-Lite Industrial Products.
 - c. Halliday Products.
 - d. O'Keeffe's Inc.
 - e. Precision Ladders, LLC.
 - f. Royalite Manufacturing, Inc.
 - g. Thompson Fabricating, LLC.
2. Space side rails 18 inches apart unless otherwise indicated.
3. Side rails: Continuous extruded-aluminum channels or tubes, not less than 2-1/2 inches deep, 3/4 inch wide, and 1/8 inch thick.
4. Rungs: Extruded-aluminum tubes, not less than 3/4 inch deep and not less than 1/8 inch thick, with ribbed tread surfaces.
5. Fit rungs in centerline of side rails; fasten by welding or with stainless-steel fasteners or brackets and aluminum rivets.
6. Provide platforms as indicated fabricated from pressure-locked aluminum bar grating, supported by extruded-aluminum framing.
7. Support each ladder at top and bottom and not more than 60 inches o.c. with welded or bolted aluminum brackets.
8. Provide minimum 72-inch high, hinged security door with padlock hasp at foot of ladder to prevent unauthorized ladder use.

2.8 LADDER SAFETY CAGES

A. General:

1. Fabricate ladder safety cages to comply with ANSI A14.3. Assemble by welding or with stainless-steel fasteners.
2. Provide primary hoops at tops and bottoms of cages and spaced not more than 20 feet o.c. Provide secondary intermediate hoops spaced not more than 48 inches o.c. between primary hoops.
3. Fasten assembled safety cage to ladder rails and adjacent construction by welding or with stainless-steel fasteners unless otherwise indicated.

B. Steel Ladder Safety Cages:

1. Primary Hoops: 1/4-by-4-inch flat bar hoops.
2. Secondary Intermediate Hoops: 1/4-by-2-inch flat bar hoops.
3. Vertical Bars: 3/16-by-1-1/2-inch flat bars secured to each hoop.
4. Galvanize ladder safety cages, including brackets and fasteners.

C. Aluminum Ladder Safety Cages:

1. Primary Hoops: 1/4-by-4-inch flat bar hoops.
2. Secondary Intermediate Hoops: 1/4-by-2-inch flat bar hoops.
3. Vertical Bars: 1/4-by-2-inch flat bars secured to each hoop.

2.9 METAL SHIPS LADDERS

- A. Provide metal ships' ladders where indicated. Fabricate of open-type construction with channel or plate stringers and pipe and tube railings unless otherwise indicated. Provide brackets and fittings for installation.
1. Treads shall be not less than 5 inches exclusive of nosing or less than 8-1/2 inches including the nosing, and riser height shall be not more than 9-1/2 inches.
 2. Fabricate ships' ladders including railings from steel.
 3. Fabricate treads and platforms from welded or pressure-locked steel bar grating.
 4. Comply with applicable railing requirements in Section 05 52 13 "Pipe and Tube Railings."
 5. Galvanize steel ships' ladders including treads, railings, brackets, and fasteners.

2.10 METAL FLOOR PLATE

- A. Fabricate from rolled-steel floor and abrasive-surface floor plate of thickness indicated below:
1. Thickness: As indicated.
- B. Provide grating sections where indicated fabricated from welded or pressure-locked steel bar grating.
- C. Provide steel angle supports as indicated.
- D. Include steel angle stiffeners, and fixed and removable sections as indicated.
- E. Provide flush steel bar drop handles for lifting removable sections, one at each end of each section.

2.11 MISCELLANEOUS STEEL TRIM

- A. Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.
- B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.
- C. Provide with integrally welded steel strap anchors for embedding in concrete or masonry construction.
- D. Galvanize and prime exterior miscellaneous steel trim.

2.12 METAL BOLLARDS

- A. Fabricate metal bollards from steel shapes, as indicated.
 - 1. Cap bollards with 1/4-inch thick steel plate.
- B. Fabricate bollards with 3/8-inch thick steel baseplates for bolting to concrete slab. Drill baseplates at all four corners for 3/4-inch anchor bolts.
 - 1. Where bollards are to be anchored to sloping concrete slabs, angle baseplates for plumb alignment of bollards.
- C. Fabricate sleeves for bollard anchorage from steel pipe with 1/4-inch thick steel plate welded to bottom of sleeve. Make sleeves not less than 8 inches deep and 3/4 inch larger than OD of bollard.
- D. Fabricate internal sleeves for removable bollards from Schedule 40 steel pipe or 1/4-inch wall-thickness steel tubing with an OD approximately 1/16 inch less than ID of bollards. Match drill sleeve and bollard for 3/4-inch steel machine bolt.

2.13 ABRASIVE METAL NOSINGS AND TREADS

- A. Cast-Metal Units: Cast iron with an integral-abrasive, as-cast finish consisting of aluminum oxide, silicon carbide, or a combination of both. Fabricate units in lengths necessary to accurately fit openings or conditions.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. American Safety Tread Co., Inc.
 - b. Balco, Inc.
 - c. Barry Pattern & Foundry Co., Inc.
 - d. Granite State Casting Co.
 - e. Safe-T-Metal Company, Inc.
 - f. Wooster Products Inc.
 - 2. Nosings: Cross-hatched units, 1-1/2 by 1-1/2 inches, for casting into concrete.
 - 3. Treads: Cross-hatched units, full depth of tread with 3/4-by-3/4-inch nosing, for application over bent plate treads or existing stairs.
 - 4. Provide solid-abrasive-type units without ribs.
- B. Provide anchors for embedding units in concrete, either integral or applied to units, as standard with manufacturer.
- C. Drill for mechanical anchors and countersink. Locate holes not more than 4 inches from ends and not more than 12 inches o.c., evenly spaced between ends, unless otherwise indicated. Provide closer spacing if recommended by manufacturer.
 - 1. Provide two rows of holes for units more than 5 inches wide, with two holes aligned at ends and intermediate holes staggered.
- D. Apply bituminous paint to concealed surfaces of cast-metal units.
- E. Apply clear lacquer to concealed surfaces of extruded units.

2.14 LOOSE BEARING AND LEVELING PLATES

- A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.
- B. Galvanize plates.

2.15 STEEL WELD PLATES AND ANGLES

- A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with no fewer than two integrally welded steel strap anchors for embedding in concrete.

2.16 FINISHES, GENERAL

- A. Finish metal fabrications after assembly.
- B. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.17 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A153 for steel and iron hardware and with ASTM A123 for other steel and iron products.
 - 1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.
- B. Preparation for Shop Priming Galvanized Items: After galvanizing, thoroughly clean railings of grease, dirt, oil, flux, and other foreign matter, and treat with metallic phosphate process.
- C. Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.
- D. Preparation for Shop Priming: Prepare surfaces to comply with requirements indicated below:
 - 1. Exterior Items: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 - 2. Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 - 3. Items Indicated to Receive Primers Specified in Section 099600 "High-Performance Coatings": SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
 - 4. Other Items: SSPC-SP 3, "Power Tool Cleaning."
- E. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
 - 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

2.18 ALUMINUM FINISHES

- A. As-Fabricated Finish: AA-M12.
- B. Clear Anodic Finish: AAMA 611, Class I, AA-M12C22A41.

PART 3 – EXECUTION**3.1 INSTALLATION, GENERAL**

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- C. Field Welding: Comply with the following requirements:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.
- E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.
- F. Corrosion Protection: Coat concealed surfaces of aluminum that come into contact with grout, concrete, masonry, wood, or dissimilar metals with the following:
 - 1. Cast Aluminum: Heavy coat of bituminous paint.
 - 2. Extruded Aluminum: Two coats of clear lacquer.

3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.
- B. Support steel girders on solid grouted masonry, concrete, or steel pipe columns. Secure girders with anchor bolts embedded in grouted masonry or concrete or with bolts through top plates of pipe columns.
 - 1. Where grout space under bearing plates is indicated for girders supported on concrete or masonry, install as specified in "Installing Bearing and Leveling Plates" Article.

3.3 INSTALLING METAL BOLLARDS

- A. Fill metal-capped bollards solidly with concrete and allow concrete to cure seven days before installing.
 - 1. Do not fill removable bollards with concrete.
- B. Anchor bollards to existing construction with expansion anchors. Provide four 3/4-inch bolts at each bollard unless otherwise indicated.

1. Embed anchor bolts at least 4 inches in concrete.

- C. Anchor bollards in concrete with pipe sleeves preset and anchored into concrete, in formed or core-drilled holes not less than 8 inches deep and 3/4 inch larger than OD of bollard. Fill annular space around bollard solidly with non-shrink grout; mixed and placed to comply with grout manufacturer's written instructions. Slope grout up approximately 1/8 inch toward bollard.
- D. Anchor internal sleeves for removable bollards in concrete by inserting in pipe sleeves preset into concrete or formed or core-drilled holes not less than 8 inches deep and 3/4 inch larger than OD of sleeve. Fill annular space around internal sleeves solidly with non-shrink grout; mixed and placed to comply with grout manufacturer's written instructions. Slope grout up approximately 1/8 inch toward internal sleeve.
- E. Anchor internal sleeves for removable bollards in place with concrete footings. Center and align sleeves in holes 3 inches above bottom of excavation. Place concrete and vibrate or tamp for consolidation. Support and brace sleeves in position until concrete has cured.
- F. Place removable bollards over internal sleeves and secure with 3/4-inch machine bolts and nuts. After tightening nuts, drill holes in bolts for inserting padlocks. Owner furnishes padlocks.
- G. Fill bollards solidly with concrete, mounding top surface to shed water.

1. Do not fill removable bollards with concrete.

3.4 INSTALLING NOSINGS, TREADS AND THRESHOLDS

- A. Center nosings on tread widths unless otherwise indicated.
- B. For nosings embedded in concrete steps or curbs, align nosings flush with riser faces and level with tread surfaces.
- C. Seal thresholds exposed to exterior with elastomeric sealant complying with Section 07 92 00 "Joint Sealants" to provide a watertight installation.

3.5 INSTALLING BEARING AND LEVELING PLATES

- A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of plates.
- B. Set bearing and leveling plates on wedges, shims, or leveling nuts. After bearing members have been positioned and plumbed, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with non-shrink grout. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.6 ADJUSTING AND CLEANING

- A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 1. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780.

END OF SECTION

SECTION 05 52 13**PIPE AND TUBE RAILINGS****PART 1 – GENERAL****1.1 DESCRIPTION**

- A. This Section Includes the following as shown on the Contract Drawings, complete including fabrication, shop finishing and installation:

1. Steel tube railings.

1.2 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- C. Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not satisfy structural performance requirements.

1.3 ACTION SUBMITTALS

- A. Product Data: For the following:
1. Manufacturer's product lines of mechanically connected railings.
 2. Railing brackets.
 3. Grout, anchoring cement, and paint products.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1.4 INFORMATIONAL SUBMITTALS

- A. Welding certificates.
- B. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers certifying that shop primers are compatible with topcoats.

1.5 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to the latest edition of AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.6 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

1.7 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Railings, including attachment to building construction, shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

1. Handrails and Top Rails of Guards:
 - a. Uniform load of 50 lbf/ ft applied in any direction.
 - b. Concentrated load of 200 lbf applied in any direction.
 - c. Uniform and concentrated loads need not be assumed to act concurrently.
2. Infill of Guards:
 - a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft.
 - b. Infill load and other loads need not be assumed to act concurrently.
3. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
 - a. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

PART 2 - PRODUCTS

2.1 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
- B. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails unless otherwise indicated.

2.2 STEEL AND IRON

- A. Hollow Structural Sections: ASTM A500, Grade B (square or rectangular), ASTM A501 (round).
 1. Provide galvanized finish for exterior installations and where indicated.
- B. Structural shapes and channels: ASTM A992 or A572, Grade 50.
- C. Angles, plates, and bars: ASTM A36.
- D. Cast Iron: Either gray iron, ASTM A48, or malleable iron, ASTM A47, unless otherwise indicated.

2.3 FASTENERS

- A. General: Provide the following:
 1. Ungalvanized Steel Railings: Plated steel fasteners complying with ASTM B633 or ASTM F1941, Class Fe/Zn 5 for zinc coating.
 2. Hot-Dip Galvanized Railings: Type 304 stainless-steel or hot-dip zinc-coated steel fasteners complying with ASTM A153 or ASTM F2329 for zinc coating.
 3. Provide exposed fasteners with finish matching appearance, including color and texture, of railings.
- B. Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads.

1. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless exposed fasteners are unavoidable or are the standard fastening method for railings indicated.
2. Provide square or hex socket flat-head machine screws for exposed fasteners unless otherwise indicated.

2.4 MISCELLANEOUS MATERIALS

- A. Etching Cleaner for Galvanized Metal: Complying with MPI#25.
- B. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
- C. Non-shrink, Non-metallic Grout: Factory-packaged, non-staining, non-corrosive, non-gaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.
- D. Anchoring Cement: Factory-packaged, non-shrink, non-staining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound.
 1. Water-Resistant Product: At exterior locations and where indicated provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended by manufacturer for exterior use.

2.5 FABRICATION

- A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.
- B. Shop assemble railings to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.
- C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- D. Form work true to line and level with accurate angles and surfaces.
- E. Fabricate connections that are exposed to weather in a manner that excludes water. Provide weep holes where water may accumulate.
- F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.
- G. Connections: Fabricate railings with either welded or non-welded connections unless otherwise indicated.
- H. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.
 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove flux immediately.

4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.
- I. For changes in direction made by bending, use jigs to produce uniform curvature for each repetitive configuration required. Maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
- J. Close exposed ends of railing members with prefabricated end fittings.
- K. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is 1/4 inch or less.
- L. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.
- M. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.
- N. For railing posts set in concrete, provide steel sleeves not less than 6 inches long with inside dimensions not less than 1/2 inch greater than outside dimensions of post, with metal plate forming bottom closure.
- O. For removable railing posts, fabricate slip-fit sockets from steel tube whose ID is sized for a close fit with posts; limit movement of post without lateral load, measured at top, to not more than one-fortieth of post height. Provide socket covers designed and fabricated to resist being dislodged.
 1. Provide chain with eye, snap hook, and staple across gaps formed by removable railing sections at locations indicated. Fabricate from same metal as railings.
- P. Steel Grating Infill Panels: Fabricate infill panels from steel grating as shown on the Contract Drawings made from same metal as railings in which they are installed.
- Q. Toe Boards: Where indicated, provide toe boards at railings around openings and at edge of open-sided floors and platforms. Fabricate to dimensions and details indicated.

2.6 STEEL AND IRON FINISHES

- A. Galvanized Railings:
 1. Hot-dip galvanize all steel railings, including hardware, after fabrication.
 2. Comply with ASTM A123 for hot-dip galvanized railings.
 3. Comply with ASTM A153 for hot-dip galvanized hardware.
 4. Fill vent and drain holes that are exposed in the finished Work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.
- B. For galvanized railings, provide hot-dip galvanized fittings, brackets, fasteners, sleeves, and other ferrous components.
- C. Preparing Galvanized Railings for Shop Priming: After galvanizing, thoroughly clean railings of grease, dirt, oil, flux, and other foreign matter, and treat with etching cleaner.
- D. For non-galvanized steel railings, provide non-galvanized ferrous-metal fittings, brackets, fasteners, and sleeves; however, galvanize anchors to be embedded in exterior concrete or masonry.
 1. Do not apply primer to galvanized surfaces.

PART 3 – EXECUTION**3.1 INSTALLATION, GENERAL**

- A. Fit exposed connections together to form tight, hairline joints.
- B. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.
 - 1. Do not weld, cut, or abrade surfaces of railing components that are coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
 - 2. Set posts plumb within a tolerance of 1/16 inch in 3 feet.
 - 3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet.
- C. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
- D. Adjust railings before anchoring to ensure matching alignment at abutting joints.
- E. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.2 RAILING CONNECTIONS

- A. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in "Fabrication" Article whether welding is performed in the shop or in the field.
- B. Expansion Joints: Install expansion joints at locations indicated but not farther apart than required to accommodate thermal movement. Provide slip-joint internal sleeve extending 2 inches beyond joint on either side, fasten internal sleeve securely to one side, and locate joint within 6 inches of post.

3.3 ANCHORING POSTS

- A. Use metal sleeves preset and anchored into concrete for installing posts. After posts are inserted into sleeves, fill annular space between post and sleeve with non-shrink, non-metallic grout or anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions.
- B. Form or core-drill holes not less than 5 inches deep and 3/4 inch larger than OD of post for installing posts in concrete. Clean holes of loose material, insert posts, and fill annular space between post and concrete with non-shrink, non-metallic grout or anchoring cement, mixed and placed to comply with anchoring material manufacturer's written instructions.
- C. Leave anchorage joint exposed with 1/8-inch buildup, sloped away from post
- D. Anchor posts to metal surfaces with oval flanges, angle type, or floor type as required by conditions, connected to posts and to metal supporting members as follows:
 - 1. For steel pipe railings, weld flanges to post and bolt to metal supporting surfaces.
- E. Install removable railing sections, where indicated, in slip-fit metal sockets cast in concrete.

3.4 ADJUSTING AND CLEANING

- A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas, and repair galvanizing to comply with ASTM A780.

3.5 PROTECTION

- A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.

END OF SECTION

SECTION 05 53 13**BAR GRATINGS****PART 1 – GENERAL****1.1 DESCRIPTION**

- A. Section includes metal bar gratings and metal frames and supports for gratings.
- B. Related Requirements:
 - 1. Section 05 12 00 "Structural Steel Framing" for structural-steel framing system components.
 - 2. Section 05 52 13 "Pipe and Tube Railings" for metal pipe and tube handrails and railings.

1.2 COORDINATION

- A. Coordinate installation of anchorages for gratings, grating frames, and supports. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.3 ACTION SUBMITTALS

- A. Product Data: For the following items.
 - 1. Clips and anchorage devices for gratings.

1.4 INFORMATIONAL SUBMITTALS

- A. Welding certificates.

1.5 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to the latest edition of AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.6 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 – PRODUCTS**2.1 MANUFACTURERS**

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Ohio Gratings, Inc. or comparable product by one of the following:
 - 1. McNichols Co.
 - 2. or approved equal.

2.2 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Gratings shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
 - 1. Walkways and Elevated Platforms Used as Exits: Uniform load of 100 lbf/sq. ft.

2. Limit deflection to $L/360$ or $1/4$ inch, whichever is less.

2.3 METAL BAR GRATINGS

- A. Metal Bar Grating Standards: Comply with NAAMM MBG 531, "Metal Bar Grating Manual" and NAAMM MBG 532, "Heavy-Duty Metal Bar Grating Manual."
- B. Welded Steel Grating:
 1. Grating Mark W-19-4 ($1 \times 1/8$) STEEL: 1-inch-by- $1/8$ -inch bearing bars at $1-3/16$ inches o.c., and crossbars at 4 inches o.c.
 2. Grating Mark W-19-4 ($1-1/2 \times 3/16$) STEEL: $1-1/2$ -by- $3/16$ -inch bearing bars at $1-3/16$ inches o.c., and crossbars at 4 inches o.c.
 3. Traffic Surface: Serrated.
 4. Steel Finish: Hot-dip galvanized with a coating weight of not less than 1.8 oz./sq. ft. of coated surface.

2.4 FERROUS METALS

- A. Steel angles, plates, and bars: ASTM A36.
- B. Steel shapes and channels: ASTM A992 or A572, Grade 50.
- C. Steel bars for bar gratings: ASTM A36 or steel strip, ASTM A1011 or ASTM A1018.
- D. Wire rod for bar grating crossbars: ASTM A510.
- E. Uncoated steel sheet: ASTM A1011, structural steel, Grade 30.
- F. Galvanized steel sheet: ASTM A653, structural quality, Grade 33, with G90 (Z275) coating.

2.5 FASTENERS

- A. General: Unless otherwise indicated, provide Type 316 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B633 or ASTM F1941 Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A307, Grade A; with hex nuts, ASTM A563 and, where indicated, flat washers.
- C. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, nuts, and, where indicated, flat washers; ASTM F593 for bolts and ASTM F594 for nuts, Alloy Group 2 (A4).
- D. Anchor Bolts: ASTM F1554, Grade 36, of dimensions indicated; with nuts, ASTM A563 and, where indicated, flat washers.
 1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.
- E. Post-Installed Anchors: Torque-controlled expansion or chemical anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
 1. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 2 (A4) stainless-steel bolts, ASTM F593, and nuts, ASTM F594.

2.6 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

2.7 FABRICATION

- A. Shop Assembly: Fabricate grating sections in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch material cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form from materials of size, thickness, and shapes indicated, but not less than that needed to support indicated loads.
- D. Fit exposed connections accurately together to form hairline joints.
- E. Welding: Comply with AWS recommendations and the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
- F. Provide for anchorage of type indicated; coordinate with supporting structure. Fabricate and space the anchoring devices to secure gratings, frames, and supports rigidly in place and to support indicated loads.
 - 1. Fabricate toe plates to fit grating units and weld to units in shop unless otherwise indicated.
 - 2. Fabricate toe plates for attaching in the field.
 - 3. Toe plate Height: 4 inches unless otherwise indicated.
- G. Removable Grating Sections: Fabricate with banding bars attached by welding to entire perimeter of each section. Include anchors and fasteners of type indicated or, if not indicated, as recommended by manufacturer for attaching to supports.
 - 1. Provide no fewer than four weld lugs for each heavy-duty grating section, with each lug shop welded to two bearing bars.
 - 2. Provide no fewer than four saddle clips for each grating section containing rectangular bearing bars 3/16 inch or less in thickness and spaced 15/16 inch or more o.c., with each clip designed and fabricated to fit over two bearing bars.
 - 3. Provide no fewer than four weld lugs for each grating section containing rectangular bearing bars 3/16 inch or less in thickness and spaced less than 15/16 inch o.c., with each lug shop welded to three or more bearing bars. Interrupt intermediate bearing bars as necessary for fasteners securing grating to supports.
 - 4. Furnish threaded bolts with nuts and washers for securing grating to supports.
 - 5. Furnish self-drilling fasteners with washers for securing grating to supports.

6. Furnish galvanized malleable-iron flange clamp with galvanized bolt for securing grating to supports. Furnish as a system designed to be installed from above grating by one person.
7. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

- a. Kee Safety, Ltd; Grating Clip.
- b. LNA Solutions, a Kee Safety company; Grate-Fast.

H. Fabricate cutouts in grating sections for penetrations indicated. Arrange cutouts to permit grating removal without disturbing items penetrating gratings.

1. Edge-band openings in grating that interrupt four or more bearing bars with bars of same size and material as bearing bars.

I. Do not notch bearing bars at supports to maintain elevation.

2.8 STEEL FINISHES

- A. Finish gratings, frames, and supports after assembly.
- B. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A153 for steel and iron hardware and with ASTM A123 for other steel and iron products.

PART 3 – EXECUTION

3.1 INSTALLATION, GENERAL

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing gratings to in-place construction. Include threaded fasteners for concrete and masonry inserts, through-bolts, lag bolts, and other connectors.
- B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing gratings. Set units accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.
- C. Provide temporary bracing or anchors in formwork for items that are to be built into concrete or masonry.
- D. Fit exposed connections accurately together to form hairline joints.
 1. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade the surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- E. Attach toe plates to gratings by welding at locations indicated.
- F. Field Welding: Comply with AWS recommendations and the following:
 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.

3.2 INSTALLING METAL BAR GRATINGS

- A. General: Install gratings to comply with recommendations of referenced metal bar grating standards that apply to grating types and bar sizes indicated, including installation clearances and standard anchoring details.
- B. Attach removable units to supporting members with type and size of clips and fasteners indicated or, if not indicated, as recommended by grating manufacturer for type of installation conditions shown.
- C. Attach non-removable units to supporting members by welding where both materials are same; otherwise, fasten by bolting as indicated above.

3.3 ADJUSTING AND CLEANING

- A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780.

END OF SECTION

DIVISION 07 – THERMAL AND MOISTURE PROTECTION

SECTION 07 92 00**JOINT SEALANTS****PART 1 – GENERAL****1.1 DESCRIPTION**

- A. This Section includes the requirements for applying exterior caulking and structural epoxy paste adhesive as shown on the Contract Drawings and as required by the Work, including the following locations:
 - 1. Construction joints
 - 2. Vertical joints between unlike materials
 - 3. Expansion joints
 - 4. Control Joints

1.2 REFERENCES

- A. The Work shall be in accordance with the latest revisions of the following codes, standards, and specifications except where more stringent requirements have been specified herein.
 - 1. United States Federal Test Method TT-S-001543
 - 2. United States Federal Test Method TT-S-00227
 - 3. United States Federal Test Method TT-S-00230
 - 4. ASTM C-881 - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete
 - 5. AASHTO M-235 - Standard Specification for Epoxy Resin Adhesives

1.3 SUBMITTALS

- A. Samples
 - 1. Manufacturer's technical data.
 - 2. Samples of sealants specified.
- B. Guarantee: Submit two written and signed guarantees.

1.4 GUARANTEE

- A. The Contractor and sealant installer shall jointly guarantee to repair or replace sealants which fail to form air-tight and water-tight joints, or fail in joint adhesion, cohesion, abrasion resistance, weather resistance, or appear to deteriorate in any other manner for a period of two years from the date of acceptance by the Owner.

1.5 PRODUCT DELIVERY, HANDLING AND STORAGE

- A. Deliver materials to the project site and store with manufacturer's label intact.
- B. Manufacturer's label shall state date of manufacture and shelf life.
- C. Materials shall be stored under cover at 70 degrees Fahrenheit for 48 hours prior to installation.

PART 2 – PRODUCTS**2.1 MATERIALS**

- A. Sealants shall be one or two component elastomeric compound of either silicone, polysulfide or polyurethane base manufactured by Sika Greenstreak Group, or equal.
 - 1. Silicone based sealants shall meet the requirements of Federal Specification TT-S-001543. Primers for silicone sealants shall be quick drying clear primers as recommended by the sealant manufacturer.
 - 2. Polysulfide and polyurethane base sealants shall meet the requirements of Federal Specification TT-S-00227 or TT-S-00230. Primers shall be non-bleeding non-staining, clear-drying materials as recommended by the sealant manufacturer.
 - 3. High-modulus, high-strength structural epoxy paste adhesive shall meet the requirements of ASTM C-881 Types I, II & IV Grade 3, Classes B & C or AASHTO M-235. The product shall meet NSF/ ANSI Standard 61 and be suitable for potable water contact.
 - 4. Single component water-swelling sealant shall be Leakmaster LV-1 or equal. The product shall expand approximately two times its original volume when exposed to water.
- B. Back-up for joint gasketing shall be closed cell polyethylene sponge for the required size and shape, as recommended by the sealant manufacturer. Materials impregnated with oil, solvents or bituminous materials shall not be used. Oakum shall be dry and free from oil and creosote.
- C. Sealants for joints which are continuously exposed to water shall be two-component polyurethane base sealants with a primer which is recommended for immersion conditions.
- D. Sealants for horizontal concrete surfaces in exposed areas shall be non-tracking and sealants for vertical and overhead joints shall be non-sagging type.
- E. Solvents, cleaning agents, and other accessory materials shall be as recommended by the sealant manufacturer.

PART 3 – EXECUTION**3.1 PREPARATION**

- A. The compatibility of the specified sealant with the joint surfaces, joint fillers and other materials behind or below the joint shall be investigated before purchases of sealant materials. Only materials which are known to be fully compatible with the actual installation condition, as shown by the manufacturer's published data or certification shall be provided.
- B. All surfaces to receive sealants shall be dry and frost free, cleaned thoroughly and made free of all loose particles, dirt, dust, oil, wax and other foreign matter. Stone, concrete, and masonry shall be cleaned with brushes, if necessary. Protective coatings and mold release agents on materials to receive sealants shall be removed with a recommended solvent.
- C. It shall be the responsibility of the sealant contractor to install a sample bead of sealant before commencing work, to demonstrate the degree of adhesion attained with actual job materials and cleaning methods.
- D. All surfaces which are to receive sealant shall be primed after the surfaces have been prepared. If tests of the primer indicate discoloration of adjacent surfaces, special precautions must be

taken to guard against the primer being applied over any surface to remain exposed. An impervious tape or equivalent cover must be applied prior to priming and shall not be removed until the sealant has been placed.

- E. Cracks in existing concrete shall be routed to allow for minimum sealant dimensions specified below. Joint surfaces shall be cleaned of all dust and debris prior to priming.

3.2 INSTALLATION

- A. Sealants shall be installed to the depths as shown or, if not shown, as recommended by the sealant manufacturer but within the following general limitations: For normal moving joints sealed with elastomeric sealants but not subject to traffic, joints shall be filled to a depth equal to 50% of the joint width, but not more than 1/2" deep or less than 1/4" deep. Control joints shall be recessed 1/4" below the adjoining surfaces. A bond breaker shall be used in all joints to prevent three-sided adhesion of the sealant material.
- B. Joints which exceed the depth requirements specified herein shall be packed with a performed backup material recommended by the sealant manufacturer. Where backing rods are used, the depth of the joint shall be measured from the crown of the circular or semi-circular rods.
- C. Sealants shall be applied in strict accordance with the manufacturer's directions. Proper nozzle for joint width shall be used and the material shall be driven with sufficient pressure to fill the joints completely. Sealants which merely bridge the joints at the surface and do not completely fill the space behind shall not be acceptable. Application shall begin at the bottom of vertical joints and work upward. Knife application shall be restricted to special conditions where gun application is impractical and shall be specifically approved by the Engineer.
- D. Joints shall be pointed smooth and neat with the proper tool. A tooling solution as recommended by the sealant manufacturer shall be used.
- E. Sealant shall be applied to all control joints, vertical joints and elsewhere as indicated on the drawings.

3.3 WEATHER CONDITIONS

- A. The installation of sealants shall not proceed under adverse conditions or when temperature is above or below the limitations set by the manufacturers.
- B. Whenever the joint width is affected by ambient temperature variation, the elastomeric sealants shall be installed only when temperatures are in the lower third of the manufacturer's recommended temperature range.

3.4 CLEANING

- A. Excess materials shall be removed and finished joints shall be left without holes, cracks, sags, wrinkles or other imperfections.
- B. Surfaces that have been soiled during sealant installation shall be cleaned immediately with solvent or cleaning agent as recommended by the sealant manufacturer.

END OF SECTION

DIVISION 31 – SITEWORK

SECTION 31 05 16**AGGREGATES FOR EARTHWORK****PART 1 – GENERAL****1.1 DESCRIPTION**

- A. This section covers the requirements for furnishing and placing aggregate materials as shown on the Contract Drawings or as required by the Work.

1.2 RELATED SECTIONS

- A. 31 23 16 Excavation
B. 31 23 23 Earthfill
C. 31 32 19 Geotextiles

1.3 REFERENCES

- A. Comply with the following codes, standards and specifications, except where more stringent requirements have been specified herein:
1. Delaware Department of Transportation Standard Specifications for Road and Bridge Construction, including all Supplemental Specifications (DelDOT Standard Specifications)
 2. American Society for Testing and Materials (ASTM)
 - a. ASTM C136 Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
 - b. ASTM D698 Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³).
 - c. ASTM D1557 Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN-m/m³).
 - d. ASTM D2487 Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System).
 - e. ASTM D4318 Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils.
 3. American Association of State Highway and Transportation Officials
 - a. AASHTO M147 Standard Specification for Materials for Aggregate and Soil-Aggregate Subbase, Base and Surface Courses.
 - b. AASHTO T180 Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop.

1.4 SUBMITTALS

- A. Submit the following in accordance with the General Conditions/General Requirements:
1. Source of Material (name and location).
 2. Certification from the quarry that material conforms to these Specifications.

1.5 QUALITY ASSURANCE

- A. Furnish each aggregate material from a single source throughout the Work.
- B. All Work shall be performed according to Delaware Department of Transportation (DelDOT) standards.

PART 2 – PRODUCTS**2.1 COARSE AGGREGATE MATERIALS**

- A. DelDOT No. 57 Coarse Aggregate – Conforming to the DelDOT Standard Specifications, Sections 805 and 813.
- B. DelDOT Type B (Crusher Run) Graded Aggregate: For asphalt pavement subbase. Conforming to the DelDOT Standard Specifications, Section 821.03.

PART 3 – EXECUTION**3.1 FOUNDATION PREPARATION**

- A. Subgrades shall be stripped of vegetation and other unsuitable materials or shall be excavated as specified.
- B. Subgrade surfaces shall not be steeper than one horizontal to one vertical unless otherwise specified.
- C. The existing subgrade soils shall be proofrolled prior to placement of aggregate materials. Geotextiles or aggregates shall not be placed until the subgrade has been observed by the Engineer.

3.2 PLACEMENT

- A. Aggregate material shall not be placed until the required excavation and subgrade preparations have been completed, the foundation surfaces have been observed by the engineer, and geotextile, if required, has been installed.
- B. Aggregates shall not be placed upon a frozen surface, nor shall snow, ice or frozen material be incorporated in the fill.
- C. Aggregates shall be placed in horizontal layers, not to exceed 12 inches after compaction. When compaction is achieved using manually-controlled equipment, layers should not exceed 8 inches before compaction. Materials shall be spread uniformly to not more than the specified thickness prior to compaction.
- D. Aggregate material placed adjacent to structures shall be placed in a manner which will prevent damage to the structures and will allow the structures to assume the loads from the fill gradually and uniformly.
- E. The distribution of the material shall be essentially uniform and free from lenses, pockets, streaks or layers of material differing substantially in texture or gradation from the surrounding material.
- F. Where aggregate is placed over geotextile, it shall be placed with sufficient care to prevent damage to the geotextile. Geotextile that is damaged shall be repaired or replaced at the Contractor's expense.
- G. The materials shall be placed in a manner to avoid segregation of particle sizes and to ensure the continuity and integrity of all zones. No foreign materials shall be allowed to become intermixed

with or otherwise contaminate the aggregate materials. Exposed areas of aggregate shall be protected from contamination caused by erosion of existing subgrade materials.

- H. Traffic shall not be allowed to cross over aggregate subbase at random. Equipment crossovers shall be maintained, and the number and location of such crossovers shall be established and approved prior to the beginning of material placement. Each crossover shall be cleaned of all contaminating materials and shall be inspected by the Engineer before additional aggregate or pavement is placed.

3.3 COMPACTION

- A. DelDOT No. 57 Coarse Aggregate shall be compacted with a minimum of four passes of a vibrating plate compactor.
- B. DelDOT Type B Graded Aggregate shall be compacted as specified in 31 23 23 Earthfill, Section 3.4.

END OF SECTION

SECTION 31 08 13.13**DYNAMIC PILE TESTING****PART 1 – GENERAL****1.1 SUMMARY OF WORK**

- A. This Section includes the requirements for dynamic pile testing of piles of the sizes, weights, and lengths as shown on the Contract Drawings and as specified herein.
- B. Dynamic testing involves attaching at least two strain transducers and two accelerometers to the pile near the pile head during initial driving or at a convenient location during re-strike testing. A cable or wireless transmitter connects the sensors near the pile head with the Pile Driving Analyzer® (PDA) system (available from Pile Dynamics, Inc., 30725 Aurora Road, Cleveland, OH 44139, USA; www.pile.com/pdi; email: info@pile.com; phone: +1 216-831-6131) or equivalent, located a safe distance from the pile, but not more than 100 m (330 ft) from the pile.
- C. The Contractor shall secure the services of a Dynamic Testing Consultant. Dynamic testing shall be performed on 2 indicator piles during the final 10 ft of initial driving and/or during restrike a minimum of 3 days after initial driving. Engineer shall designate production pile locations for use as indicator piles.

1.2 RELATED SECTIONS

- A. Section 31 62 16.16 Steel H-Piles
- B. Section 31 62 23.13 Concrete Filled Steel Piles

1.3 REFERENCES

- A. Materials and installation shall be in accordance with the latest revisions of the following codes, standards, and specifications except where more stringent requirements have been specified herein.
 - 1. American Society for Testing and Materials (ASTM)
 - a. ASTM D-4945 Standard Test Method for High-Strain Dynamic Testing of Piles
 - 2. Delaware Department of Transportation Standard Specifications for Road and Bridge Construction, including all Supplemental Specifications (DelDOT Standard Specifications)

1.4 EQUIPMENT AND PERSONNEL

- A. The dynamic monitoring shall be performed using a Pile Driving Analyzer® system (Model 8G or PAX). All equipment necessary for the dynamic monitoring such as sensors, cables or wireless transmitters, etc., shall be furnished by the Dynamic Testing Consultant. The equipment shall conform to the requirements of ASTM D-4945.
- B. An engineer who has achieved Advanced Level or better on the PDI / PDCA Dynamic Measurement and Analysis Proficiency Test shall be in charge of PDA operation and of result interpretation, either on site or by remote connection (SiteLink®).

PART 2 – PRECONSTRUCTION**2.1 PRECONSTRUCTION WAVE EQUATION ANALYSIS**

- A. Fifteen (15) working days prior to driving the indicator piles, the Contractor shall submit the “Pile and Complete Driving Equipment Data Form” to the Dynamic Testing Consultant. The Dynamic

Testing Consultant shall use the submitted information to perform wave equation analyses and shall prepare a summary report of the wave equation results. The wave equation analysis (using GRLWEAP software by Pile Dynamics, Inc. or equivalent) shall be used to assess the ability of the proposed driving system to install the pile to the required capacity and desired penetration depth within the allowable driving stresses.

- B. Approval of the proposed driving system by the Engineer shall be based upon the wave equation analyses indicating that the proposed driving system can develop a pile capacity of the pile design load times 2.5 at a driving resistance not greater than 5 blows per inch within allowable driving stress limits. The hammer should also be sized or adjustable such that the penetration per blow at the required ultimate capacity does not exceed 0.5 inches.
- C. A new pile driving system, modifications to existing system, or new pile installation procedures shall be proposed by the Contractor if the pile installation stresses calculated by wave equation analysis or derived from the Pile Driving Analyzer measurements exceed the maximum values specified by the Engineer or shown in the Appendix.

PART 3 - EXECUTION

3.1 CONSTRUCTION ACCESS

- A. To prepare the pile for sensor attachment, a drill of sufficient power, operated by a DC battery, shall be available. A hammer drill is required for preparation of concrete piles.
- B. Prior to lifting the pile to be dynamically tested, the Contractor shall provide a minimum of 3 feet of clear access to 180 degree opposite faces of the pile for pile preparation. The Dynamic Testing Consultant or the Contractor's personnel shall then drill and prepare holes for sensor attachment. Sensors are usually attached near the pile top.
- C. The Contractor's personnel shall attach the sensors to the pile after the pile has been driven to the penetration depths identified in Part 1.1 C. If wireless transmitters are used, sensors may be attached to the pile prior to lifting the pile into the leads; the wireless transmitters and sensors shall be covered with protection devices, if appropriate. Driving shall then continue using routine pile installation procedures. When the level of the sensors is within 1 foot of any obstruction endangering the survival of sensors or cables, driving shall be halted to remove the sensors from the pile. If additional driving is required, the obstruction shall be removed or the pile shall be spliced and the sensors shall be reattached to the head of the next pile segment prior to the resumption of driving.

3.2 TESTING PROCEDURES

A. Indicator Pile Program

- 1. Indicator piles shall be driven to an ultimate capacity of 2.0 times the design load based upon the preliminary driving resistance indicated by wave equation results. Adjustments to the preliminary driving criteria may be made by the Engineer based upon the dynamic testing results.
- 2. All indicator piles shall be re-driven with dynamic testing after a minimum waiting period of 3 days. The restrike driving sequence shall be performed with a warmed up hammer and shall consist of striking the piles for 10 blows or until the pile penetrates an additional three inches, whichever occurs first. In the event the pile movement is less than $\frac{1}{4}$ inch during the restrike at satisfactory hammer energy output, the restrike may be terminated after 20 blows.

3.3 DYNAMIC TESTING ANALYSIS AND REPORTS

A. Indicator Pile Program

1. Signal matching analysis (by CAPWAP® software, available from Pile Dynamics, Inc) of the dynamic pile testing data shall be performed on data obtained from the end of initial driving and the beginning of restrike of the indicator piles. CAPWAP analyses shall be performed by an engineer who has achieved Advanced Level or better on the PDI / PDCA Dynamic Measurement and Analysis Proficiency Test for Providers of PDA Testing Services. The Engineer may request additional analyses at selected pile penetration depths.
2. For a blow count based driving criterion, the Dynamic Testing Consultant shall perform a refined wave equation analysis or analyses based upon the variations in the subsurface conditions and/or drive system performance observed in the indicator pile program results. Refined wave equation analyses are not required for restrike situations or when piles are driven to depth.
3. The Dynamic Testing Consultant shall prepare a written report of the indicator pile program. This report shall and shall contain a discussion of the pile capacity obtained from the dynamic testing. The report shall also discuss hammer and driving system performance, driving stress levels, and pile integrity.

Appendix:

Table 1: Typical Allowable Driving Stresses

Pile Material	Compression Stress	Tension Stress (psi)	Tension Stress (MPa)
Steel	$0.9 F_y$	$0.9 F_y$	$0.9 F_y$
Prestressed Concrete	$0.85 f'_c - f_{pe}$	$3 (f'_c)^{1/2} + f_{pe}$	$0.25 (f'_c)^{1/2} + f_{pe}$
Precast Concrete*	$0.85 f'_c$	$0.70 f_y (A_s / A_c)$	$0.70 f_y (A_s / A_c)$
Timber	$3 \sigma_a$	$3 \sigma_a$	$3 \sigma_a$

* Allows for tension cracks; for uncracked section allow prestressed concrete tension stress with $f_{pe} = 0$.

F_y = Steel Yield Strength

f'_c = Concrete Compressive Strength (MPa or psi)

f_{pe} = Effective Prestress (after losses) (MPa or psi)

A_s = Reinforcement Steel Cross Sectional Area

A_c = Concrete Cross Sectional Area

f_y = Reinforcement Steel Yield Strength

σ_a = Allowable Timber Design Stress

Table 2: Examples of Static Allowable Stresses for Timber

	Allowable Static Stress, σ_a (psi)	Allowable Static Stress, σ_a (MPa)
Douglas Fir	1200	8.3
Red Oak	1100	7.6
Southern Pine	1200	8.3
Eastern Hemlock	800	5.5

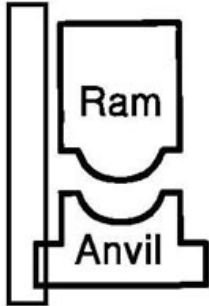
Reference:

Hannigan, P., Goble, G., Likins, G., and Rausche, F., 2006. Design and construction of driven pile foundations. FHWA-NH1-05-043. U.S. Department of Transportation, Federal Highway Administration, Office of Technology Application, Washington, D.C.

Pile and Complete Driving Equipment Data Form (English Units)

Contract No.: _____ Structure Name and/or No.: _____
 Project: _____ Pile Driving Contractor or Subcontractor: _____
 County: _____
 (Piles driven by)

Hammer Components

**Hammer**

Manufacturer: _____ Model No.: _____
 Hammer Type: _____ Serial No.: _____
 Manufacturers Maximum Rated Energy: _____ (ft-lbs)
 Stroke at Maximum Rated Energy: _____ (ft)
 Range in Operating Energy: _____ to _____ (ft-lbs)
 Range in Operating Stroke: _____ to _____ (ft)
 Ram Weight: _____ (lbs)
 Modifications: _____

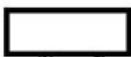
**Striker Plate**

Weight: _____ (lbs) Diameter: _____ (in)
 Thickness: _____ (in)

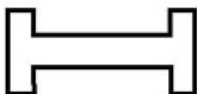
Material #1

Material #2

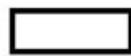
(for Composite Cushion)

**Hammer Cushion**

Name: _____ Name: _____
 Area: _____ (in²) Area: _____ (in²)
 Thickness/Plate: _____ (in) Thickness/Plate: _____ (in)
 No. of Plates: _____ No. of Plates: _____
 Total Thickness of Hammer Cushion: _____

**Helmet (Drive Head)**

Weight: _____ (lbs)

**Pile Cushion**

Material: _____
 Area: _____ (in²) Thickness/Sheet: _____ (in)
 No. of Sheets: _____
 Total Thickness of Pile Cushion: _____ (in)

**Pile**

Pile Type: _____
 Wall Thickness: _____ (in) Taper: _____
 Cross Sectional Area: _____ (in²) Weight/Meter: _____
 Ordered Length: _____ (ft)
 Design Load: _____ (kips)
 Ultimate Pile Capacity: _____ (kips)

Description of Splice: _____

Driving Shoe/Closure Plate Description: _____

Submitted By: _____ Date: _____
 Telephone No.: _____ Fax No.: _____

SECTION 31 11 00
CLEARING AND GRUBBING

PART 1 – GENERAL

1.1 DESCRIPTION

- A. This section covers the clearing of an area as shown on the Contract Drawings or as required by the Work. The Contractor shall coordinate with the Engineer to determine the extent of removals and clearing to be performed.

1.2 PROTECTION

- A. The Contractor shall maintain and protect all bench marks, monuments, and reference points. If the bench marks, monuments, or reference points are disturbed or destroyed, they shall be replaced to the satisfaction of the Owners Representative, at the Contractor's expense.
- B. The Contractor shall protect and barricade, where necessary, existing trees, shrubs, drainage swales, pavement, and other features outside the work limits from damage due to this construction.
- C. The Contractor shall protect and barricade, where necessary, those features inside the work limits that are designated for special protection by the Contract Drawings.
- D. The Contractor shall protect existing trees and other vegetation indicated to remain in place against unnecessary cutting, breaking, or skinning of roots, skinning and bruising of bark, smothering of trees by stockpiling of materials within dripline.

1.3 REGULATORY AGENCIES

- A. State and local requirements shall govern the disposal of materials from all clearing operations.

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION

3.1 CLEARING AND GRUBBING

- A. The limits of clearing and grubbing shall be as indicated on the Contract Drawings. The Contractor shall verify these limits with the Engineer in the field prior to the start of work.
- B. Clearing shall consist of the removal and disposal of all trees, logs, brush, snags, bushes, vines, shrubs, decayed stumps, leaves, roots, grasses, weeds, fences, posts, rubbish, and other perishable and objectionable materials. Large bushes and trees smaller than eight (8) inches in diameter shall be cut six (6) inches above ground line; trees eight (8) inches and larger in diameter shall be cut twelve (12) inches above ground line. All other vegetation in areas to be cleared shall be cut within two (2) inches of the ground.
- C. Grubbing shall consist of the removal of all stumps, roots and root clusters having a maximum diameter of less than eight (8) inches to a minimum depth of twelve (12) inches below the ground surface; stumps that are eight (8) inches in diameter or greater shall be grubbed to a minimum depth of twenty-four (24) inches below the ground surface.

- D. Trees and other miscellaneous features damaged or removed during the performance of the Work that are not designated for removal shall be replaced by the Contractor to the satisfaction of the Engineer at no cost to the Owner.

3.2 PRUNING

- A. Only those branches of existing trees designated to remain that interfere in some way with the Contractor's operations are to be pruned.
- B. Pruning shall be performed by a certified arborist.
- C. Prune trees according to ANSI A300 Pruning Standards.
- D. Where necessary, repairs to damaged wood shall be performed under the direction of a certified arborist.
- E. Evergreens shall only be pruned to remove dead, broken or damaged branches.
- F. Perform pruning using scissors-style cutting devices, and not anvil-style hand pruners, pole pruners or loppers.

3.3 DISPOSAL

- A. The Contractor shall be responsible for compliance with all Federal, State and Local laws and regulations relative to disposal by removal, and for obtaining all necessary permits and payment of fees for removal or disposal. Disposal of materials by burning shall not be permitted.
- B. Precautions shall be taken to prevent debris from clearing and grubbing operations from entering any water course.
- C. Materials removed from the site for disposal shall be transported in a manner to prevent spillage on public and private roadways or pavements. In the event that spillage does occur, the Contractor shall maintain the roadways as often as necessary to remove any such spillage.
- D. Material suitable for chipping/shredding may be spread on-site as mulch in lieu of removal.
- E. Solvents, oils, and other materials used in the course of the Work which may be harmful to the environment shall be properly disposed of in appropriate containers and removed from the site. Any soils contaminated by the Contractor's operation shall be removed and replaced with topsoil at the Contractor's expense. Such materials and contaminated soils shall be disposed of in accordance with state and local requirements.
- F. The Contractor will be allowed to stockpile salvageable materials at the allowable staging areas or at other locations approved by the Engineer. All salvageable materials must be removed from the site before final acceptance of the Work.

3.4 BACKFILL AND COMPACTION OF GRUBBED AREAS

- A. Grubbed areas shall be backfilled with soil material of similar permeability to the adjacent embankment.
- B. Backfill shall comply with the requirements of Section 31 23 23 Earthfill.

END OF SECTION

SECTION 31 14 13.23**TOPSOIL STRIPPING AND STOCKPILING****PART 1 – GENERAL****1.1 DESCRIPTION**

- A. This Section includes the requirements for stripping designated area(s) as shown on the Contract Drawings. The work shall consist of the excavation and removal of all topsoil, organic and other unsuitable matter at the location(s) and to the limits shown on the Contract Drawings where excavations will occur or new fill will be placed.

1.2 RELATED SECTIONS

- A. 31 11 00 Clearing and Grubbing
- B. 31 25 00 Erosion and Sedimentation Controls

1.3 REFERENCES

Not Used.

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION**3.1 GENERAL**

- A. The area(s) designated for stripping shall be stripped to a depth established by the Engineer. In general, the stripping depth will be approximately four (4) to six (6) inches.
- B. Stripped material shall be stockpiled at designated areas for later use or removed from the site.
- C. Objectionable materials encountered during the stripping operation shall be removed from the site.
- D. The Contractor shall be responsible for compliance with all Federal, State and local laws and regulations relative to disposal by removal, and for obtaining all necessary permits and payment of fees for removal or disposal.

END OF SECTION

SECTION 31 23 16**EXCAVATION****PART 1 – GENERAL****1.1 DESCRIPTION**

- A. This section includes the requirements all excavation at the location(s) and to the limits shown on the Contract Drawings or as required by the Work.

1.2 RELATED SECTIONS

- A. 31 11 00 Clearing and Grubbing
B. 31 14 13.23 Topsoil Stripping and Stockpiling
C. 31 25 00 Erosion and Sediment Control

1.3 REFERENCES

Not Used.

1.4 DEFINITIONS

A. Excavation (or Trenching)

1. Grubbing, stripping, removing, storing and rehandling of all materials of every name and nature necessary to be removed for all purposes incidental to the construction and completion of all the work under construction;
2. All sheeting, sheet piling, bracing and shoring, and the placing, driving, cutting off and removing of the same;
3. The removing and disposing of all surplus materials from the excavations in the manner specified;
4. The maintenance, accommodation and protection of travel and the temporary paving of highways, roads and driveways;
5. The supporting and protecting of all tracks, rails, curbs, sidewalks, pavements, overhead wires, poles, trees, vines, shrubbery, pipes, sewers, conduits or other structures or property in the vicinity of the work, whether over- or underground or which appear within or adjacent to the excavations, and the restoration of the same in case of settlement or other injury;
6. All temporary bridging and fencing and the removing of same;
7. Underpinning existing structures adjacent to the project area.

B. Earth

1. All materials such as sand, gravel, clay, loam, ashes, cinders, pavements, muck, roots or pieces of timber, soft or disintegrated rock, not requiring blasting, barring, or wedging from their original beds, and specifically excluding all ledge or bedrock and individual boulders or masonry larger than one-half cubic yard in volume.
2. This contract includes excavation of the unclassified basis. The cost of all excavation required under this Contract will be merged into the base bid. No distinction will be made insofar as payment is concerned between earth and rock.

C. Backfill

1. The refilling of excavation and trenches to the line of filling indicated on the Contract Drawings or as directed using materials suitable for refilling of excavations and trenches; and the compacting of all materials used in filling or refilling by rolling, ramming, etc., as may be required.

D. Spoil

1. Surplus excavated materials not required or not suitable for backfills or embankments.

E. Embankments

1. Fills constructed above the excavated surface of the ground or such other elevation as specified or directed.

F. Limiting Subgrade

1. The underside of footing lines for structures.
2. Excavation to limiting subgrade as shown on the Contract Drawings shall be included in the Lump Sum pricing.

G. Excavation Below Subgrade

1. Excavation below the limiting subgrades of structures or pipelines.
2. Where materials encountered at the limiting subgrades are not suitable for proper support of structures, the Contractor shall excavate to such new lines and grades as required by the Engineer.
3. Excavation below subgrade shall be measured and payment made in accordance with Section 01 22 00 – Unit Prices.

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION**3.1 EXCAVATION**

- A. The tolerance for excavation shall be plus or minus three-tenths (0.3) of a foot from the lines and grades shown on the Contract Drawings or as directed by the Engineer. Excavation beyond the approved lines and grades shall be backfilled as directed by the Engineer with approved suitable material and compacted. This work shall be at the Contractor's expense and no payment will be made for over excavation or backfill of over excavated areas.
- B. Where excavation lines are marked as pay lines, the Contractor will be permitted to cut a flatter slope, at no additional payment for excavation or backfill, if he believes that a flatter slope is more appropriate for his operations.
- C. Suitable excavated soils may be utilized as earthfill and placed in accordance with Section 31 23 23 Earthfill if required by the Work.

- D. Excavated material not needed for backfill or unsuitable for use as earthfill shall become the property of the Contractor and be disposed of off-site in accordance with all local, county, and state regulations.

3.2 SHORING AND BRACING

- A. The Contractor shall furnish, place and maintain such sheeting, bracing and shoring as may be required to support the sides and ends of excavations in such manner as to prevent any movement which could, in any way, injure the structures, or other work; diminish the width necessary for construction; otherwise damage or delay the work of the Contract; or endanger existing structures. In no case will bracing be permitted against structures in trenches or other excavations.
- B. Removal
 - 1. In general, all sheeting and bracing, whether of steel, wood or other material, used to support the sides of trenches or other open excavations, shall be withdrawn as the trenches or other open excavations are being refilled. That portion of the sheeting extending below the top of structural foundation shall not be withdrawn, unless otherwise directed, before more than six inches of earth is placed above the top of the structural foundation and before any bracing is removed. The voids left by the sheeting shall be carefully refilled with selected material and rammed tight with tools especially adapted for the purpose or otherwise as may be approved.
 - 2. The Contractor shall not remove sheeting and bracing until the work has attained the necessary strength to permit placing of backfill.

END OF SECTION

SECTION 31 23 23**EARTHFILL****PART 1 – GENERAL****1.1 DESCRIPTION**

- A. This Section includes the requirements for the construction of earth embankments, backfill of excavations and other earthfills as shown on the Contract Drawings and specified herein.

1.2 REFERENCES

- A. This Section includes the requirements for the construction of earth embankments and other earthfills as shown on the Contract Drawings and specified herein.
- B. Materials and installation shall be in accordance with the latest revisions of the following codes, standards, and specifications except where more stringent requirements have been specified herein.
 - 1. Delaware Department of Transportation Standard Specifications for Road and Bridge Construction, including all Supplemental Specifications (DelDOT Standard Specifications)
 - 2. American Society for Testing and Materials (ASTM)
 - a. ASTM D422 Test Method for Particle-Size Analysis of Soils
 - b. ASTM D1556 Test Method for Soil by the Sand Cone Method
 - c. ASTM D1557 Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (6,000 ft-lbf/ft³)
 - d. ASTM D2487 Standard Classification of Soils for Engineering Purposes
 - e. ASTM D2922 Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
 - f. ASTM D3017 Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)

1.3 TESTING

- A. During the course of the work the Engineer may perform such tests as are required to identify materials, measure compaction characteristics, measure moisture contents, and measure density of fill in place. These tests performed by the Engineer will be used to verify that the fills conform to the requirements of the specifications. Such tests are not intended to provide the Contractor with the information required by him for the proper execution of the work and their performance shall not relieve the Contractor of the necessity to perform tests for that purpose.
- B. The Contractor shall include the cost of all testing in his bid. No additional compensation for testing will be made.

1.4 SUBMITTALS

- A. Proposed testing laboratory.
- B. Source of off-site materials.
- C. Samples and test reports of the materials, including compaction curves for all materials to be used.

PART 2 – PRODUCTS**2.1 MATERIALS**

- A. Earthfill materials shall be obtained from suitable on-site excavation or, if need be, off-site borrow areas. The selection, blending, routing and disposition of materials in the various fills shall be subject to approval by the Engineer.
- B. Earthfill shall consist of a mixture of silt, sand and gravel. Earthfill shall be soils classified as SW-SM, SW-SC, SP-SM or SP-SC according to ASTM D2487.
- C. Earthfills may be any of the following classifications as defined in the DelDOT Standard Specifications:
 - 1. Borrow Type A
 - 2. Borrow Type B (Special Fill)
 - 3. Borrow Type C (Backfill)
 - 4. Borrow Type F (Common Borrow)
- D. Fill materials shall contain no sod, brush, roots or other perishable materials. Rock particles larger than the maximum size specified for each type of fill shall be removed prior to compaction of the fill.
- E. Fill material shall be uniform in composition and obtained from a consistent source.

PART 3 – EXECUTION**3.1 FOUNDATION PREPARATION**

- A. Foundations for earthfill shall be stripped to remove vegetation and other unsuitable materials or shall be excavated as specified.
- B. Earth foundation surfaces shall be graded to remove surface irregularities and shall be scarified parallel to the axis of the fill to a minimum depth of six (6) inches. The moisture content of the loosened materials shall be between minus one percent and plus three percent of the optimum moisture content at the time of the first placement of fill material on the foundation. The surface materials of the foundation shall be compacted and bonded with the first layer of earthfill as specified for subsequent layers of earthfill.
- C. Earth abutment surfaces shall be free of loose, uncompacted earth in excess of two (2) inches in depth normal to the slope and shall be at such a moisture content that the earthfill can be compacted against them to effect a good bond between the fill and the abutments.
- D. Rock foundation and abutment surfaces shall be cleared of all loose materials by hand or other effective means and shall be free of standing water when fill is placed upon them.
- E. Foundation and abutment surfaces shall not be steeper than one horizontal to one vertical unless otherwise specified. Test pits or other cavities shall be filled with compacted earthfill conforming to the specifications for earthfill to be placed upon the foundation.

3.2 PLACEMENT

- A. Fill shall not be placed until the required excavation and foundation preparations have been completed and the foundation has been inspected and approved by the Engineer. Fill shall not be placed upon a frozen surface, nor shall snow, ice or frozen material be incorporated in the fill.
- B. Fill shall be placed in horizontal layers. The thickness of each layer before compaction shall not exceed the maximum thickness specified. Materials placed by dumping in piles or windrows shall be spread uniformly to not more than the specified thickness before being compacted. Hand compacted fill, including fill compacted by manually directed power tampers, shall be placed in layers whose thickness before compaction does not exceed the maximum thickness specified for layers of fill compacted by manually directed power tampers.
- C. Fill adjacent to structures shall be placed in a manner which will prevent damage to the structures and will allow the structures to assume the loads from the fill gradually and uniformly. The height of the fill adjacent to a structure shall be increased at approximately the same rate on all sides of the structure.
- D. The distribution of materials throughout each zone shall be essentially uniform, and the fill shall be free from lenses, pockets, streaks or layers of material differing substantially in texture or gradation from the surrounding material. If the surface of any layer becomes too hard and smooth for proper bond with the succeeding layer, it shall be scarified parallel to the axis of the fill to a depth of not less than three (3) inches before the next layer is placed.
- E. The surfaces of embankments shall be maintained approximately level during construction, except that a crown or cross-slope of not less than two percent (2%) shall be maintained to insure effective drainage, unless otherwise specified.
- F. Embankments built at different levels shall be constructed so that the slope of the bonding surface between embankment in place and embankment to be placed is not steeper than three feet horizontal to one foot vertical (3H:1V). The bonding surface of the embankment in place shall be scarified, moistened and recompactd when the new fill is placed against it as needed to insure a good bond with the new fill, and to obtain the specified moisture content and density at the junction of the in place and new fill.

3.3 CONTROL OF MOISTURE CONTENT

- A. During placement and compaction of fill, the moisture content of materials being placed and that of the preceding layer shall be maintained between plus or minus three percent ($\pm 3\%$) of optimum moisture content. The application of water to fill materials shall be accomplished at the borrow areas insofar as practicable. Water may be applied by sprinkling the materials after placement of the fill, if necessary. Uniform moisture distribution shall be obtained by discing, blading or other approved methods prior to compaction of the layer. Material that is too wet when deposited on the fill shall either be removed or dried to the specified moisture content prior to compaction.

3.4 COMPACTION

- A. Earthfills shall be spread in horizontal layers approximately twelve (12) inches in thickness before compaction, and shall be compacted to 90 percent of maximum dry density as determined by the Modified Proctor Compaction Test ASTM D1557, Method A. Spreading of material in layers thicker than twelve (12) inches may be approved by the Engineer if it can be demonstrated that the compaction requirement is met throughout the layer.

- B. Fill adjacent to structures shall be compacted to a density equivalent to that of the surrounding fill by means of hand tamping, or manually directed power tampers or plate vibrators. Fill to be compacted by hand tamping, or manually directed power tampers or plate vibrators shall be spread in horizontal layers approximately six (6) inches in thickness before compaction. Heavy equipment shall not be operated within two (2) feet of any structure. Vibrating rollers shall not be operated within five (5) feet of any structure. Compaction by means of drop weights operating from a crane or hoist will not be permitted.

3.5 FIELD QUALITY CONTROL

- A. Compaction curves for the full range of soil materials to be used as earthfill/backfill shall be developed by the Contractor's designated testing laboratory.
- B. Field control samples shall be taken and tested by the testing laboratory as required to assure that adequate compaction of the embankment material is being achieved.
- C. Unless specified elsewhere herein, a minimum of one (1) in-place density test shall be made for every 2,500 square feet of compacted area per lift.

3.6 REMOVAL AND PLACEMENT OF DEFECTIVE FILL

- A. Fill placed at densities lower than the specified minimum density or at moisture contents outside the specified acceptable range of moisture content or otherwise not conforming to the requirements of the specifications shall be reworked to meet the requirement or removed and replaced by acceptable fill at the Contractor's expense. The replacement fill and the foundation, abutment and fill surfaces upon which it is placed shall conform to all requirements of this specification for foundation preparation, approval, placement, moisture control and compaction.

END OF SECTION

SECTION 31 25 00**EROSION AND SEDIMENTATION CONTROLS****PART 1 – GENERAL****1.1 DESCRIPTION**

- A. This Section includes the furnishing, installation and maintenance of erosion and sedimentation control measures intended to minimize erosion of soils and sedimentation of adjacent waterways and lands adjacent to or affected by the Work.

1.2 REFERENCES

- A. Materials and installation shall be in accordance with the Erosion and Sedimentation Control Plans (E&S Plans) included in the Contract Drawings and the latest revisions of the following codes, standards and specifications:
 - 1. Delaware Erosion and Sediment Control Handbook.
 - 2. Delaware Sediment and Stormwater Regulations.

1.3 SUBMITTALS

- A. The Contractor shall submit product data consisting of manufacturer's cut sheets for all manufactured erosion and sediment control measures including, but not limited to:
 - 1. Silt Fence
 - 2. Rolled Erosion Control Mats or Blankets
 - 3. Pumped Water Filter Bags (if utilized)
 - 4. Turbidity Barriers

PART 2 – PRODUCTS**2.1 SUMMARY**

- A. The Contractor shall provide all materials as needed to perform the specified work. Materials shall include silt fencing, vegetation, stone, filter cloth, or other manufactured products to reduce erosion and control siltation.

2.2 SILT FENCE

- A. Silt fence shall be in accordance with the requirements of the Delaware Erosion and Sediment Control Handbook, Section 3.1.

2.3 STABILIZED CONSTRUCTION ENTRANCE

- A. Stone used for stabilized construction entrances shall be DelDOT No. 3 Coarse Aggregate. Equivalent material (*i.e.*, reclaimed concrete) may be used with approval from the Engineer.
- B. Geotextile underlayment shall consist of non-woven geotextile in accordance with Section 31 32 19 Geotextiles.
- C. Overall dimensions and installation notes are as shown on the Contract Drawings and in the Delaware Erosion & Sediment Control Handbook.

2.4 ROLLED EROSION CONTROL MATS OR BLANKETS

- A. Rolled erosion control mats or blankets shall be used for stabilization of all vegetated slopes 3:1 (horizontal:vertical) or steeper or as indicated on the Contract Drawings.
- B. Erosion Control blankets shall be a machine produced mat of 100% straw with a functional longevity of up to 12 months. The blanket shall be of consistent thickness with the straw distributed evenly over the entire area of the mat. The blanket shall be covered on top and bottom sides with a 100% biodegradable woven natural fiber netting.
- C. Acceptable products:
 - 1. BioNet S150BN Erosion Control Blankets as manufactured by Tensar North American Green.
 - 2. ECS-2B Double Net Straw Biodegradable Rolled Erosion Control Product as manufactured by East Coast Erosion Blankets.
 - 3. Approved Equal.

2.5 PUMPED WATER FILTER BAGS (IF UTILIZED)

- A. Pumped water filter bags shall consist of high volume filter bags made from non-woven geotextile material sewn with high strength, double stitched "J" type seams. They shall be capable of trapping particles larger than 150 microns.
- B. Specific material properties, dimensions and installation notes shall be as indicated on the Contract Drawings or in the Delaware Erosion & Sediment Control Handbook.

2.6 TURBIDITY BARRIERS

- A. Turbidity barriers shall be in accordance with the Delaware Erosion and Sediment Control Handbook, Section 3.5.3 and as shown on the Contract Drawings.

PART 3 - EXECUTION**3.1 SEQUENCE**

- A. Construction shall be performed in accordance with the sequence of construction indicated on the Contract Drawings.
- B. At least seven (7) days before starting any earth disturbance activities, the Contractor shall invite any and all subcontractors involved in those activities, the Owner, the Engineer and the Delaware Department of Natural Resources and Environmental Control (DNREC) Sediment and Stormwater Program to a pre-construction meeting at each project site.
- C. The Contractor shall notify the DNREC Sediment and Stormwater Program at least five (5) days prior to the start of earth disturbance activities at each project site. Failure to do so constitutes a violation of Delaware Sediment and Stormwater Regulations.
- D. Stabilized construction entrances shall be installed at the locations indicated on the Contract Drawings.
- E. Silt fencing shall be installed at the toes of embankments, on downstream portions of the site perimeter, around spoil piles and stockpiles and wetlands, as shown on the Contract Drawings or as directed by the Engineer.

- F. Additional erosion and sediment control (E&S) facilities shall be installed as shown on the Contract Drawings or as directed by the Engineer. These facilities shall remain in place until construction activities are completed and the site is stabilized.
- G. Staging areas for construction vehicles, equipment, and supplies shall be established by the Contractor in areas approved by the Engineer.
- H. The site shall be cleared and grubbed within the limits of work only. Care shall be taken to minimize impacts to wetlands and other sensitive areas. Cleared vegetation, soil, and other debris shall be stockpiled in approved areas for disposal at an approved location.
- I. Topsoil shall be stripped and stockpiled in areas approved by the Engineer.
- J. Exposed soil shall be stabilized, topsoiled, seeded, and mulched as specified.
- K. Until stabilization of the site and approval of final site inspection, temporary E&S measures shall not be removed.

3.2 STABILIZATION

- A. Until the site is stabilized, all erosion and sediment control measures must remain in place and be maintained properly.
- B. Final stabilization shall be defined as a minimum density uniform 80% perennial vegetative cover or other non-vegetative cover with a density sufficient to resist accelerated surface erosion and subsurface characteristics sufficient to resist sliding and other movements. Areas of riprap shall be considered stabilized once the entire area to be armored has been completed.
- C. Areas shall be stabilized in accordance with the Contract Drawings. For portions of the site where soil disturbance activities have temporarily or permanently ceased, stabilization measures must be implemented within 7 calendar days of the conclusion of activities.
- D. Disturbed areas that are at finished grade or will not be redisturbed within one year must be stabilized in accordance with the permanent vegetative stabilization specifications.
- E. Disturbed areas that are not at finished grade or will be redisturbed within one year must be stabilized in accordance with the temporary vegetative stabilization specifications.
- F. Vegetated areas with slopes 3:1 (horizontal:vertical) or steeper shall be stabilized with rolled erosion control mats or blankets after topsoiling and seeding. Mats shall be installed and anchored according to the manufacturer's instructions and as indicated on the Contract Drawings. Areas with slopes flatter than 3:1 shall be mulched with straw mulch or wood chips according to the notes and details on the E&S Plan and as indicated in the Delaware Erosion & Sediment Control Handbook.

3.3 ADDITIONAL CONTROLS

- A. The following additional controls and measures are to be implemented at the site to minimize pollutant transport:
 - 1. Proper precautions are to be taken so materials do not spill onto public thoroughfares. If materials are dropped onto these areas they are to be cleaned or removed as soon as practicable so that they do not enter surface and subsurface drainage systems.
 - 2. The Contractor is to provide dust control measures to mitigate dust migration off-site. Measures may include water application or mulching and shall not include use of chemical additives.
 - 3. Solid waste disposal dumpsters and containers are to be covered and emptied regularly. Waste is to be disposed of properly in accordance with local, State, and/or federal regulations.

4. Portable toilets are to be installed and cleaned regularly with their contents properly disposed of. They are to be secured in place so they will not be knocked over by construction activities.
5. Building materials are to be properly stored and contained on-site to prevent contamination of site stormwater runoff.
6. Oil and fuel containers are to have appropriate secondary containment. If total oil storage on-site exceeds a cumulative total of 1,320-gallons, a spill prevention control and countermeasure (SPCC) plan shall to be prepared by the Contractor and maintained on-site.

3.4 MAINTENANCE

- A. The following procedures shall be utilized to maintain the effectiveness of the erosion and sediment control measures during construction:
 1. Clean, repair, and/or replace silt fence and construction entrances as necessary.
 2. Clean and/or sweep affected roadways daily, or more frequently if otherwise required by the Owner, Engineer, or Delaware Department of Transportation (DelDOT).
 3. Regrade and re-seed any vegetated areas which have eroded. Re-apply mulch or stabilization matting as needed.
 4. Remove debris and litter on a weekly basis or more frequently if necessary.
 5. Observe equipment/vehicles within the work area, particularly for identification of vehicles leaking petroleum products that could enter stormwater drainage facilities.

3.5 INSPECTION

- A. The Contractor will be responsible to provide a responsible inspector with a Certification of Training at a DNREC sponsored or approved training course for the control of erosion and sediment during construction (i.e. a Blue Card Holder).
- B. The Blue Card Holder shall prepare an inspection report after each inspection. Reports shall include the date that all identified deficiencies must be resolved and are to be signed by the Blue Card Holder. Inspection reports shall be emailed or faxed to the Contractor and to the DNREC Sediment and Stormwater Program or as directed at the preconstruction meeting.

3.6 NON-STORMWATER DISCHARGES

- A. The following preventative measures shall be employed by the Contractor to minimize non-stormwater discharges associated with the construction activity entering Site stormwater facilities:
 1. Cleaning water for construction vehicles and equipment and ground water encountered within excavations shall not be discharged directly to storm drains or adjacent surface waters. Chemicals and detergents are not to be used.
 2. The Contractor is responsible for identifying areas on-site for construction vehicle transit (i.e., haul roads, Contractor trailers and parking areas, etc.) or equipment staging, which are to be visually inspected and where runoff can be controlled.
 3. Water used for dust control measures is to be applied using proper quantities and equipment. No chemical additives are to be used.

3.7 SPILL PREVENTION AND CONTROL

- A. Spills of petroleum, toxins, or hazardous material are to be reported to the appropriate State or local government agencies immediately, regardless of size.

- B. The following material management practices shall be used by the Contractor to reduce the risk of spills or other accidental exposure of materials and substances to stormwater runoff during construction.
1. Materials with potential for spillage, stored on-site, are to be stored in a neat, orderly manner in their appropriate containers and, if possible, under a roof or other enclosure.
 2. Products are to be kept in their original containers with the original manufacturer's label.
 3. Substances are not to be mixed with one another unless recommended by the manufacturer.
 4. Whenever possible, product is to be used up or packages resealed before proper disposal of contents and containers off-site.
 5. Manufacturers' recommendations for proper use and disposal are to be followed.
 6. Inspection is to be made by the Contractor for proper use and disposal of materials during periodic inspections and recorded on the Inspection Report Form.
 7. On-site vehicles are to be monitored for leaks and receive regular preventative maintenance to reduce the chance of leakage of petroleum products. Petroleum products are to be stored in closed containers that are clearly labeled. Used oils are to be disposed of properly.
 8. Materials are to be brought on-site in quantities that limit or minimize the amount of on-site storage.
 9. Containers are to be tightly sealed and properly stored when not required for use. Excess paint, solvents, etc. shall not be discharged to the storm sewer facilities or waterways but are to be properly disposed of according to manufacturers' instructions, or State and local regulations.
 10. Manufacturers' recommended methods for spill cleanup are to be clearly posted and site personnel are to be made aware of the procedures and the location of the information and cleanup supplies.
 11. Materials and equipment necessary for spill cleanup are to be kept in designated material storage areas on-site. Equipment and materials are to include but not be limited to brooms, dust pans, mops, rags, gloves, goggles, spill control materials, sand, sawdust, and trash containers specifically for this purpose.
 12. Spills are to be cleaned up immediately after discovery.
 13. The spill area is to be kept well ventilated and personnel are to wear appropriate protective clothing to prevent injury from contact with a hazardous substance.
 14. A spill report is to be completed and filed with the Owner, Engineer and DNREC and is to include a description of the spill, what caused it, and the corrective actions taken.

END OF SECTION

SECTION 31 32 19**GEOTEXTILES****PART 1 – GENERAL****1.1 DESCRIPTION**

- A. This Section includes the requirements for furnishing, installation, and protection of geotextiles as specified herein and as shown on the Contract Drawings. All materials used shall meet the requirements of this specification and all work shall be performed in accordance with the procedures provided herein, the manufacturers' recommendations, and the Contract Drawings.

1.2 REFERENCES

- A. Materials and installation shall be in accordance with the latest revisions of the following codes, standards, and specifications except where more stringent requirements have been specified herein.

1. American Society for Testing and Materials (ASTM).

- a. ASTM D3786 Test Methods for Hydraulic Bursting Strength of Knitted Goods and Nonwoven Fabric-Diaphragm Bursting Strength Tester Method
- b. ASTM D4355 Test Method for Deterioration of Geotextiles from Exposure to Ultraviolet Light and Water (Xenon-Arc Type Apparatus)
- c. ASTM D4491 Test Methods for Water Permeability of Geotextiles by Permittivity
- d. ASTM D4533 Test Method for Trapezoid Tearing Strength of Geotextiles
- e. ASTM D4632 Test Method for Grab Breaking Load and Elongation of Geotextiles
- f. ASTM D4751 Test Method for Determining the Apparent Opening Size of a Geotextile
- g. ASTM D4833 Test Method for Index Puncture Resistance of Geotextiles, Geomembranes and Related Products
- h. ASTM D5199 Test Method for Measuring Nominal Thickness of Geotextiles and Geomembranes
- i. ASTM D5261 Test Method for Measuring Mass per Unit Area of Geotextiles

1.3 DELIVERY, STORAGE AND HANDLING OF MATERIALS

- A. Materials delivered to the site shall be inspected for damage, unloaded and stored with a minimum of handling. Materials shall not be stored directly on the ground. During shipment and storage, geotextile shall be wrapped in heavy-duty protective covering. The storage area shall be such that the fabric is protected from mud, soil, dust, and debris. Geotextile materials that are not to be installed immediately shall not be stored in direct sunlight.
- B. Materials shall be handled in such a manner as to ensure delivery to the site in sound undamaged condition.

PART 2 - PRODUCTS**2.1 MANUFACTURERS**

A. The following manufacturers are named to establish a standard of quality necessary for the project.

1. TENAX Corporation
2. Propex Geosynthetics
3. Equivalent

2.2 NON-WOVEN GEOTEXTILE

A. The Geotextile shall be a non-woven fabric. Non-woven fabrics shall consist only of continuous chain polymeric filaments or yarns of polyester, formed into a stable network by needle punching. All fabrics shall be inert to commonly encountered chemicals and hydrocarbons, mildew and rot resistant, insect and rodent resistant, resistant to ultraviolet light and heat exposure, and conform to the physical strength requirements listed in Table 2.2.1 below.

1. Geotex 1071, manufactured by Propex Geosynthetics, or approved equal, is acceptable for this work

Table 2.2.1 - Physical Strength Requirements: Non-Woven Geotextile

Physical Property	Test Method	MARV
10-oz Non-Woven Geotextile		
Grab Tensile Strength	ASTM D4632	270 lbs.
Grab Elongation	ASTM D4632	50%
Puncture Strength	ASTM D4833	180 lbs.
Mullen Burst Strength	ASTM D3786	520 psi.
Trapezoid Tear Strength	ASTM D4533	105 lbs.
Apparent Opening Size	ASTM D 4751	U.S. Sieve 100
Permittivity	ASTM D 4491	1.2 sec ⁻¹
Permeability	ASTM D 4491	0.3 cm/sec
Flow Rate	ASTM D 4491	85 gal/min/ft. ²
Mass per Unit Area	ASTM D 5261	10 oz./yd.

B. The seams of the fabric shall be sewn with thread of a material meeting the chemical requirements given above for synthetic yarn or shall be bonded by cementing or by heat. Seams shall be tested in accordance with method ASTM D4884, using 1-inch square jaws and 12 inches per minute constant rate of traverse. The strengths shall be not less than 90% of the required tensile strength of the unaged fabric in any principal direction. Unaged fabric is defined as fabric in the condition received from the manufacturer or distributor.

C. Each roll of the geotextile shall bear a label which identifies the following:

1. Manufacturer
2. Product Identification
3. Unique roll or lot number.
4. Roll dimensions.

2.3 GEOGRID

A. Geogrid shall consist of an integrally formed biaxial geogrid constructed of polypropylene. All materials shall be inert to commonly encountered chemicals and hydrocarbons, mildew and rot resistant, insect and rodent resistant, resistant to ultraviolet light and heat exposure, and conform to the physical properties listed in Table 2.3.1 below.

1. Biaxial Geogrid BX 1101, manufactured by Tensar International Corporation, or approved equal, is acceptable for this work.

Table 2.3.1 - Requirements: Geogrid

Index Properties	Units	MD Values ¹	XMD Values ¹
Aperture Dimensions ²	mm (in)	25 (1.0)	33 (1.3)
Minimum Rib Thickness ²	mm (in)	0.76 (0.03)	0.76 (0.03)
Tensile Strength @ 2% Strain ³	kN/m (lb/ft)	4.1 (280)	6.6 (450)
Tensile Strength @ 5% Strain ³	kN/m (lb/ft)	8.5 (580)	13.4 (920)
Ultimate Tensile Strength ³	kN/m (lb/ft)	12.4 (850)	19.0 (1,300)
Structural Integrity			
Junction Efficiency ⁴	%	93	
Flexural Stiffness ⁵	mg-cm	250,000	
Aperture Stability ⁶	m-N/deg	0.32	
Durability			
Resistance to Installation Damage ⁷	%SC / %SW / %GP	95 / 93 / 90	
Resistance to Long Term Degradation ⁸	%	100	
Resistance to UV Degradation ⁹	%	100	

Notes:

1. Unless indicated otherwise, values shown are minimum average roll values determined in accordance with ASTM D4759-02. Brief descriptions of test procedures are given in the following notes.
2. Nominal dimensions.
3. True resistance to elongation when initially subjected to a load determined in accordance with ASTM D6637-01 without deforming test materials under load before measuring such resistance or employing "secant" or "offset" tangent methods of measurement so as to overstate tensile properties.
4. Load transfer capability determined in accordance with GRI-GG2-05 and expressed as a percentage of ultimate tensile strength.
5. Resistance to bending force determined in accordance with ASTM D5732-01, using specimens of width two ribs wide, with transverse ribs cut flush with exterior edges of longitudinal ribs (as a "ladder"), and of length sufficiently long to enable measurement of the overhang dimension. The overall Flexural Stiffness is calculated as the square root of the product of MD and XMD Flexural Stiffness values.

6. Resistance to in-plane rotational movement measured by applying a 20 kg-cm (2 m-N) moment to the central junction of a 9 inch x 9 inch specimen restrained at its perimeter in accordance with U.S. Army Corps of Engineers Methodology for measurement of Torsional Rigidity.
7. Resistance to loss of load capacity or structural integrity when subjected to mechanical installation stress in clayey sand (SC), well graded sand (SW), and crushed stone classified as poorly graded gravel (GP). The geogrid shall be sampled in accordance with ASTM D5818-06 and load capacity shall be determined in accordance with ASTM D6637-01.
8. Resistance to loss of load capacity or structural integrity when subjected to chemically aggressive environments in accordance with EPA 9090 immersion testing.
9. Resistance to loss of load capacity or structural integrity when subjected to 500 hours of ultraviolet light and aggressive weathering in accordance with ASTM D4355-05.

PART 3 – EXECUTION

3.1 GENERAL

- A. During all periods of shipment and storage, the geotextile shall be protected from adverse weather, heavy winds or precipitation, direct sunlight, ultraviolet light, temperatures greater than 140°F, mud, dirt, dust, debris, and vandals. To the extent possible, the geotextile shall be maintained wrapped in a heavy-duty protective covering. In the event of damage, the Contractor shall immediately make all repair and replacements at no additional cost to the Owner.
- B. Geotextiles shall not be exposed to sunlight for more than 15 days unless otherwise specified and guaranteed by the manufacturer.

3.2 INSTALLATION

- A. Prior to installation of the geotextile, the material on which the geotextile is to be installed will be free of organic matter, irregularities, protrusions, and any abrupt changes in grade that could damage the geotextile. The supporting layer will be maintained in a smooth, uniform, and compacted condition during installation of the geotextile. The subsurface shall be inspected and accepted by the Installer and Engineer prior to placement of the geotextile.
- B. The geotextile shall be placed in manner and at the locations shown on the drawings. At the time of the installation, the geotextile shall be rejected if it has defects, rips, holes, flaws, deterioration, or damage incurred during manufacture, transportation, or storage.
- C. The geotextile shall be protected at all times during construction from damage by surface runoff and any geotextile so damaged shall be removed and replaced with undamaged geotextile. Any damage to the geotextile during its installation or during placement of any material including, but not limited to soil layers, free draining filter, rock fill, or riprap shall be replaced by the Contractor at the Contractor's expense.
- D. The placement of the geotextile shall not be conducted during adverse weather conditions. The geotextile will be kept dry during storage and up to the time of deployment. During windy conditions, all geotextiles will be secured with sandbags or an equivalent approved anchoring system. Removal of the sandbags or equal will only occur upon placement of an overlying layer or as otherwise accepted by the Engineer.
- E. Proper cutting tools shall be used to cut and size the geotextile materials. Extreme care will be taken while cutting in-place geotextiles.
- F. During the placement of geotextiles, all dirt, dust, sand or mud shall be kept off to prevent clogging. If excessive contaminant materials are present on the geotextile, the geotextile shall be replaced as directed by the Engineer.
- G. The geotextile shall be protected from damage due to the placement of materials by limiting the height of drop of the material to less than one (1) foot.

- H. The geotextile shall be placed with the long dimension parallel to the line of maximum slope and shall be laid smooth and free of tension, stress, folds, wrinkles, or creases.
- I. Adjacent rolls of geotextile will overlap a minimum of 1 foot from the respective edges.
- J. Seaming or Joining
 - 1. Geotextiles shall be continuously seamed using a minimum four (4) inch overlap and thermal hot wedge or hot air methods. In all cases, seams on side slopes shall be parallel to the line of maximum slope and seamed five (5) feet from the toe-of slope upward over the length of the slope. No horizontal seams will be allowed on side slopes, except for patching.
- K. Repair of tears or holes in the geotextile will require the following procedures:
 - 1. On slopes: A patch made from the same geotextile will be double seamed into place; with each seam 1/4-inch to 3/4-inch apart and no closer than 1 inch from any edge. Should any tear exceed 10% of the width of the roll, the roll will be removed from the slope and replaced.
 - 2. Non-slopes: A patch made from the same geotextile will be spot-seamed in place with a minimum of 24 inch overlap in all directions.

END OF SECTION

SECTION 31 37 00**RIPRAP****PART 1 – GENERAL****1.1 DESCRIPTION**

- A. This Section includes rock material used as riprap for slope or channel stabilization or for other erosion and sediment control measures as shown on the Contract Drawings.
- B. The work shall consist of furnishing and placing riprap at the locations and to the dimension shown on the Contract Drawings.

1.2 REFERENCES

- A. Comply with the following codes, standards and specifications, except where more stringent requirements have been specified herein:
 - 1. American Society for Testing and Materials (ASTM)
 - a. ASTM C127 Test Method for Specific Gravity and Absorption of Coarse Aggregate
 - b. ASTM C136 Test Method for Sieve Analysis of Fine and Coarse Aggregates
 - c. ASTM C535 Test Method for Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
 - d. ASTM C702 Practice for Reducing Samples of Aggregate to Testing Size
 - e. ASTM D422 Test Method for Particle-Size Analysis of Soils
 - 2. Delaware Department of Transportation Standard Specifications for Road and Bridge Construction, including all Supplemental Specifications (DelDOT Standard Specifications)

1.3 SUBMITTALS

- A. Submit the following in accordance with the General Conditions/General Requirements:
 - 1. Source of Material (name and location).
 - 2. Certification from the quarry that material conforms to these Specifications.

1.4 QUALITY ASSURANCE

- A. All riprap shall be obtained from a single off-site quarry.
- B. All testing, including field and laboratory services, required to document compliance with these specifications shall be performed at the Contractor's sole expense.
- C. The Contractor shall arrange for the Engineer to have entry to any quarry furnishing riprap under this Contract upon request.

PART 2 – PRODUCTS**2.1 GENERAL PROPERTIES**

- A. Except as provided, the rock shall have the following properties:
 - 1. Bulk specific gravity (bulk-saturated, surface-dry basis): Not less than 2.5.

2. Absorption: Not greater than 2 percent.
3. Soundness: Weight loss in five cycles not greater than 10 percent when sodium sulfate is used and 15 percent when magnesium sulfate is used.
4. Abrasion: Weight loss after 500 revolutions not greater than 25 percent using Los Angeles Machine Grading 1.

2.2 MATERIAL

- A. All riprap shall conform to the requirements of Section 712 of the DelDOT Standard Specifications unless otherwise noted in this Section.
- B. Riprap shall be obtained from a single off-site quarry. Individual rock fragments shall be dense, sound and free from cracks, seams and other defects conducive to accelerated weathering. Riprap shall be free from foreign materials such as quarry dust, shale, soil and organic material.
- C. Riprap shall be well graded angular rock that conforms to the gradation requirements in the table below. Riprap shall consist of rock fragments of approximately equal dimensions in all directions. No piece should have a length exceeding three (3) times its width or depth. Long flat pieces may be rejected by the Engineer.

Table 2.2.1: Riprap Stone Gradation – Percent Passing (Square Openings) by Weight (Adapted from DelDOT Standard Specifications)

NCSA* Rock Size	R-7	R-6	R-5	R-4
30"	100**	---	---	---
24"	---	100**	---	---
18"	15 – 50	---	100**	---
12"	---	15 – 50	---	100**
9"	0 – 15	---	15 – 50	---
6"	---	0 – 15	---	15 – 50
4"	---	---	0 – 15	---
3"	---	---	---	0 – 15

* National Crushed Stone Association

** Maximum allowable rock size

PART 3 – EXECUTION

3.1 PLACEMENT

- A. Riprap shall be placed in the locations and to the dimensions, lines and grades indicated on the Contract Drawings. Riprap shall be graded in such a manner that large rock fragments are uniformly distributed and smaller fragments fill the spaces between larger fragments to create a compact uniform layer.
- B. Riprap shall be placed in one full course thickness in one operation in a manner to prevent segregation and to avoid displacement of underlying material. Do not place rock in layers, by dumping into chutes, or by similar methods likely to cause segregation. The maximum drop height when placing riprap shall be 12 inches.

3.2 FIELD QUALITY CONTROL

- A. The Contractor shall be responsible for ensuring that the finished surface of the riprap conforms to the design lines and grades indicated on the Contract Drawings. The specified depth of riprap may be exceeded in localized areas, provided that the overall finished grade is consistent with the design grades, but in no case shall the depth of riprap be less than the specified depth.

- B. All riprap delivered to the project site may be subject to laboratory testing for conformance with these specifications upon written direction of the Engineer.
- C. Acceptance of gradation will be based upon visual observation by the Engineer and certification by the quarry.

END OF SECTION

SECTION 31 52 00
CONTROL OF WATER

PART 1 – GENERAL

1.1 DESCRIPTION

- A. This Section includes the furnishing, installation and maintenance of all measures for the Control of Water as needed to perform the required construction in accordance with the Contract Documents.
- B. The Work includes, but is not limited to:
 - 1. Preparation and submission of a Summary Control of Water Plan for Chipmans Pond Dam with the Bid.
 - 2. Preparation and submission of a detailed Control of Water Plan for each Project Site.
 - 3. Designing, building and maintaining all necessary temporary impounding works, cofferdams, check dams, channels, ditches and diversions.
 - 4. Furnishing, installing and operating all necessary pumps, piping, siphons and other facilities and equipment.
 - 5. Removing all temporary works and equipment after they have served their purposes.

1.2 REFERENCES

- A. The Contractor shall review available data regarding groundwater flow, surface flow, and geotechnical conditions at each project site before preparing and submitting a Control of Water Plan to the Engineer.
- B. The Contractor is warned that groundwater, streamflow, runoff and other site conditions may be highly variable and difficult to accurately predict. It is the Contractor's responsibility to evaluate the applicability of the available information and to obtain or develop additional information as a basis of development of the Contractor's Control of Water Plan.
- C. Identified Available Data as of December 2016:
 - a. Surface Water Flow (USGS StreamStats data are estimates of streamflow statistics based on a Regressions Equation tool developed by USGS)
 - i. Chipmans Pond Dam
 - 1. Delaware Environmental Observing System (DEOS)
 - a. Gage Height – Current, Daily Summary, Current Monthly Summary
 - b. URL - http://www.deos.udel.edu/odd-divas/station_current.php?network=DEOS&station=DCHP&units=English
 - 2. USGS
 - a. StreamStats Version 4 (Flow Statistics Ungaged Site Report) Peak Flows – Table COW – 1 (attached)
 - b. USGS Station No. 01487700 Elliot Pond Branch near Laurel DE
 - i. StreamStats Data-Collection Station Report - Low Flow, Partial Record – Table COW-2 (attached)

- ii. Concord Pond Dam
 - 1. USGS
 - a. StreamStats Version 4 (Flow Statistics Ungaged Site Report) Peak Flows – Table COW – 3 (attached)
 - b. USGS Station No. 01487100 Deep Creek at Old Furnace, DE
 - i. StreamStats Data-Collection Station Report - Low Flow, Partial Record – Table COW-4 (attached)
 - c. USGS Station No. 01487120 Tyndall Branch near Hardscrabble, DE
 - i. StreamStats Data-Collection Station Report - Low Flow, Partial Record – Table COW-5 (attached)
 - 2. Delaware Environmental Observing System (DEOS)
 - a. Seaford, DE – Concord Pond Station
 - i. Water level and temperature data available at http://www.deos.udel.edu/data/current_retrieval.php
- iii. Craigs Pond Dam
 - 1. USGS
 - a. StreamStats Version 4 (Flow Statistics Ungaged Site Report) Peak Flows –Table COW– 6 (attached)
 - b. USGS Station No. 01487300 Butler Mill Branch near Woodland, DE
 - i. StreamStats Data-Collection Station Report - Low Flow, Partial Record – Table COW-7 (attached)
 - 2. Delaware Environmental Observing System (DEOS)
 - a. Seaford, DE – Craigs Pond Station
 - i. Water level and temperature data available at http://www.deos.udel.edu/data/current_retrieval.php
 - b. Tidal Levels (Potential Impact at Craigs Pond Dam and Concord Pond Dam)
 - i. USGS Tidal Station No. 01488110 Nanticoke River at Sharptown, MD
 - 1. URL - http://waterdata.usgs.gov/nwis/uv?site_no=01488110
 - c. Weather
 - i. Multiple Stations in Sussex County, DE; Easton, MD; Cambridge, MD.
 - ii. URLs through Delaware Environmental Observing System (DEOS)
 - 1. <http://www.deos.udel.edu/geobrowser.html>

1.3 SUBMITTALS

- A. The Contractor shall furnish, **with his bid**, a Summary Control of Water Plan for controlling surface and groundwater and for bypassing normal and flood flows around the project work area at Chipmans Pond Dam. The Summary Control of Water Plan shall include:
1. A scope and description of the Contractor's planned methods for bypassing flow from Chipmans Pond to the downstream receiving water.
 2. A description of the flow rates to be used in designing the bypass. At a minimum, bypass measures shall be designed to convey the anticipated peak flow rate from the 10-year return period flood without overtopping the dam or eroding or otherwise damaging the bypass. The Contractor may utilize the 10-year peak flood of 423 cfs as calculated by the USGS StreamStats application, or may perform a detailed hydrologic analysis of the drainage basin to determine the peak flows to be used in the design.
 3. A description or conceptual sketch showing the general locations, layouts and anticipated dimensions of the bypass.
 4. A description of any additional work areas or environmental permits required to accomplish the proposed bypass. The Contractor shall be aware that wetlands are present along the stream channel downstream of the dam. The Contractor shall minimize disturbance to wetland areas and shall be required to restore any wetlands disturbed by a control of water measure to their pre-construction condition.
 5. A description of any additional work required to restore areas disturbed by the flow bypass to their pre-construction condition.
- B. The Contractor shall furnish to the Engineer, in writing, his complete plan for controlling surface and ground water, for cofferdam construction, and for dewatering of excavation areas at each project site included in the Contract for review and comment at least 30 calendar days prior to implementation. Review of this plan by the Engineer will not relieve the Contractor of his responsibility for completing the work as specified. The Control of Water Plan shall include:
1. Construction sequence for the implementation of the Control of Water Plan.
 2. Scope and description of the probing and geotechnical investigations, if performed.
 3. Structural design of all cofferdams, including scaled layouts, design elevations, loading assumptions, sizing, capacity calculations and allowable deflections.
 4. Calculations for bypass pump or siphon sizing, if utilized.
 5. Inflow and reservoir monitoring program.

1.4 CONTROL OF WATER REQUIREMENTS

- A. The Control of Water Plan shall consider the following project requirements and constraints:
1. Temporary diversion and cofferdam works will be required to divert normal streamflow through and around the construction site and away from open excavations and ongoing construction work.
 2. Normal streamflow must be maintained to the channels downstream of each project area during construction.
 3. In general, the reservoir levels at each project site **SHALL NOT** be lowered to accommodate this project. The Control of Water Plan shall assume a minimum reservoir level of normal pool as the reservoir, lake or pond level shown on the Contract Drawings throughout the project.

- B. Unless detailed hydrologic calculations are performed to justify a lower height, temporary diversions or cofferdams shall be constructed to a minimum elevation of 1 foot above the normal pool at each project site as indicated on the Contract Drawings.
 - 1. Hydrologic calculations to justify a lower diversion or cofferdam height shall demonstrate a minimum of 6 inches of freeboard during a 24-hour duration storm with a 10-year return period.

1.5 QUALIFICATIONS

- A. The Summary Control of Water Plan and detailed Control of Water Plans shall be developed by personnel with expertise in the appropriate technical disciplines.

PART 2 – PRODUCTS

2.1 GENERAL

- A. The Contractor shall be responsible for the calculation of the required volume and quantities of each material based on Contractor Drawings, the approved Control of Water Plan and associated shop drawings, and other factors as identified by the Contractor.
- B. The Contractor shall be responsible for all costs associated with delays or material quantity shortfalls due to volume or quantity miscalculations or required rework resulting from not meeting the requirements of this Specification and the approved Control of Water Plan.
- C. The Control of Water Plan shall include complete details of all materials to be utilized in the construction of temporary control of water measures.

PART 3 – EXECUTION

3.1 DIVERTING CONCENTRATED FLOW AND OTHER SURFACE WATER

- A. The Contractor shall build, maintain and operate cofferdams, channels, flumes, sumps or other diversion and protective works needed to divert concentrated flows and other surface water through and around the construction site while construction is in progress.
- B. The Contractor shall furnish, install and operate all necessary pumps, well points, piping and other facilities and equipment needed to divert concentrated flows and other surface water through and around the construction site while construction is in progress.
- C. After diversion works have served their purpose, the Contractor shall remove, level or regrade such works to present a sightly appearance and to prevent any obstruction of the flow of water or any other interference with the operation of or access to the permanent works. In general, all temporary diversions shall be completely removed unless otherwise approved by the Engineer.
- D. If the Contractor demonstrates that lowering a reservoir pool is necessary, the Contractor shall obtain approval from the Delaware Department of Natural Resources and Environmental Control (DNREC) – Division of Water Resources and DelDOT. Any permits required for the lowering of a reservoir are the responsibility of the Contractor.

3.2 DEWATERING

- A. The foundations of the structures to be constructed under this Contract shall be dewatered and kept free of standing or running water or muddy conditions as needed for the proper execution of the work.

- B. At locations where the presence of fine grained subsurface materials and a high groundwater table may cause the upward flow of water into the excavation with a resulting quick or unstable condition, the Contractor shall install and operate a well point system or equivalent system, as necessary, to limit the upward flow of water during construction.
- C. The Contractor shall build, maintain and operate cofferdams, channels, flumes, sumps and other diversion and protective works needed to divert or remove water from foundation areas while construction is in progress.
- D. Water pumped or drained from excavations or any sewers, drains or water courses shall be disposed of in a suitable manner without injury to adjacent property, the work under construction or to pavements, roads, drives and water courses.
- E. Water pumped or drained from excavations shall not be discharged directly to a water course or other surface water, but must be discharged to an approved sediment control measure such as a pumped water filter bag discharging to a stable area. The Contractor shall refer to the Delaware Erosion and Sediment Control Handbook, Section 3.2 for acceptable Dewatering Practices.
- F. No water shall be discharged to sanitary sewers or storm sewers.
- G. After the construction dewatering site works have served their purposes, the Contractor shall remove, level or regrade such works to present a sightly appearance and to prevent any obstruction to the flow of water or any other interference with the operation of or access to the permanent works. The termination of dewatering of the construction site works shall be subject to the approval of the Engineer.

3.3 MONITORING

- A. The Contractor shall visually monitor the control of water measures at least daily for the duration of the project. Any bulges, breakages or other evidence of displacement shall be promptly corrected to ensure that all control of water measures are stable.
- B. The Contractor shall be responsible for monitoring weather forecasts for impending precipitation events that may overwhelm the Control of Water measures. The Contractor shall be responsible for stabilizing work areas to the extent practical in advance of such events.

END OF SECTION

StreamStats Report - Chipmans Pond Dam

Region ID:

DE

Workspace ID:

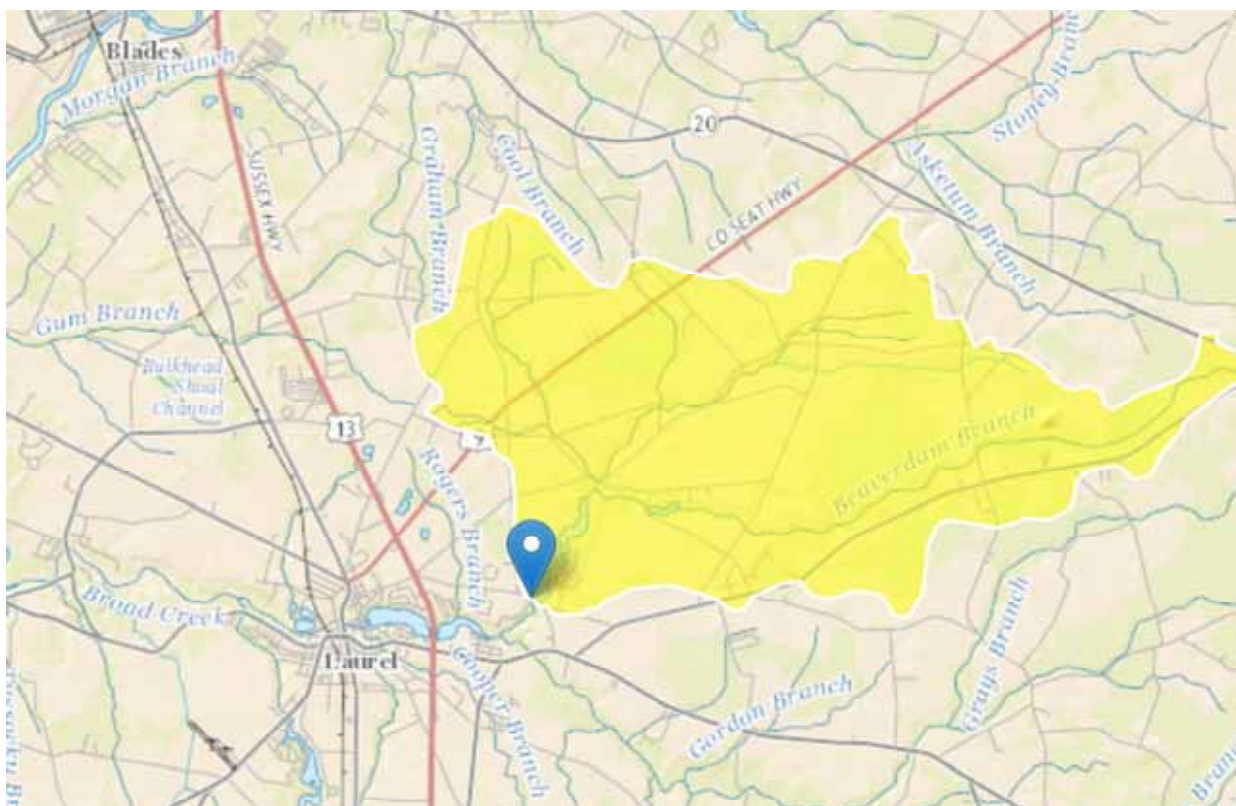
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Time:

2016-12-07 08:29:02 -0500



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	16.6	square miles
BSLDEM10M	Mean basin slope computed from 10 m DEM	0.63	percent
FOREST	Percentage of area covered by forest	25.6241	percent

Parameter Code	Parameter Description	Value	Unit
IMPNLCD01	Average percentage of impervious area determined from NLCD 2001 impervious dataset	0.1527	percent
SOILA	Percentage of area of Hydrologic Soil Type A	38.0876	percent
STORNHD	Percent storage (wetlands and waterbodies) determined from 1:24K NHD	0.8107	percent
LC11IMP	Average percentage of impervious area determined from NLCD 2011 impervious dataset	0.69	percent
LC11DEV	Percentage of developed (urban) land from NLCD 2011 classes 21-24	5.22	percent

Peak-Flow Statistics Parameters [100.00 Percent Coastal Plain Region]

Parameter	Value	Min Limit	Max Limit
Drainage Area	16.6	0.51	117
Mean Basin Slope from 10m DEM	0.63	0.3	3.69
Percent Hydrologic Soil Type A	38.0876	0.53	60

Peak-Flow Statistics Flow Report [100.00 Percent Coastal Plain Region]

Statistic	Value	Unit	Prediction Error
2 Year Peak Flood	197	ft ³ /s	67.4
5 Year Peak Flood	324	ft ³ /s	60.1
10 Year Peak Flood	423	ft ³ /s	58.5
25 Year Peak Flood	568	ft ³ /s	59
50 Year Peak Flood	683	ft ³ /s	60.8
100 Year Peak Flood	815	ft ³ /s	63.4
200 Year Peak Flood	954	ft ³ /s	66.9
500 Year Peak Flood	1150	ft ³ /s	72.3

Peak-Flow Statistics Citations

Ries, K.G., III, and Dillow, J.J.A., 2006, Magnitude and frequency of floods in Delaware: Scientific Investigations Report 2006-5146, 59 p.
(<http://pubs.usgs.gov/sir/2006/5146/>)



StreamStats Data-Collection Station Report

USGS Station Number 01487700
 Station Name ELLIOTT POND BRANCH NEAR LAUREL, DE

[Click here to link to available data on NWIS-Web for this site.](#)

Descriptive Information

Station Type	Low Flow, partial record
Location	
Gage	
Regulation and Diversions	
Regulated?	Unknown
Period of Record	
Remarks	
Latitude (degrees NAD83)	38.57761495
Longitude (degrees NAD83)	-75.52797898
Hydrologic unit code	02060008
County	005-Sussex
HCDN2009	No

Physical Characteristics

Characteristic Name	Value	Units	Citation Number
Descriptive Information			
Low_Flow_Regression_Equation	Yes	Yes or No	46
Datum_of_Latitude_Longitude	NAD83	dimensionless	30
District_Code	10	dimensionless	30
Precipitation Statistics			
Mean_Annual_Precipitation	46.5	inches	46
Topographical Characteristics			
Mean_Basin_Elevation	41	feet	46
Land Cover Characteristics			
Percent_Forest	42	percent	46
Percent_Storage	1.67	percent	46
Soil Properties			
Percent_Hydrologic_Soil_Type_A	52	percent	46
Stream Channel Properties			
Main_Channel_Length	5.6	miles	46
Stream_Slope_10_and_85_Method	5.7	feet per mi	46
Basin Dimensional Characteristics			
Drainage_Area	8.55	square miles	46

Streamflow Statistics

Statistic Name	Value	Units	Citation Number	Preferred?	Years of Record	Standard Error, percent	Variance log-10	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Start Date	End Date	Remarks
Low-Flow Statistics												
7_Day_2_Year_Low_Flow	2.7	cubic feet per second	46	Y								
7_Day_10_Year_Low_Flow	1.1	cubic feet per second	46	Y								
7_Day_20_Year_Low_Flow	0.8	cubic feet per second	46	Y								
14_Day_2_Year_Low_Flow	2.8	cubic feet per second	46	Y								
14_Day_10_Year_Low_Flow	1.2	cubic feet per second	46	Y								
14_Day_20_Year_Low_Flow	0.8	cubic feet per second	46	Y								
30_Day_2_Year_Low_Flow	2.9	cubic feet per second	46	Y								
30_Day_10_Year_Low_Flow	1.3	cubic feet per second	46	Y								
30_Day_20_Year_Low_Flow	1	cubic feet per second	46	Y								

Citations

Citation Number	Citation Name and URL
46	Carpenter, D.H., and Hayes, D.C., 1996, Low-flow characteristics of streams in Maryland and Delaware: U.S. Geological Survey Water-Resources Investigations Report 94-4020, 113 p., 10 plates

StreamStats Report - Concord Pond Dam

Region ID:

DE

Workspace ID:

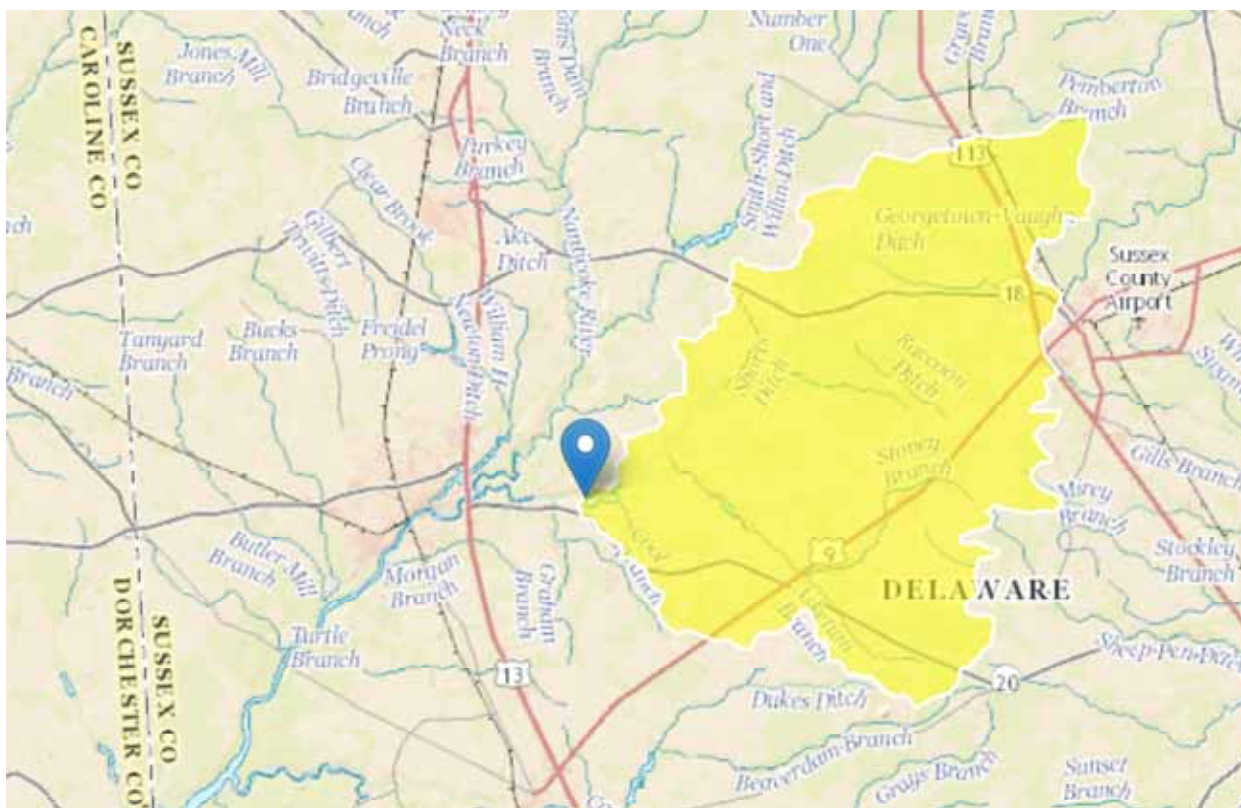
DE20161207073223736000

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Time:

2016-12-07 09:35:15 -0500



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	59.6	square miles
BSLDEM10M	Mean basin slope computed from 10 m DEM	0.6	percent
SOILA	Percentage of area of Hydrologic Soil Type A	38.3566	percent

Parameter Code	Parameter Description	Value	Unit
FOREST	Percentage of area covered by forest	26.6404	percent
IMPNLCD01	Average percentage of impervious area determined from NLCD 2001 impervious dataset	0.8407	percent
STORNHD	Percent storage (wetlands and waterbodies) determined from 1:24K NHD	4.0308	percent
LC11IMP	Average percentage of impervious area determined from NLCD 2011 impervious dataset	1.58	percent
LC11DEV	Percentage of developed (urban) land from NLCD 2011 classes 21-24	7.2	percent

Peak-Flow Statistics Parameters [100.00 Percent Coastal Plain Region]

Parameter	Value	Min Limit	Max Limit
Drainage Area	59.6	0.51	117
Mean Basin Slope from 10m DEM	0.6	0.3	3.69
Percent Hydrologic Soil Type A	38.3566	0.53	60

Peak-Flow Statistics Flow Report [100.00 Percent Coastal Plain Region]

Statistic	Value	Unit	Prediction Error
2 Year Peak Flood	479	ft ³ /s	67.4
5 Year Peak Flood	789	ft ³ /s	60.1
10 Year Peak Flood	1030	ft ³ /s	58.5
25 Year Peak Flood	1390	ft ³ /s	59
50 Year Peak Flood	1670	ft ³ /s	60.8
100 Year Peak Flood	2000	ft ³ /s	63.4
200 Year Peak Flood	2340	ft ³ /s	66.9
500 Year Peak Flood	2840	ft ³ /s	72.3

Peak-Flow Statistics Citations

Ries, K.G., III, and Dillow, J.J.A., 2006, Magnitude and frequency of floods in Delaware: Scientific Investigations Report 2006-5146, 59 p.
(<http://pubs.usgs.gov/sir/2006/5146/>)



TABLE COW - 4

StreamStats Data-Collection Station Report

USGS Station Number 01487100
 Station Name DEEP CREEK AT OLD FURNACE, DE

[Click here to link to available data on NWIS-Web for this site.](#)

Descriptive Information

Station Type	Low Flow, partial record
Location	
Gage	
Regulation and Diversions	
Regulated?	Unknown
Period of Record	
Remarks	
Latitude (degrees NAD83)	38.66627778
Longitude (degrees NAD83)	-75.51430556
Hydrologic unit code	02060008
County	005-Sussex
HCDN2009	No

Physical Characteristics

Characteristic Name	Value	Units	Citation Number
Descriptive Information			
Low_Flow_Regression_Equation	Yes	Yes or No	46
Datum_of_Latitude_Longitude	NAD83	dimensionless	30
District_Code	10	dimensionless	30
Precipitation Statistics			
Mean_Annual_Precipitation	47	inches	46
Topographical Characteristics			
Mean_Basin_Elevation	40	feet	46
Land Cover Characteristics			
Percent_Forest	68	percent	46
Percent_Storage	5.49	percent	46
Soil Properties			
Percent_Hydrologic_Soil_Type_A	28	percent	46
Stream Channel Properties			
Main_Channel_Length	12.1	miles	46
Stream_Slope_10_and_85_Method	3.2	feet per mi	46
Basin Dimensional Characteristics			
Drainage_Area	33	square miles	46

Streamflow Statistics

Statistic Name	Value	Units	Citation Number	Preferred?	Years of Record	Standard Error, percent	Variance log-10	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Start Date	End Date	Remarks
Low-Flow Statistics												
7_Day_2_Year_Low_Flow	6.1	cubic feet per second	46	Y								
7_Day_10_Year_Low_Flow	2.8	cubic feet per second	46	Y								
7_Day_20_Year_Low_Flow	2.2	cubic feet per second	46	Y								
14_Day_2_Year_Low_Flow	6.5	cubic feet per second	46	Y								
14_Day_10_Year_Low_Flow	3	cubic feet per second	46	Y								
14_Day_20_Year_Low_Flow	2.4	cubic feet per second	46	Y								
30_Day_2_Year_Low_Flow	7.2	cubic feet per second	46	Y								
30_Day_10_Year_Low_Flow	3.4	cubic feet per second	46	Y								
30_Day_20_Year_Low_Flow	2.8	cubic feet per second	46	Y								

Citations

Citation Number	Citation Name and URL
46	Carpenter, D.H., and Hayes, D.C., 1996, Low-flow characteristics of streams in Maryland and Delaware: U.S. Geological Survey Water-Resources Investigations Report 94-4020, 113 p., 10 plates



TABLE COW - 5

StreamStats Data-Collection Station Report

USGS Station Number 01487120
 Station Name TYNDALL BRANCH NEAR HARDSCRABBLE, DE

[Click here to link to available data on NWIS-Web for this site.](#)

Descriptive Information

Station Type	Low Flow, partial record
Location	
Gage	
Regulation and Diversions	
Regulated?	Unknown
Period of Record	
Remarks	
Latitude (degrees NAD83)	38.63178114
Longitude (degrees NAD83)	-75.49131107
Hydrologic unit code	02060008
County	005-Sussex
HCDN2009	No

Physical Characteristics

Characteristic Name	Value	Units	Citation Number
Descriptive Information			
Low_Flow_Regression_Equation	Yes	Yes or No	46
Datum_of_Latitude_Longitude	NAD83	dimensionless	30
District_Code	10	dimensionless	30
Precipitation Statistics			
Mean_Annual_Precipitation	45.5	inches	46
Topographical Characteristics			
Mean_Basin_Elevation	45	feet	46
Land Cover Characteristics			
Percent_Forest	57	percent	46
Percent_Storage	1.79	percent	46
Soil Properties			
Percent_Hydrologic_Soil_Type_A	32	percent	46
Stream Channel Properties			
Main_Channel_Length	5.4	miles	46
Stream_Slope_10_and_85_Method	2.8	feet per mi	46
Basin Dimensional Characteristics			
Drainage_Area	12.3	square miles	46

Streamflow Statistics

Statistic Name	Value	Units	Citation Number	Preferred?	Years of Record	Standard Error, percent	Variance log-10	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Start Date	End Date	Remarks
Low-Flow Statistics												
7_Day_2_Year_Low_Flow	3.2	cubic feet per second	46	Y								
7_Day_10_Year_Low_Flow	1.2	cubic feet per second	46	Y								
7_Day_20_Year_Low_Flow	0.8	cubic feet per second	46	Y								
14_Day_2_Year_Low_Flow	3.3	cubic feet per second	46	Y								
14_Day_10_Year_Low_Flow	1.3	cubic feet per second	46	Y								
14_Day_20_Year_Low_Flow	0.9	cubic feet per second	46	Y								
30_Day_2_Year_Low_Flow	3.5	cubic feet per second	46	Y								
30_Day_10_Year_Low_Flow	1.5	cubic feet per second	46	Y								
30_Day_20_Year_Low_Flow	1.1	cubic feet per second	46	Y								

Citations

Citation Number	Citation Name and URL
46	Carpenter, D.H., and Hayes, D.C., 1996, Low-flow characteristics of streams in Maryland and Delaware: U.S. Geological Survey Water-Resources Investigations Report 94-4020, 113 p., 10 plates

StreamStats Report - Craigs Pond Dam

Region ID:

DE

Workspace ID:

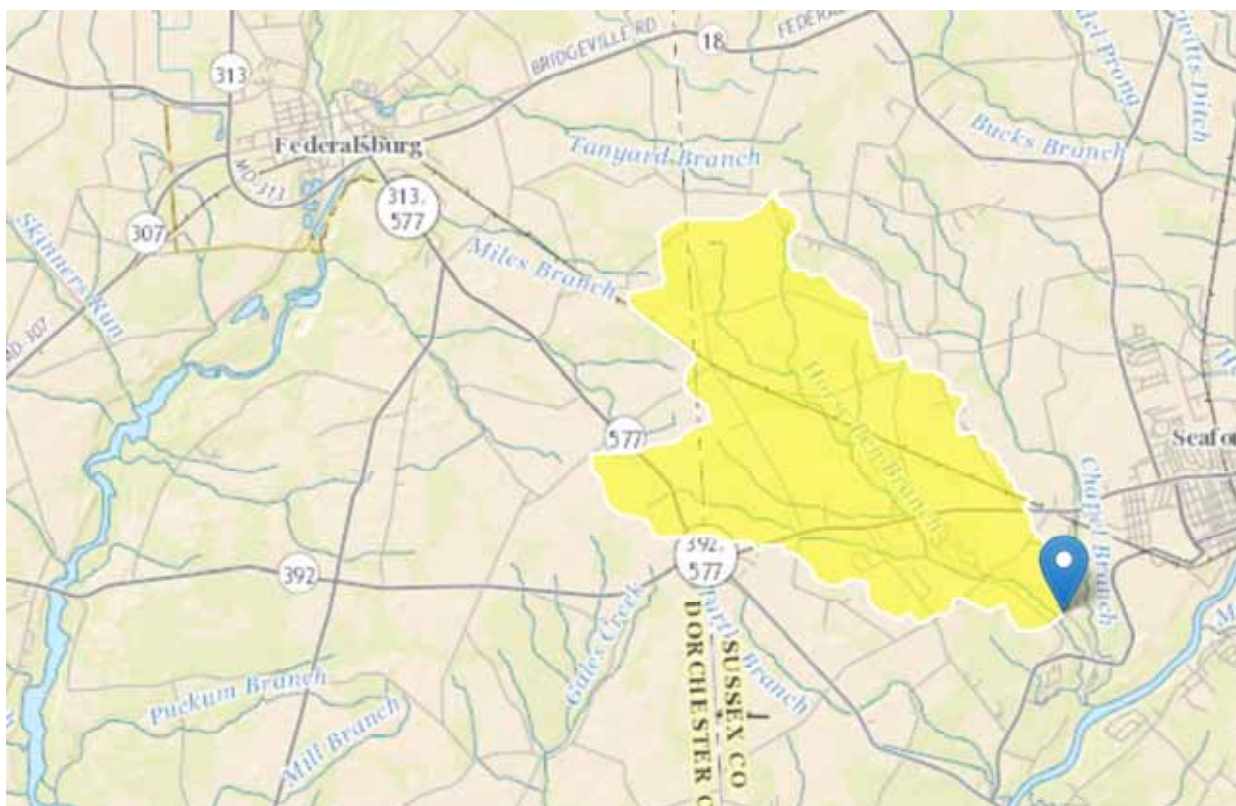
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Time:

2016-12-07 09:28:06 -0500



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	8.83	square miles
BSLDEM10M	Mean basin slope computed from 10 m DEM	0.59	percent
SOILA	Percentage of area of Hydrologic Soil Type A	12.6108	percent

Parameter Code	Parameter Description	Value	Unit
FOREST	Percentage of area covered by forest	8.8859	percent
IMPNLCD01	Average percentage of impervious area determined from NLCD 2001 impervious dataset	0.5989	percent
STORNHD	Percent storage (wetlands and waterbodies) determined from 1:24K NHD	0	percent
LC11IMP	Average percentage of impervious area determined from NLCD 2011 impervious dataset	1.32	percent
LC11DEV	Percentage of developed (urban) land from NLCD 2011 classes 21-24	8.14	percent

Peak-Flow Statistics Parameters [100.00 Percent Coastal Plain Region]

Parameter	Value	Min Limit	Max Limit
Drainage Area	8.83	0.51	117
Mean Basin Slope from 10m DEM	0.59	0.3	3.69
Percent Hydrologic Soil Type A	12.6108	0.53	60

Peak-Flow Statistics Flow Report [100.00 Percent Coastal Plain Region]

Statistic	Value	Unit	Prediction Error
2 Year Peak Flood	169	ft ³ /s	67.4
5 Year Peak Flood	281	ft ³ /s	60.1
10 Year Peak Flood	370	ft ³ /s	58.5
25 Year Peak Flood	500	ft ³ /s	59
50 Year Peak Flood	604	ft ³ /s	60.8
100 Year Peak Flood	723	ft ³ /s	63.4
200 Year Peak Flood	848	ft ³ /s	66.9
500 Year Peak Flood	1030	ft ³ /s	72.3

Peak-Flow Statistics Citations

Ries, K.G., III, and Dillow, J.J.A., 2006, Magnitude and frequency of floods in Delaware: Scientific Investigations Report 2006-5146, 59 p.
(<http://pubs.usgs.gov/sir/2006/5146/>)



TABLE COW - 7

StreamStats Data-Collection Station Report

USGS Station Number 01487300
 Station Name BUTLER MILL BRANCH NEAR WOODLAND, DE

[Click here to link to available data on NWIS-Web for this site.](#)

Descriptive Information

Station Type	Low Flow, partial record
Location	
Gage	
Regulation and Diversions	
Regulated?	Unknown
Period of Record	
Remarks	
Latitude (degrees NAD83)	38.63233682
Longitude (degrees NAD83)	-75.65937338
Hydrologic unit code	02060008
County	005-Sussex
HCDN2009	No

Physical Characteristics

Characteristic Name	Value	Units	Citation Number
Descriptive Information			
Low_Flow_Regression_Equation	Yes	Yes or No	46
Datum_of_Latitude_Longitude	NAD83	dimensionless	30
District_Code	10	dimensionless	30
Precipitation Statistics			
Mean_Annual_Precipitation	46	inches	46
Topographical Characteristics			
Mean_Basin_Elevation	42	feet	46
Land Cover Characteristics			
Percent_Forest	27	percent	46
Percent_Storage	0.56	percent	46
Soil Properties			
Percent_Hydrologic_Soil_Type_A	20	percent	46
Stream Channel Properties			
Main_Channel_Length	4.8	miles	46
Stream_Slope_10_and_85_Method	5.4	feet per mi	46
Basin Dimensional Characteristics			
Drainage_Area	6.85	square miles	46

Streamflow Statistics

Statistic Name	Value	Units	Citation Number	Preferred?	Years of Record	Standard Error, percent	Variance log-10	Lower 95% Confidence Interval	Upper 95% Confidence Interval	Start Date	End Date	Remarks
Low-Flow Statistics												
7_Day_2_Year_Low_Flow	2.2	cubic feet per second	46	Y								
7_Day_10_Year_Low_Flow	1.3	cubic feet per second	46	Y								
7_Day_20_Year_Low_Flow	1.1	cubic feet per second	46	Y								
14_Day_2_Year_Low_Flow	2.3	cubic feet per second	46	Y								
14_Day_10_Year_Low_Flow	1.3	cubic feet per second	46	Y								
14_Day_20_Year_Low_Flow	1.1	cubic feet per second	46	Y								
30_Day_2_Year_Low_Flow	2.5	cubic feet per second	46	Y								
30_Day_10_Year_Low_Flow	1.4	cubic feet per second	46	Y								
30_Day_20_Year_Low_Flow	1.2	cubic feet per second	46	Y								

Citations

Citation Number	Citation Name and URL
46	Carpenter, D.H., and Hayes, D.C., 1996, Low-flow characteristics of streams in Maryland and Delaware: U.S. Geological Survey Water-Resources Investigations Report 94-4020, 113 p., 10 plates

SECTION 31 62 16.13**STEEL SHEET PILES****PART 1 – GENERAL****1.1 DESCRIPTION**

- A. This Section includes the requirements for furnishing and installing steel sheet piles of the sizes, weights, and lengths as shown on the Contract Drawings and as specified herein.

1.2 REFERENCES

- A. Materials and installation shall be in accordance with the latest revisions of the following codes, standards, and specifications except where more stringent requirements have been specified herein.
1. American Society for Testing and Materials (ASTM)
 - a. ASTM A6/A6M General Requirements for Rolled Structural Steel Bars, Plates, Shapes and Sheet Piling
 - b. ASTM A328/A328M Steel Sheet Piling
 - c. ASTM A572/A572M High Strength Low-Alloy Columbium-Vanadium Structural Steel
 - d. ASTM A690/A690M High Strength Low-Alloy Structural Steel H-Piles and Sheet Piling for Use in Marine Environments
 2. American Welding Society
 - a. AWS D1.1/D1.1M Structural Welding Code – Steel
 3. Delaware Department of Transportation Standard Specifications for Road and Bridge Construction, including all Supplemental Specifications (DelDOT Standard Specifications)

1.3 SUBMITTALS

- A. The Contractor shall submit for approval detailed drawings for sheet piling, including fabricated sections, shall show complete piling dimensions and details, driving sequence, pile configuration, material specifications, complete layout plan, and proposed method of installation. Detail drawings shall include dimensions of templates and other temporary guide structures for installing piling. Detail drawings shall provide the method of handling piling to prevent permanent deflection, distortion or damage to piling interlocks.
- B. The contractor shall prepare as soon as possible after award of the contract, complete and accurate shop drawings of all work of the section. The drawings shall include the size and spacing of all steel members. All members shall be numbered for identification in erection. Shop drawings shall give complete information necessary for fabrication of component parts of the structure, including location, type and size of all bolts and welds. Shop and field bolts and welds shall be clearly distinguished. Welding symbols used on shop drawings shall show complete dimensioned layout of all steel sheet piling.
- C. Contractor shall submit checked shop drawings to Engineer for approval. No steel shall be ordered until the Engineer has approved such drawings.
- D. Approval by the Engineer covers general design details only, and if any change is made, which would cause members not to fit, or would give insufficient strength, the contractor shall call the engineer's attention to the fact at once, in writing, so that corrections may be made. If the contractor fails to do this, the sole responsibility shall rest upon the contractor.

- E. Any error or omission on the contractor's drawings, even though approved, shall not relieve the contractor from the responsibility of performing the work in accordance with the specifications.
- F. The Engineer upon request will furnish any details not sufficiently shown on the plans to the contractor.
- G. The Contractor shall submit complete descriptions of sheet piling driving equipment including hammers, extractors, protection caps, and other installation appurtenances for approval prior to commencement of work.
- H. The Contractor shall maintain records of the sheet piling driving operations and shall submit such records after driving is completed. These records shall provide a system of identification which shows the disposition of approved piling, driving equipment performance data, piling penetration rate data, piling dimensions, and top and bottom elevations of installed piling. The format for driving records shall be as directed by the Engineer.
- I. Notification: The Contractor shall give written notification to the Engineer of the scheduled date for installation of sheet piling at each site at least five working days in advance of that date.

1.4 SUBSURFACE CONDITIONS

- A. The soil boring logs for subsurface investigations performed at each site are included with the Contract Drawings. The soil boring log and laboratory testing information is provided to the contractor at its own risk, in the assessment of subsurface conditions at the site. Prior to bidding, bidding contractors may make their own subsurface investigations to satisfy themselves as to site and subsurface conditions, but such subsurface investigations shall be performed only under time schedules and arrangements approved in advance by the Department of Natural Resources and Environmental Control.

1.5 DELIVERY, HANDLING AND STORAGE

- A. Materials delivered to the site shall be new, undamaged, and be accompanied by certified test reports. The manufacturer's logo and mill identification mark shall be provided on the sheet piling, as required by the referenced specifications.
- B. Steel sheet piles shall be handled and stored by methods that will not injure the pile and in a manner recommended by the manufacturer to prevent permanent deflection, distortion or damage to the interlocks. Storage of sheet piling should also facilitate required inspection activities. The pile shall be stored above ground upon platforms, blocking, or other supports. They shall be kept free from dirt, grease, and other foreign matter and shall be protected from corrosion.

1.6 QUALITY ASSURANCE

- A. The manufacturer shall furnish 3 certified copies of mill test reports containing the true chemical and physical analysis of piling material prior to each shipment to the project site and identified with specific lots prior to installing materials. Material test reports shall meet the requirements of ASTM A6/A6M.
- B. All steel sheet piles shall be straight and within appropriate tolerances at the time of delivery. Any steel sheet piles not within tolerances must be replaced at the contractor's expense.
- C. Permanent sheet piling shall be new piling and shall be furnished and driven by contractor as provided on the Contract Drawings or as designated by the Engineer.
- D. The contractor shall inspect the interlocked joints of driven pilings extending above ground. Piling found to be out of interlock shall be removed and replaced at the contractor's expense.

1.7 QUALIFICATIONS

- A. Fabricator Qualifications: The steel sheet piling shall be fabricated by a manufacturer in the practice of designing and fabricating steel sheet piling similar in size and scope to this project within the last ten years.
- B. Installer Qualifications: The steel sheet pile shall be installed by a firm which is regularly engaged in the installation of steel sheet piling, and has at least ten years of experience in the installation of similar systems. The superintendent shall have installed sheet pile wall systems on at least five projects of similar scope and size.

PART 2 – PRODUCTS

2.1 MATERIALS

- A. Steel sheet piling shall be hot rolled steel sheet pile sections conforming to ASTM A572 Grade 50. Cold rolled steel sheet pile sections as a substitute is not allowed. Steel sheet piles shall be supplied and driven in pairs.
- B. Tie rods, H-pile sections, waler beams, plates, bolts, washers and all included accessories shall conform to the latest AISC / ASTM standards.
- C. Steel sheet piles shall be PZ hot rolled steel sections of the weight, shape, and length as indicated on the Contract Drawings.
- D. Steel sheet piles shall be of continuous interlocking type. The interlocks of sheet piling shall be free-sliding and maintain continuous interlocking when installed.
- E. Piles must be of a single type with no splices. Sheet piling (including special fabricated sections) shall be full-length sections of the dimensions shown. Fabricated sections shall conform to the requirement and the piling manufacturer's recommendations for fabricated sections. Fabricated tees, wyes and crosspieces shall be fabricated of piling sections with a minimum web thickness of ½ inch.
- F. Appurtenant Metal Materials: Metal plates, shapes, bolts, nuts, rivets, and other appurtenant fabrication and installation materials shall conform to manufacturer's standards and to the requirements specified in the respective sheet piling.

PART 3 – EXECUTION

3.1 DRIVING EQUIPMENT

- A. Pile Hammers
 - 1. Hammers shall be steam, air, diesel drop, single-acting, double-acting or vibratory type. The driving energy of the hammers used shall be sufficient as recommended by the manufacturer for the total weight of the pile and the character of the subsurface material to be encountered.

3.2 INSTALLATION

- A. Pile Driving: The driving energy of the hammers for driving the sheet piles shall be as recommended by the manufacturer to reach the required tip elevations for the piling weights and subsurface materials to be encountered.
- B. Jetting: The use of jetting will not be permitted.

- C. Pile Placement: To maintain satisfactory alignment, sheet piles shall be driven in increments of penetration necessary to prevent distortion, twisting out of position, or pulling apart at interlocks. Pilings shall be carefully located as shown on the plans. Pilings shall be placed plumb with out-of-plumbness not exceeding 1/8 inch per foot of length and true to line. Temporary wales, templates, master pilings, or guide structures shall be provided to ensure that the pilings are placed and driven to the correct alignment. Pilings properly placed and driven shall be interlocked throughout their length with adjacent pilings to form a continuous diaphragm throughout the length or run of piling wall.
- D. Pilings damaged during or driven out of interlock shall be removed and replaced at the contractor's expense.
- E. Cutoffs and Splicing: Tops of sheet piling shall be cut off or driven down to a straight line at the elevation shown on the plans. Pilings driven to refusal or to the point where additional penetration cannot be attained and are extending above the required top elevation in excess of the specified tolerance shall be cut off to the required elevation. Piling driven below the required top elevation and pilings damaged by driving and cut off to permit further driving shall be extended as required to reach the top elevation by splicing when directed by the engineer at no additional cost to the Owner. If directed, pilings shall be spliced as required to drive them to depths greater than shown and extend them up the required top elevation. Pilings adjoining spliced pilings shall be full-length unless otherwise approved. Splicing of pilings shall be as indicated. Ends of pilings to be spliced shall be squared before splicing to eliminate dips or camber. Pilings shall be spliced together with concentric alignment of the interlocks so that there are no discontinuities, dips, or camber at the abutting interlocks. Spliced pilings shall free sliding and able to obtain the maximum swing with contiguous pilings. The tops of pilings excessively battered during driving shall be trimmed when directed at no cost to the Owner. Piling cutoffs shall become the property of the contractor and shall be removed from the site. The contractor shall cut holes in pilings for bolts, rods, reinforcement, drains, or utilities as shown on the plans or as directed. All cutting shall be done in a neat and workmanlike manner. A straight edge shall be used in cuts made by burning to avoid abrupt nicks. Bolt holes in steel piling shall be drilled or may be burned and reamed by approved methods that will not damage the surrounding metal. Holes, other than bolt holes, shall be reasonably smooth and the proper size for rods and other items to be inserted.
- F. Pulling and redriving: In the pulling and redriving of piles, the contractor shall pull selected pilings to determine the condition of the underground portions of pilings. Any piling pulled and found to be damaged to the extent that its usefulness in the structure is impaired shall be removed and replaced at the contractor's expense. Pilings pulled found to be in satisfactory condition shall be redriven when directed.

3.3 INSPECTION

- A. Contractor shall perform continuous inspection during pile driving. Inspect all piles for compliance with tolerance requirements. Any unusual problems which may occur shall be brought to the attention of the Engineer. The Contractor shall inspect interlock joints for driven piles extending above the ground. Pilings found to be out of interlock shall be removed and replaced at the Contractor's expense.

3.4 AS-BUILT RECORDS

- A. As-built construction records, shall, as a minimum, reflect the following information:
 - 1. Recorded tip and top elevations at all changes in profile.
 - 2. Recorded field modifications to the contract drawings and reviewed shop drawings.

END OF SECTION

SECTION 31 62 16.16**STEEL H PILES****PART 1 – GENERAL****1.1 DESCRIPTION**

- A. This Section includes the requirements for furnishing and installing steel H piles of the sizes, weights and lengths as shown on the Contract Drawings and as specified herein.

1.2 RELATED SECTIONS

- A. 01 45 00 Quality Requirements
- B. 31 08 13.13 Dynamic Pile Testing
- C. 01 78 39 Project Record Documents

1.3 REFERENCES

- A. Materials and installation shall be in accordance with the latest revisions of the following codes, standards, and specifications except where more stringent requirements have been specified herein.
1. American Society for Testing and Materials (ASTM)
 - a. ASTM A6/A6M General Requirements for Rolled Structural Steel Bars, Plates, Shapes and Sheet Piling
 - b. ASTM A572/A572M High Strength Low-Alloy Columbium-Vanadium Structural Steel
 - c. ASTM A690/A690M High Strength Low-Alloy Structural Steel H-Piles and Sheet Piling for Use in Marine Environments
 2. American Welding Society
 - a. AWS D1.1/D1.1M Structural Welding Code – Steel
 3. Delaware Department of Transportation Standard Specifications for Road and Bridge Construction, including all Supplemental Specifications (DelDOT Standard Specifications)

1.4 SUBMITTALS

- A. Product Data: For each type of pile product, accessory, and paint indicated.
- B. Shop Drawings: Show fabrication and installation details for piles, including splices, field-cut holes, and pile caps.
1. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld.
- C. Welding Certificates: Copies of certificates for welding procedures and personnel.
- D. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of Engineers and owners, and other information specified.
- E. Mill test reports signed by manufacturer certifying that each of the following complies with requirements:
1. Steel H piles
 2. Steel castings

3. Steel plate

- F. Pile-Driving Equipment: Include type, make, maximum rated energy, and rated energy per blow of hammer; weight of striking part of hammer; weight of drive cap; details, type, and structural properties of hammer cushion; and details of follower and jetting equipment.
- G. Pile-Layout: Include field-verified locations of existing features and proposed pile-layout, fully dimensioned.
- H. Driving Records: Submit within two days of driving.

1.5 SUBSURFACE CONDITIONS

- A. The soil boring logs for subsurface investigations performed at each site are included with the Contract Drawings. The soil boring log and laboratory testing information is provided to the contractor at its own risk, in the assessment of subsurface conditions at the site. Prior to bidding, bidding contractors may make their own subsurface investigations to satisfy themselves as to site and subsurface conditions, but such subsurface investigations shall be performed only under time schedules and arrangements approved in advance by the Department of Natural Resources and Environmental Control.

1.6 DELIVERY, HANDLING AND STORAGE

- A. Materials delivered to the site shall be new, undamaged, and be accompanied by certified test reports. The manufacturer's logo and mill identification mark shall be provided as required by the referenced specifications.
- B. Deliver piles to project sites in such quantities and at such times to ensure continuity of installation. Handle and store piles at site to prevent physical damage. Support piles with webs in vertical position.
 - 1. Protect pile coatings and touch up damaged coatings before driving pile.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who has specialized in installing piling similar in material, design, and extent to that indicated for this Project.
- B. Survey Work: Provide pile-driving records, including surveys, layouts, and measurements, prepared by a surveyor or professional engineer who is legally qualified in jurisdiction where Project is located to perform these kinds of services.
- C. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services for piles that are similar to those indicated for this Project in material, design, and extent.
- D. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM E 329 to conduct the testing indicated, as documented according to ASTM E 548.
- E. Comply with requirements of the following publications:
 - 1. ANSI/AISC 360-05 "Load and Resistance Factor Design (LRFD) Specification for Structural Steel Buildings", 13th Edition, March 9, 2005.
 - 2. ANSI/AISC 360-05 "Specifications for Structural Steel Buildings – Allowable Strength Design and Plastic Design", 13th Edition, March 9, 2005.

- F. Welding Standards: Qualify welding procedures and personnel according to AWS D1.1, "Structural Welding Code-Steel."
- G. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings."

PART 2 – PRODUCTS

2.1 STEEL H PILES

- A. Steel H Piles shall be High Strength, Low-Alloy, Columbium-Vanadium Steel conforming to ASTM A572 Grade 50.

2.2 PILE ACCESSORIES

- A. Splice Units: Manufacturer's standard splice unit, fabricated from two connected steel plates, of same material as the H pile, shaped and tapered to encase web and part of each flange.

2.3 PAINT

- A. Paint: SSPC-Paint 16; self-priming, two-component, coal-tar epoxy polyamide.
 - 1. Color: Black

2.4 FABRICATION

- A. The Engineer will review the pile segment lengths proposed for use by the Contractor after the submission of the Preconstruction Wave Equation Analysis.
- B. Fabricate and assemble piles in shop to greatest extent possible.
- C. Fabricate full-length piles to eliminate splicing during driving, with ends square.
- D. Fabricate full-length piles by splicing lengths of H pile together. Accurately mill meeting ends of piles and bevel for welding. Maintain axial alignment of pile lengths.
 - 1. Splice Unit: Notch web of pile, fit splice unit into position, and weld according to manufacturer's written instructions and AWS D1.1 for procedures, appearance and quality of welds, and methods used in correcting welding work.
 - 2. Welded Splices: Continuously weld pile according to AWS D1.1 for procedures, appearance and quality of welds, and methods used in correcting welding work.
 - 3. Splice piles during fabrication or field installation.
- E. Pile-Length Markings: Mark each pile length with horizontal line at 12-inch intervals, and the distance from pile tip at 60-inch intervals.

2.5 SHOP PAINTING

- A. General: Shop paint steel pile surfaces, except for surfaces to be encased in concrete, as follows:
 - 1. Extend painting from a depth of 60 inches (1500 mm) below low tide level to top of exposed pile.
- B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and loose mill scale, and remove spatter, slag, or flux deposits. Prepare surfaces according to SSPC-SP 10/NACE No. 2, "Near-White Blast Cleaning."

- C. Painting: Immediately after surface preparation, apply first coat of paint according to manufacturer's written instructions to provide a dry film thickness of not less than 8 mils.
 - 1. Apply second coat to provide a dry film thickness of not less than 8 mils, resulting in a two-coat paint system thickness of not less than 16 mils.
 - 2. Apply second and third coat with each coat of dry film thickness of not less than 8 mils, resulting in a three-coat paint system thickness of not less than 24 mils.
 - 3. Mark pile lengths after shop painting.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Site Conditions: Do not start pile-driving operations until earthwork fills have been completed or excavations have reached an elevation of 6 to 12 inches (150 to 300 mm) above bottom of footing or pile cap.

3.2 DRIVING EQUIPMENT

- A. Pile Hammer: Air-, steam-, or diesel-powered type capable of consistently delivering driving energy to pile within range recommended by hammer manufacturer for length and weight of pile and character of subsurface material anticipated.
- B. Hammer Cushions and Driving Caps: Between hammer and top of pile, provide hammer cushion and steel driving cap recommended by hammer manufacturer for type of pile.
- C. Leads: Use fixed or rigid-type pile-driver leads that will hold full length of pile firmly in position and in axial alignment with hammer. Extend leads to within 24 inches of elevation at which pile enters ground.

3.3 DYNAMIC PILE TESTING

- A. Engage Dynamic Pile Testing Consultant and perform dynamic pile testing in accordance with Specification Section 31 08 13.13 Dynamic Pile Testing.

3.4 DRIVING PILES

- A. General: Continuously drive piles to elevations or penetration resistance indicated or established by dynamic load testing of piles. Establish and maintain axial alignment of leads and pile before and during driving.
- B. Heaved Piles: Redrive heaved piles to tip elevation at least as deep as original tip elevation with a driving resistance at least as great as original driving resistance.
- C. Driving Tolerances: Drive piles without pile heads exceeding the following tolerances:
 - 1. Location: 4 inches from location indicated after initial driving, and 6 inches after pile driving is completed.
 - 2. Plumb: Maintain 1 inch per 10 feet from vertical, or a maximum of 4 inches, measured when pile is above ground in leads.
 - 3. Batter Angle: Maximum 1 inch in 10 feet from required angle, measured when pile is above ground in leads.
 - 4. Roll Angle: Maximum 0.30 degrees total at top of H-pile.

- D. Withdraw damaged or defective piles and piles that exceed driving tolerances and install new piles within driving tolerances. Fill holes left by withdrawn piles as directed by Engineer.
 - 1. Rejected piles may be abandoned and cut off as directed by Engineer.
 - 2. Leave rejected piles in place and install new piles in locations as directed by Engineer.
 - 3. Fill holes left by withdrawn piles that will not be filled by new piles using cohesionless soil material such as gravel, broken stone, and gravel-sand mixtures. Place and compact in lifts not exceeding 72 inches.
- E. Cutting off: Cut off tops of driven piles square with pile axis and at elevations indicated.
- F. Pile Caps: Weld steel plates, of same material as H pile, to top of steel pile square and level.
- G. Driving Record: Maintain accurate driving records for each pile, compiled and attested to by a qualified professional engineer. Include the following data:
 - 1. Project name and number
 - 2. Name of Contractor
 - 3. Pile location in pile group and designation of pile group
 - 4. Sequence of driving in pile group
 - 5. Pile dimensions
 - 6. Ground elevation
 - 7. Elevation of tip after driving
 - 8. Final tip and cutoff elevations of pile after driving pile group
 - 9. Records of redriving
 - 10. Elevation of splices
 - 11. Type, make, model, and rated energy of hammer
 - 12. Weight and stroke of hammer
 - 13. Type of pile-driving cap used
 - 14. Cushion material and thickness
 - 15. Actual stroke and blow rate of hammer
 - 16. Pile-driving start and finish time; and total driving time
 - 17. Time, pile-tip elevation, and reason for interruptions
 - 18. Record of number of blows for each 12 inches of penetration, and number of blows per 1 inch for the last 6 inches of driving
 - 19. Pile deviations from location and plumb
 - 20. Record preboring, jetting, or special procedures used
 - 21. Record of unusual occurrences during pile driving.

3.5 FIELD QUALITY CONTROL

- A. Contractor shall engage a qualified independent testing agency to perform field quality-control testing.
- B. In addition to visual inspection, all welds, including splices, will be inspected and weld tested according to AWS D1.1 and one of the inspection procedures listed below, at testing agency's option. Correct deficiencies in and retest welds to determine compliance with requirements.
 - 1. Liquid penetrant inspection shall meet ASTM E 165.
 - 2. Magnetic particle inspection shall meet ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
 - 3. Radiographic inspection shall meet ASTM E 94 and ASTM E 142; minimum quality level "2-2T."
 - 4. Ultrasonic inspection shall meet ASTM E 164.

3.6 TOUCHUP PAINTING

- A. Clean field welds, splices, and abraded painted areas and field-apply paint according to SSPC-PA 1. Use same paint and apply same number of coats as specified for shop painting.
 - 1. Apply touchup paint before driving piles to surfaces that will be immersed or inaccessible after driving.

3.7 DISPOSAL

- A. Remove cutoff sections of piles from site and legally dispose of them off Owner's property.

END OF SECTION

SECTION 31 62 23.13**CONCRETE FILLED STEEL PILES****PART 1 – GENERAL****1.1 DESCRIPTION**

- A. This Section includes the furnishing, handling, coring and cutting-off of permanent steel end bearing concrete filled pipe piles as indicated on the Contract Drawings and described herein.

1.2 RELATED SECTIONS

- A. 01 45 00 Quality Requirements
B. 01 78 39 Project Record Documents
C. 31 08 13.13 Dynamic Pile Testing

1.3 REFERENCES

- A. Materials and installation shall be in accordance with the latest revisions of the following codes, standards and specifications, except where more stringent requirements have been specified herein.
1. American Society for Testing and Materials (ASTM)
 - a. ASTM A36 Structural Steel
 - b. ASTM A139 Electro-Fusion (Arc)- Welded Steel Pipe (NPS 4 and Over)
 2. American Welding Society (AWS)
 - a. AWS D1.1 Structural Welding Code – Steel
 3. American Concrete Institute (ACI)
 - a. ACI 301 Specifications for Structural Concrete
 - b. ACI 318 Building Code Requirements for Structural Concrete
 4. Delaware Department of Transportation Standard Specifications for Road and Bridge Construction, including all Supplemental Specifications

1.4 SUBMITTALS

- A. The Contractor shall submit the following items in accordance with the General Provisions:
1. The Contractor or his pile driving subcontractor shall submit qualifications and a list including at least five projects of scope and complexity similar to this Project 30 days prior to start of any pile driving.
 2. The Contractor shall submit names, qualifications and references of any subcontractors intended to perform the Work. All subcontractors are subject to the Owner's review and approval in accordance with the General Provisions.
 3. The Contractor shall submit the name of the independent testing agency to be responsible for the testing of piles.
 4. Before the start of pile installation, the Contractor shall submit for the Engineer's review, a schedule of the procedures and operations that he intends to adopt. The schedule shall show in detail, to the Engineer's satisfaction, the sequence and timing of all pile installation operations and the equipment to be used.

5. Product data for each type of pile product and accessory.
6. Shop Drawings indicating fabrication and installation details for piles, including splicing and tip details.
 - a. Indicate welds by standard AWS symbols, distinguishing between shop and field welds. Show size, length and type of each weld.
 - b. Indicate locations, sizes, type and arrangement of reinforcement.
 - c. Details and procedures for the dynamic load tests.
7. Copies of welding certificates for welding procedures and personnel.
8. Submit working drawings to the Engineer for review showing the procedures for picking up, transporting, and handling the piles, before the start of the work.
9. Pile Ordering List:
 - a. All piles shall be furnished by the Contractor. Pile detail drawings included in the Contract Drawings are to be used in the preparation of the fabrication details. Shop drawings are to be submitted to the Engineer for review prior to purchase of any piles.
 - b. The Contractor shall prepare a list of piles that are to be installed in the work showing size, type, number, location and length needed to assure the required penetration. The Contractor shall submit the list to the Engineer for the review prior to ordering the piles. The accuracy of the pile list is the responsibility of the Contractor.
10. Pile Installation Equipment:
 - a. Submit the following details of driving equipment to the Engineer for review at least 30 days prior to driving any production piles.
 - (1) Pile-Driving Equipment: Include type, make, maximum rated energy, and rated energy per blow of hammer; weight of striking part of hammer; weight of drive cap; details, type, and structural properties of hammer cushion; and details of follower and jetting equipment. Driving equipment shall be selected on the basis of a Wave Equation Analysis of Piles (WEAP) in accordance with Specification Section 31 08 13 13 Dynamic Pile Testing.
 - (2) Pile-Layout: Include field-verified locations of existing features and proposed pile-layout, fully dimensioned.
11. Driving Records: Submit within two days of driving.

1.5 QUALITY ASSURANCE

- A. Installer shall be an experienced installer who has specialized in installing piles similar in material, design and extent to that indicated for this Project.
- B. Fabricator shall be a firm experienced in producing steel pipe piles similar to those indicated for this Project and with a record of successful in-service performance.
- C. Provide pile-driving records, including surveys, layouts and measurements prepared by a Professional Land Surveyor or Professional Engineer licensed in the State of Delaware.
- D. The testing agency shall be an independent testing agency, acceptable to the Owner, qualified according to ASTM C1077 and ASTM E329 to conduct the testing indicated, as documented according to ASTM E548.

- E. Welding personnel shall be certified according to AWS D.1.
- F. Conduct a pre-installation conference at the project site to discuss procedures, quality control and testing. The Engineer is required to be present at the pre-installation conference.

1.6 DELIVERY, HANDLING AND STORAGE

- A. Deliver piles to the project site in such quantities and at such times to ensure continuity of installation.
- B. Handle and store piles at the project site to prevent physical damage.

1.7 JOB CONDITIONS

- A. Contractor shall provide all necessary excavation, sheeting and bracing or other adequate maintenance of excavation slopes, suitable runways and ramps as necessary for pile installation, control of ground and surface water as necessary to keep the work area sufficiently dry, suitable access roads for the movement of materials to and from pile locations; field layout required for pile work, including setting and maintaining location stakes for each pile and providing cut-off grades on all piles; and removal of all overhead and underground obstructions as required.
- B. Coordination:
 - 1. Notify the Engineer ten days prior to the pile driving operations for production piles so that the appropriate personnel can witness the pile installation.
 - 2. The Contractor shall provide any assistance required by the Engineer to monitor pile installation operations.

PART 2 – PRODUCTS

2.1 STEEL PIPE PILES

- A. Steel pipe piles shall meet ASTM A139, Grade B, spiral welded pipe.
- B. Diameter and thickness shall be as indicated on the Contract Drawings.

2.2 CONCRETE

- A. Concrete shall be as indicated on the Contract Drawings or as specified in Section 03 30 00 Cast-in-Place Concrete.

2.3 PILE ACCESSORIES

- A. End plates shall be minimum 1/2 inch thick steel plate welded to pile.
- B. Splice couplings shall be manufacturer's standard splice coupling.

2.4 FABRICATION

- A. The Engineer will review the pile segment lengths proposed for use by the Contractor after the submission of the Preconstruction Wave Equation Analysis.
- B. Fabricate and assemble piles in shop to greatest extent possible to minimize field splicing.
 - 1. Accurately mill meeting ends of steel pipe piles and bevel for welding. Continuously weld pile according to AWS D1.1 for procedures, appearance and quality of welds, and methods used in correcting welding work.

- C. Fit and weld end plates to tip of pile according to AWS D1.1 for procedures, appearance and quality of welds, and methods used in correcting welding work.
- D. Mark each pile length with horizontal line at 12-inch intervals, and the distance from pile tip at 60-inch intervals.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Do not start pile-driving operations until earthwork fills have been completed or excavations have reached an elevation of 6 to 12 inches (150 to 300 mm) above bottom of footing, mat or pile cap.

3.2 DRIVING EQUIPMENT

- A. Pile hammer shall be air, steam or diesel-powered type capable of consistently delivering driving energy to pile within range recommended by hammer manufacturer for length and weight of pile and character of subsurface material anticipated.
- B. Provide hammer cushion and steel driving cap between hammer and top of pile, recommended by hammer manufacturer for type of pile.
- C. Use fixed pile-driver leads that will hold pile firmly in position and in axial alignment with hammer.

3.3 DYNAMIC PILE TESTING

- A. Engage Dynamic Pile Testing Consultant and perform dynamic pile testing in accordance with Specification Section 31 08 13.13 Dynamic Pile Testing.

3.4 DRIVING PILES

- A. Monitor adjacent structures for vibration transmission from the pile-driving operations. Adjacent structures shall not be subject to vibrations in excess of two inches per second peak particle velocity during pile driving operations. If adjacent structures experience vibrations from the pile driving operations exceeding two inches per second peak particle velocity, Contractor shall adjust his driving operations to reduce vibrations to acceptable limits.
- B. Continuously drive piles to elevations or penetration resistance indicated or established by dynamic load testing. Establish and maintain axial alignment of leads and pile before and during driving.
- C. Re-drive heaved piles to tip elevation at least as deep as original tip elevation with a driving resistance at least as great as original driving resistance.
- D. Splice piles during installation and align pile segments concentrically.
- E. Drive piles without pile heads exceeding the following tolerances:
 - 1. Plan location shall not exceed 4 inches from location indicated after initial driving, and 6 inches after pile driving is completed.
 - 2. Plumbness shall be 1 inch in 10 feet from vertical.
- F. Clean out pile by removing soil and debris from inside pile.
- G. Withdraw damaged or defective piles and piles that exceed driving tolerances and install new piles within driving tolerances. Fill holes left by withdrawn piles as directed by Engineer.
 - 1. Rejected piles may be abandoned and cut off as directed by Engineer.

- H. Cut off tops of driven piles, square with pile axis and at elevations indicated.
- I. Maintain accurate driving records for each pile, compiled and attested to by a professional engineer licensed in the State of Delaware. Include the following data:
 - 1. Project name and number.
 - 2. Name of Contractor.
 - 3. Type of pile and date of casting.
 - 4. Pile location in pile group and designation of pile group.
 - 5. Sequence of driving in pile group.
 - 6. Pile dimensions.
 - 7. Ground elevation.
 - 8. Elevation of tip after driving.
 - 9. Final tip and cutoff elevations of pile after driving pile group.
 - 10. Records of re-driving.
 - 11. Elevation of splices.
 - 12. Type, make, model, and rated energy of hammer.
 - 13. Weight and stroke of hammer.
 - 14. Type of pile-driving cap used.
 - 15. Cushion material and thickness.
 - 16. Actual stroke and blow rate of hammer.
 - 17. Pile-driving start and finish time; and total driving time.
 - 18. Time, pile-tip elevation, and reason for interruptions.
 - 19. Record of number of blows for each 12 inches of penetration, and number of blows per 1 inch for the last 6 inches of driving.
 - 20. Pile deviations from location and plumb.
 - 21. Record pre-boring, jetting, or special procedures used.
 - 22. Record of unusual occurrences during pile driving.

3.5 CONCRETE PLACEMENT

- A. Do not place concrete until other piles within a radius of 20 feet have been driven and approved.
- B. Before placing concrete, allow testing and inspecting agency to visually inspect that each pile is clean, watertight, plumb, and free of distortion or other defects.
- C. Place concrete in a continuous operation and without segregation immediately after cleaning out pile.
- D. Place concrete by means of bottom discharge bucket, flexible drop chute, elephant-trunk hopper, or tremie or pump concrete into place.
- E. Place concrete in a dry pile, unless placement underwater is approved by Engineer.
- F. Screed concrete at cutoff elevation level and apply a scoured, rough finish.

3.6 FIELD QUALITY CONTROL

- A. Contractor shall engage a qualified independent testing agency to perform field quality-control testing.
- B. In addition to visual inspection, all splices will be inspected and weld tested according to AWS D1.1 and one of the inspection procedures listed below, at testing agency's option. Correct deficiencies in and retest welds to determine compliance with requirements.
 - 1. Liquid penetrant inspection shall meet ASTM E 165.

2. Magnetic particle inspection shall meet ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
 3. Radiographic inspection shall meet ASTM E 94 and ASTM E 142; minimum quality level "2-2T."
 4. Ultrasonic inspection shall meet ASTM E 164.
- C. Sampling and testing of concrete for quality control will comply with the requirements of Section 03 30 00 "Cast-in-Place Concrete."

3.7 DISPOSAL

- A. Remove withdrawn piles and cutoff sections of piles from site and legally dispose of them off Owner's property.

END OF SECTION

DIVISION 32 – EXTERIOR IMPROVEMENTS

SECTION 32 01 00.91**RESTORATION OF SURFACES****PART 1 – GENERAL****1.1 DESCRIPTION**

- A. This Section includes the restoration and maintenance of all types of surfaces, gutters, culverts and other features disturbed, damaged or destroyed during the performance of the work under or as a result of the operations of the Contract.
- B. The quality of materials and the performance of the work used in restoration shall produce a surface or feature equal to the condition of each before the work began.

1.2 REFERENCES

- A. Materials and installation shall be in accordance with the latest revisions of the following codes, standards and specifications:
 - 1. Delaware Department of Transportation Standard Specifications for Road and Bridge Construction, including all Supplemental Specifications (DelDOT Standard Specifications)

1.3 SUBMITTALS

- A. Submit the following in accordance with the General Provisions:
 - 1. A schedule of restoration operations for each project site. After an accepted schedule has been agreed upon, it shall be adhered to unless otherwise revised with the approval of the Engineer.
 - 2. A Deviation Schedule if there is a proposed change from the original schedule.

PART 2 – PRODUCTS

Not Used.

PART 3 – EXECUTION**3.1 GENERAL**

- A. The replacement of surfaces at any time, as scheduled or as directed, shall not relieve the Contractor of responsibility to repair damages by settlement or other failures.
- B. All paved areas shall be swept or washed to remove dirt, sediment and dust. Any signs, fences, utility markers, etc. that were relocated or removed by the Contractor shall be replaced.

3.2 TEMPORARY PAVEMENT

- A. Immediately upon completion of refilling of the trench or excavation, the Contractor shall place a temporary pavement over all disturbed areas of streets, driveways, sidewalks, and other traveled places where the original surface has been disturbed as a result of construction operations.
- B. All temporary pavement shall conform to the requirements of the DelDOT Standard Specifications.
- C. Where concrete pavements are removed, the temporary pavement shall be surfaced with asphalt "cold patch". The surface of the temporary pavement shall conform to the slope and grade of the area being restored.

- D. Control of dust shall be the Contractor's responsibility. All surfaces shall be treated as frequently as may be required in the opinion of the Owner's Representative.
- E. Temporary pavement shall be maintained by the Contractor in a safe and satisfactory condition until such time as the permanent pavement is completed. The Contractor shall immediately remove and restore all pavement that is deemed unsatisfactory to the Engineer.

3.3 PERMANENT PAVEMENT OVERLAY

- A. Where minimal damage to the pavement surface has occurred due to the Contractor's operations, the Engineer may authorize the restoration of the permanent surface by milling and overlaying with a new permanent surface course.
- B. Pavement milling shall be performed in accordance with Section 760 of the DelDOT Standard Specifications.
- C. Surface course of pavement shall be in accordance with Section 32 12 16 Asphalt Pavement and in conformity with the DelDOT Standard Specifications.
- D. The top surface shall conform with the grade of existing adjacent pavement.

3.4 PERMANENT PAVEMENT REPLACEMENT

- A. The permanent and final repaving of all streets, driveways and surfaces where pavement has been removed, disturbed, settled or damaged by or as a result of performance of the Contract shall be repaired and replaced by the Contractor, with a new and similar pavement.
- B. The top surface shall conform with the grade of existing adjacent pavement and the entire replacement shall meet the current specifications of the Delaware Department of Transportation for each type of pavement.
- C. Replacement of permanent pavement shall be in accordance with Section 32 12 16 Asphalt Pavement and in conformity with the DelDOT Standard Specifications.
- D. The Contractor shall notify DelDOT prior to the replacement of any permanent pavement within the State Right-of-Way. The Contractor shall coordinate with the DelDOT inspector for scheduling inspections of work within the right-of-way and shall comply with all requirements of the DelDOT representative.

3.6 CONCRETE PAVEMENT AND BRIDGE DECK

- A. Repairs to concrete pavements and bridge deck, if required by the Engineer after consultation with DelDOT, shall be performed in strict compliance with the DelDOT Standard Specifications.

3.7 STONE OR GRAVEL PAVEMENT

- A. All pavement and other areas surfaced with stone or gravel shall be replaced with material to match the existing surface unless otherwise specified.
- B. The depth of the stone or gravel shall be at least equal to the existing.
- C. After compaction the surface shall conform to the slope and grade of the area being replaced.

3.8 CONCRETE WALKS, CURBS AND GUTTER REPLACEMENT

- A. Concrete walks, curbs, and gutters removed or damaged in connection with or as a result of the construction operations shall be replaced with new construction.
- B. Walks, curbs and gutters shall be in accordance with the DelDOT Standard Specifications and DelDOT Standard Construction Details.

- C. All concrete shall be placed and cured as specified in Specification 03 30 00 Cast in Place Concrete.

3.9 LAWNS AND IMPROVED AREAS

- A. The area to receive topsoil shall be graded to a depth of not less than 4 inches or as specified below the proposed finished surface.
- B. If the depth of existing topsoil prior to construction was greater than 4 inches, topsoil shall be replaced to that depth.
- C. The furnishing and placing of topsoil, seed and mulch shall be in accordance with Specification 32 93 13 Topsoil and Seeding.
- D. When required to obtain germination, the seeded areas shall be watered in such a manner as to prevent washing out of the seed.
- E. Any washout or damage that occurs shall be regraded and reseeded until a good sod is established.
- F. The Contractor shall maintain the newly seeded areas, including regrading, reseeding, watering, and mowing in accordance with Technical Specification 32 93 13 Topsoil and Seeding.

3.10 OTHER TYPES OF RESTORATION

- A. Trees, shrubs and landscape items damaged or destroyed as a result of the construction operations shall be replaced in like species and size.
- B. All planting and care thereof shall meet the standards of the American Nursery and Landscaper Association.
- C. Swales and other water courses shall be reshaped to the original grade and cross-section and all debris removed. Where required to prevent erosion, the bottom and sides of the water course shall be protected.
- D. Storm sewers and culverts damaged or removed as a result of the construction operations shall be replaced with like size and material and shall be replaced at the original location and grade. When there is minor damage to a pipe, and with the consent of the Engineer, a repair may be undertaken if satisfactory results can be obtained.
- E. Storm sewers and culverts shall be cleaned of any accumulated sediment.

END OF SECTION

SECTION 32 12 16**ASPHALT PAVING****PART 1 – GENERAL****1.1 DESCRIPTION**

- A. This Section includes furnishing and installation of hot-mix asphalt paving as shown on the Contract Drawings or as required by the Engineer.

1.2 REFERENCES

- A. Materials and installation shall be in accordance with the latest revisions of the following codes, standards and specifications:
 - 1. Delaware Department of Transportation Standard Specifications for Road and Bridge Construction, including all Supplemental Specifications (DelDOT Standard Specifications)

1.3 RELATED SECTIONS

- A. 31 05 16 Aggregates for Earthwork
- B. 31 23 16 Excavation
- C. 31 32 19 Geotextiles

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated. Include technical data and tested physical and performance properties.
 - 1. Job-Mix Designs: Certification, by authorities having jurisdiction, of approval of each job mix proposed for the Work.
 - 2. Job-Mix Designs: For each job-mix proposed for the Work.
- B. Material Certificates: For each paving material, from the manufacturer.

1.5 QUALITY ASSURANCE

- A. Manufacturer's Qualifications: A paving mix manufacturer registered with and approved by the Delaware Department of Transportation (DelDOT).
- B. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of DelDOT for asphalt paving work.
 - 1. Measurement and payment provisions and safety program submittals included in the DelDOT Standard Specifications do not apply to this Section.
- C. Preinstallation Conference: Conduct conference at each project site. If paving is to be performed within DelDOT right-of-way, invite representatives of DelDOT to attend conference.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp, if rain is imminent or expected before time required for adequate cure, or if the following conditions are not met:
 - 1. Asphalt Base Course: Minimum surface temperature of 40 deg. F (4.4 deg. C) and rising at time of placement

2. Asphalt Surface Course: Minimum surface temperature of 60 deg. F (15.6 deg. C) at time of placement
- B. Pavement Marking Paint: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of 40 deg. F (4.4 deg. C) for oil-based materials and not exceeding 95 deg. F (35 deg. C).

PART 2 – PRODUCTS

2.1 AGGREGATES

- A. Coarse Aggregate: Conform with the requirements of Section 823 of the DelDOT Standard Specifications.
- B. Fine Aggregate: Conform with the requirements of Section 823 of the DelDOT Standard Specifications.

2.2 ASPHALT MATERIALS

- A. Asphalt Cement: Conform with the requirements of Section 823 of the DelDOT Standard Specifications.

2.3 MIXES

- A. Base and Binder Course: DelDOT Job Mix Formula Type B. Conform with the requirements of Section 823 of the DelDOT Standard Specifications.
- B. Surface Course: DelDOT Job Mix Formula Type C. Conform with the requirements of Section 823 of the DelDOT Standard Specifications.

2.4 RECYCLED MIXTURES

- A. The use of recycled mixtures for the mix types specified herein shall be at the option of the Contractor. All provisions of these specifications and the DelDOT Standard Specifications shall apply to recycled mixtures.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Proof-roll subgrade below pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excessive yielding. Do not proof-roll wet or saturated subgrades.
- B. Proceed with paving only after unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION

- A. General: Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving.
- B. Existing Pavement: Where pavement will be placed adjacent to existing pavement, the existing pavement shall be saw cut. The limits of saw cut shall extend a minimum of 12 inches into adjacent sound pavement. Cut excavation faces vertically. Excavate material and recompact existing base course to form sound subgrade.
- C. Coarse aggregate subbase shall be installed according to the Contract Drawings and the requirements of Section 31 05 16 Aggregates for Earthwork.

3.3 PATCHING

- A. Saw cut perimeter of patch and excavate existing pavement section to sound base. Excavate rectangular or trapezoidal patches, extending 12 inches into sound pavement, unless otherwise indicated. Cut excavation faces vertically. Excavate material and recompact existing base course to form sound subgrade.
- B. Fill excavated pavements with bituminous concrete base course and surface course pavement, compact flush with adjacent surfaces.

3.4 HOT-MIX ASPHALT PLACING

- A. Machine place hot-mix asphalt paving on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand in areas inaccessible to equipment in a manner that prevents segregation of the mix. Place each course to the required grade, cross-section and thickness when compacted.
 - 1. Spread mix at minimum temperature of 250 deg. F (121 deg. C.)
 - 2. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in the asphalt paving mat.
- B. Place paving in consecutive strips not less than 10 feet wide, unless infill edge strips of a lesser width are required.
- C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix. Use suitable hand tools to smooth surface.

3.5 JOINTS

- A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions, with same texture and smoothness as other sections of hot-mix asphalt course.
 - 1. Clean contact surfaces and apply tack coat to joints.
 - 2. Offset longitudinal joints, in successive courses, a minimum of 6 inches.
 - 3. Offset transverse joints, in successive courses, a minimum of 24 inches.
 - 4. Construct transverse joints at each point where paver ends a day's work and resumes work at a subsequent time. Construct these joints using either "bulkhead" or "papered" method according to AI MS-22, for both "Ending a Lane" and "Resumption of Paving Operations."

3.6 COMPACTION

- A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or with vibratory plate compactors in areas inaccessible to rollers.
 - 1. Complete compaction before mix temperature cools to 185 deg. F (85 deg. C).
- B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade and smoothness. Correct laydown and rolling operations to comply with requirements.
- C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt has been uniformly compacted to the following density:

1. Average Density: 92 percent of reference maximum theoretical density according to ASTM D2041, but not less than 90 percent nor greater than 96 percent.
- D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.
- E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot. Compact edges thoroughly.
- F. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.
 1. Erect barricades as needed to protect pavement from traffic until mixture has sufficiently cooled.

3.7 INSTALLATION TOLERANCES

- A. Pavement Thickness: Compact each course to produce the thickness indicated within the following tolerances:
 1. Base Course: Plus or Minus 1/2 inch (13 mm).
 2. Surface Course: Plus 1/4 inch (6 mm), No minus.
- B. Pavement Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot (3 m) straightedge applied transversely or longitudinally to paved areas:
 1. Base Course: 1/4 inch (6 mm)
 2. Surface Course: 1/8 inch (3 mm)

3.8 FIELD QUALITY CONTROL

- A. Testing Agency: Contractor shall engage a qualified independent testing agency to perform field inspections and tests and to prepare test reports.
 1. Testing agency will conduct and interpret tests and state in each report whether tested work complies with or deviates from specified requirements.
- B. Additional testing required to determine compliance of corrected Work with specified requirements shall be at the Contractor's sole expense.
- C. Thickness: In-place compacted thickness of hot-mix asphalt courses will be determined according to ASTM D3549.
- D. Surface Smoothness: Finished surface of each hot-mix asphalt course shall be tested for compliance with smoothness tolerances.
- E. In-Place Density: Samples of uncompacted paving mixtures and compacted pavement will be secured by the testing agency according to ASTM D979.
 1. Reference laboratory density will be determined by averaging results from 4 samples of hot-mix asphalt paving mixture delivered daily to site, prepared according to ASTM D1559 and compacted according to job-mix specifications.
 2. Reference maximum theoretical density will be determined by averaging results from 4 samples of hot-mix asphalt paving mixture delivered daily to site, prepared according to ASTM D2041 and compacted according to job-mix specifications.
 3. In-place density of compacted pavement will be determined by nuclear method according to ASTM D2950 and correlated with ASTM D1188 or ASTM D2276.

- a. Field density of compacted pavement may also be determined by testing core samples according to ASTM D1188 or ASTM D2276.

F. Where test results indicate that hot-mix asphalt does not comply with specified requirement, the Contractor shall remove and replace or install additional hot-mix asphalt.

3.9 DISPOSAL

- A. Except for material indicated to be recycled, remove excavated materials from project site and legally dispose of them in accordance with Federal, State and local regulations.

END OF SECTION

SECTION 32 93 13**TOPSOIL AND SEEDING****PART 1 – GENERAL****1.1 DESCRIPTION**

- A. This Section includes spreading topsoil, fertilizer, lime, seed, mulch and all associated work in the areas indicated on the Contract Drawings or as required by the Engineer.

1.2 REFERENCES

- A. Materials and installation shall be in accordance with the latest revisions of the following codes, standards and specifications:
 - 1. Delaware Erosion and Sediment Control Handbook
 - 2. Delaware Department of Transportation Standard Specifications for Road and Bridge Construction, including all Supplemental Specifications (DelDOT Standard Specifications)

1.3 RELATED SECTIONS

- A. 31 25 00 Erosion and Sediment Controls

1.4 SUBMITTALS

- A. Submit the following in accordance with the General Provisions:
 - 1. The source and analysis of off-site topsoil, if utilized.
 - 2. Results of laboratory soil testing, including recommended application rates for fertilizer and lime, if soil testing is performed.
 - 3. Analysis of all seed mixtures.
 - 4. Certification from the seed supplier that all seed meets the requirements of this Specification.
 - 5. Hydroseeding data, including material and application rates, if hydroseeding is used.

PART 2 – PRODUCTS**2.1 MATERIALS**

- A. Topsoil
 - 1. Topsoil shall be unfrozen, friable clayey loam free from clay lumps, stones, roots, sticks, stumps, brush or foreign objects and containing not less than 2.0% nor more than 10.0% organic matter, as determined according to AASHTO T 194.
 - 2. All stones and rocks larger than 1/4-inch diameter shall be removed from topsoil prior to placement.
- B. Fertilizer
 - 1. Fertilizer shall be a standard quality commercial carrier of available plant food elements. Fertilizer shall be a complete prepared and packaged material containing a minimum of 10 percent nitrogen, 10 percent phosphoric acid and 10 percent potash (10-10-10).
 - 2. Each bag of fertilizer shall bear the manufacturer's guaranteed statement of analysis.

C. Agricultural Lime

1. Agricultural lime shall consist of pulverized agricultural limestone consisting of a minimum of 85% calcium and magnesium carbonates by mass.
2. Limestone shall be ground to the gradation requirements of the DelDOT Standard Specifications Section 734.

D. Seed Mixtures

1. Seed mixtures shall be of commercial stock of the current season's crop and shall be delivered in unopened containers bearing the guaranteed analysis of the mix. All seed shall be labeled in accordance with State law and the requirements of the Delaware Erosion and Sediment Control Handbook, Section 3.4.3.
2. All seed shall meet the State standards of germination and purity.
3. Temporary Seed Mixture:
 - a. Temporary seed shall consist of any species indicated in the Delaware Erosion and Sediment Control Handbook, Standard Detail DE-ESC-3.4.3, Sheet 1.
4. Permanent Seed Mixture:
 - a. Mix No. 4 – Seed mix shall be in accordance with the mixtures and rates designated as Mix. No. 4 specified in the Delaware Erosion and Sediment Control Handbook, Standard Detail DE-ESC-3.4.3, Sheets 2 & 3.

E. Mulch

1. Mulch shall be stalks of oats, wheat, rye or other approved crops which are free from noxious weeds.

F. Sod

1. The contractor may elect to sod disturbed areas in lieu of seeding and mulching at no additional expense to the Owner. Sod shall be in conformance with all requirements of the Delaware Erosion and Sediment Control Handbook, Section 3.4.3.

PART 3 – EXECUTION**3.1 TOPSOILING**

- A. The areas to receive topsoil shall be graded to a depth of not less than 4 inches or as specified, below the proposed finished surface. If the depth of topsoil existing prior to construction was greater than 4 inches, the topsoil shall be replaced not less than the greater depth.
- B. All debris and inorganic material shall be removed and the surface loosened for a depth of 2 inches prior to the placing of the topsoil.
- C. The topsoil shall not be placed until the subgrade is in suitable condition and shall be free of excessive moisture and frost.
- D. Satisfactory topsoil shall be placed on the prepared subgrade to the depth required.
- E. All topsoil shall be free from stones, roots, sticks and other foreign substances and shall not be placed in a frozen or muddy condition.

- F. The finished surface shall conform to the lines and grades of the area before disturbed or as shown on the Contract Drawings. Any irregularities shall be corrected before the placement of fertilizer and seed.

3.2 SOIL AMENDMENTS

- A. It is recommended that the Contractor perform site specific soils testing to determine the appropriate application rates of agricultural lime and fertilizer. Soils testing shall be in accordance with the Delaware Erosion and Sediment Control Handbook, Section 3.4.3. Soils tests and instructions may be obtained from the University of Delaware, Research and Education Center, R.D. 6, Box 48, Georgetown, DE 19947.
- B. In the absence of site specific soils test results, agricultural lime shall be applied uniformly at the rate of 1 ton per acre and 10-10-10 fertilizer shall be applied uniformly at the rate of 600 pounds per acre.
- C. Following the application of the lime and fertilizer and prior to application of the seed, the topsoil shall be scarified to a depth of at least 2 inches with a disc or other suitable method traveling across the slope if possible to work the amendments into the soil.

3.3 SEEDING AND MULCHING

- A. When the topsoil surface has been fine graded, the seed mixture shall be uniformly applied upon the prepared surface with a mechanical spreader at the rates specified in the Delaware Erosion and Sediment Control Handbook, Standard Detail DE-ESC-3.4.3.
- B. The seed shall be raked lightly into the surface and rolled with a light hand lawn roller.
- C. Seeding and mulching shall not be done during windy weather.
- D. The mulch shall be hand or machine spread to form a continuous blanket over the seed bed, approximately 2 inches uniform thickness at loose measurement. Excessive amounts or bunching of mulch will not be permitted.
- E. Mulch shall be anchored by an acceptable method in conformance with the Delaware Erosion and Sediment Control Handbook, Standard Detail DE-ESC-3.4.5.
- F. Unless otherwise specified, mulch shall be left in place and allowed to decay.
- G. Mulch may be replaced by rolled erosion control matting as indicated on the approved erosion and sediment control plan and Contract Drawings.
- H. Seeded areas shall be watered as often as required to obtain germination and to obtain and maintain a satisfactory sod growth. Watering shall be in such a manner as to prevent washing out of seed.
- I. Hydroseeding may be accepted as an alternative method of applying fertilizer, seed and mulch. The Contractor shall submit all data regarding materials and application rates to the Engineer for review.

3.4 MAINTENANCE

- A. Vegetative cover established as part of this project does not require mowing during construction activities, unless necessary to facilitate the Contractor's operations.
- B. The Contractor shall be responsible for the repair of settlement or damage, including re-soiling, re-seeding and re-mulching as needed until permanent vegetative cover has been established.

END OF SECTION

DIVISION 35 – WATERWAY AND MARINE CONSTRUCTION

SECTION 35 20 16**STAINLESS STEEL HYDRAULIC GATES****PART 1 – GENERAL****1.1 DESCRIPTION**

- A. This Section includes the furnishing and installation of 316 stainless steel alloy gates, including slide and weir gates, complete with all appurtenances as shown on the Contract Drawings or described herein.
- B. Gates shall be either self-contained or non-self-contained of the rising stem, non-rising or telescopic stem configuration as indicated on the Contract Drawings and the Gate Schedule.

1.2 REFERENCES

- A. Materials and installation shall be in accordance with the latest revisions of the following codes, standards and specifications:
 - 1. American National Standards Institute (ANSI)
 - 2. American Water Works Association (AWWA)
 - 3. American Welding Society (AWS)
 - 4. American Society for Testing and Materials (ASTM)

1.3 SUBMITTALS

- A. The Contractor shall submit the following items in accordance with the General Provisions:
 - 1. Compliance Statement: With each submittal, include a Compliance Statement listing each Specification Section, and Part 1, 2, and 3 Sub-Sections, stating, paragraph-by-paragraph, compliance with the Specification, each minor nonconformity that is within the intent of the Specification, and proposed nonconformities. Provide short description of minor nonconformities, and detailed explanation of other nonconformities.
 - 2. Shop drawings, including dimensions, material of construction, size and location of connections to other work, and weight of equipment.
 - 3. Catalog information and cuts.
 - 4. Complete manufacturer's specifications, including materials description and lubricant requirements.
 - 5. Suggested spare parts list with current price information.
 - 6. List of special tools required for checking, testing, parts replacement, and maintenance. Special tools are those which have been specially designed or adapted for use on parts of the equipment, and which are not customarily and routinely carried by maintenance mechanics.
 - 7. List of special tools furnished with the equipment.
 - 8. Special handling instructions.
 - 9. Requirements for storage and protection prior to installation.
 - 10. Manufacturer's installation recommendations.
 - 11. Requirements for routine maintenance required prior to startup.

12. Submit a coordination list that identifies each gate. The coordination list shall include project specific information such as tag numbers, gate type, size, and application.

13. Submit Operation and Maintenance Manuals for the gates

14. Submit Manufacturer's Certificate of proper installation.

1.4 QUALITY ASSURANCE

- A. Gates shall be the product of a single manufacturer.
- B. All materials furnished under this Section shall be furnished by manufacturers who have at least five years of experience in the design, production, assembly and field service of units of like type, size and materials.
- C. Welding shall be performed in accordance with AWS standards.
- D. Gates and operators shall be furnished with all necessary parts and accessories and shall be fabricated, assembled and placed in proper operating condition in accordance with installation instructions and recommendations of the manufacturer.

1.5 DELIVERY, HANDLING AND STORAGE

- A. Materials and equipment shall be boxed, crated or otherwise completely enclosed and protected during shipment, handling and storage. Such boxes, crates or protection shall be clearly labeled with manufacturer's name, brand or model designation, type or grade and color.
- B. Protect materials and equipment from exposure to the elements and keep dry at all times. Handle and store to prevent damage in accordance with the manufacturer's recommendations.
- C. Material and equipment damaged by handling and storage shall be repaired or replaced by the Contractor as directed by the Engineer.

1.6 WARRANTY

- A. Gates and appurtenances shall be provided with a manufacturer's warranty of not less than one (1) year from the date of final acceptance.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Stainless steel gates are the design basis for this Project. The following manufacturers are named to establish a standard of quality necessary for the project:

- 1. Whipps, Inc. - Series 900
- 2. WACO Products, Inc. – 7500 Series
- 3. Approved equal.

2.2 GENERAL

- A. Furnish and install stainless steel gates with frames and accessories suitable for high humidity and corrosive conditions.

2.3 PERFORMANCE REQUIREMENTS

- A. Gates shall be designed for the indicated seating and unseating heads.
- B. Gates shall conform to the requirements of the latest revision of AWWA C561.
- C. All gates shall meet the allowable leakage specified herein according to gate type.
- D. Materials of construction shall be suitable for the environment.
- E. Slide Gates
 - 1. Gates shall be substantially watertight under the design head conditions. Leakage shall not exceed 0.05 U.S. gallon per minute per foot seal periphery under the design seating head and unseating head.
 - 2. The slide gates shall be designed to withstand the maximum design head (maximum design head shall be taken as the height of the slide unless otherwise shown in the schedule).
 - 3. The gate's sealing system should have been tested through a cycle test in an abrasive environment and should show that the leakage requirements are still obtained after 25,000 cycles with a minimum deterioration.
- F. Weir Gates
 - 1. Gates shall be substantially watertight under the design head conditions. Leakage shall not exceed 0.05 U.S. gallon per minute per foot seal periphery under the design seating head and unseating head.
 - 2. The weir gates shall be designed to withstand the maximum design head (maximum design head shall be taken as the height of the slide unless otherwise shown in the schedule).
 - 3. The gate's sealing system should have been tested through a cycle test in an abrasive environment and should show that the leakage requirements are still obtained after 25,000 cycles with a minimum deterioration.

2.4 MATERIALS AND CONSTRUCTION

- A. Guide Frame and Bench
 - 1. The frame assembly, including the guide members, invert member and yoke members, shall be constructed of formed stainless steel plate with a minimum thickness of 1/4-inch and reinforced as required to resist loads imposed by the design head.
 - 2. Self-contained gates shall require no additional reinforcing where it extends above the operating floor to support the operator.
 - 3. Frame design shall allow for embedded mounting, mounting directly to a wall with stainless steel anchor bolts and grout or mounting to a wall thimble or structural steel framework with stainless steel mounting studs and a mastic gasket material. Mounting style shall be as shown on the Contract Drawings.
 - 4. All wall mounted or wall thimble mounted gates shall have a flange frame. Flat frame gates are not acceptable.
 - 5. The structural portion of the frame that incorporates the seat/seals shall be formed into a one-piece shape for rigidity. Guide members that consist of two or more bolted structural members are not acceptable. Guide member designs where water loads are transferred through the assembly bolts are specifically not acceptable.

6. Gussets shall be provided as necessary to support the guide members in an unseating head condition. The gussets shall extend to support the outer portion of the guide assembly and shall be positioned to ensure that the load is transferred to the anchor bolts or the wall thimble studs or structural steel framework bolts.
7. The frame shall extend to accommodate the entire height of the slide when the slide is in the fully opened position on upward opening gates or downward opening weir gates.
8. On self-contained gates, a bench (yoke) shall be provided across the top of the frame. The bench (yoke) shall be formed by two structural members affixed to the top of the side frame members to provide a one-piece rigid assembly. The bench (yoke) shall be designed to allow removal of the slide. The bench shall be capable of supporting all loads imparted by the operator and shall have a deflection of no more than $1/360$ of the span width of the gate under full design head operating conditions.
9. A rigid stainless steel invert member shall be provided across the bottom of the opening. The invert member shall be of the flush bottom type on upward opening gates.
10. A rigid stainless steel top seal member shall be provided across the top of the opening on gates designed to cover submerged openings.
11. A rigid stainless steel member shall be provided across the invert of the opening on downward opening weir gates.
12. The frame configuration shall be of the flush-bottom type and shall allow the replacement of the top and side seals without removing the gate frame.

B. Slide

1. The slide shall consist of a stainless steel flat plate reinforced with formed plates or structural members to limit its deflection to $1/360$ of the gate's span under the design head.
2. When the width of the gate opening multiplied by the maximum design head is 80 square feet or greater, the portion of the slide that engages the guide members shall be of a "thick edge" design. The thick edge portion of the slide shall have a minimum thickness of 3 inches.
3. Reinforcing stiffeners shall be welded to the slide and mounted horizontally. Vertical stiffeners shall be welded on the outside of the horizontal stiffeners for additional reinforcement.
4. The stem connector shall be constructed of two angles or plates. The stem connector shall be welded to the slide. A minimum of two bolts shall connect the stem to the stem connector.

C. Seals

1. All gates shall be provided with a self-adjusting seal system to restrict leakage in accordance with the requirements listed in this specification.
2. All gates shall be equipped with UHMW polyethylene seat/seals to restrict leakage and to prevent metal to metal contact between the frame and slide.
3. The seat/seals shall extend to accommodate the $1-1/2$ x the height of the slide when the slide is in the fully closed or fully opened position.
4. All upward opening gates shall be provided with a resilient seal to seal the bottom portion of the gate. The seal shall be attached to the invert member or the bottom of the slide and it shall be held in place with stainless steel attachment hardware.
5. All downward opening weir gates shall be provided with UHMW polyethylene seat/seals across the invert member.

6. Seal pressure shall be made constant in all gate positions in the gate side frames, slide gate top seals and weir gate invert seals by a continuous compression cord.
7. The seal system shall be durable and shall be designed to accommodate high velocities and frequent cycling without loosening or suffering damage.
8. All seals must be bolted or otherwise mechanically fastened to the frame or slide. Arrangement with seals that are force fit or held in place with adhesives are unacceptable.
9. The seals shall be mounted so as not to obstruct the water way opening.
10. The gate's sealing system should have been tested through a cycle test in an abrasive environment and should show that the leakage requirements are still obtained after 25,000 cycles with a minimum deterioration.

D. Stems and Stem Guides

1. A threaded operating stem shall be utilized to connect the operating mechanism to the slide. On rising stem gates, the threaded portion shall engage the operating nut in the manual operator or motor actuator. On non-rising stem gates, the threaded portion shall engage the nut on the slide.
2. The threaded portion of the stem shall have a minimum outside diameter of 1-1/2 inches. Stem extension pipes are not acceptable. Stems shall be of ample cross section to prevent distortion.
3. Stems and extensions shall be entirely of Type 316 Stainless steel.
4. The stem shall be constructed of solid stainless steel bar for the entire length. In compression, the stem shall be designed for a critical buckling load caused by a 40 lb effort on the crank or handwheel with a safety factor of 2, using the Euler column formula. The stem shall be designed to withstand the tension load caused by the application of a 40 lb effort on the crank or handwheel without exceeding 1/5 of the ultimate tensile strength of the stem material.
5. The stem shall be threaded to allow full travel of the slide unless the travel distance is otherwise shown on the Contract Drawings.
6. Stems of more than one section shall be joined by stainless steel or bronze couplings. The coupling shall be bolted to the stems. All couplings of the same size shall be interchangeable.
7. Stems, on manually operated gates, shall be provided with adjustable stop collars to prevent over closing of the slide.
8. Stems shall be furnished with bronze bushed stem guides, spaced as necessary to maintain a slenderness ratio L/R of less than 200. The stem guides shall be adjustable in two directions. Stem guide brackets shall be fabricated of stainless steel.
9. Gates and stems shall be threaded for opening in direction scheduled herein.

2.5 ACCESSORIES

A. Manual Gate Operators

1. Unless otherwise shown on the Drawings, gates shall be operated by a manual handwheel or a manual crank-operated gearbox. The operator shall be mounted on the yoke of self contained gates or on the pedestal of non-self contained gates.
2. Each gearbox shall be equipped with a 316 stainless steel keyed, pinion shaft that mates with the removable extended handcrank with a keyed pinion adapter.
3. Operators shall be sized to start the gate moving under maximum head pressure with a pull of not more than 40 pounds.

4. Provide indication of "OPEN" and arrow indicating direction of operator rotation to open gate.
5. Provide gearing as necessary to coordinate manual operator with space available at gate installation location.
6. The lifting mechanism shall be capable of withstanding, without damage, an effort of up to 200 pounds.
7. Provide lubrication fittings for grease lubrication of bearings.
8. Handwheel operators shall be fully enclosed and shall have a high strength die cast aluminum or ductile iron housing bolted to the bench or pedestal.
 - a. Handwheel operators shall be provided with a threaded cast bronze lift nut to engage the operating stem.
 - b. Handwheel operators shall be equipped with roller bearings above and below the operating nut.
 - c. Gears shall be steel with machined cut teeth designed for smooth operation.
 - d. Positive mechanical seals shall be provided above and below the operating nut to exclude moisture and dirt and prevent leakage of lubricant out of the hoist.
 - e. The handwheel shall be removable and shall have a minimum diameter of 15 inches.
9. Crank-operated gearboxes shall be fully enclosed and shall have a high strength die cast aluminum or ductile iron housing bolted to the bench or pedestal.
 - a. Gearboxes shall be provided with a threaded cast bronze lift nut to engage the operating stem.
 - b. Bearings shall be provided above and below the flange on the operating nut to support both opening and closing thrusts.
 - c. Gears shall be steel with machined cut teeth designed for smooth operation.
 - d. The pinion shaft shall be stainless steel and shall be supported on ball or tapered roller bearings.
 - e. Positive mechanical seals shall be provided on the operating nut and the pinion shafts to exclude moisture and dirt and prevent leakage of lubricant out of the hoist.
 - f. The crank shall be cast aluminum or cast iron with a revolving nylon grip with a keyed pinion adapter. One crank shall be provided for each gate.
 - g. The crank shall be removable.
10. Pedestals shall be constructed of stainless steel. Aluminum pedestals are not acceptable.
 - a. The pedestal height shall be such that the handwheel or pinion shaft on the crank-operated gearbox is located approximately 36 in above the operating floor unless otherwise noted on the Contract Drawings.
 - b. Wall brackets shall be used to support floor stands where shown on the Drawings and shall be constructed of stainless steel.
 - c. Wall brackets shall be reinforced to withstand in compression at least two times the rated output of the operator with a 40 lb effort on the crank or handwheel.

- d. The design and detail of the brackets and anchor bolts shall be provided by the gate manufacturer. The gate manufacturer shall supply the bracket, anchor bolts and accessories as part of the gate assembly.

11. Vandal-Resistant Construction

a. Operator Enclosure

1. The gate operators shall be protected with a lockable enclosure fabricated from 316 stainless steel. The base and top of the enclosure shall be 3/16" 316 stainless steel; all other parts of the enclosure shall be 14 gauge 316 stainless steel. The enclosure framework shall be 3/16" x 1-1/4" x 1-1/4" 316 stainless steel angles.
2. The top portion of the enclosure shall be bolted to the enclosure for removal if required for installation or removal of the operator.
3. The enclosure shall have a circular cut-out to allow stem cover clearance.
4. The lockable front portion of the enclosure shall be a hinged door to allow access to the operator. The door shall have a 2-1/2" hole to allow the crank to be used while the door is locked.

b. Stem Cover

1. The stem cover shall completely enclose the stem in the extended position and shall be 316 stainless steel, Schedule 10 pipe with a 1/2" continuous slot. The slot shall stop at 1 inch from each end on the stem cover.
2. The top of the stem cover shall be a welded 316 stainless steel plate.
3. The bottom end of the stem cover shall be mounted in a housing or adapter for easy field mounting.
4. Stem covers shall be complete with indicator markings to indicate gate position.

B. Anchor Bolts and Hardware

1. All necessary attaching bolts, anchor bolts, mounting and assembly hardware shall be of Type 316 stainless steel and shall be furnished by the gate manufacturer. Anchor bolts shall have a minimum diameter of 1/2 inch.

2.6 SCHEDULE

A. Provide stainless steel gates as indicated on the Contract Drawings and as scheduled below.

Tag No.	Style	Description	Gate Frame Mounting	Opening Direction	Dimensions WxH/Dia.	Operator Mounting	Head Conditions
CHIPMANS POND DAM							
CH-1	Weir Gate	Chipmans Pond Weir Gate #1	Face Mounted, Self-Contained	Down	42" x 34"	Frame Mounted, Crank Operator, Rising Stem	10 ft. Seating/ Unseating Head
CH-2	Slide Gate	Chipmans Pond Slide Gate	Face Mounted, Self-Contained, Flush Bottom	Up	54" x 60"	Frame Mounted, Crank Operator, Rising Stem	10 ft. Seating/ Unseating Head
CH-3	Weir Gate	Chipmans Pond Weir Gate #1	Face Mounted, Self-Contained	Down	42" x 34"	Frame Mounted, Crank Operator, Rising Stem	10 ft. Seating/ Unseating Head
CONCORD POND DAM							
CO-1	Weir Gate	Concord Pond Bay #1	Face Mounted, Self-Contained	Down	24" x 30"	Frame Mounted, Crank Operator, Rising Stem	12 ft. Seating/ Unseating Head
CO-2	Weir Gate	Concord Pond Bay #2	Face Mounted, Self-Contained	Down	32" x 30"	Frame Mounted, Crank Operator, Rising Stem	12 ft. Seating/ Unseating Head
CO-3	Weir Gate	Concord Pond Bay #3	Face Mounted, Self-Contained	Down	32" x 30"	Frame Mounted, Crank Operator, Rising Stem	12 ft. Seating/ Unseating Head
CO-4	Slide Gate	Concord Pond Bay #4	Face Mounted, Self-Contained, Flush Bottom	Up	32" x 54"	Frame Mounted, Crank Operator, Rising Stem	12 ft. Seating/ Unseating Head
CO-5	Weir Gate	Concord Pond Bay #5	Face Mounted, Self-Contained	Down	24" x 30"	Frame Mounted, Crank Operator, Rising Stem	12 ft. Seating/ Unseating Head
CO-6	Weir Gate	Concord Pond Bay #6	Face Mounted, Self-Contained	Down	32" x 30"	Frame Mounted, Crank Operator, Rising Stem	12 ft. Seating/ Unseating Head
CO-7	Weir Gate	Concord Pond Bay #7	Face Mounted, Self-Contained	Down	32" x 30"	Frame Mounted, Crank Operator, Rising Stem	12 ft. Seating/ Unseating Head

Tag No.	Style	Description	Gate Frame Mounting	Opening Direction	Dimensions WxH/Dia.	Operator Mounting	Head Conditions
CO-8	Slide Gate	Concord Pond Bay #8	Face Mounted, Self-Contained, Flush Bottom	Up	32" x 54"	Frame Mounted, Crank Operator, Rising Stem	12 ft. Seating/Unseating Head
CRAIGS POND DAM							
CR-1	Slide Gate	Craigs Pond Slide Gate	Wall Face, Self-Contained, Flush Bottom	Up	54" x 33"	Frame Mounted, Crank Operator, Rising Stem	12 ft. Seating/Unseating Head
CR-2	Weir Gate	Craigs Pond Weir Gate	Wall Face, Self-Contained	Down	54" x 60"	Frame Mounted, Crank Operator, Rising Stem	12 ft. Seating/Unseating Head

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Install equipment and accessories in accordance with the manufacturer's instructions and recommendations and in conformance with the Contract Drawings.
- B. Prepare mounting surfaces for installation of gates in accordance with manufacturer's instructions.

3.2 PAINTING

- A. With the exception of those parts and components customarily furnished unpainted, all non-stainless steel metal surfaces shall be shop prepared and coated with rust inhibitive shop paint.
- B. Machined surfaces shall be protected against damage and corrosion by other means.

3.3 FIELD TESTING

- A. After installation, the Contractor shall operate all gates to show they operate without binding or strain.
- B. Any deficiencies shall be corrected at the Contractor's expense.
- C. Gates shall be tested under active operating conditions for a minimum of two (2) hours.
 1. Ensure leakage rate past seated gate does not exceed 0.05 gpm/ft of wetted perimeter.
 2. Verify proper operation of gate operators.
 - a. Unseat seated gate and run full-open.
 - b. Fully seat open gate.
 - c. Perform cycle a minimum of five (5) times.
 3. Verify the following for each gate:
 - a. Gate deflection is less than specified.
 - b. Stem deflection is less than specified.
 - c. Gate warpage/crowning is less than specified.

- D. Defective components shall be replaced or repaired and retested at no additional cost to the Owner.

END OF SECTION

APPENDIX A
ENVIRONMENTAL PERMITS

Chipmans Pond Approved Permits

Department of the Army Nationwide Permit 3

DNREC Subaqueous Lands Permit and Water Quality Certification

Delaware Coastal Management Federal Consistency Determination

DNREC Standard Sediment and Stormwater Plan Approval

Department of the Army Nationwide Permit 3



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY

PHILADELPHIA DISTRICT CORPS OF ENGINEERS
WANAMAKER BUILDING, 100 PENN SQUARE EAST
PHILADELPHIA, PENNSYLVANIA 19107-3390

Regulatory Branch
Application Section I

SEP 27 2016

RECEIVED

OCT 04 2016

SUBJECT: CENAP-OP-R-2016-449-23 (NWP3)
Project Name: Chipman Pond Spillway Repair SX
Location: 38.56194N/-75.53972W

Melissa Hubert
Delaware Division of Watershed Stewardship
21309 Berlin Road, Unit 6
Georgetown, Delaware 19947

Dear Ms. Hubert:

This is in regard to a proposal by the Delaware Division of Watershed Stewardship to discharge fill material into waters of the United States associated with the replacement of timber flashboards with three manually operated gates at the Chipman Pond spillway located in Laurel, Sussex County, Delaware.

Under current Federal regulations, a Department of the Army permit is required for work or structures in navigable waters of the United States and/or the discharge of dredged or fill material into waters of the United States including their adjacent wetlands.

Based upon our review of the information you have provided, it has been determined that the proposed work is approved by the existing Department of the Army Nationwide Permit (NWP) described in Enclosure 1, provided the work is conducted in compliance with the project specific special conditions listed below and the attached general conditions (Enclosure 2). Initiation of any authorized work shall constitute your agreement to comply with all of the NWP's conditions. You should also note that the authorized work may be subject to periodic inspections by a Corps of Engineers representative. The verification of a nationwide permit including all general and special conditions is not subject to appeal.

On March 16, 2012 the Division Engineer approved several Regional Conditions for NWPs within the Philadelphia District. The enclosed table (Enclosure 3) identifies those NWPs which require a preconstruction notification (PCN) to the Corps of Engineers, those which have been regionally conditioned by the Division Engineer, and those which have been denied 401 Water Quality Certification (WQC) and/or Coastal Zone Management (CZM) consistency by the Delaware Department of Natural Resources and Environmental Control (DDNREC). It should be carefully noted that DDNREC has denied the requisite WQC and CZM for certain NWP activities in ALL waters of the United States in Delaware. For other NWP activities, DDNREC

has denied the requisite WQC and CZM for projects located in waters of the United States which have been determined to be critical resource waters.

For those NWP's for which DDNREC has denied the requisite WQC and CZM, the NWP authorization is considered denied without prejudice by the Corps of Engineers until an individual, project-specific WQC and/or CZM review and approval has been obtained from DDNREC. Furthermore, copies of the WQC and CZM approvals must be provided to the Corps of Engineers before the authorized work begins. Any project-specific conditions required by DDNREC for the WQC and/or CZM approval will automatically become part of the NWP authorization as well.

Please note that CZM consistency from DDNREC is only required for those activities in or affecting Delaware's coastal zone. Additionally, some of the NWP's do not involve a discharge of dredged or fill material and, as such, do not require a 401 WQC. For those NWP's not requiring a 401 WQC, the appropriate rows and columns of the enclosed table (Enclosure 3) have been identified with the term "NA".

PROJECT SPECIFIC SPECIAL CONDITIONS:

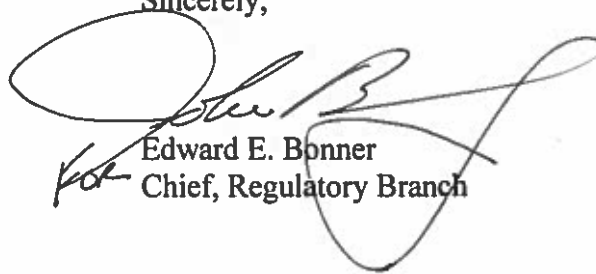
1. All work performed in association with the above noted project shall be conducted in accordance with the project plans prepared by O'Brien and Gere Engineers, Inc., dated November 2015, entitled: *State of Delaware DNREC Department of Watershed Stewardship Improvements to Delaware Dams, Improvements to Chipmans Pond Dam*, seventeen sheets. The stated purpose of the project is to discharge fill material into waters of the United States associated with the replacement of timber flashboards with three manually operated gates at the Chipman Pond spillway located in Laurel, Sussex County, Delaware.
2. Any deviation in construction methodology or project design from that shown on the above noted drawings must be approved by this office, in writing, prior to performance of the work. All modifications to the above noted project plans shall be approved, in writing, by this office. No work shall be performed prior to written approval of this office.
3. This office shall be notified at least 10 days prior to the commencement of authorized work by completing and signing the enclosed Notification/ Certification of Work Commencement Form (Enclosure 4). This office shall also be notified within 10 days of the completion of the authorized work by completing and signing the enclosed Notification/Certification of Work Completion/Compliance Form (Enclosure 5). All notifications required by this condition shall be in writing and shall be transmitted to this office by registered mail. Oral notifications are not acceptable. Similar notification is required each time maintenance work is to be done under the terms of this Corps of Engineers permit.
4. Representatives of the U.S. Army Corps of Engineers shall be permitted to inspect the project during its phase of construction, and to collect any samples, or to conduct any tests deemed necessary.

5. The permittee is responsible for ensuring that the contractor and/or workers executing the activity(s) authorized by this permit have knowledge of the terms and conditions of the authorization and that a copy of the permit document is at the project site throughout the period the work is underway.
6. The mechanical equipment used to execute the work authorized shall be operated in such a way as to minimize turbidity that could degrade water quality and adversely affect aquatic plant and animal life.
7. Every effort shall be made to keep construction debris from entering the waterway or wetland. Debris in the waterway or wetland shall be removed immediately.
8. This permit does not obviate the permittee from obtaining any State or local assent required by law for the activity authorized.

This verification is valid until the NWP is modified, reissued, or revoked. All of the existing NWPs are scheduled to be modified, reissued, or revoked prior to March 16, 2017. It is incumbent upon the permittee to remain informed of changes to the NWPs. We will issue a public notice when the NWPs are reissued. Furthermore, if you commence or are under contract to commence this activity before the date that the relevant NWP is modified or revoked, you will have 12 months from the date of the modification or revocation of the NWP to complete the activity under the present terms and conditions of this NWP.

Also enclosed is a pre-addressed postal card (Enclosure 6) soliciting your comments on the processing of your application. Any comments, positive or otherwise, on the procedures, timeliness, fairness, etc., may be made on this card. If you have any questions regarding this matter, please contact John Brundage at 302-736-9763 or write to the above address.

Sincerely,



Edward E. Bonner
Chief, Regulatory Branch

Enclosures

3. **Maintenance.** (a) The repair, rehabilitation, or replacement of any previously authorized, currently serviceable structure, or fill, or of any currently serviceable structure or fill authorized by 33 CFR 330.3, provided that the structure or fill is not to be put to uses differing from those uses specified or contemplated for it in the original permit or the most recently authorized modification. Minor deviations in the structure's configuration or filled area, including those due to changes in materials, construction techniques, requirements of other regulatory agencies, or current construction codes or safety standards that are necessary to make the repair, rehabilitation, or replacement are authorized. Any stream channel modification is limited to the minimum necessary for the repair, rehabilitation, or replacement of the structure or fill; such modifications, including the removal of material from the stream channel, must be immediately adjacent to the project or within the boundaries of the structure or fill. This NWP also authorizes the repair, rehabilitation, or replacement of those structures or fills destroyed or damaged by storms, floods, fire or other discrete events, provided the repair, rehabilitation, or replacement is commenced, or is under contract to commence, within two years of the date of their destruction or damage. In cases of catastrophic events, such as hurricanes or tornadoes, this two-year limit may be waived by the district engineer, provided the permittee can demonstrate funding, contract, or other similar delays.

(b) This NWP also authorizes the removal of accumulated sediments and debris in the vicinity of existing structures (e.g., bridges, culverted road crossings, water intake structures, etc.) and/or the placement of new or additional riprap to protect the structure. The removal of sediment is limited to the minimum necessary to restore the waterway in the vicinity of the structure to the approximate dimensions that existed when the structure was built, but cannot extend farther than 200 feet in any direction from the structure. This 200 foot limit does not apply to maintenance dredging to remove accumulated sediments blocking or restricting outfall and intake structures or to maintenance dredging to remove accumulated sediments from canals associated with outfall and intake structures. All dredged or excavated materials must be deposited and retained in an area that has no waters of the United States unless otherwise specifically approved by the district engineer under separate authorization. The placement of new or additional riprap must be the minimum necessary to protect the structure or to ensure the safety of the structure. Any bank stabilization measures not directly associated with the structure will require a separate authorization from the district engineer.

(c) This NWP also authorizes temporary structures, fills, and work necessary to conduct the maintenance activity. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable, when temporary structures, work, and discharges, including cofferdams, are necessary for construction activities, access fills, or dewatering of construction sites. Temporary fills must consist of materials, and be placed in a manner, that will not be eroded by expected high flows. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The areas affected by temporary fills must be revegetated, as appropriate.

(d) This NWP does not authorize maintenance dredging for the primary purpose of navigation. This NWP does not authorize beach restoration. This NWP does not authorize new stream channelization or stream relocation projects.

Notification: For activities authorized by paragraph (b) of this NWP, the permittee must submit a pre-construction notification to the district engineer prior to commencing the activity (see general condition 31). The pre-construction notification must include information regarding the original design capacities and configurations of the outfalls, intakes, small impoundments, and canals. (Sections 10 and 404)

Note: This NWP authorizes the repair, rehabilitation, or replacement of any previously authorized structure or fill that does not qualify for the Clean Water Act Section 404(f) exemption for maintenance.

ENCLOSURE 1

Nationwide Permit General Conditions (2012)

Note: To qualify for NWP authorization, the prospective permittee must comply with the following general conditions, as applicable, in addition to any regional or case-specific conditions imposed by the division engineer or district engineer. Prospective permittees should contact the appropriate Corps district office to determine if regional conditions have been imposed on an NWP. Prospective permittees should also contact the appropriate Corps district office to determine the status of Clean Water Act Section 401 water quality certification and/or Coastal Zone Management Act consistency for an NWP. Every person who may wish to obtain permit authorization under one or more NWPs, or who is currently relying on an existing or prior permit authorization under one or more NWPs, has been and is on notice that all of the provisions of 33 CFR §§ 330.1 through 330.6 apply to every NWP authorization. Note especially 33 CFR § 330.5 relating to the modification, suspension, or revocation of any NWP authorization.

1. Navigation. (a) No activity may cause more than a minimal adverse effect on navigation.

(b) Any safety lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the United States. (c) The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

2. Aquatic Life Movements. No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. All permanent and temporary crossings of waterbodies shall be suitably culverted, bridged, or otherwise designed and constructed to maintain low flows to sustain the movement of those aquatic species.

3. Spawning Areas. Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area are not authorized.

4. Migratory Bird Breeding Areas. Activities in waters of the United States that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.

5. Shellfish Beds. No activity may occur in areas of concentrated shellfish populations, unless the activity is directly related to a shellfish harvesting activity authorized by NWPs 4 and 48, or is a shellfish seeding or habitat restoration activity authorized by NWP 27.

6. Suitable Material. No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see Section 307 of the Clean Water Act).

7. Water Supply Intakes. No activity may occur in the proximity of a public water supply intake, except where the activity is for the repair or improvement of public water supply intake structures or adjacent bank stabilization.

8. Adverse Effects From Impoundments. If the activity creates an impoundment of water, adverse effects to the aquatic system due to accelerating the passage of water, and/or restricting its flow must be minimized to the maximum extent practicable.

9. Management of Water Flows. To the maximum extent practicable, the pre-construction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization and storm water management activities, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the pre-construction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

10. Fills Within 100-Year Floodplains. The activity must comply with applicable FEMA-approved state or local floodplain management requirements.

11. Equipment. Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.

12. Soil Erosion and Sediment Controls. Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow.

13. Removal of Temporary Fills. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.

14. Proper Maintenance. Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety and compliance with applicable NWP general conditions, as well as any activity-specific conditions added by the district engineer to an NWP authorization.

15. Single and Complete Project. The activity must be a single and complete project. The same NWP cannot be used more than once for the same single and complete project.

16. Wild and Scenic Rivers. No activity may occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, unless the appropriate Federal agency with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation or study status. Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency responsible for the designated Wild and Scenic River or study river (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service).

17. Tribal Rights. No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.

18. Endangered Species. (a) No activity is authorized under any NWP which is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will directly or indirectly destroy or adversely modify the critical habitat of such species. No activity is authorized under any NWP which "may affect" a listed species or critical habitat, unless Section 7 consultation addressing the effects of the proposed activity has been completed.

(b) Federal agencies should follow their own procedures for complying with the requirements of the ESA. Federal permittees must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will review the documentation and determine whether it is sufficient to address ESA compliance for the NWP activity, or whether additional ESA consultation is necessary.

(c) Non-federal permittees must submit a pre-construction notification to the district engineer if any listed species or designated critical habitat might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat, and shall not begin work on the activity until notified by the district engineer that the requirements of the ESA have been satisfied and that the activity is authorized. For activities that might affect Federally-listed endangered or threatened species or designated critical habitat, the pre-construction notification must include the name(s) of the endangered or threatened species that might be affected by the proposed work or that utilize the designated critical habitat that might be affected by the proposed work. The district engineer will determine whether the proposed activity "may affect" or will have "no effect" to listed species and designated critical habitat and will notify the non-Federal applicant of the Corps' determination within 45 days of receipt of a complete pre-construction notification. In cases where the non-Federal applicant has identified listed species or critical habitat that might be affected or is in the vicinity of the project, and has so notified the Corps, the applicant shall not begin work until the Corps has provided notification the proposed activities will have "no effect" on listed species or critical habitat, or until Section 7 consultation has been completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.

(d) As a result of formal or informal consultation with the FWS or NMFS the district engineer may add species-specific regional endangered species conditions to the NWPs.

(e) Authorization of an activity by a NWP does not authorize the "take" of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with "incidental take" provisions, etc.) from the U.S. FWS or the NMFS, The Endangered Species Act prohibits any person subject to the jurisdiction of the United States to take a listed species, where "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The word "harm" in the definition of "take" means an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering.

(f) Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the U.S. FWS and NMFS or their world wide web pages at <http://www.fws.gov/> or <http://www.fws.gov/ipac> and <http://www.noaa.gov/fisheries.html> respectively.

19. Migratory Birds and Bald and Golden Eagles. The permittee is responsible for obtaining any "take" permits required under the U.S. Fish and Wildlife Service's regulations governing compliance with the Migratory Bird Treaty Act or the Bald and Golden Eagle Protection Act. The permittee should contact the appropriate local office of the U.S. Fish and Wildlife Service to determine if such "take" permits are required for a particular activity.

20. Historic Properties. (a) In cases where the district engineer determines that the activity may affect properties listed, or eligible for listing, in the National Register of Historic Places, the activity is not authorized, until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied.

(b) Federal permittees should follow their own procedures for complying with the requirements of Section 106 of the National Historic Preservation Act. Federal permittees must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will review the documentation and determine whether it is sufficient to address section 106 compliance for the NWP activity, or whether additional section 106 consultation is necessary.

(c) Non-federal permittees must submit a pre-construction notification to the district engineer if the authorized activity may have the potential to cause effects to any historic properties listed on, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places, including previously unidentified properties. For such activities, the pre-construction notification must state which historic properties may be affected by the proposed work or include a vicinity map indicating the location of the historic properties or the potential for the presence of historic properties. Assistance regarding information on the location of or potential for the presence of historic resources can be sought from the State Historic Preservation Officer or Tribal Historic Preservation Officer, as appropriate, and the National Register of Historic Places (see 33 CFR 330.4(g)). When reviewing pre-construction notifications, district engineers will comply with the current procedures for addressing the requirements of Section 106 of the National Historic Preservation Act. The district engineer shall make a reasonable and good faith effort to carry out appropriate identification efforts, which may include background research, consultation, oral history interviews, sample field investigation, and field survey. Based on the information submitted and these efforts, the district engineer shall determine whether the proposed activity has the potential to cause an effect on the historic properties. Where the non-Federal applicant has identified historic properties on which the activity may have the potential to cause effects and so notified the Corps, the non-Federal applicant shall not begin the activity until notified by the district engineer either that the activity has no potential to cause effects or that consultation under Section 106 of the NHPA has been completed.

(d) The district engineer will notify the prospective permittee within 45 days of receipt of a complete pre-construction notification whether NHPA Section 106 consultation is required. Section 106 consultation is not required when the Corps determines that the activity does not have the potential to cause effects on historic properties (see 36 CFR §800.3(a)). If NHPA section 106 consultation is required and will occur, the district engineer will notify the non-Federal applicant that he or she cannot begin work until Section 106 consultation is completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.

(e) Prospective permittees should be aware that section 110k of the NHPA (16 U.S.C. 470h-2(k)) prevents the Corps from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of Section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant. If circumstances justify granting the assistance, the Corps is required to notify the ACHP and provide documentation specifying the circumstances, the degree of damage to the integrity of any historic properties affected, and proposed mitigation. This documentation must include any views obtained from the applicant, SHPO/THPO, appropriate Indian tribes if the undertaking occurs on or affects historic properties on tribal lands or affects properties of interest to those tribes, and other parties known to have a legitimate interest in the impacts to the permitted activity on historic properties.

21. Discovery of Previously Unknown Remains and Artifacts. If you discover any previously unknown historic, cultural or archeological remains and artifacts while accomplishing the activity authorized by this permit, you must immediately notify the district engineer of what you have found, and to the maximum extent practicable, avoid construction activities that may affect the remains and artifacts until the required coordination has been completed. The district engineer will initiate the Federal, Tribal and state coordination required to determine if the items or remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

22. Designated Critical Resource Waters. Critical resource waters include, NOAA-managed marine sanctuaries and marine monuments, and National Estuarine Research Reserves. The district engineer may designate, after notice and opportunity for public comment, additional waters officially designated by a state as having particular environmental or ecological significance, such as outstanding national resource waters or state natural heritage sites. The district engineer may also designate additional critical resource waters after notice and opportunity for public comment.

(a) Discharges of dredged or fill material into waters of the United States are not authorized by NWPs 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, 44, 49, 50, 51, and 52 for any activity within, or directly affecting, critical resource waters, including wetlands adjacent to such waters.

(b) For NWPs 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, and 38, notification is required in accordance with general condition 31, for any activity proposed in the designated critical resource waters including wetlands adjacent to those

waters. The district engineer may authorize activities under these NWP's only after it is determined that the impacts to the critical resource waters will be no more than minimal.

23. Mitigation. The district engineer will consider the following factors when determining appropriate and practicable mitigation necessary to ensure that adverse effects on the aquatic environment are minimal:

- (a) The activity must be designed and constructed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States to the maximum extent practicable at the project site (i.e., on site).
- (b) Mitigation in all its forms (avoiding, minimizing, rectifying, reducing, or compensating for resource losses) will be required to the extent necessary to ensure that the adverse effects to the aquatic environment are minimal.
- (c) Compensatory mitigation at a minimum one-for-one ratio will be required for all wetland losses that exceed 1/10-acre and require pre-construction notification, unless the district engineer determines in writing that either some other form of mitigation would be more environmentally appropriate or the adverse effects of the proposed activity are minimal, and provides a project-specific waiver of this requirement. For wetland losses of 1/10-acre or less that require pre-construction notification, the district engineer may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in minimal adverse effects on the aquatic environment. Compensatory mitigation projects provided to offset losses of aquatic resources must comply with the applicable provisions of 33 CFR part 332.
 - (1) The prospective permittee is responsible for proposing an appropriate compensatory mitigation option if compensatory mitigation is necessary to ensure that the activity results in minimal adverse effects on the aquatic environment.
 - (2) Since the likelihood of success is greater and the impacts to potentially valuable uplands are reduced, wetland restoration should be the first compensatory mitigation option considered.
 - (3) If permittee-responsible mitigation is the proposed option, the prospective permittee is responsible for submitting a mitigation plan. A conceptual or detailed mitigation plan may be used by the district engineer to make the decision on the NWP verification request, but a final mitigation plan that addresses the applicable requirements of 33 CFR 332.4(c)(2) – (14) must be approved by the district engineer before the permittee begins work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation (see 33 CFR 332.3(k)(3)).
 - (4) If mitigation bank or in-lieu fee program credits are the proposed option, the mitigation plan only needs to address the baseline conditions at the impact site and the number of credits to be provided.
 - (5) Compensatory mitigation requirements (e.g., resource type and amount to be provided as compensatory mitigation, site protection, ecological performance standards, monitoring requirements) may be addressed through conditions added to the NWP authorization, instead of components of a compensatory mitigation plan.
- (d) For losses of streams or other open waters that require pre-construction notification, the district engineer may require compensatory mitigation, such as stream rehabilitation, enhancement, or preservation, to ensure that the activity results in minimal adverse effects on the aquatic environment.
- (e) Compensatory mitigation will not be used to increase the acreage losses allowed by the acreage limits of the NWP's. For example, if an NWP has an acreage limit of 1/2-acre, it cannot be used to authorize any project resulting in the loss of greater than 1/2-acre of waters of the United States, even if compensatory mitigation is provided that replaces or restores some of the lost waters. However, compensatory mitigation can and should be used, as necessary, to ensure that a project already meeting the established acreage limits also satisfies the minimal impact requirement associated with the NWP's.
- (f) Compensatory mitigation plans for projects in or near streams or other open waters will normally include a requirement for the restoration or establishment, maintenance, and legal protection (e.g., conservation easements) of riparian areas next to open waters. In some cases, riparian areas may be the only compensatory mitigation required. Riparian areas should consist of native species. The width of the required riparian area will address documented water quality or aquatic habitat loss concerns. Normally, the riparian area will be 25 to 50 feet wide on each side of the stream, but the district engineer may require slightly wider riparian areas to address documented water quality or habitat loss concerns. If it is not possible to establish a riparian area on both sides of a stream, or if the waterbody is a lake or coastal waters, then restoring or establishing a riparian area along a single bank or shoreline may be sufficient. Where both wetlands and open waters exist on the project site, the district engineer will determine the appropriate compensatory mitigation (e.g., riparian areas and/or wetlands compensation) based on what is best for the aquatic environment on a watershed basis. In cases where riparian areas are determined to be the most appropriate form of compensatory mitigation, the district engineer may waive or reduce the requirement to provide wetland compensatory mitigation for wetland losses.
- (g) Permittees may propose the use of mitigation banks, in-lieu fee programs, or separate permittee-responsible mitigation. For activities resulting in the loss of marine or estuarine resources, permittee-responsible compensatory mitigation may be environmentally preferable if there are no mitigation banks or in-lieu fee programs in the area that have marine or estuarine credits available for sale or transfer to the permittee. For permittee-responsible mitigation, the special conditions of the NWP verification must clearly indicate the party or parties responsible for the implementation and performance of the compensatory mitigation project, and, if required, its long-term management.
- (h) Where certain functions and services of waters of the United States are permanently adversely affected, such as the conversion of a forested or scrub-shrub wetland to a herbaceous wetland in a permanently maintained utility line right-of-way, mitigation may be required to reduce the adverse effects of the project to the minimal level.

24. Safety of Impoundment Structures. To ensure that all impoundment structures are safely designed, the district engineer may require non-Federal applicants to demonstrate that the structures comply with established state dam safety criteria or have been designed by qualified persons. The district engineer may also require documentation that the design has been independently reviewed by similarly qualified persons, and appropriate modifications made to ensure safety.

25. Water Quality. Where States and authorized Tribes, or EPA where applicable, have not previously certified compliance of an NWP with CWA Section 401, individual 401 Water Quality Certification must be obtained or waived (see 33 CFR 330.4(c)). The district engineer or State or Tribe may require additional water quality management measures to ensure that the authorized activity does not result in more than minimal degradation of water quality.

26. Coastal Zone Management. In coastal states where an NWP has not previously received a state coastal zone management consistency concurrence, an individual state coastal zone management consistency concurrence must be obtained, or a presumption of concurrence must occur (see 33 CFR 330.4(d)). The district engineer or a State may require additional measures to ensure that the authorized activity is consistent with state coastal zone management requirements.

27. Regional and Case-By-Case Conditions. The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state, Indian Tribe, or U.S. EPA in its section 401 Water Quality Certification, or by the state in its Coastal Zone Management Act consistency determination.

28. Use of Multiple Nationwide Permits. The use of more than one NWP for a single and complete project is prohibited, except when the acreage loss of waters of the United States authorized by the NWPs does not exceed the acreage limit of the NWP with the highest specified acreage limit. For example, if a road crossing over tidal waters is constructed under NWP 14, with associated bank stabilization authorized by NWP 13, the maximum acreage loss of waters of the United States for the total project cannot exceed 1/3-acre.

29. Transfer of Nationwide Permit Verifications. If the permittee sells the property associated with a nationwide permit verification, the permittee may transfer the nationwide permit verification to the new owner by submitting a letter to the appropriate Corps district office to validate the transfer. A copy of the nationwide permit verification must be attached to the letter, and the letter must contain the following statement and signature: "When the structures or work authorized by this nationwide permit are still in existence at the time the property is transferred, the terms and conditions of this nationwide permit, including any special conditions, will continue to be binding on the new owner(s) of the property. To validate the transfer of this nationwide permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below."

(Transferee)

(Date)

30. Compliance Certification. Each permittee who receives an NWP verification letter from the Corps must provide a signed certification documenting completion of the authorized activity and any required compensatory mitigation. The success of any required permittee-responsible mitigation, including the achievement of ecological performance standards, will be addressed separately by the district engineer. The Corps will provide the permittee the certification document with the NWP verification letter. The certification document will include:

- (a) A statement that the authorized work was done in accordance with the NWP authorization, including any general, regional, or activity-specific conditions;
- (b) A statement that the implementation of any required compensatory mitigation was completed in accordance with the permit conditions. If credits from a mitigation bank or in-lieu fee program are used to satisfy the compensatory mitigation requirements, the certification must include the documentation required by 33 CFR 332.3(l)(3) to confirm that the permittee secured the appropriate number and resource type of credits; and
- (c) The signature of the permittee certifying the completion of the work and mitigation.

31. Pre-Construction Notification. (a) **Timing.** Where required by the terms of the NWP, the prospective permittee must notify the district engineer by submitting a pre-construction notification (PCN) as early as possible. The district engineer must determine if the PCN is complete within 30 calendar days of the date of receipt and, if the PCN is determined to be incomplete, notify the prospective permittee within that 30 day period to request the additional information necessary to make the PCN complete. The request must specify the information needed to make the PCN complete. As a general rule, district engineers will request additional information necessary to make the PCN complete only once. However, if the prospective permittee does not provide all of the requested information, then the district engineer will notify the prospective permittee that the PCN is still incomplete and the PCN review process will not commence until all of the requested information has been received by the district engineer. The prospective permittee shall not begin the activity until either:

- (1) He or she is notified in writing by the district engineer that the activity may proceed under the NWP with any special

conditions imposed by the district or division engineer; or

(2) 45 calendar days have passed from the district engineer's receipt of the complete PCN and the prospective permittee has not received written notice from the district or division engineer. However, if the permittee was required to notify the Corps pursuant to general condition 18 that listed species or critical habitat might be affected or in the vicinity of the project, or to notify the Corps pursuant to general condition 20 that the activity may have the potential to cause effects to historic properties, the permittee cannot begin the activity until receiving written notification from the Corps that there is "no effect" on listed species or "no potential to cause effects" on historic properties, or that any consultation required under Section 7 of the Endangered Species Act (see 33 CFR 330.4(f)) and/or Section 106 of the National Historic Preservation Act (see 33 CFR 330.4(g)) has been completed. Also, work cannot begin under NWP 21, 49, or 50 until the permittee has received written approval from the Corps. If the proposed activity requires a written waiver to exceed specified limits of an NWP, the permittee may not begin the activity until the district engineer issues the waiver. If the district or division engineer notifies the permittee in writing that an individual permit is required within 45 calendar days of receipt of a complete PCN, the permittee cannot begin the activity until an individual permit has been obtained. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).

(b) Contents of Pre-Construction Notification: The PCN must be in writing and include the following information:

(1) Name, address and telephone numbers of the prospective permittee;

(2) Location of the proposed project;

(3) A description of the proposed project; the project's purpose; direct and indirect adverse environmental effects the project would cause, including the anticipated amount of loss of water of the United States expected to result from the NWP activity, in acres, linear feet, or other appropriate unit of measure; any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity. The description should be sufficiently detailed to allow the district engineer to determine that the adverse effects of the project will be minimal and to determine the need for compensatory mitigation. Sketches should be provided when necessary to show that the activity complies with the terms of the NWP. (Sketches usually clarify the project and when provided results in a quicker decision. Sketches should contain sufficient detail to provide an illustrative description of the proposed activity (e.g., a conceptual plan), but do not need to be detailed engineering plans);

(4) The PCN must include a delineation of wetlands, other special aquatic sites, and other waters, such as lakes and ponds, and perennial, intermittent, and ephemeral streams, on the project site. Wetland delineations must be prepared in accordance with the current method required by the Corps. The permittee may ask the Corps to delineate the special aquatic sites and other waters on the project site, but there may be a delay if the Corps does the delineation, especially if the project site is large or contains many waters of the United States. Furthermore, the 45 day period will not start until the delineation has been submitted to or completed by the Corps, as appropriate;

(5) If the proposed activity will result in the loss of greater than 1/10-acre of wetlands and a PCN is required, the prospective permittee must submit a statement describing how the mitigation requirement will be satisfied, or explaining why the adverse effects are minimal and why compensatory mitigation should not be required. As an alternative, the prospective permittee may submit a conceptual or detailed mitigation plan.

(6) If any listed species or designated critical habitat might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat, for non-Federal applicants the PCN must include the name(s) of those endangered or threatened species that might be affected by the proposed work or utilize the designated critical habitat that may be affected by the proposed work. Federal applicants must provide documentation demonstrating compliance with the Endangered Species Act; and

(7) For an activity that may affect a historic property listed on, determined to be eligible for listing on, or potentially eligible for listing on, the National Register of Historic Places, for non-Federal applicants the PCN must state which historic property may be affected by the proposed work or include a vicinity map indicating the location of the historic property. Federal applicants must provide documentation demonstrating compliance with Section 106 of the National Historic Preservation Act.

(c) Form of Pre-Construction Notification: The standard individual permit application form (Form ENG 4345) may be used, but the completed application form must clearly indicate that it is a PCN and must include all of the information required in paragraphs (b)(1) through (7) of this general condition. A letter containing the required information may also be used.

(d) Agency Coordination: (1) The district engineer will consider any comments from Federal and state agencies concerning the proposed activity's compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the project's adverse environmental effects to a minimal level.

(2) For all NWP activities that require pre-construction notification and result in the loss of greater than 1/2-acre of waters of the United States, for NWP 21, 29, 39, 40, 42, 43, 44, 50, 51, and 52 activities that require pre-construction notification and will result in the loss of greater than 300 linear feet of intermittent and ephemeral stream bed, and for all NWP 48 activities that require pre-construction notification, the district engineer will immediately provide (e.g., via e-mail, facsimile transmission, overnight mail, or other expeditious manner) a copy of the complete PCN to the appropriate Federal or state offices (U.S. FWS, state natural resource or water quality agency, EPA, State Historic Preservation Officer (SHPO) or Tribal Historic Preservation Office (THPO), and, if appropriate, the NMFS). With the exception of NWP 37, these agencies will have 10 calendar days from the date the material is transmitted to telephone or fax the district engineer notice that they intend to provide substantive, site-specific comments. The comments must explain why the agency believes the adverse effects will be more than minimal. If so contacted by an agency, the district engineer will wait an additional 15 calendar days before making a decision on the pre-construction notification. The district engineer will fully consider agency comments received within the specified time frame concerning the proposed activity's

compliance with the terms and conditions of the NWP, including the need for mitigation to ensure the net adverse environmental effects to the aquatic environment of the proposed activity are minimal. The district engineer will provide no response to the resource agency, except as provided below. The district engineer will indicate in the administrative record associated with each pre-construction notification that the resource agencies' concerns were considered. For NWP 37, the emergency watershed protection and rehabilitation activity may proceed immediately in cases where there is an unacceptable hazard to life or a significant loss of property or economic hardship will occur. The district engineer will consider any comments received to decide whether the NWP 37 authorization should be modified, suspended, or revoked in accordance with the procedures at 33 CFR 330.5. (3) In cases of where the prospective permittee is not a Federal agency, the district engineer will provide a response to NMFS within 30 calendar days of receipt of any Essential Fish Habitat conservation recommendations, as required by Section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act. (4) Applicants are encouraged to provide the Corps with either electronic files or multiple copies of pre-construction notifications to expedite agency coordination.

D. District Engineer's Decision

1. In reviewing the PCN for the proposed activity, the district engineer will determine whether the activity authorized by the NWP will result in more than minimal individual or cumulative adverse environmental effects or may be contrary to the public interest. For a linear project, this determination will include an evaluation of the individual crossings to determine whether they individually satisfy the terms and conditions of the NWP(s), as well as the cumulative effects caused by all of the crossings authorized by NWP. If an applicant requests a waiver of the 300 linear foot limit on impacts to intermittent or ephemeral streams or of an otherwise applicable limit, as provided for in NWPs 13, 21, 29, 36, 39, 40, 42, 43, 44, 50, 51 or 52, the district engineer will only grant the waiver upon a written determination that the NWP activity will result in minimal adverse effects. When making minimal effects determinations the district engineer will consider the direct and indirect effects caused by the NWP activity. The district engineer will also consider site specific factors, such as the environmental setting in the vicinity of the NWP activity, the type of resource that will be affected by the NWP activity, the functions provided by the aquatic resources that will be affected by the NWP activity, the degree or magnitude to which the aquatic resources perform those functions, the extent that aquatic resource functions will be lost as a result of the NWP activity (e.g., partial or complete loss), the duration of the adverse effects (temporary or permanent), the importance of the aquatic resource functions to the region (e.g., watershed or ecoregion), and mitigation required by the district engineer. If an appropriate functional assessment method is available and practicable to use, that assessment method may be used by the district engineer to assist in the minimal adverse effects determination. The district engineer may add case-specific special conditions to the NWP authorization to address site-specific environmental concerns.

2. If the proposed activity requires a PCN and will result in a loss of greater than 1/10 acre of wetlands, the prospective permittee should submit a mitigation proposal with the PCN. Applicants may also propose compensatory mitigation for projects with smaller impacts. The district engineer will consider any proposed compensatory mitigation the applicant has included in the proposal in determining whether the net adverse environmental effects to the aquatic environment of the proposed activity are minimal. The compensatory mitigation proposal may be either conceptual or detailed. If the district engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse effects on the aquatic environment are minimal, after considering mitigation, the district engineer will notify the permittee and include any activity-specific conditions in the NWP verification the district engineer deems necessary. Conditions for compensatory mitigation requirements must comply with the appropriate provisions at 33 CFR 332.3(k). The district engineer must approve the final mitigation plan before the permittee commences work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation. If the prospective permittee elects to submit a compensatory mitigation plan with the PCN, the district engineer will expeditiously review the proposed compensatory mitigation plan. The district engineer must review the proposed compensatory mitigation plan within 45 calendar days of receiving a complete PCN and determine whether the proposed mitigation would ensure no more than minimal adverse effects on the aquatic environment. If the net adverse effects of the project on the aquatic environment (after consideration of the compensatory mitigation proposal) are determined by the district engineer to be minimal, the district engineer will provide a timely written response to the applicant. The response will state that the project can proceed under the terms and conditions of the NWP, including any activity-specific conditions added to the NWP authorization by the district engineer.

3. If the district engineer determines that the adverse effects of the proposed work are more than minimal, then the district engineer will notify the applicant either: (a) That the project does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an individual permit; (b) that the project is authorized under the NWP subject to the applicant's submission of a mitigation plan that would reduce the adverse effects on the aquatic environment to the minimal level; or (c) that the project is authorized under the NWP with specific modifications or conditions. Where the district engineer determines that mitigation is required to ensure no more than minimal adverse effects occur to the aquatic environment, the activity will be authorized within the 45-day PCN period, with activity-specific conditions that state the mitigation requirements. The authorization will include the necessary conceptual or detailed mitigation or a requirement that the applicant submit a mitigation plan that would reduce the adverse effects on the aquatic environment to the minimal level. When mitigation is required, no work in waters of the United States may occur until the district engineer has approved a specific mitigation plan or has determined that prior approval of a final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation.

NWP CZM and WQC Status Table: Delaware, New Jersey, Pennsylvania (4.4.2012)

NWP #	PCN	DE CZM	DE WQC	NJ CZM	NJ WQC	PA CZM	PA WQC
NWP 1	NO	ISSUED	N/A				
NWP 2	NO	ISSUED	N/A				
NWP 3	YES *	DENIED #	DENIED #				
NWP 4	NO	ISSUED	ISSUED				
NWP 5	NO	ISSUED	ISSUED				
NWP 6	NO	ISSUED	ISSUED				
NWP 7	YES	ISSUED	ISSUED				
NWP 8	YES	DENIED	N/A				
NWP 9	NO	ISSUED	N/A				
NWP 10	YES *	ISSUED	N/A				
NWP 11	YES *	ISSUED	N/A				
NWP 12	YES	ISSUED	ISSUED				
NWP 13	YES *	DENIED #	DENIED #				
NWP 14	YES	ISSUED	ISSUED				
NWP 15	YES *	ISSUED	ISSUED				
NWP 16	NO	ISSUED	ISSUED				
NWP 17	YES	ISSUED	ISSUED				
NWP 18	YES *	DENIED #	DENIED #				
NWP 19	YES	ISSUED	ISSUED				
NWP 20	NO	ISSUED	ISSUED				
NWP 21	YES	ISSUED	ISSUED				
NWP 22	YES *	ISSUED	ISSUED				
NWP 23	YES	ISSUED	ISSUED				
NWP 24	NO	ISSUED	N/A				
NWP 25	YES *	ISSUED	ISSUED				
NWP 27	YES *	ISSUED	ISSUED				
NWP 28	YES	ISSUED	N/A				
NWP 29	YES	DENIED #	DENIED #				
NWP 30	YES *	ISSUED	ISSUED				
NWP 31	YES	ISSUED	ISSUED				
NWP 32	N/A	ISSUED	ISSUED				
NWP 33	YES	ISSUED	ISSUED				
NWP 34	YES	ISSUED	ISSUED				
NWP 35	YES	ISSUED	N/A				
NWP 36	YES *	ISSUED	ISSUED				
NWP 37	YES	ISSUED	ISSUED				
NWP 38	YES	ISSUED	ISSUED				
NWP 39	YES	DENIED #	DENIED #				
NWP 40	YES	DENIED	DENIED				
NWP 41	YES	DENIED	DENIED				
NWP 42	YES	DENIED	DENIED				
NWP 43	YES	DENIED	DENIED				
NWP 44	YES	DENIED	DENIED				
NWP 45	YES	ISSUED	ISSUED				
NWP 46	YES	DENIED	DENIED				
NWP 48	YES	ISSUED	ISSUED				
NWP 49	YES	ISSUED	ISSUED				
NWP 50	YES	ISSUED	ISSUED				
NWP 51	YES	DENIED	DENIED				
NWP 52	YES	DENIED	DENIED				

Note: *A PCN is required under certain circumstances. Review the terms of the NWP, general conditions, or regional conditions to identify those circumstances. # The State of Delaware has denied the CZM and WQC for this NWP in critical resource waters only.

NOTIFICATION/CERTIFICATION OF WORK COMMENCEMENT FORM

Permit Number: CENAP-OP-R-2016-449-23 (NWP3)
Name of Permittee: DDNREC Watershed Stewardship
Project Name: Chipman Pond Spillway Repair
Waterway: Chipman Pond
County: Sussex State: Delaware_
Compensation/Mitigation Work Required: Yes ☐ No X

TO: U.S. Army Corps of Engineers, Philadelphia District
Wanamaker Building - 100 Penn Square East
Philadelphia, Pennsylvania 19107-3390
Attention: CENAP-OP-R

I have received authorization to discharge fill material into waters of the United States associated with the replacement of timber flashboards with three manually operated gates at the Chipman Pond spillway located in Laurel, Sussex County, Delaware.

The work will be performed by:

Name of Person or Firm _____

Address: _____

I hereby certify that I have reviewed the approved plans, have read the terms and conditions of the above referenced permit, and shall perform the authorized work in strict accordance with the permit document. The authorized work will begin on or about _____ and should be completed on or about _____.

Please note that the permitted activity is subject to compliance inspections by the Army Corps of Engineers. If you fail to return this notification form or fail to comply with the terms or conditions of the permit, you are subject to permit suspension, modification, revocation, and/or penalties.

Permittee (Signature and Date)

Telephone Number

Contractor (Signature and Date)

Telephone Number

NOTE: This form shall be completed/signed and returned to the Philadelphia District Office a minimum of 10 days prior to commencing work.

Enclosure 4

NOTIFICATION/CERTIFICATION OF WORK COMPLETION/COMPLIANCE FORM

Permit Number: CENAP-OP-R-2016-449-23 (NWP3)

Name of Permittee: DDNREC Watershed Stewardship

Name of Contractor: _____

Project Name: Chipman Pond Spillway Repair

County: Sussex State: Delaware

Waterway: Chipman Pond

Within 10 days of completion of the activity authorized by this permit, please sign this certification and return it to the following address:

U.S. Army Corps of Engineers, Philadelphia District
Wanamaker Building - 100 Penn Square East
Philadelphia, Pennsylvania 19107-3390
Attention: CENAP-OP-R

Please note that the permitted activity is subject to a compliance inspection by an Army Corps of Engineers representative. If you fail to return this notification form or fail to perform work in compliance with the permit, you are subject to administrative, civil and/or criminal penalties. Further, the subject permit may be suspended or revoked.

The authorized work was commenced on _____.

The authorized work was completed on _____.

I hereby certify that the work authorized by the above referenced permit has been completed in accordance with the terms and conditions of the above noted permit.

Signature of Contractor

Signature of Permittee

Address: _____

Address: _____

Telephone Number: _____

Telephone Number: _____

For project located in areas identified as shellfish habitat, you must include with this form a bill of lading; sales order or any other document(s) demonstrating non-polluting materials were purchased and utilized for your project. I hereby certify that I and/or my contractor have utilized non-polluting materials as defined in the above noted permit.

Signature of Contractor

Signature of Permittee

DNREC Subaqueous Lands Permit and Water Quality Certification



STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES &
ENVIRONMENTAL CONTROL
DIVISION OF WATER
89 KINGS HIGHWAY
DOVER, DELAWARE 19901

RECEIVED
AUG 16 2016

WETLANDS & SUBAQUEOUS
LANDS SECTION

TELEPHONE (302) 739-9943
FACSIMILE (302) 739-6304

August 3, 2016

DNREC – Division of Fish and Wildlife
C/o: Larry Horan
89 Kings Highway
Dover, DE 19901

RE: Subaqueous Lands Permit and Water Quality Certification No. SP/WQ-223/16

Dear Mr. Horan:

Enclosed are the Subaqueous Lands Permit and Water Quality Certification granted by the State of Delaware for the Chipman's Pond Dam Spillway Improvements. Please read all of the Special Conditions carefully. The permittee and contractor are responsible to ensure that all conditions are strictly adhered to.

Also enclosed is the Contractors Post-Construction Completion Report. Within ten days of the completion of construction, the contractor must mail the completed and signed Post-Construction Completion Report to this office.

If you have any questions, please feel free to contact this office at (302) 739-9386.

Sincerely,

A handwritten signature in cursive script, appearing to read "Katie Huegel".

Katie Huegel
Environmental Scientist
Wetlands & Subaqueous Lands Section

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STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES &
ENVIRONMENTAL CONTROL
DIVISION OF WATER
89 KINGS HIGHWAY
DOVER, DELAWARE 19901

WETLANDS & SUBAQUEOUS
LANDS SECTION

TELEPHONE (302) 739-9943
FAX (302) 739-6304

**SUBAQUEOUS LANDS PERMIT AND WATER QUALITY
CERTIFICATION
CONTRACTOR'S COMPLETION REPORT
POST-CONSTRUCTION**

Subaqueous Lands Permit / Water Quality Certification Number: SP/WQ-223/16

Name: DNREC - Division of Fish and Wildlife
C/o: Larry Horan

Address: In Chipman Pond
Chipman Pond Road
Laurel, DE 19956

Parcel #: 232-13.00-3.16

I hereby certify that I have constructed the project authorized by the above-referenced Subaqueous Lands Permit in accordance with the approved plans for the project.

Printed Name of Contractor

Name of Company

Contractor's Signature

Date

Telephone Number

Upon completion of construction, this form shall be completed, signed by the contractor, and mailed to the Wetlands and Subaqueous Lands Section at:

**DNREC
Wetlands and Subaqueous Lands Section
89 Kings Highway
Dover, Delaware 19901**

Or faxed to the Wetlands and Subaqueous Lands Section at: **302-739-6304**

This form must be received by the Department within ten days of the date that construction is completed.

For official use only

Compliance inspection date _____ *Built in accordance with plans* ☐ Yes ☐ No

Scientist: _____

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STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES &
ENVIRONMENTAL CONTROL
DIVISION OF WATER
89 KINGS HIGHWAY
DOVER, DELAWARE 19901

GENERAL CONDITIONS

1. The permittee and contractor shall at all times comply with all applicable laws and regulations of the Department of Natural Resources and Environmental Control.
2. The activities authorized herein shall be undertaken in accordance with the Permit conditions, the final stamped and approved plans, and with the information provided in the Permit application.
3. A copy of this Permit and the stamped approved plans shall be available on-site during all phases of construction activity.
4. The conditions contained herein shall be incorporated into any and all construction contracts associated with the construction authorized herein. The permittee and contractor are responsible to ensure that the workers executing the activities authorized by this Permit have full knowledge of, and abide by, the terms and conditions of this Permit.
5. No portion of the structure shall be constructed using creosote treated lumber.
6. No portion of the structure(s) authorized by this Permit shall exceed the dimensions for that structure identified on Page One of this Permit.
7. The activities authorized herein shall be conducted so as not to violate the State of Delaware's Surface Water Quality Standards in effect at the date of Permit authorization.
8. The issuance of this Permit does not constitute approval for any activities that may be required by any other local, state or federal government agency.
9. The issuance of this Permit does not imply approval of any other part, phase, or portion of any overall project the permittee may be contemplating.
10. This Permit authorizes only the activities described herein. Modifications to the project may require a supplemental approval from this office prior to the initiation of construction. A determination of the need for a supplemental approval will be made by this office pursuant to the permittee submitting written notification and revised plans indicating project changes. Failure to contact the Department prior to executing changes to the project shall constitute reason for this Permit being revoked.
11. The Contractors Completion Report shall be filled out and returned within 10 days of completion of the authorized work.
12. The permittee shall protect and hold the State of Delaware harmless from any loss, cost or damage resulting from the activities authorized herein.
13. Representatives of the Department of Natural Resources and Environmental Control shall be allowed to access the property to inspect all work during any phase of the construction and may conduct pre and post-construction inspections, collect any samples or conduct any tests that are deemed necessary.
14. The permittee shall maintain all authorized structures and activities in a good and safe condition.

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15. All construction materials, waste or debris associated with this activity shall be properly disposed of and contained at all times to prevent its entry into waters or wetlands. Construction materials shall not be stockpiled in subaqueous lands or wetlands.
16. The permittee and contractor shall employ measures during construction to prevent spills of fuels, lubricants or other hazardous substances. In the event of a spill, the permittee and contractor shall make every effort to stop the leak and contain the spill, and shall immediately contact the Hazardous Spill Response Team (HAZMAT) at 1-800-662-8802 and this office at (302) 739-9943. The permittee and contractor are responsible to comply with all directives to contain and clean up the spilled material(s) as stipulated by the HAZMAT team, and to restore the site as may be required by this office.
17. No construction shall occur after the construction expiration date identified on Page One of this Permit. The permittee may file a construction expiration date extension request of up to one (1) year if necessary to complete the authorized work. Such requests must be received by the Department at least thirty (30) days prior to the construction expiration date.
18. Any actions, operations or installations which are found by the Department to be contrary to the public interest may constitute reason for the discontinuance and/or removal of said action, operation or installation. Removal and restoration shall be at the expense of the permittee and/or upland property owner within thirty (30) days of receipt of written notice of revocation and demand for removal.
19. Disturbance of subaqueous lands or wetlands adjacent to the authorized structures or activities is prohibited unless specifically addressed in the special conditions of this Permit. Disturbance of subaqueous lands or wetlands in the path of construction activities shall be minimized. Any temporarily impacted subaqueous lands or wetlands shall be returned to pre-disturbance elevations and conditions.
20. This Permit is personal and may not be transferred without the prior written consent of the Department. Prior to the transfer of the adjacent upland property, the permittee shall obtain the written consent of the Department to transfer the Permit to the new upland property owner. Failure to obtain such written consent may result in the revocation of this Permit and the removal of all structures authorized by this Permit at the expense of the permittee.
21. The permittee shall notify the Wetlands and Subaqueous Lands Section prior to the commencement of the work authorized by this Permit.
22. No portion of the structure shall be installed within ten (10) feet of the adjacent property lines.
23. No portion of the structure shall exceed 20% of the width of the water body as measured at mean low water.
24. The structures authorized by this Permit shall be constructed and maintained in a manner so as to assure water access to adjacent properties.
25. This Permit does not authorize any future repairs below the water line, or any additions or modifications to the structures authorized herein. Such activities require separate written authorization from the Department of Natural Resources and Environmental Control.
26. Failure to comply with any of the terms or conditions of this Permit may result in enforcement action which could include the revocation of this Permit and subsequent restoration of the site to preconstruction conditions.



STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES &
ENVIRONMENTAL CONTROL
DIVISION OF WATER
89 KINGS HIGHWAY
DOVER, DELAWARE 19901

WETLANDS & SUBAQUEOUS
LANDS SECTION

TELEPHONE (302) 739-9943
FAX (302) 739-6304

DNREC - Division of Fish and Wildlife
C/o: Larry Horan
89 Kings Highway
Dover, DE 19901
Tax Parcel: 232-13.00-3.16

Subaqueous Lands Permit: SP-223/16
Water Quality Certification: WQ-223/16
Date of Issuance: 8/8/2016
Construction Expiration Date: 8/8/2019
Amended Date: N/A

**SUBAQUEOUS LANDS PERMIT AND WATER QUALITY CERTIFICATION
GRANTED TO:**

DNREC - Division of Fish and Wildlife

FOR THE FOLLOWING ACTIVITIES:

- To remove existing timber flashboards and replace them with 3 manually-operated steel gates
- To install a 4 by 27 foot long catwalk to access the gates
- To dredge 25 cubic yards of material for the new gates concrete foundation and removal of accumulated sediment from the existing concrete foundation and dispose of the material in the adjacent uplands
- To place 16 cubic yards of concrete fill for the new gates foundation
- To install a temporary cofferdam

LOCATED ON PUBLIC SUBAQUEOUS LANDS:

**In Chipman Pond
On Chipman Pond Road
Laurel, Sussex County, Delaware**

Pursuant to the provisions of 7 Del. C., §7205, and the Department's Regulations Governing the Use of Subaqueous Lands and 7 Del. C., Section 6003, the Department's Regulations Governing the Control of Water Pollution and Section 401 of the Clean Water Act, permission is hereby granted on this 8th day of August A.D. 2016, to construct the above-referenced project in accordance with the approved plans (12 sheets), as approved on August 2, 2016; and the application dated June 1, 2016, and received by this Division on June 2, 2016.

WHEREAS, DNREC - Division of Fish and Wildlife, the underwater land owners of Chipman Pond, have applied for permission to conduct the indicated activities; and;

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WHEREAS, pursuant to the provisions of 7 Del. C., §7203, and 7 Del. C., §6604, the Secretary of the Department of Natural Resources and Environmental Control through his duly authorized representative finds that it is not contrary to the public interest if this project is approved subject to the terms and conditions herein set forth.


NOW THEREFORE, this Permit/Certification is issued subject to the attached Subaqueous Lands Permit General Conditions and the following special conditions:

SPECIAL CONDITIONS

1. This approval is in accordance with the plans and application submitted to the Department of Natural Resources and Environmental Control, a copy of which is attached hereto and made a part hereof.
2. The work authorized by this Permit/Certification shall not alter existing water levels or flow in Chipman Pond or downstream of the project location. Any impacts to water levels or flow could have an adverse impact on Water Bulrush (*Schoenoplectus subterminalis*) and other state-rare plants in and downstream of Chipman Pond.
3. The boat ramp and parking area are open to the public. Larry Horan of the Fisheries Section in the Division of Fish and Wildlife shall be notified when the work authorized by this Permit/Certification is scheduled so that a press release can be coordinated.
4. No work shall take place from **April 1st through June 30th** if the work will take place in or immediately adjacent to dense patches of aquatic vegetation to protect blackbanded sunfish.
5. To avoid impacts to freshwater mussels, measures shall be taken to decrease sedimentation during construction activities.
6. The Delaware Environmental Observation System (DEOS) Water Level Gauge shall be properly reinstalled at the end of construction.
7. The work authorized herein shall be completed in accordance with the terms and conditions of the appropriate Department of the Army Corps. of Engineers Nationwide Permit.
8. There shall be no stockpiling of material within regulated subaqueous lands.
9. There shall be no movement of equipment within subaqueous lands not specifically authorized by this Permit/Certification. Any areas disturbed, as authorized by this Permit, shall be returned to pre-construction conditions and elevations and appropriately stabilized.
10. Erosion and sediment control measures shall be implemented in accordance with the specifications and criteria in the current Delaware Erosion and Sediment Control Handbook so as to minimize entry and dispersal of sediment and other contaminants in surface waters.
11. All work shall be planned for periods of low waterway base flows. In the event that sediment and erosion controls are damaged or destroyed due to storm events, such controls shall be repaired and/or replaced immediately.

12. All fill materials associated with the proposed project shall be clean and free from oils, grease, asphalt and other contaminants.

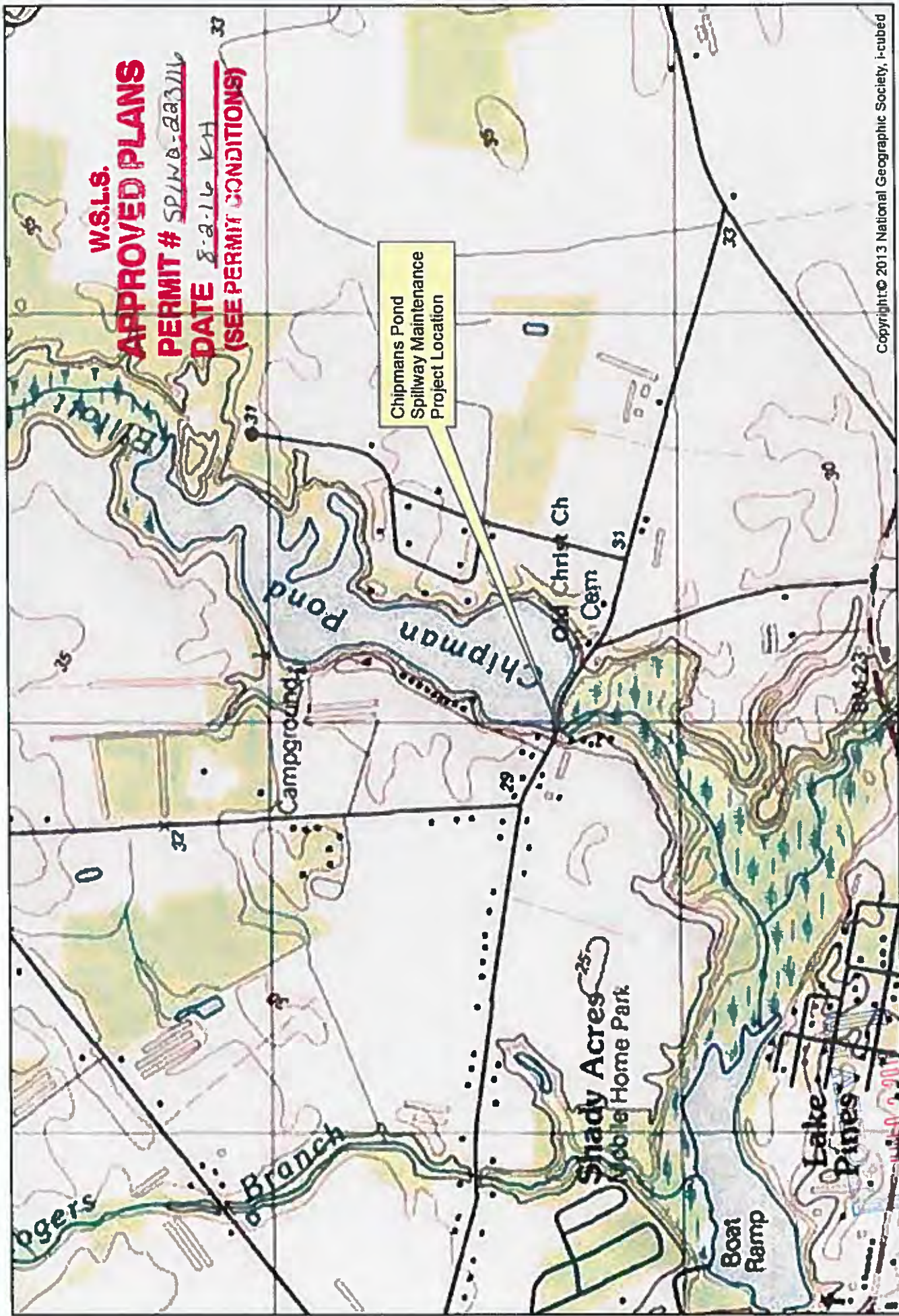
IN WITNESS WHEREOF, I, Steven M. Smailer, the duly authorized representative of David S. Small, Secretary of the Department of Natural Resources and Environmental Control, have hereunto set my hand this 8th day of August, 2016.



By Steven M. Smailer, Section Manager
the duly authorized representative of the Secretary of the
Department of Natural Resources and Environmental Control



Katie Huegel, Environmental Scientist
Wetlands and Subaqueous Lands Section



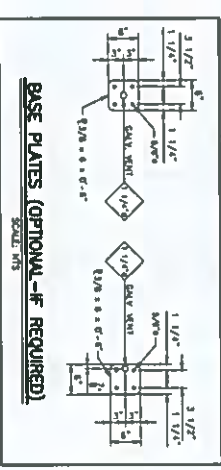
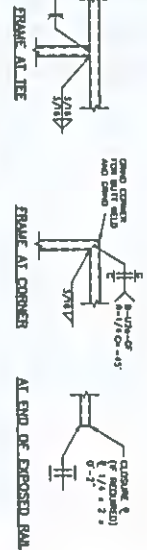
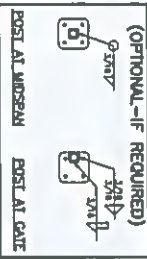
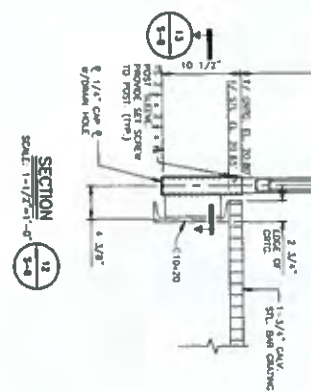
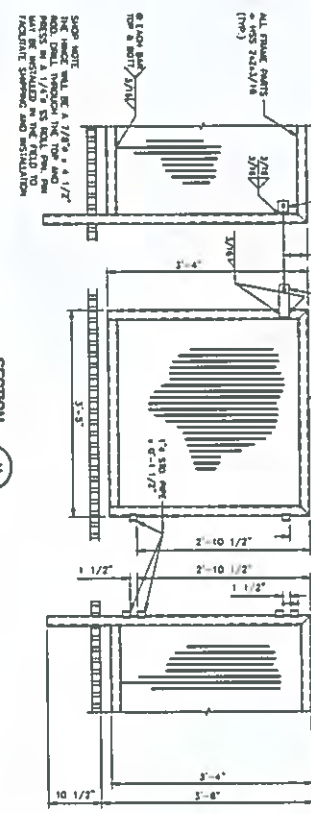
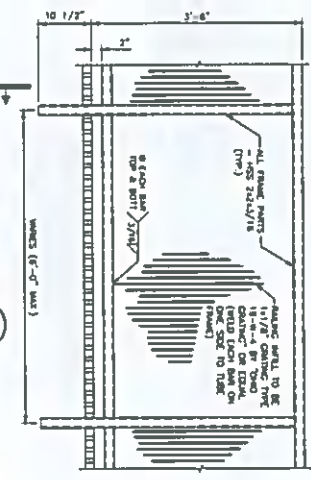
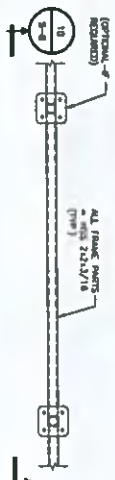
W.S.L.S.
APPROVED PLANS
 PERMIT # SP1NB-223116
 DATE 8-2-16 KH
 (SEE PERMIT CONDITIONS)

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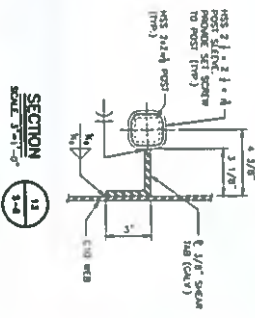
	<p>Feet</p> <p>1,000 0 1,000</p> <p>1 inch = 1,000 feet</p>	<p>This map was compiled by the DWS, Division of Watershed Stewardship, Drainage Program. Ditch locations and all features are approximate and based on field information, other agency layers and original topographic maps. This map does not replace legal survey instruments on file at the county preliminary office.</p> <p>Property lines are approximate and may have changed since the date this map was made.</p> <p>Map Created on: 1/15/2016 at 10:15 AM</p> <p>Map Created by: melina.hubert</p>	<p>Chipmans Pond Dam Spillway Improvements Topographic Map</p>
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9102 2 0 MNC

GALETON



W.S.I.S.
APPROVED PLANS
PERMIT # SPW6-223/14
DATE 8-2-16
(SEE PERMIT CONDITIONS)

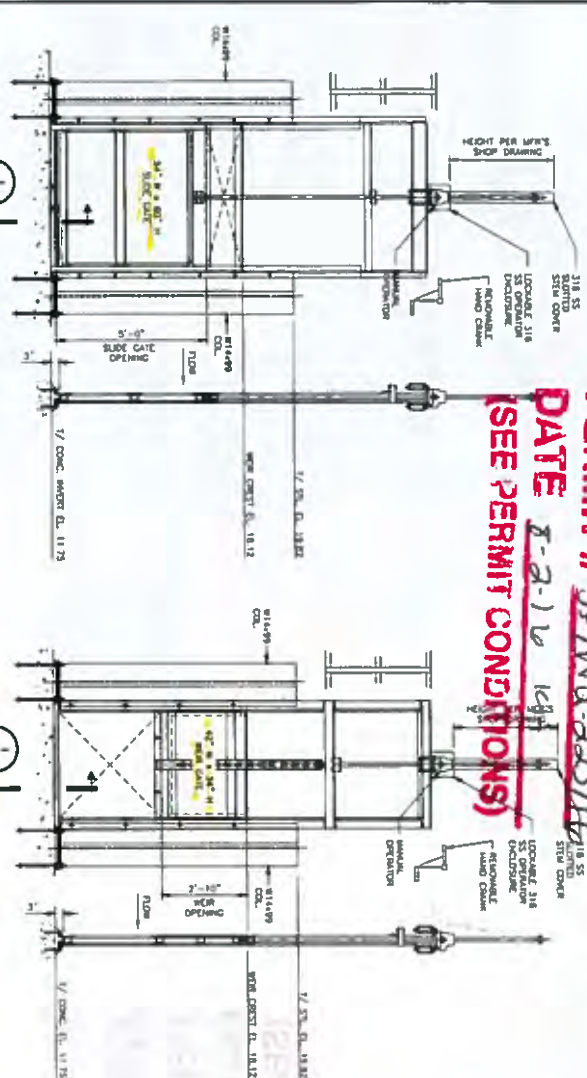


- PLAN NOTES:**
- SEE SHEET S-1 FOR STRUCTURAL NOTES AND MATERIAL SPECIFICATIONS.
 - ALL STEEL SHALL BE HOT-DIPPED GALVANIZED PER STRUCTURAL STEEL & ALUMINUM NOTES ON SHEET S-1.

DESIGNED BY		CHECKED BY		DATE	
DRAWN BY		SCALE		SHEET NO.	
STATE OF DELAWARE DIRECT DEPARTMENT OF WATERSHED STEWARDSHIP IMPROVEMENTS TO DELAWARE DAMS DOVER, DELAWARE					
DIRECT CONTRACT NO.: NAT 15003-FI OODPLAIN IMPROVEMENTS TO CHIPMANS POND DAM HANDRAIL FABRICATION DETAILS					
S-7					

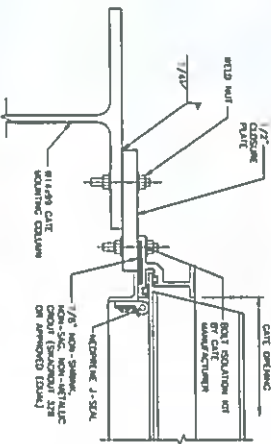
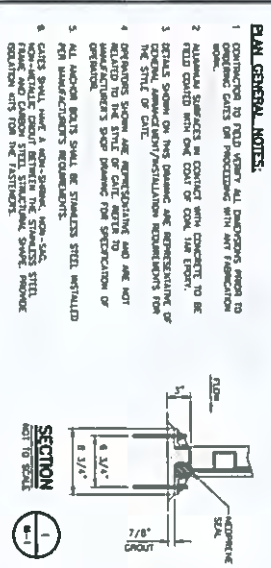
W.S.L.S. APPROVED PLANS

PERMIT # SP1W8-223/LH
DATE 8-2-16
 (SEE PERMIT CONDITIONS)



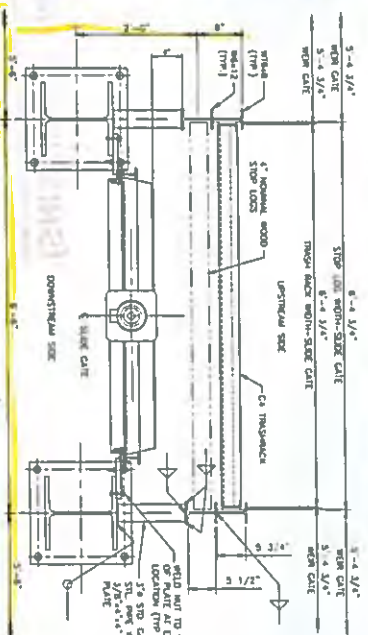
1 of the 3 gates like this
 FACE-MOUNTED
 SELF-CONTAINED SLIDE GATE
 SCALE: 1/2" = 1'-0"

2 of 3 gates like this
 FACE-MOUNTED
 SELF-CONTAINED WEIR GATE
 SCALE: 1/2" = 1'-0"

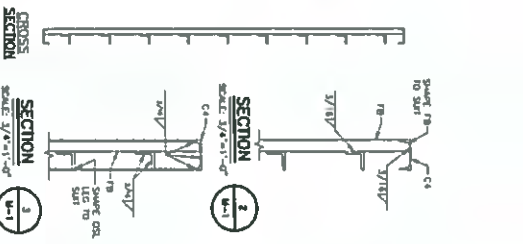
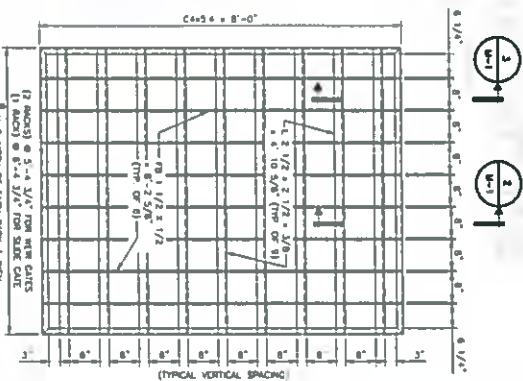


GATE MOUNTING DETAIL
 NOT TO SCALE

width of structure 3'9"



length of structure 17.5'
STEEL TRASH RACK & STOP LOG GUIDE ASSEMBLY DETAIL
 SCALE: 1" = 1'-0"



STEEL TRASH RACK DETAIL - (1) RACK PER BAY
 SCALE: 3/4" = 1'-0"

- BLM GENERAL NOTES:**
1. CONFORM TO FIELD VERIFY ALL DIMENSIONS PRIOR TO CONSTRUCTION.
 2. ALL SURFACES IN CONTACT WITH CONCRETE TO BE FIELD COATED WITH ONE COAT OF COAL TAR EPXY.
 3. DETAILS SHOWN ON THIS DRAWING ARE REPRESENTATIVE OF GENERAL ASSEMBLY/INSTALLATION REQUIREMENTS FOR THE TYPE OF GATE.
 4. OPERATING SCHEM ARE REPRESENTATIVE AND ARE NOT TO BE USED FOR CONSTRUCTION OF THE GATE.
 5. ALL MANHOLES SHALL BE STAINLESS STEEL INSTALLED PER MANUFACTURER'S REQUIREMENTS.
 6. GATES SHALL HAVE A NON-SKID, NON-SLIP, HIGH-WEAR SURFACE BETWEEN THE STAINLESS STEEL MANHOLES AND THE GATE BODY.
 7. GATES SHALL HAVE A NON-SKID, NON-SLIP, HIGH-WEAR SURFACE BETWEEN THE STAINLESS STEEL MANHOLES AND THE GATE BODY.

DATE	8-2-16
DESIGNED BY	W.S.L.S.
CHECKED BY	W.S.L.S.
APPROVED BY	W.S.L.S.

OTOREN & GENE ENGINEERS, INC.
 1000 N. 10TH STREET, SUITE 100
 DOVER, DELAWARE 19901

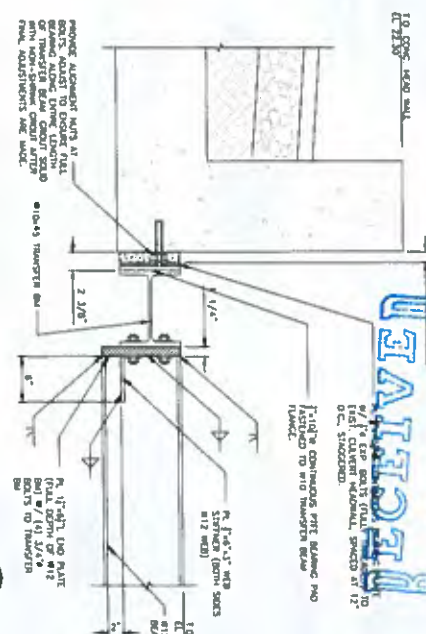
STATE OF DELAWARE DIRECT
 DEPARTMENT OF WATERSHED STEWARDSHIP
 IMPROVEMENTS TO DELAWARE DAMS
 DOVER, DELAWARE

DIRECT CONTRACT NO. NAT 15003-FLOODPLAIN
 IMPROVEMENTS TO CHESAPEAKE POND DAM
 NEW GATE AND TRASH RACK
 DETAILS
 M-1

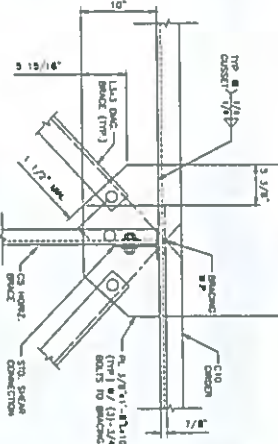
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2027 0 2027

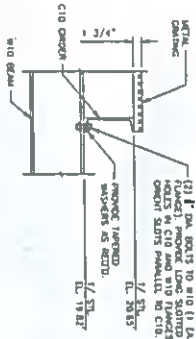
FIRST CLAUENT
OC. SIMOCCED.



TRANSFER BEAM TO EXIST. CULVERT-JOINT DETAIL



INTERMEDIATE BRACING DETAIL PLAN VIEW



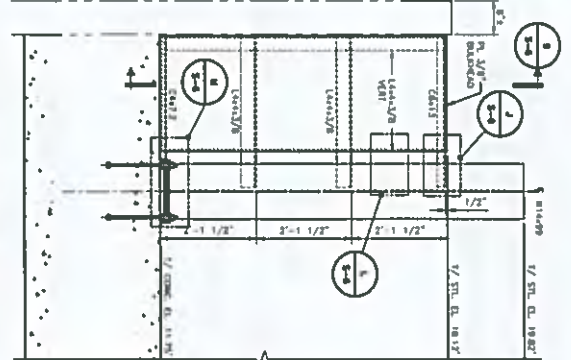
GATE FRAME BEAM CONNECTION

DNREC CONTRACT NO.: NAT 15003-FL00DPLAIN

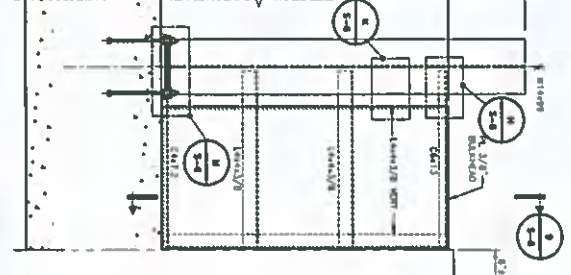
LE NO	5-5
12004 8 0224 - 0000	
DATE	1 AUGUST 19

W.S.I.S.
APPROVED PLANS
PERMIT # SPIND-233116
DATE 8-2-16
(SEE PERMIT CONDITIONS)

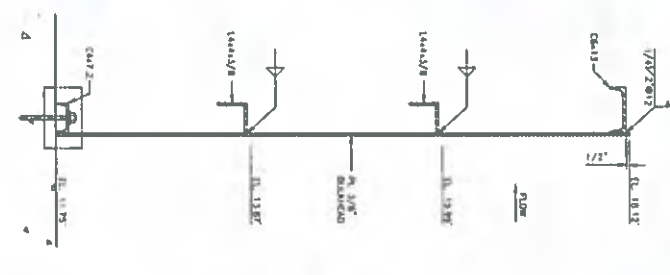
**ELEVATION • EAST BULKHEAD
 LOOKING DOWNSTREAM**
 SCALE 3/4"=1'-0"



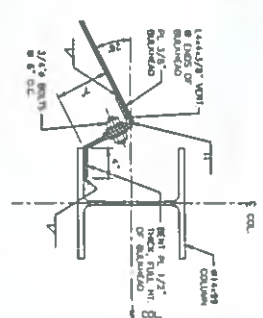
**ELEVATION • WEST BULKHEAD
 LOOKING DOWNSTREAM**
 SCALE 3/4"=1'-0"



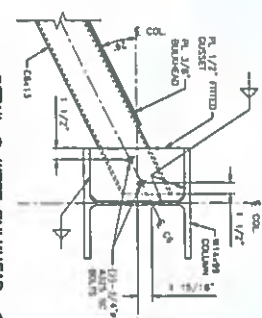
BULKHEAD SECTION
 SCALE 1-1/2"=1'-0"



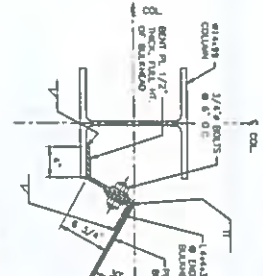
**DETAIL • WEST BULKHEAD
 BULKHEAD TO COLUMN CONNECTION**
 SCALE 1-1/2"=1'-0"



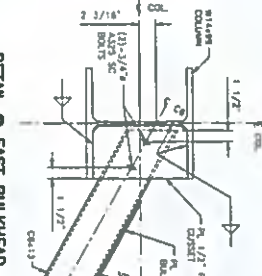
**DETAIL • WEST BULKHEAD
 W14 BRACE CONNECTION**
 SCALE 1-1/2"=1'-0"



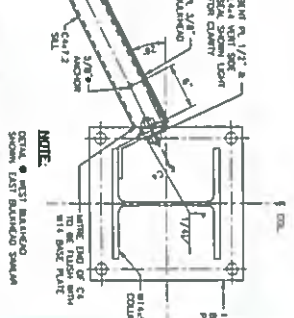
**DETAIL • EAST BULKHEAD
 BULKHEAD TO COLUMN CONNECTION**
 SCALE 1-1/2"=1'-0"



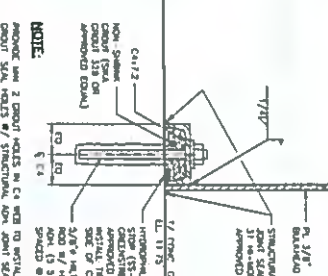
**DETAIL • EAST BULKHEAD
 W14 BRACE CONNECTION**
 SCALE 1-1/2"=1'-0"



**DETAIL • WEST BULKHEAD
 CORNER SEAL • W14 COLUMN**
 SCALE 1-1/2"=1'-0"



BULKHEAD SILL DETAIL
 SCALE 1-1/2"=1'-0"



THE DRAWING HAS BEEN PREPARED BY THE ENGINEER AND THE ENGINEER'S SEAL AND SIGNATURE ARE REQUIRED FOR THE DRAWING TO BE VALID. THE ENGINEER'S SEAL AND SIGNATURE ARE REQUIRED FOR THE DRAWING TO BE VALID. THE ENGINEER'S SEAL AND SIGNATURE ARE REQUIRED FOR THE DRAWING TO BE VALID.

DESIGNED BY: W.S.I.S.
 CHECKED BY: W.S.I.S.
 DATE: 8-2-16

ORCH & GENE ENGINEERS, INC.
 1000 N. 10TH ST.
 SUITE 100
 DOVER, DE 19901

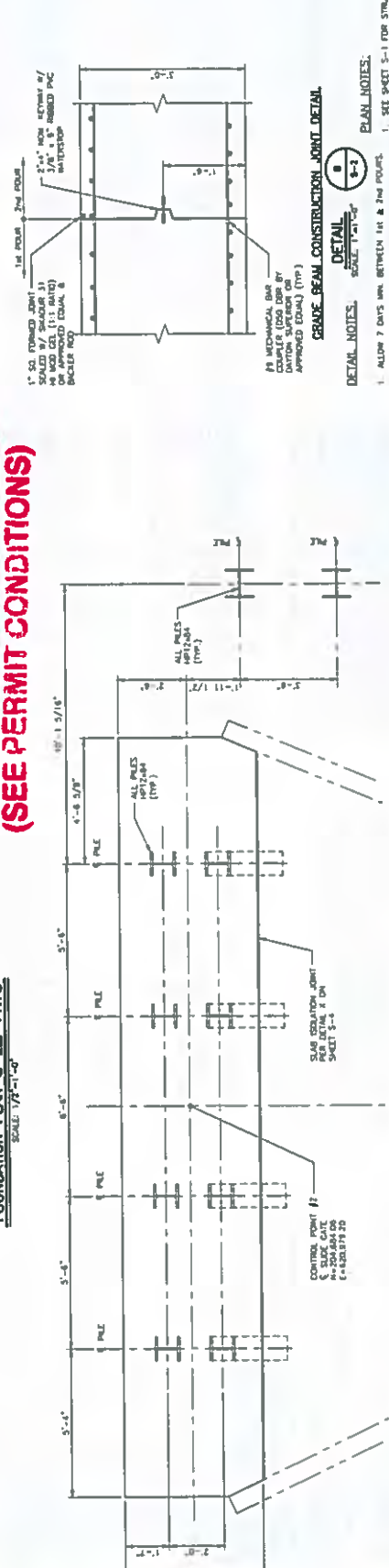
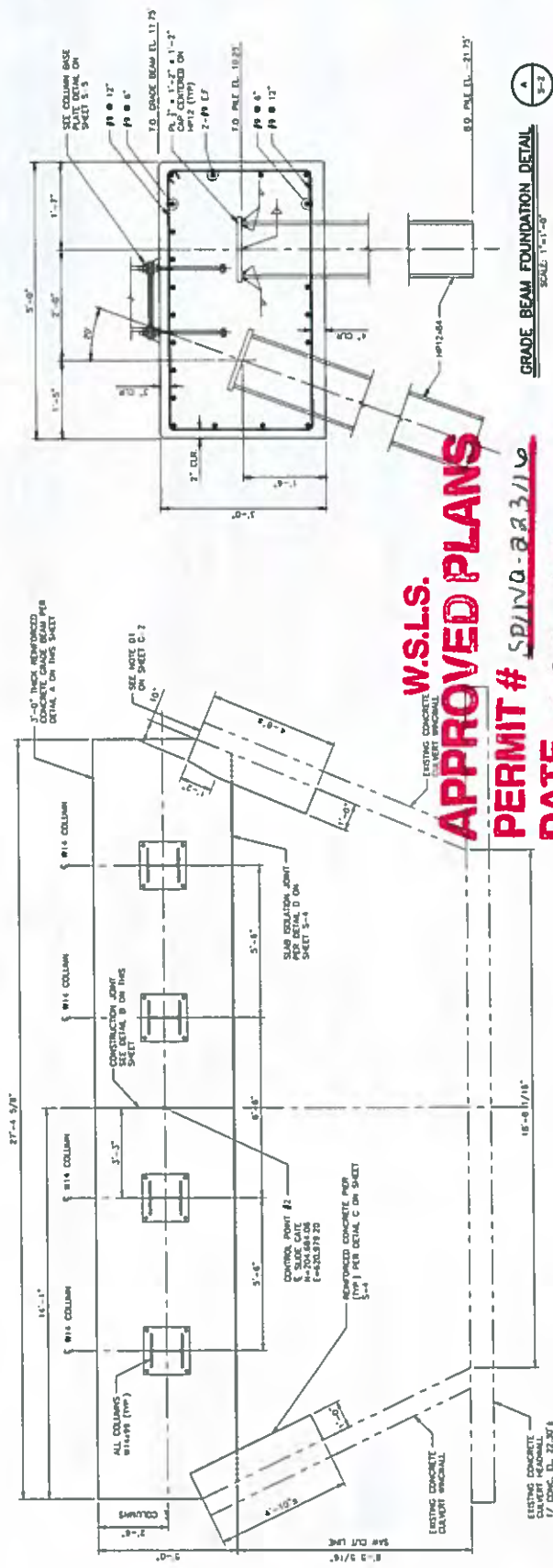
STATE OF DELAWARE DIRECT
 DEPARTMENT OF WATERSHED STEWARDSHIP
 IMPROVEMENTS TO DELAWARE DAMS
 DOVER, DELAWARE

DIRECT CONTRACT NO.: NAT 15003-01-001-001

SECTION: BULKHEAD

DATE: 8-2-16

S-6



GATE FOUNDATION PLANS®

EXISTING CONCRETE
NEW WALL

W.S.L.S.

APPROVED PLANS

PERMIT # SP1N0-00310

DATE 1-2-6

(SEE PERMIT CONDITIONS)

[illegible]

DATE 8-2-16 K-H
(SEE PERMIT CONDITIONS)
X-20481



STATE OF DELAWARE DNREC
DEPARTMENT OF WATERSHED STEWARDSHIP
IMPROVEMENTS TO DELAWARE DAMS
DOVER, DELAWARE

DNREC CONTRACT NO.: NAT 15003-FLOODPLAIN IMPROVEMENTS TO CHIPMANS POND DAM EROSION & SEDIMENTATION CONTROL PLAN & NOTES	DATE	1/10/2019
	DATE	1/10/2019

6.5

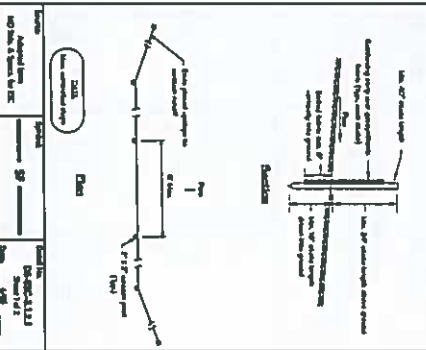
JUN 07 2016
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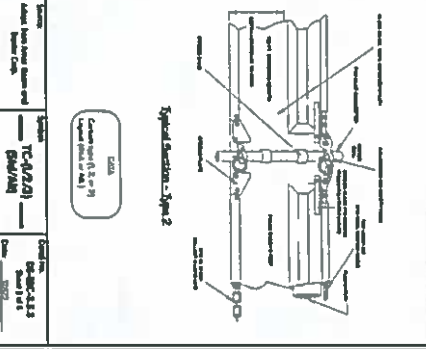
EROSION AND SEDIMENT CONTROL NOTES

1. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE CURRENT DELAWARE EROSION AND SEDIMENT CONTROL HANDBOOK.
2. CONSTRUCTION SHALL BEGIN AFTER THE RECEIPT OF ALL NECESSARY PERMITS, STATE, COUNTY AND LOCAL. THE EROSION AND SEDIMENT CONTROL MEASURES SHALL BE CONSTRUCTED AND MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD AND SHALL REMAIN IN PLACE UNTIL THE PROJECT SITE IS RESTORED TO ORIGINAL OR BETTER CONDITION.
3. AT LEAST 50% OF THE EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED BEFORE ANY EXCAVATION OR FILLING OF THE PROJECT SITE.
4. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD AND SHALL REMAIN IN PLACE UNTIL THE PROJECT SITE IS RESTORED TO ORIGINAL OR BETTER CONDITION.
5. THE EROSION AND SEDIMENT CONTROL MEASURES SHALL BE MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD AND SHALL REMAIN IN PLACE UNTIL THE PROJECT SITE IS RESTORED TO ORIGINAL OR BETTER CONDITION.
6. AT LEAST 50% OF THE EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED BEFORE ANY EXCAVATION OR FILLING OF THE PROJECT SITE.
7. THE EROSION AND SEDIMENT CONTROL MEASURES SHALL BE MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD AND SHALL REMAIN IN PLACE UNTIL THE PROJECT SITE IS RESTORED TO ORIGINAL OR BETTER CONDITION.
8. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD AND SHALL REMAIN IN PLACE UNTIL THE PROJECT SITE IS RESTORED TO ORIGINAL OR BETTER CONDITION.
9. THE EROSION AND SEDIMENT CONTROL MEASURES SHALL BE MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD AND SHALL REMAIN IN PLACE UNTIL THE PROJECT SITE IS RESTORED TO ORIGINAL OR BETTER CONDITION.
10. THE EROSION AND SEDIMENT CONTROL MEASURES SHALL BE MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD AND SHALL REMAIN IN PLACE UNTIL THE PROJECT SITE IS RESTORED TO ORIGINAL OR BETTER CONDITION.
11. FOLLOWING SOIL DISTURBANCE OR CONSTRUCTION, REPAIRMENT OR RESTORATION OF THE EROSION AND SEDIMENT CONTROL MEASURES SHALL BE COMPLETED WITHIN 10 DAYS.
12. THE EROSION AND SEDIMENT CONTROL MEASURES SHALL BE MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD AND SHALL REMAIN IN PLACE UNTIL THE PROJECT SITE IS RESTORED TO ORIGINAL OR BETTER CONDITION.
13. THE EROSION AND SEDIMENT CONTROL MEASURES SHALL BE MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD AND SHALL REMAIN IN PLACE UNTIL THE PROJECT SITE IS RESTORED TO ORIGINAL OR BETTER CONDITION.
14. ANY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD AND SHALL REMAIN IN PLACE UNTIL THE PROJECT SITE IS RESTORED TO ORIGINAL OR BETTER CONDITION.
15. ANY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD AND SHALL REMAIN IN PLACE UNTIL THE PROJECT SITE IS RESTORED TO ORIGINAL OR BETTER CONDITION.
16. ANY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD AND SHALL REMAIN IN PLACE UNTIL THE PROJECT SITE IS RESTORED TO ORIGINAL OR BETTER CONDITION.

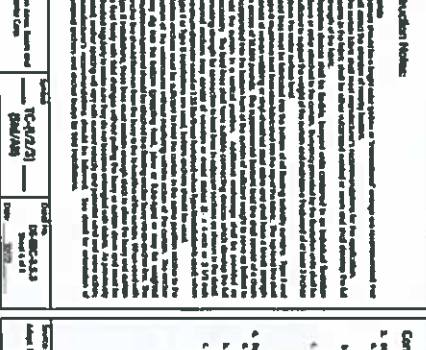
Standard Detail & Specification S10: Fences



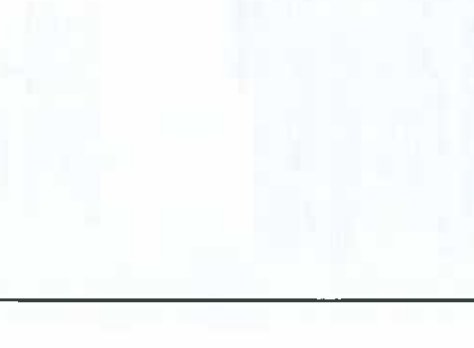
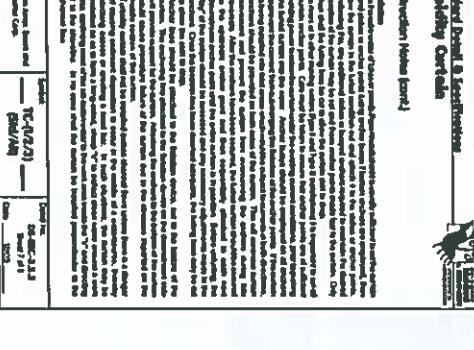
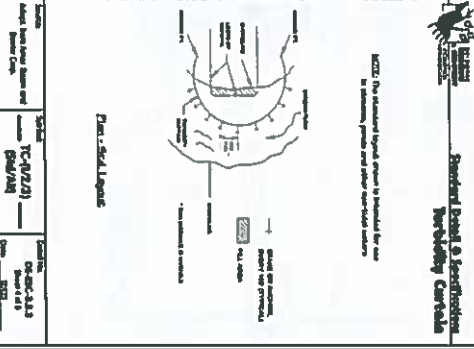
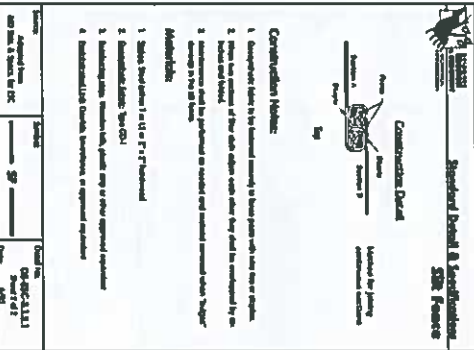
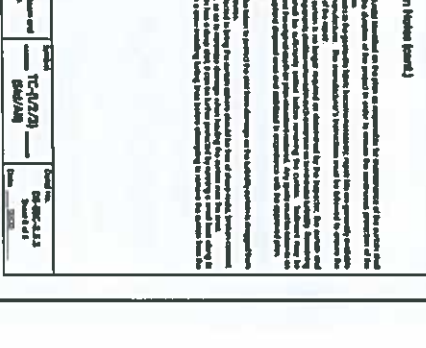
Standard Detail & Specification S11: Erosion Control



Standard Detail & Specification S12: Erosion Control



Standard Detail & Specification S13: Erosion Control



STATE OF DELAWARE DNRDC
DEPARTMENT OF WATERSHED STEWARDSHIP
DOVER, DELAWARE

CONTRACT NO.: NAT 15003-FLOODPLAIN

PROJECT NAME: CHIPMANS POND DAM IMPROVEMENTS TO DELAWARE DAMS

NOTES & DETAILS

DATE: 1/1/2024

BY: [Signature]

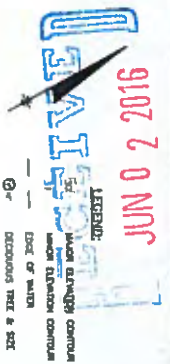
FOR: [Signature]

PROJECT NO.: 9102 2 0 NMF

...

JUN 02 2016

THE



- PROJECT GENERAL NOTES:**

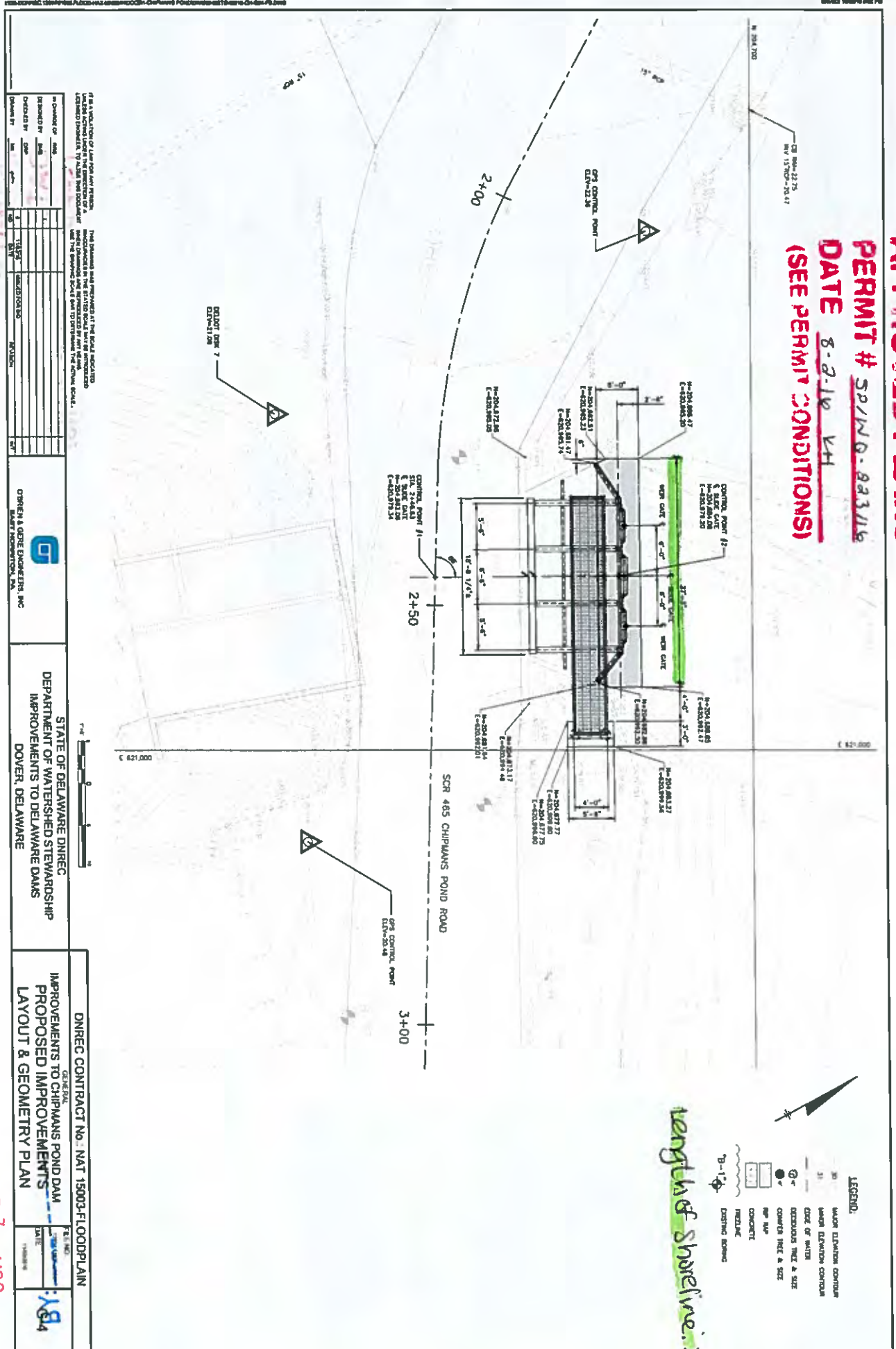
[illegible]

IMPROVEMENTS TO CHIPMANS POND DAM PROPOSED IMPROVEMENTS PLAN	(2) EMB. TOTAL	(3) E. NO.
	DATE (1) MONTHS	(1) YEAR & MONTH (2) DAY

G-3

W.S.L.S. APPROVED PLANS

PERMIT # SP/NO-83316
DATE 8-2-16 44
(SEE PERMIT CONDITIONS)



9102 2 0 NINP

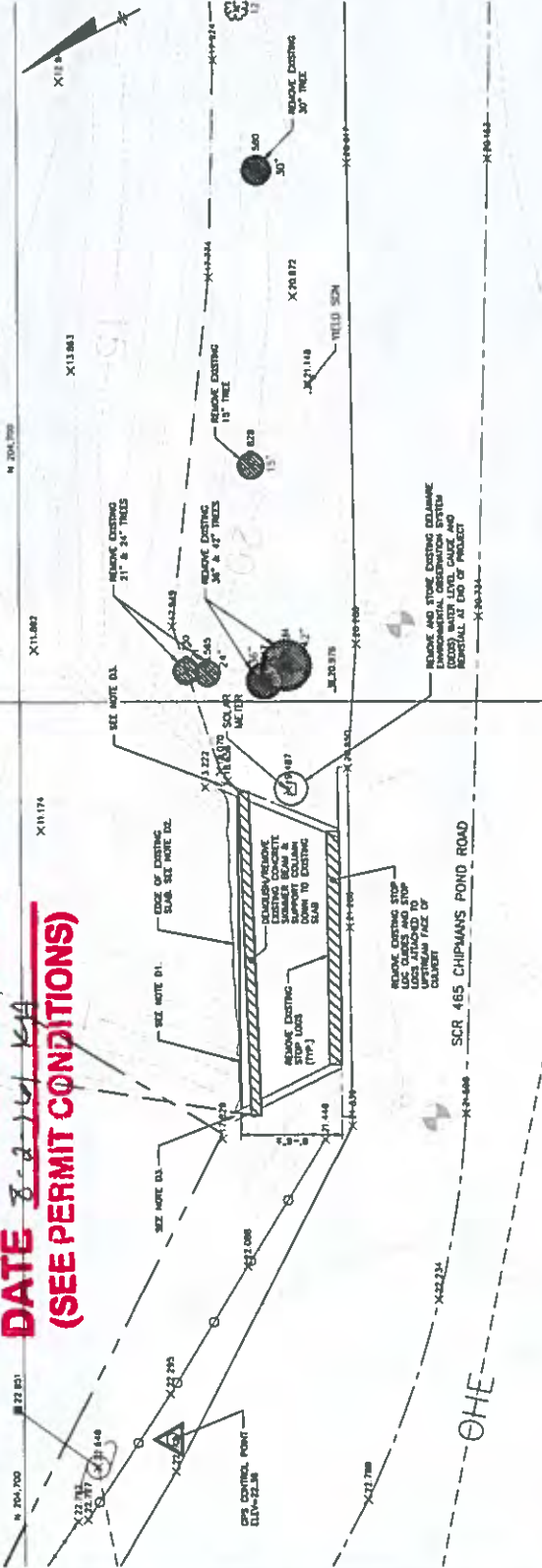
W.S.L.S.
APPROVED PLANS
PERMIT # SP10A-223116
DATE 8-2-16
(SEE PERMIT CONDITIONS)

LEGEND:

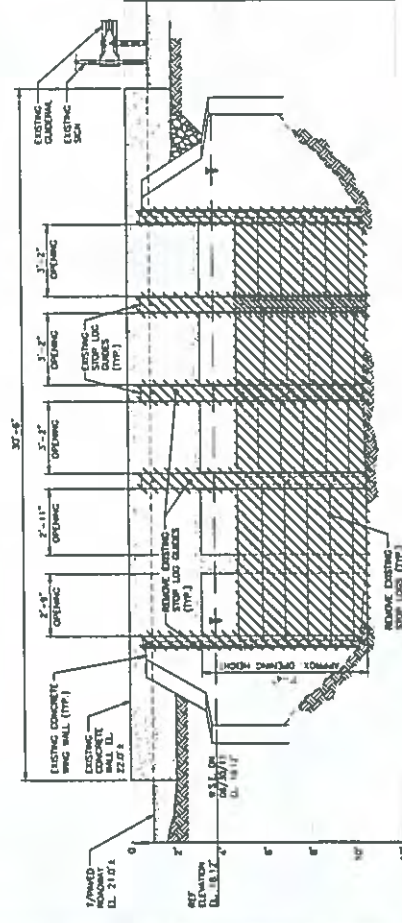
- 30 MAJOR ELEVATION CONTOUR
- 31 MINOR ELEVATION CONTOUR
- EDGE OF WATER
- DECIDUOUS TREE & SIZE
- CONIFER TREE & SIZE
- REF. MAP
- CONCRETE
- PIEDRA
- EXISTING BORING
- DEMOLITION/REMOVE STRUCTURE

DEMOLITION NOTES:

01. CONTRACTOR TO DO TEST PIT AT EDGE OF EXISTING SLAB TO VERIFY SLAB THICKNESS AND TO ESTABLISH THE SLAB FOUNDATION CONDITIONS (BEARING ON ROCK OR FILL). THE CONTRACTOR SHALL RECORD THE RESULTS OF THE TEST PIT. THE CONTRACTOR SHALL ASSURE THE TEST PIT IS 3 FT WIDE, 3 FT LONG, AND 3 FT DEEP. LOCATION TO BE DETERMINED BY THE CONTRACTOR. THE CONTRACTOR SHALL REPORT THE RESULTS OF THE TEST PIT TO THE ENGINEER. THE CONTRACTOR SHALL VERIFY THE EXISTING CONDITIONS OF THE STRUCTURE WITHIN THE LIMITS OF THE WORK.
02. EDGES OF SLAB PROFILE AND EXISTING DEPTH SHOWN ARE BASED UPON DRWG REPORT FRANCHES PREPARED IN PROJECT 20-070-01. AGREEMENT SHALL TAKE PLACE - UNDERSTANDING BEFORE PROCEEDING. STRUCTURE 3351-401* PREPARED BY COLLINS ENGINEERING, INC AND DATED SEPTEMBER 4, 2011. THE ACTUAL SLAB EDGE PROFILE AND EXISTING DEPTH SHALL BE VERIFIED BY THE CONTRACTOR. THE CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS OF THE STRUCTURE WITHIN THE LIMITS OF THE WORK.
03. EDGE OF WING WALL LOCATION IS SHOWN. CONTRACTOR TO VERIFY (TYP. BOTH WALLS).



EXISTING CULVERT - DEMOLITION PLAN
 SCALE: 1"=2'



EXISTING CULVERT ELEVATION
 SCALE: 3/8"=1'-0"

EXISTING CULVERT AND BEAM ELEVATION
 SCALE: 3/8"=1'-0"

THIS DRAWING WAS PREPARED AT THE SCALE INDICATED. DIMENSIONS SHOWN IN THIS DRAWING SHALL BE INTERPRETED AS DIMENSIONS UNLESS OTHERWISE NOTED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE ACTUAL SCALE OF THE STRUCTURE.

NO.	DATE	BY	CHKD.	APP'D.
1	11/20/11	SP10A-223116		
2	11/20/11	SP10A-223116		
3	11/20/11	SP10A-223116		
4	11/20/11	SP10A-223116		
5	11/20/11	SP10A-223116		

STATE OF DELAWARE DNREC
 DEPARTMENT OF WATERSHED STEWARDSHIP
 IMPROVEMENTS TO DELAWARE DAMS
 DOVER, DELAWARE

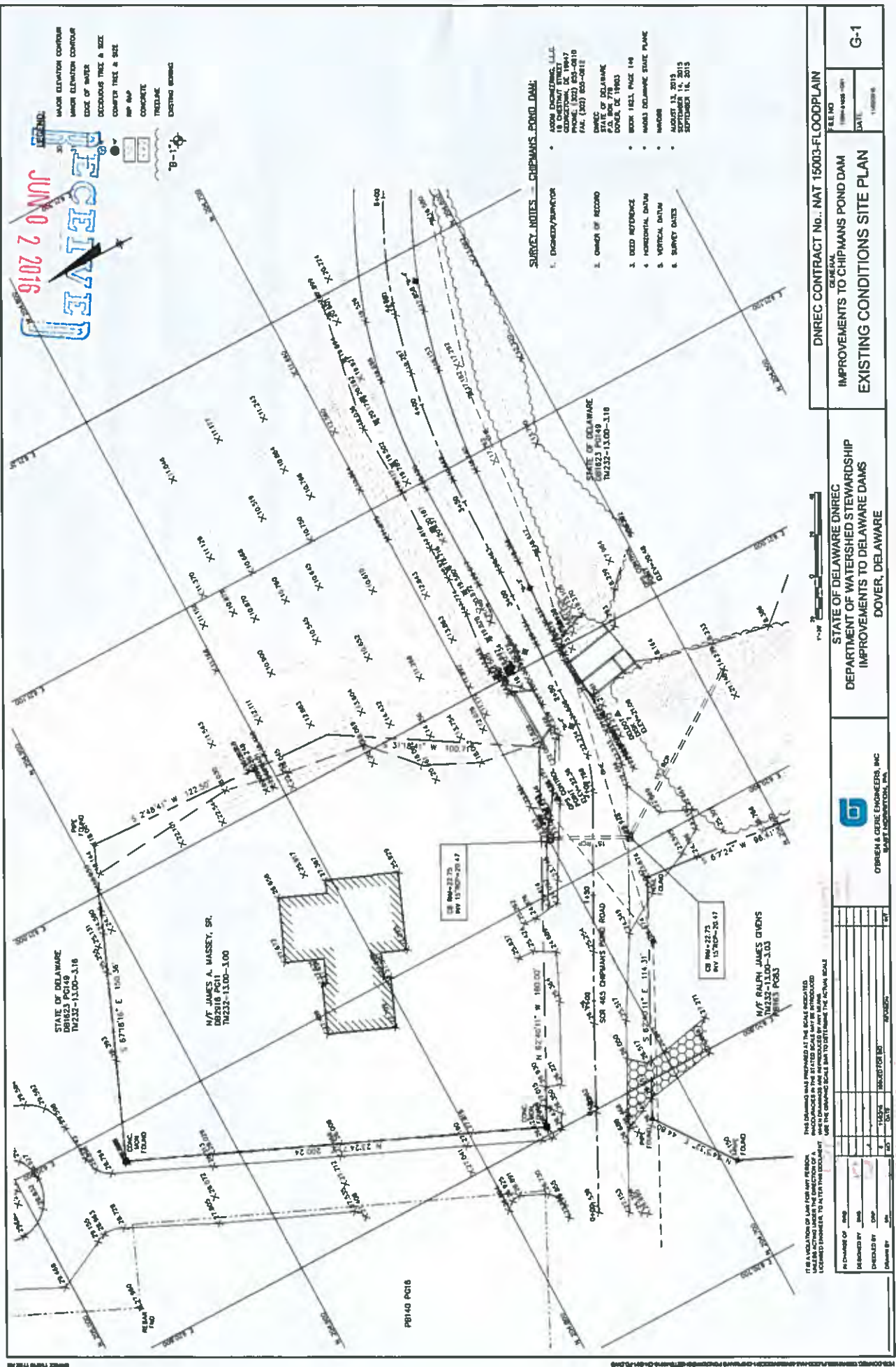
OTBREM & GERE ENGINEERS INC
 1000 MARKET STREET, SUITE 200
 DOVER, DE 19901

DNREC CONTRACT NO.: NAT 15003-FLOODPLAIN
 IMPROVEMENTS TO CHIPMANS POND DAM
 DEMOLITION PLAN
 FILE NO.: 15003-FPS-002
 DATE: 8/2/16
 G-2

9107 6 0 11



BY: _____



THIS DRAWING AND ANY INFORMATION CONTAINED HEREIN IS THE PROPERTY OF O'BRIEN & GIER ENGINEERS, INC. IT IS A VIOLATION OF LAW FOR ANY PERSON TO REPRODUCE OR TRANSMIT THIS DRAWING OR ANY INFORMATION CONTAINED HEREIN IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT THE WRITTEN PERMISSION OF O'BRIEN & GIER ENGINEERS, INC.

NO.	DATE	BY	DESCRIPTION
1	06/02/16	DN	ISSUED FOR PERMIT
2	06/02/16	DN	ISSUED FOR PERMIT
3	06/02/16	DN	ISSUED FOR PERMIT
4	06/02/16	DN	ISSUED FOR PERMIT
5	06/02/16	DN	ISSUED FOR PERMIT
6	06/02/16	DN	ISSUED FOR PERMIT
7	06/02/16	DN	ISSUED FOR PERMIT
8	06/02/16	DN	ISSUED FOR PERMIT
9	06/02/16	DN	ISSUED FOR PERMIT
10	06/02/16	DN	ISSUED FOR PERMIT

STATE OF DELAWARE DNREC
DEPARTMENT OF WATERSHED STEWARDSHIP
IMPROVEMENTS TO DELAWARE DAMS
DOVER, DELAWARE

O'BRIEN & GIER ENGINEERS, INC.
1001 W. 10TH STREET, SUITE 200
WILMINGTON, DE 19801

DNREC CONTRACT No. 15003-FLOODPLAIN
IMPROVEMENTS TO CHIPMANS POND DAM
EXISTING CONDITIONS SITE PLAN

GENERAL
G-1
DATE: 1/08/06
SCALE: 1"=50'



WETLANDS AND SUBAQUEOUS LANDS SECTION

PERMIT NO.: SP/ WQ-223/16

CONSTRUCTION EXPIRATION DATE:

8/8/2019

FOR THE FOLLOWING ACTIVITIES:

- To remove existing timber flashboards and replace them with 3 manually-operated steel gates
- To install a 4 by 27 foot long catwalk to access the gates
- To dredge 25 cubic yards of material for the new gates concrete foundation and removal of accumulated sediment from the existing concrete foundation and dispose of the material in the adjacent uplands
- To place 16 cubic yards of concrete fill for the new gates foundation
- To install a temporary cofferdam

LOCATED ON PUBLIC SUBAQUEOUS LANDS:

In Chipman Pond
On Chipman Pond Road
Laurel, Sussex County, Delaware

ISSUED TO: DNREC - Division of Fish and Wildlife, C/o: Larry Horan

LOCATION OF WORK: Same as above

**DISPLAY THIS CERTIFICATE IN A HIGHLY
VISIBLE LOCATION ON THE JOB SITE.**

Authorized by:

Delaware Coastal Management Federal Consistency Determination



RECEIVED

AUG 26 2016

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES & ENVIRONMENTAL CONTROL

DELAWARE COASTAL
MANAGEMENT PROGRAM

89 KINGS HIGHWAY
DOVER, DELAWARE 19901

Phone: (302) 739- 9283
Fax: (302) 739-2048

August 22, 2016

Melissa A. Hubert
Division of Watershed Stewardship
Department of Natural Resources and Environmental Control
21309 Berlin Rd Unit #6
Georgetown, DE 19947

**RE: *Delaware Coastal Management Federal Consistency Review
Chipman Pond Dam Spillway Improvements (FC# 2016.0081)***

Dear Ms. Hubert:

The Delaware Coastal Management Program (DCMP) has received and reviewed your consistency determination for the Chipmans Pond Dam Spillway Improvement Project (FC# 2016.0081). The project includes proposed improvements within the spillway of Chipmans Pond entailing replacement of timber flash boards with new manual gates held by a steel frame constructed 10 feet upstream of the road bridge and an access catwalk to allow for improved management and safety.

Based upon our review and pursuant to National Oceanic & Atmospheric Administration regulations (15 CFR 930), the DCMP conditionally concurs with your consistency determination for the above referenced project. Our concurrence is based on the adherence to restrictions and/or conditions placed on any and all permits issued to you for this project and the following conditions:

1. Existing water levels shall not be altered and sufficient flow shall be maintained to prevent impacts to water bulrush (*Schoenoplectus subterminalis*) and blackbanded sunfish (*Enneacanthus chaetodon*) in the pond and downstream.
2. Sedimentation during construction activities shall be minimized to limit impacts to the state-rare freshwater mussel species, Northern Lance (*Elliptio fisheriana*).
3. Blackbanded sunfish (*Enneacanthus chaetodon*), a state rare species occurs within the Chipman Pond system. No work shall take place from April 1st through June 30th if the work will take place in or immediately adjacent to dense patches of aquatic vegetation to protect blackbanded sunfish.

Delaware's good nature depends on you!

RECEIVED
AUG 16 2016

These conditions are necessary in order to satisfy the DCMP Living Resources policy 5.11.1.1 and Nongame and Endangered Species policy 5.11.3 which refer to protecting living resources and rare/endangered wildlife in the state from adverse environmental effects.

Failure to comply with the conditions above will result in this conditional concurrence henceforth being considered an objection. Under this scenario, the applicant is advised that pursuant to 15 CFR part 930, subpart H, and within 30 days from receipt of this letter, you may request that the Secretary of Commerce override the objection. In order to grant an override request, the Secretary must find that the activity is consistent with the objectives or purposes of the Coastal Management Act, or is necessary in the interest of national security. A copy of the request and supporting information must be sent to the Delaware Coastal Management Program and the federal permitting or licensing agency. The Secretary may collect fees for administering and processing your request.

The DCMP also offers the following comments for consideration:

The boat ramp and parking area are open to the public. Larry Horan of the Fisheries Section in the Division of Fish and Wildlife should be notified when the work authorized by this Permit/Certification is scheduled so that a press release can be coordinated. (302-739-9084 or Larry.Horan@state.de.us).

If you have any questions or would like to discuss the conditions or comments included in this letter, please contact me or Amanda Santoni of my staff at (302) 739-9283.

Sincerely,



Sarah W. Cooksey, Administrator
Delaware Coastal Management Program

SWC/as

cc: File 2016.0080
Kate Fleming-WSCRP
Devin Ray- USFWS
Craig Lukezic-SHPO

DNREC Standard Sediment and Stormwater Plan Approval



DNREC Division of Watershed Stewardship
89 Kings Highway
Dover, DE 19901
(302) 739-9921

GENERAL APPLICATION FOR STANDARD PLAN APPROVAL

Approval of this Standard Sediment and Stormwater Plan may be granted if all applicability items established in Technical Document Article 3.01.1 for the individual standard plan project type are met, and the owner/applicant agrees to comply with the conditions of the individual standard plan project type contained in the same Article.

Standard Plan Project Type (select one)

☐ 3.01.1.4 Agricultural Structure Construction
☐ 3.01.1.5 Tax Ditch Maintenance
☐ 3.01.1.8 BMP Construction and Retrofit
☒ 3.01.1.9 Minor Bridge and Culvert Construction

Site Information

Project Name: Improvements to Chipmans Pond Dam
Site Location: Chipmans pond outlet along Chipmans Pond Rd
Tax Parcel ID: 2-32 13.00 3.16
Parcel Total Acres (nearest 0.1ac): 87.7
Disturbed Acres (nearest 0.1ac): 0.1
Proposed Impervious Area: 0 sq ft / ac
Wooded area to be cleared: 0 sq ft / ac

Applicant Information

Owner: State of Delaware
Mailing Address: PO Box 778 Dover, DE 19903
Applicant: DE DNREC Division of Fish & Wildlife
Mailing Address: 89 Kings Highway Dover, DE 19901
Owner Phone: _____
Applicant Phone: 302-739-9910

Applicant Certification

I, the undersigned, certify that the information supplied on this Application for Standard Plan Approval is accurate, the proposed land disturbing activity meets the criteria established, and all conditions of this Standard Plan Approval will be met by the applicant, builder, contractor, and owner during construction and post construction.

Applicant Signature: Lawrence R. Horan Date: 6/3/16
Applicant Printed Name: LAWRENCE R HORAN Title: CONSTRUCTION PROJECT MANAGER

Fees

The review fee is \$80 per disturbed acre to the nearest 0.1 acre with a minimum fee of \$80 for any standard plan approvals disturbing less than 1.0 acre. Make checks payable to Division of Watershed Stewardship.

Approval Information (for office use only)

Approval # 2016-101 Fee Paid: \$ 0 (WAIVED)
Approved by: Randall K Green Approval Date: 10/12/16
Title: EVI Expiration Date: 10/12/21

Concord Pond Approved Permits

Department of the Army Nationwide Permit 3

DNREC Subaqueous Lands Permit and Water Quality Certification

Delaware Coastal Management Federal Consistency Determination

DNREC Standard Sediment and Stormwater Plan Approval

Department of the Army Nationwide Permit 3



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
PHILADELPHIA DISTRICT CORPS OF ENGINEERS
WANAMAKER BUILDING, 100 PENN SQUARE EAST
PHILADELPHIA, PENNSYLVANIA 19107-3390

Regulatory Branch
Application Section I

JUN - 3 2016

SUBJECT: CENAP-OP-R-2016-442-85 (NWP3)
Project Name: DDNREC Concord Pond Dam Repair SX
Latitude/Longitude: 38.64312°N/-75.55404°W

RECEIVED
JUN 07 2016

Melissa A. Hubert
Delaware Department of Natural Resources and Environmental Control
Division of Watershed Stewardship
21309 Berlin Road, Unit 6
Georgetown, Delaware 19947

Dear Mrs. Melissa A. Hubert:

This is in regard to your proposal to discharge fill material into waters of the United States in order to repair/replace the spillway associated with the Concord Pond Dam located on Concord Pond Road, Tax Map Parcel Number 231-17.00-12.00, Seaford, Sussex County, Delaware.

Under current Federal regulations, a Department of the Army permit is required for work or structures in navigable waters of the United States and/or the discharge of dredged or fill material into waters of the United States including their adjacent wetlands.

Based upon our review of the information you have provided, it has been determined that the proposed work is approved by the existing Department of the Army Nationwide Permit (NWP) described in Enclosure 1, provided the work is conducted in compliance with the project specific special conditions listed below and the attached general conditions (Enclosure 2). Initiation of any authorized work shall constitute your agreement to comply with all of the NWP's conditions. You should also note that the authorized work may be subject to periodic inspections by a Corps of Engineers representative. The verification of a nationwide permit including all general and special conditions is not subject to appeal.

On March 16, 2012 the Division Engineer approved several Regional Conditions for NWPs within the Philadelphia District. The enclosed table (Enclosure 3) identifies those NWPs which require a preconstruction notification (PCN) to the Corps of Engineers, those which have been regionally conditioned by the Division Engineer, and those which have been denied 401 Water Quality Certification (WQC) and/or Coastal Zone Management (CZM) consistency by the Delaware Department of Natural Resources and Environmental Control (DDNREC). It should

be carefully noted that DDNREC has denied the requisite WQC and CZM for certain NWP activities in ALL waters of the United States in Delaware. For other NWP activities, DDNREC has denied the requisite WQC and CZM for projects located in waters of the United States which have been determined to be critical resource waters.

For those NWPs for which DDNREC has denied the requisite WQC and CZM, the NWP authorization is considered denied without prejudice by the Corps of Engineers until an individual, project-specific WQC and/or CZM review and approval has been obtained from DDNREC. Furthermore, copies of the WQC and CZM approvals must be provided to the Corps of Engineers before the authorized work begins. Any project-specific conditions required by DDNREC for the WQC and/or CZM approval will automatically become part of the NWP authorization as well.

Please note that CZM consistency from DDNREC is only required for those activities in or affecting Delaware's coastal zone. Additionally, some of the NWPs do not involve a discharge of dredged or fill material and, as such, do not require a 401 WQC. For those NWPs not requiring a 401 WQC, the appropriate rows and columns of the enclosed table (Enclosure 3) have been identified with the term "NA".

PROJECT SPECIFIC SPECIAL CONDITIONS:

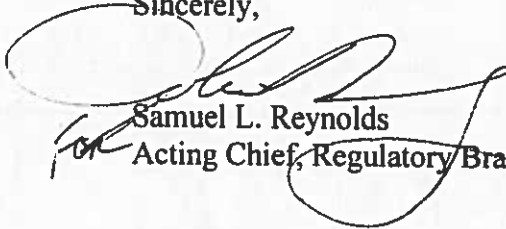
1. All work performed in association with the above noted project shall be conducted in accordance with the project plans prepared by O'Brien & Gere Engineers, Inc., dated November 2015, entitled: *Improvements to Delaware Dams Improvements to Concord Pond Dam*, 13 sheets. The stated purpose of the project is to improve operational safety of the dam spillway and enhance the effectiveness of the dam and its management during storm events.
2. Construction activities shall not result in the temporary disturbance or alteration of greater than 0.07 acre of waters of the United States, and the permanent disturbance or alteration of greater than 0.04 acre of waters of the United States.
3. Any deviation in construction methodology or project design from that shown on the above noted drawings must be approved by this office, in writing, prior to performance of the work. All modifications to the above noted project plans shall be approved, in writing, by this office. No work shall be performed prior to written approval of this office.
4. This office shall be notified at least 10 days prior to the commencement of authorized work by completing and signing the enclosed Notification/ Certification of Work Commencement Form (Enclosure 4). This office shall also be notified within 10 days of the completion of the authorized work by completing and signing the enclosed Notification/Certification of Work Completion/Compliance Form (Enclosure 5). All notifications required by this condition shall be in writing and shall be transmitted to this office by registered mail. Oral notifications are not acceptable. Similar notification is required each time maintenance work is to be done under the terms of this Corps of Engineers permit.

5. Representatives of the U.S. Army Corps of Engineers shall be permitted to inspect the project during its phase of construction, and to collect any samples, or to conduct any tests deemed necessary.
6. The permittee is responsible for ensuring that the contractor and/or workers executing the activity(s) authorized by this permit have knowledge of the terms and conditions of the authorization and that a copy of the permit document is at the project site throughout the period the work is underway.
7. The mechanical equipment used to execute the work authorized shall be operated in such a way as to minimize turbidity that could degrade water quality and adversely affect aquatic plant and animal life.
8. The disposal of trees, brush and other debris in any stream corridor, wetland or surface water is prohibited.
9. Every effort shall be made to keep construction debris from entering the waterway or wetland. Debris in the waterway or wetland shall be removed immediately.
10. All material to be used as fill shall be obtained from an upland source. The fill material shall be free of oil and grease, debris, wood, general refuse, plaster, and other pollutants, and shall contain no broken asphalt.
11. Appropriate erosion and siltation controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills must be permanently stabilized at the earliest practicable date.
12. This permit authorizes temporary impacts to waters of the United States associated with the project. Upon completion of the authorized work, all wetland areas disturbed during construction shall be returned to their pre-construction grades and elevations.
13. This permit does not obviate the permittee from obtaining any State or local approvals required by law for the activity authorized.

This verification is valid until the NWP is modified, reissued, or revoked. All of the existing NWPs are scheduled to be modified, reissued, or revoked prior to March 16, 2017. It is incumbent upon the permittee to remain informed of changes to the NWPs. We will issue a public notice when the NWPs are reissued. Furthermore, if you commence or are under contract to commence this activity before the date that the relevant NWP is modified or revoked, you will have 12 months from the date of the modification or revocation of the NWP to complete the activity under the present terms and conditions of this NWP.

Also enclosed is a pre-addressed postal card (Enclosure 6) soliciting your comments on the processing of your application. Any comments, positive or otherwise, on the procedures, timeliness, fairness, etc., may be made on this card. If you have any questions regarding this matter, please contact Michael Yost at 302-736-9763 or write to the above address.

Sincerely,



Samuel L. Reynolds
for Acting Chief, Regulatory Branch

Enclosures

2012 Nationwide Permits

NWP 3. Maintenance. (a) The repair, rehabilitation, or replacement of any previously authorized, currently serviceable structure, or fill, or of any currently serviceable structure or fill authorized by 33 CFR 330.3, provided that the structure or fill is not to be put to uses differing from those uses specified or contemplated for it in the original permit or the most recently authorized modification. Minor deviations in the structure's configuration or filled area, including those due to changes in materials, construction techniques, requirements of other regulatory agencies, or current construction codes or safety standards that are necessary to make the repair, rehabilitation, or replacement are authorized. Any stream channel modification is limited to the minimum necessary for the repair, rehabilitation, or replacement of the structure or fill; such modifications, including the removal of material from the stream channel, must be immediately adjacent to the project or within the boundaries of the structure or fill. This NWP also authorizes the repair, rehabilitation, or replacement of those structures or fills destroyed or damaged by storms, floods, fire or other discrete events, provided the repair, rehabilitation, or replacement is commenced, or is under contract to commence, within two years of the date of their destruction or damage. In cases of catastrophic events, such as hurricanes or tornadoes, this two-year limit may be waived by the district engineer, provided the permittee can demonstrate funding, contract, or other similar delays.

(b) This NWP also authorizes the removal of accumulated sediments and debris in the vicinity of existing structures (e.g., bridges, culverted road crossings, water intake structures, etc.) and/or the placement of new or additional riprap to protect the structure. The removal of sediment is limited to the minimum necessary to restore the waterway in the vicinity of the structure to the approximate dimensions that existed when the structure was built, but cannot extend farther than 200 feet in any direction from the structure. This 200 foot limit does not apply to maintenance dredging to remove accumulated sediments blocking or restricting outfall and intake structures or to maintenance dredging to remove accumulated sediments from canals associated with outfall and intake structures. All dredged or excavated materials must be deposited and retained in an area that has no waters of the United States unless otherwise specifically approved by the district engineer under separate authorization. The placement of new or additional riprap must be the minimum necessary to protect the structure or to ensure the safety of the structure. Any bank stabilization measures not directly associated with the structure will require a separate authorization from the district engineer.

(c) This NWP also authorizes temporary structures, fills, and work necessary to conduct the maintenance activity. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable, when temporary structures, work, and discharges, including cofferdams, are necessary for construction activities, access fills, or dewatering of construction sites. Temporary fills must consist of materials, and be placed in a manner, that will not be eroded by expected high flows. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The areas affected by temporary fills must be revegetated, as appropriate.

(d) This NWP does not authorize maintenance dredging for the primary purpose of navigation. This NWP does not authorize beach restoration. This NWP does not authorize new stream channelization or stream relocation projects.

Notification: For activities authorized by paragraph (b) of this NWP, the permittee must submit a pre-construction notification to the district engineer prior to commencing the activity (see general condition 31). The pre-construction notification must include information regarding the original design capacities and configurations of the outfalls, intakes, small impoundments, and canals. (Sections 10 and 404)

Note: This NWP authorizes the repair, rehabilitation, or replacement of any previously authorized structure or fill that does not qualify for the Clean Water Act Section 404(f) exemption for maintenance.

Nationwide Permit General Conditions (2012)

Note: To qualify for NWP authorization, the prospective permittee must comply with the following general conditions, as applicable, in addition to any regional or case-specific conditions imposed by the division engineer or district engineer. Prospective permittees should contact the appropriate Corps district office to determine if regional conditions have been imposed on an NWP. Prospective permittees should also contact the appropriate Corps district office to determine the status of Clean Water Act Section 401 water quality certification and/or Coastal Zone Management Act consistency for an NWP. Every person who may wish to obtain permit authorization under one or more NWPs, or who is currently relying on an existing or prior permit authorization under one or more NWPs, has been and is on notice that all of the provisions of 33 CFR §§ 330.1 through 330.6 apply to every NWP authorization. Note especially 33 CFR § 330.5 relating to the modification, suspension, or revocation of any NWP authorization.

1. Navigation. (a) No activity may cause more than a minimal adverse effect on navigation.

(b) Any safety lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the United States. (c) The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

2. Aquatic Life Movements. No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. All permanent and temporary crossings of waterbodies shall be suitably culverted, bridged, or otherwise designed and constructed to maintain low flows to sustain the movement of those aquatic species.

3. Spawning Areas. Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area are not authorized.

4. Migratory Bird Breeding Areas. Activities in waters of the United States that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.

5. Shellfish Beds. No activity may occur in areas of concentrated shellfish populations, unless the activity is directly related to a shellfish harvesting activity authorized by NWPs 4 and 48, or is a shellfish seeding or habitat restoration activity authorized by NWP 27.

6. Suitable Material. No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see Section 307 of the Clean Water Act).

7. Water Supply Intakes. No activity may occur in the proximity of a public water supply intake, except where the activity is for the repair or improvement of public water supply intake structures or adjacent bank stabilization.

8. Adverse Effects From Impoundments. If the activity creates an impoundment of water, adverse effects to the aquatic system due to accelerating the passage of water, and/or restricting its flow must be minimized to the maximum extent practicable.

9. Management of Water Flows. To the maximum extent practicable, the pre-construction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization and storm water management activities, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the pre-construction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

10. Fills Within 100-Year Floodplains. The activity must comply with applicable FEMA-approved state or local floodplain management requirements.

11. Equipment. Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.

12. Soil Erosion and Sediment Controls. Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow.

13. Removal of Temporary Fills. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.

14. Proper Maintenance. Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety and compliance with applicable NWP general conditions, as well as any activity-specific conditions added by the district engineer to an NWP authorization.

15. Single and Complete Project. The activity must be a single and complete project. The same NWP cannot be used more than once for the same single and complete project.

16. Wild and Scenic Rivers. No activity may occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, unless the appropriate Federal agency with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation or study status. Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency responsible for the designated Wild and Scenic River or study river (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service).

17. Tribal Rights. No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.

18. Endangered Species. (a) No activity is authorized under any NWP which is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will directly or indirectly destroy or adversely modify the critical habitat of such species. No activity is authorized under any NWP which "may affect" a listed species or critical habitat, unless Section 7 consultation addressing the effects of the proposed activity has been completed.

(b) Federal agencies should follow their own procedures for complying with the requirements of the ESA. Federal permittees must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will review the documentation and determine whether it is sufficient to address ESA compliance for the NWP activity, or whether additional ESA consultation is necessary.

(c) Non-federal permittees must submit a pre-construction notification to the district engineer if any listed species or designated critical habitat might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat, and shall not begin work on the activity until notified by the district engineer that the requirements of the ESA have been satisfied and that the activity is authorized. For activities that might affect Federally-listed endangered or threatened species or designated critical habitat, the pre-construction notification must include the name(s) of the endangered or threatened species that might be affected by the proposed work or that utilize the designated critical habitat that might be affected by the proposed work. The district engineer will determine whether the proposed activity "may affect" or will have "no effect" to listed species and designated critical habitat and will notify the non-Federal applicant of the Corps' determination within 45 days of receipt of a complete pre-construction notification. In cases where the non-Federal applicant has identified listed species or critical habitat that might be affected or is in the vicinity of the project, and has so notified the Corps, the applicant shall not begin work until the Corps has provided notification the proposed activities will have "no effect" on listed species or critical habitat, or until Section 7 consultation has been completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.

(d) As a result of formal or informal consultation with the FWS or NMFS the district engineer may add species-specific regional endangered species conditions to the NWPs.

(e) Authorization of an activity by a NWP does not authorize the "take" of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with "incidental take" provisions, etc.) from the U.S. FWS or the NMFS, The Endangered Species Act prohibits any person subject to the jurisdiction of the United States to take a listed species, where "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The word "harm" in the definition of "take" means an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering.

(f) Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the U.S. FWS and NMFS or their world wide web pages at <http://www.fws.gov/> or <http://www.fws.gov/ipac> and <http://www.noaa.gov/fisheries.html> respectively.

19. Migratory Birds and Bald and Golden Eagles. The permittee is responsible for obtaining any "take" permits required under the U.S. Fish and Wildlife Service's regulations governing compliance with the Migratory Bird Treaty Act or the Bald and Golden Eagle Protection Act. The permittee should contact the appropriate local office of the U.S. Fish and Wildlife Service to determine if such "take" permits are required for a particular activity.

20. Historic Properties. (a) In cases where the district engineer determines that the activity may affect properties listed, or eligible for listing, in the National Register of Historic Places, the activity is not authorized, until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied.

(b) Federal permittees should follow their own procedures for complying with the requirements of Section 106 of the National Historic Preservation Act. Federal permittees must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will review the documentation and determine whether it is sufficient to address section 106 compliance for the NWP activity, or whether additional section 106 consultation is necessary.

(c) Non-federal permittees must submit a pre-construction notification to the district engineer if the authorized activity may have the potential to cause effects to any historic properties listed on, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places, including previously unidentified properties. For such activities, the pre-construction notification must state which historic properties may be affected by the proposed work or include a vicinity map indicating the location of the historic properties or the potential for the presence of historic properties. Assistance regarding information on the location of or potential for the presence of historic resources can be sought from the State Historic Preservation Officer or Tribal Historic Preservation Officer, as appropriate, and the National Register of Historic Places (see 33 CFR 330.4(g)). When reviewing pre-construction notifications, district engineers will comply with the current procedures for addressing the requirements of Section 106 of the National Historic Preservation Act. The district engineer shall make a reasonable and good faith effort to carry out appropriate identification efforts, which may include background research, consultation, oral history interviews, sample field investigation, and field survey. Based on the information submitted and these efforts, the district engineer shall determine whether the proposed activity has the potential to cause an effect on the historic properties. Where the non-Federal applicant has identified historic properties on which the activity may have the potential to cause effects and so notified the Corps, the non-Federal applicant shall not begin the activity until notified by the district engineer either that the activity has no potential to cause effects or that consultation under Section 106 of the NHPA has been completed.

(d) The district engineer will notify the prospective permittee within 45 days of receipt of a complete pre-construction notification whether NHPA Section 106 consultation is required. Section 106 consultation is not required when the Corps determines that the activity does not have the potential to cause effects on historic properties (see 36 CFR §800.3(a)). If NHPA section 106 consultation is required and will occur, the district engineer will notify the non-Federal applicant that he or she cannot begin work until Section 106 consultation is completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.

(e) Prospective permittees should be aware that section 110k of the NHPA (16 U.S.C. 470h-2(k)) prevents the Corps from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of Section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant. If circumstances justify granting the assistance, the Corps is required to notify the ACHP and provide documentation specifying the circumstances, the degree of damage to the integrity of any historic properties affected, and proposed mitigation. This documentation must include any views obtained from the applicant, SHPO/THPO, appropriate Indian tribes if the undertaking occurs on or affects historic properties on tribal lands or affects properties of interest to those tribes, and other parties known to have a legitimate interest in the impacts to the permitted activity on historic properties.

21. Discovery of Previously Unknown Remains and Artifacts. If you discover any previously unknown historic, cultural or archeological remains and artifacts while accomplishing the activity authorized by this permit, you must immediately notify the district engineer of what you have found, and to the maximum extent practicable, avoid construction activities that may affect the remains and artifacts until the required coordination has been completed. The district engineer will initiate the Federal, Tribal and state coordination required to determine if the items or remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

22. Designated Critical Resource Waters. Critical resource waters include, NOAA-managed marine sanctuaries and marine monuments, and National Estuarine Research Reserves. The district engineer may designate, after notice and opportunity for public comment, additional waters officially designated by a state as having particular environmental or ecological significance, such as outstanding national resource waters or state natural heritage sites. The district engineer may also designate additional critical resource waters after notice and opportunity for public comment.

(a) Discharges of dredged or fill material into waters of the United States are not authorized by NWPs 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, 44, 49, 50, 51, and 52 for any activity within, or directly affecting, critical resource waters, including wetlands adjacent to such waters.

(b) For NWPs 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, and 38, notification is required in accordance with general condition 31, for any activity proposed in the designated critical resource waters including wetlands adjacent to those

waters. The district engineer may authorize activities under these NWP only after it is determined that the impacts to the critical resource waters will be no more than minimal.

23. Mitigation. The district engineer will consider the following factors when determining appropriate and practicable mitigation necessary to ensure that adverse effects on the aquatic environment are minimal:

(a) The activity must be designed and constructed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States to the maximum extent practicable at the project site (i.e., on site).

(b) Mitigation in all its forms (avoiding, minimizing, rectifying, reducing, or compensating for resource losses) will be required to the extent necessary to ensure that the adverse effects to the aquatic environment are minimal.

(c) Compensatory mitigation at a minimum one-for-one ratio will be required for all wetland losses that exceed 1/10-acre and require pre-construction notification, unless the district engineer determines in writing that either some other form of mitigation would be more environmentally appropriate or the adverse effects of the proposed activity are minimal, and provides a project-specific waiver of this requirement. For wetland losses of 1/10-acre or less that require pre-construction notification, the district engineer may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in minimal adverse effects on the aquatic environment. Compensatory mitigation projects provided to offset losses of aquatic resources must comply with the applicable provisions of 33 CFR part 332.

(1) The prospective permittee is responsible for proposing an appropriate compensatory mitigation option if compensatory mitigation is necessary to ensure that the activity results in minimal adverse effects on the aquatic environment.

(2) Since the likelihood of success is greater and the impacts to potentially valuable uplands are reduced, wetland restoration should be the first compensatory mitigation option considered.

(3) If permittee-responsible mitigation is the proposed option, the prospective permittee is responsible for submitting a mitigation plan. A conceptual or detailed mitigation plan may be used by the district engineer to make the decision on the NWP verification request, but a final mitigation plan that addresses the applicable requirements of 33 CFR 332.4(c)(2) – (14) must be approved by the district engineer before the permittee begins work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation (see 33 CFR 332.3(k)(3)).

(4) If mitigation bank or in-lieu fee program credits are the proposed option, the mitigation plan only needs to address the baseline conditions at the impact site and the number of credits to be provided.

(5) Compensatory mitigation requirements (e.g., resource type and amount to be provided as compensatory mitigation, site protection, ecological performance standards, monitoring requirements) may be addressed through conditions added to the NWP authorization, instead of components of a compensatory mitigation plan.

(d) For losses of streams or other open waters that require pre-construction notification, the district engineer may require compensatory mitigation, such as stream rehabilitation, enhancement, or preservation, to ensure that the activity results in minimal adverse effects on the aquatic environment.

(e) Compensatory mitigation will not be used to increase the acreage losses allowed by the acreage limits of the NWPs. For example, if an NWP has an acreage limit of 1/2-acre, it cannot be used to authorize any project resulting in the loss of greater than 1/2-acre of waters of the United States, even if compensatory mitigation is provided that replaces or restores some of the lost waters. However, compensatory mitigation can and should be used, as necessary, to ensure that a project already meeting the established acreage limits also satisfies the minimal impact requirement associated with the NWPs.

(f) Compensatory mitigation plans for projects in or near streams or other open waters will normally include a requirement for the restoration or establishment, maintenance, and legal protection (e.g., conservation easements) of riparian areas next to open waters. In some cases, riparian areas may be the only compensatory mitigation required. Riparian areas should consist of native species. The width of the required riparian area will address documented water quality or aquatic habitat loss concerns. Normally, the riparian area will be 25 to 50 feet wide on each side of the stream, but the district engineer may require slightly wider riparian areas to address documented water quality or habitat loss concerns. If it is not possible to establish a riparian area on both sides of a stream, or if the waterbody is a lake or coastal waters, then restoring or establishing a riparian area along a single bank or shoreline may be sufficient. Where both wetlands and open waters exist on the project site, the district engineer will determine the appropriate compensatory mitigation (e.g., riparian areas and/or wetlands compensation) based on what is best for the aquatic environment on a watershed basis. In cases where riparian areas are determined to be the most appropriate form of compensatory mitigation, the district engineer may waive or reduce the requirement to provide wetland compensatory mitigation for wetland losses.

(g) Permittees may propose the use of mitigation banks, in-lieu fee programs, or separate permittee-responsible mitigation. For activities resulting in the loss of marine or estuarine resources, permittee-responsible compensatory mitigation may be environmentally preferable if there are no mitigation banks or in-lieu fee programs in the area that have marine or estuarine credits available for sale or transfer to the permittee. For permittee-responsible mitigation, the special conditions of the NWP verification must clearly indicate the party or parties responsible for the implementation and performance of the compensatory mitigation project, and, if required, its long-term management.

(h) Where certain functions and services of waters of the United States are permanently adversely affected, such as the conversion of a forested or scrub-shrub wetland to a herbaceous wetland in a permanently maintained utility line right-of-way, mitigation may be required to reduce the adverse effects of the project to the minimal level.

24. Safety of Impoundment Structures. To ensure that all impoundment structures are safely designed, the district engineer may require non-Federal applicants to demonstrate that the structures comply with established state dam safety criteria or have been designed by qualified persons. The district engineer may also require documentation that the design has been independently reviewed by similarly qualified persons, and appropriate modifications made to ensure safety.

25. Water Quality. Where States and authorized Tribes, or EPA where applicable, have not previously certified compliance of an NWP with CWA Section 401, individual 401 Water Quality Certification must be obtained or waived (see 33 CFR 330.4(c)). The district engineer or State or Tribe may require additional water quality management measures to ensure that the authorized activity does not result in more than minimal degradation of water quality.

26. Coastal Zone Management. In coastal states where an NWP has not previously received a state coastal zone management consistency concurrence, an individual state coastal zone management consistency concurrence must be obtained, or a presumption of concurrence must occur (see 33 CFR 330.4(d)). The district engineer or a State may require additional measures to ensure that the authorized activity is consistent with state coastal zone management requirements.

27. Regional and Case-By-Case Conditions. The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state, Indian Tribe, or U.S. EPA in its section 401 Water Quality Certification, or by the state in its Coastal Zone Management Act consistency determination.

28. Use of Multiple Nationwide Permits. The use of more than one NWP for a single and complete project is prohibited, except when the acreage loss of waters of the United States authorized by the NWPs does not exceed the acreage limit of the NWP with the highest specified acreage limit. For example, if a road crossing over tidal waters is constructed under NWP 14, with associated bank stabilization authorized by NWP 13, the maximum acreage loss of waters of the United States for the total project cannot exceed 1/3-acre.

29. Transfer of Nationwide Permit Verifications. If the permittee sells the property associated with a nationwide permit verification, the permittee may transfer the nationwide permit verification to the new owner by submitting a letter to the appropriate Corps district office to validate the transfer. A copy of the nationwide permit verification must be attached to the letter, and the letter must contain the following statement and signature: "When the structures or work authorized by this nationwide permit are still in existence at the time the property is transferred, the terms and conditions of this nationwide permit, including any special conditions, will continue to be binding on the new owner(s) of the property. To validate the transfer of this nationwide permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below."

(Transferee)

(Date)

30. Compliance Certification. Each permittee who receives an NWP verification letter from the Corps must provide a signed certification documenting completion of the authorized activity and any required compensatory mitigation. The success of any required permittee-responsible mitigation, including the achievement of ecological performance standards, will be addressed separately by the district engineer. The Corps will provide the permittee the certification document with the NWP verification letter. The certification document will include:

- (a) A statement that the authorized work was done in accordance with the NWP authorization, including any general, regional, or activity-specific conditions;
- (b) A statement that the implementation of any required compensatory mitigation was completed in accordance with the permit conditions. If credits from a mitigation bank or in-lieu fee program are used to satisfy the compensatory mitigation requirements, the certification must include the documentation required by 33 CFR 332.3(l)(3) to confirm that the permittee secured the appropriate number and resource type of credits; and
- (c) The signature of the permittee certifying the completion of the work and mitigation.

31. Pre-Construction Notification. (a) **Timing.** Where required by the terms of the NWP, the prospective permittee must notify the district engineer by submitting a pre-construction notification (PCN) as early as possible. The district engineer must determine if the PCN is complete within 30 calendar days of the date of receipt and, if the PCN is determined to be incomplete, notify the prospective permittee within that 30 day period to request the additional information necessary to make the PCN complete. The request must specify the information needed to make the PCN complete. As a general rule, district engineers will request additional information necessary to make the PCN complete only once. However, if the prospective permittee does not provide all of the requested information, then the district engineer will notify the prospective permittee that the PCN is still incomplete and the PCN review process will not commence until all of the requested information has been received by the district engineer. The prospective permittee shall not begin the activity until either:

- (1) He or she is notified in writing by the district engineer that the activity may proceed under the NWP with any special

conditions imposed by the district or division engineer; or

(2) 45 calendar days have passed from the district engineer's receipt of the complete PCN and the prospective permittee has not received written notice from the district or division engineer. However, if the permittee was required to notify the Corps pursuant to general condition 18 that listed species or critical habitat might be affected or in the vicinity of the project, or to notify the Corps pursuant to general condition 20 that the activity may have the potential to cause effects to historic properties, the permittee cannot begin the activity until receiving written notification from the Corps that there is "no effect" on listed species or "no potential to cause effects" on historic properties, or that any consultation required under Section 7 of the Endangered Species Act (see 33 CFR 330.4(f)) and/or Section 106 of the National Historic Preservation (see 33 CFR 330.4(g)) has been completed. Also, work cannot begin under NWP 21, 49, or 50 until the permittee has received written approval from the Corps. If the proposed activity requires a written waiver to exceed specified limits of an NWP, the permittee may not begin the activity until the district engineer issues the waiver. If the district or division engineer notifies the permittee in writing that an individual permit is required within 45 calendar days of receipt of a complete PCN, the permittee cannot begin the activity until an individual permit has been obtained. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).

(b) Contents of Pre-Construction Notification: The PCN must be in writing and include the following information:

(1) Name, address and telephone numbers of the prospective permittee;

(2) Location of the proposed project;

(3) A description of the proposed project; the project's purpose; direct and indirect adverse environmental effects the project would cause, including the anticipated amount of loss of water of the United States expected to result from the NWP activity, in acres, linear feet, or other appropriate unit of measure; any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity. The description should be sufficiently detailed to allow the district engineer to determine that the adverse effects of the project will be minimal and to determine the need for compensatory mitigation. Sketches should be provided when necessary to show that the activity complies with the terms of the NWP. (Sketches usually clarify the project and when provided results in a quicker decision. Sketches should contain sufficient detail to provide an illustrative description of the proposed activity (e.g., a conceptual plan), but do not need to be detailed engineering plans);

(4) The PCN must include a delineation of wetlands, other special aquatic sites, and other waters, such as lakes and ponds, and perennial, intermittent, and ephemeral streams, on the project site. Wetland delineations must be prepared in accordance with the current method required by the Corps. The permittee may ask the Corps to delineate the special aquatic sites and other waters on the project site, but there may be a delay if the Corps does the delineation, especially if the project site is large or contains many waters of the United States. Furthermore, the 45 day period will not start until the delineation has been submitted to or completed by the Corps, as appropriate;

(5) If the proposed activity will result in the loss of greater than 1/10-acre of wetlands and a PCN is required, the prospective permittee must submit a statement describing how the mitigation requirement will be satisfied, or explaining why the adverse effects are minimal and why compensatory mitigation should not be required. As an alternative, the prospective permittee may submit a conceptual or detailed mitigation plan.

(6) If any listed species or designated critical habitat might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat, for non-Federal applicants the PCN must include the name(s) of those endangered or threatened species that might be affected by the proposed work or utilize the designated critical habitat that may be affected by the proposed work. Federal applicants must provide documentation demonstrating compliance with the Endangered Species Act; and

(7) For an activity that may affect a historic property listed on, determined to be eligible for listing on, or potentially eligible for listing on, the National Register of Historic Places, for non-Federal applicants the PCN must state which historic property may be affected by the proposed work or include a vicinity map indicating the location of the historic property. Federal applicants must provide documentation demonstrating compliance with Section 106 of the National Historic Preservation Act.

(c) Form of Pre-Construction Notification: The standard individual permit application form (Form ENG 4345) may be used, but the completed application form must clearly indicate that it is a PCN and must include all of the information required in paragraphs (b)(1) through (7) of this general condition. A letter containing the required information may also be used.

(d) Agency Coordination: (1) The district engineer will consider any comments from Federal and state agencies concerning the proposed activity's compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the project's adverse environmental effects to a minimal level.

(2) For all NWP activities that require pre-construction notification and result in the loss of greater than 1/2-acre of waters of the United States, for NWP 21, 29, 39, 40, 42, 43, 44, 50, 51, and 52 activities that require pre-construction notification and will result in the loss of greater than 300 linear feet of intermittent and ephemeral stream bed, and for all NWP 48 activities that require pre-construction notification, the district engineer will immediately provide (e.g., via e-mail, facsimile transmission, overnight mail, or other expeditious manner) a copy of the complete PCN to the appropriate Federal or state offices (U.S. FWS, state natural resource or water quality agency, EPA, State Historic Preservation Officer (SHPO) or Tribal Historic Preservation Office (THPO), and, if appropriate, the NMFS). With the exception of NWP 37, these agencies will have 10 calendar days from the date the material is transmitted to telephone or fax the district engineer notice that they intend to provide substantive, site-specific comments. The comments must explain why the agency believes the adverse effects will be more than minimal. If so contacted by an agency, the district engineer will wait an additional 15 calendar days before making a decision on the pre-construction notification. The district engineer will fully consider agency comments received within the specified time frame concerning the proposed activity's

compliance with the terms and conditions of the NWP, including the need for mitigation to ensure the net adverse environmental effects to the aquatic environment of the proposed activity are minimal. The district engineer will provide no response to the resource agency, except as provided below. The district engineer will indicate in the administrative record associated with each pre-construction notification that the resource agencies' concerns were considered. For NWP 37, the emergency watershed protection and rehabilitation activity may proceed immediately in cases where there is an unacceptable hazard to life or a significant loss of property or economic hardship will occur. The district engineer will consider any comments received to decide whether the NWP 37 authorization should be modified, suspended, or revoked in accordance with the procedures at 33 CFR 330.5.

(3) In cases of where the prospective permittee is not a Federal agency, the district engineer will provide a response to NMFS within 30 calendar days of receipt of any Essential Fish Habitat conservation recommendations, as required by Section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act.

(4) Applicants are encouraged to provide the Corps with either electronic files or multiple copies of pre-construction notifications to expedite agency coordination.

D. District Engineer's Decision

1. In reviewing the PCN for the proposed activity, the district engineer will determine whether the activity authorized by the NWP will result in more than minimal individual or cumulative adverse environmental effects or may be contrary to the public interest. For a linear project, this determination will include an evaluation of the individual crossings to determine whether they individually satisfy the terms and conditions of the NWP(s), as well as the cumulative effects caused by all of the crossings authorized by NWP. If an applicant requests a waiver of the 300 linear foot limit on impacts to intermittent or ephemeral streams or of an otherwise applicable limit, as provided for in NWPs 13, 21, 29, 36, 39, 40, 42, 43, 44, 50, 51 or 52, the district engineer will only grant the waiver upon a written determination that the NWP activity will result in minimal adverse effects. When making minimal effects determinations the district engineer will consider the direct and indirect effects caused by the NWP activity. The district engineer will also consider site specific factors, such as the environmental setting in the vicinity of the NWP activity, the type of resource that will be affected by the NWP activity, the functions provided by the aquatic resources that will be affected by the NWP activity, the degree or magnitude to which the aquatic resources perform those functions, the extent that aquatic resource functions will be lost as a result of the NWP activity (e.g., partial or complete loss), the duration of the adverse effects (temporary or permanent), the importance of the aquatic resource functions to the region (e.g., watershed or ecoregion), and mitigation required by the district engineer. If an appropriate functional assessment method is available and practicable to use, that assessment method may be used by the district engineer to assist in the minimal adverse effects determination. The district engineer may add case-specific special conditions to the NWP authorization to address site-specific environmental concerns.

2. If the proposed activity requires a PCN and will result in a loss of greater than 1/10 acre of wetlands, the prospective permittee should submit a mitigation proposal with the PCN. Applicants may also propose compensatory mitigation for projects with smaller impacts. The district engineer will consider any proposed compensatory mitigation the applicant has included in the proposal in determining whether the net adverse environmental effects to the aquatic environment of the proposed activity are minimal. The compensatory mitigation proposal may be either conceptual or detailed. If the district engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse effects on the aquatic environment are minimal, after considering mitigation, the district engineer will notify the permittee and include any activity-specific conditions in the NWP verification the district engineer deems necessary. Conditions for compensatory mitigation requirements must comply with the appropriate provisions at 33 CFR 332.3(k). The district engineer must approve the final mitigation plan before the permittee commences work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation. If the prospective permittee elects to submit a compensatory mitigation plan with the PCN, the district engineer will expeditiously review the proposed compensatory mitigation plan. The district engineer must review the proposed compensatory mitigation plan within 45 calendar days of receiving a complete PCN and determine whether the proposed mitigation would ensure no more than minimal adverse effects on the aquatic environment. If the net adverse effects of the project on the aquatic environment (after consideration of the compensatory mitigation proposal) are determined by the district engineer to be minimal, the district engineer will provide a timely written response to the applicant. The response will state that the project can proceed under the terms and conditions of the NWP, including any activity-specific conditions added to the NWP authorization by the district engineer.

3. If the district engineer determines that the adverse effects of the proposed work are more than minimal, then the district engineer will notify the applicant either: (a) That the project does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an individual permit; (b) that the project is authorized under the NWP subject to the applicant's submission of a mitigation plan that would reduce the adverse effects on the aquatic environment to the minimal level; or (c) that the project is authorized under the NWP with specific modifications or conditions. Where the district engineer determines that mitigation is required to ensure no more than minimal adverse effects occur to the aquatic environment, the activity will be authorized within the 45-day PCN period, with activity-specific conditions that state the mitigation requirements. The authorization will include the necessary conceptual or detailed mitigation or a requirement that the applicant submit a mitigation plan that would reduce the adverse effects on the aquatic environment to the minimal level. When mitigation is required, no work in waters of the United States may occur until the district engineer has approved a specific mitigation plan or has determined that prior approval of a final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation.

NWP CZM and WQC Status Table: Delaware, New Jersey, Pennsylvania (4.4.2012)

NWP #	PCN	DE CZM	DE WQC	NJ CZM	NJ WQC	PA CZM	PA WQC
NWP 1	NO	ISSUED	N/A				
NWP 2	NO	ISSUED	N/A				
NWP 3	YES *	DENIED #	DENIED #				
NWP 4	NO	ISSUED	ISSUED				
NWP 5	NO	ISSUED	ISSUED				
NWP 6	NO	ISSUED	ISSUED				
NWP 7	YES	ISSUED	ISSUED				
NWP 8	YES	DENIED	N/A				
NWP 9	NO	ISSUED	N/A				
NWP 10	YES *	ISSUED	N/A				
NWP 11	YES*	ISSUED	N/A				
NWP 12	YES	ISSUED	ISSUED				
NWP 13	YES *	DENIED #	DENIED #				
NWP 14	YES	ISSUED	ISSUED				
NWP 15	YES *	ISSUED	ISSUED				
NWP 16	NO	ISSUED	ISSUED				
NWP 17	YES	ISSUED	ISSUED				
NWP 18	YES *	DENIED #	DENIED #				
NWP 19	YES	ISSUED	ISSUED				
NWP 20	NO	ISSUED	ISSUED				
NWP 21	YES	ISSUED	ISSUED				
NWP 22	YES *	ISSUED	ISSUED				
NWP 23	YES	ISSUED	ISSUED				
NWP 24	NO	ISSUED	N/A				
NWP 25	YES *	ISSUED	ISSUED				
NWP 27	YES *	ISSUED	ISSUED				
NWP 28	YES	ISSUED	N/A				
NWP 29	YES	DENIED #	DENIED #				
NWP 30	YES *	ISSUED	ISSUED				
NWP 31	YES	ISSUED	ISSUED				
NWP 32	N/A	ISSUED	ISSUED				
NWP 33	YES	ISSUED	ISSUED				
NWP 34	YES	ISSUED	ISSUED				
NWP 35	YES	ISSUED	N/A				
NWP 36	YES *	ISSUED	ISSUED				
NWP 37	YES	ISSUED	ISSUED				
NWP 38	YES	ISSUED	ISSUED				
NWP 39	YES	DENIED #	DENIED #				
NWP 40	YES	DENIED	DENIED				
NWP 41	YES	DENIED	DENIED				
NWP 42	YES	DENIED	DENIED				
NWP 43	YES	DENIED	DENIED				
NWP 44	YES	DENIED	DENIED				
NWP 45	YES	ISSUED	ISSUED				
NWP 46	YES	DENIED	DENIED				
NWP 48	YES	ISSUED	ISSUED				
NWP 49	YES	ISSUED	ISSUED				
NWP 50	YES	ISSUED	ISSUED				
NWP 51	YES	DENIED	DENIED				
NWP 52	YES	DENIED	DENIED				

Note: *A PCN is required under certain circumstances. Review the terms of the NWP, general conditions, or regional conditions to identify those circumstances. # The State of Delaware has denied the CZM and WQC for this NWP in critical resource waters only.

ENCLOSURE 3

NOTIFICATION/CERTIFICATION OF WORK COMMENCEMENT FORM

Permit Number: CENAP-OP-R-2016-442-85 (NWP3)
Name of Permittee: DDNREC, Division of Fish and Wildlife
Project Name: DDNREC Concord Pond Dam Repair SX
Waterway: Concord Pond/Deep Creek
County: Sussex State: Delaware
Compensation/Mitigation Work Required: Yes ☐ No ☒

TO: U.S. Army Corps of Engineers, Philadelphia District
Wanamaker Building - 100 Penn Square East
Philadelphia, Pennsylvania 19107-3390
Attention: CENAP-OP-R

I have received authorization to discharge fill material into waters of the United States in order to repair/replace the spillway associated with the Concord Pond Dam located on Concord Pond Road, Tax Map Parcel Number 231-17.00-12.00, Seaford, Sussex County, Delaware.

The work will be performed by:

Name of Person or Firm _____

Address: _____

I hereby certify that I have reviewed the approved plans, have read the terms and conditions of the above referenced permit, and shall perform the authorized work in strict accordance with the permit document. The authorized work will begin on or about _____ and should be completed on or about _____.

Please note that the permitted activity is subject to compliance inspections by the Army Corps of Engineers. If you fail to return this notification form or fail to comply with the terms or conditions of the permit, you are subject to permit suspension, modification, revocation, and/or penalties.

Permittee (Signature and Date)

Telephone Number

Contractor (Signature and Date)

Telephone Number

NOTE: This form shall be completed/signed and returned to the Philadelphia District Office a minimum of 10 days prior to commencing work.

NOTIFICATION/CERTIFICATION OF WORK COMPLETION/COMPLIANCE FORM

Permit Number: CENAP-OP-R-2016-442-85 (NWP3)
Name of Permittee: DDNREC, Division of Fish and Wildlife
Name of Contractor: _____
Project Name: DDNREC Concord Pond Dam Repair SX
County: Sussex State: Delaware
Waterway: Concord Pond/Deep Creek

Within 10 days of completion of the activity authorized by this permit, please sign this certification and return it to the following address:

U.S. Army Corps of Engineers, Philadelphia District
Wanamaker Building - 100 Penn Square East
Philadelphia, Pennsylvania 19107-3390
Attention: CENAP-OP-R

Please note that the permitted activity is subject to a compliance inspection by an Army Corps of Engineers representative. If you fail to return this notification form or fail to perform work in compliance with the permit, you are subject to administrative, civil and/or criminal penalties. Further, the subject permit may be suspended or revoked.

The authorized work was commenced on _____.

The authorized work was completed on _____.

I hereby certify that the work authorized by the above referenced permit has been completed in accordance with the terms and conditions of the above noted permit.

Signature of Contractor

Signature of Permittee

Address: _____

Address: _____

Telephone Number: _____

Telephone Number: _____

For project located in areas identified as shellfish habitat, you must include with this form a bill of lading; sales order or any other document(s) demonstrating non-polluting materials were purchased and utilized for your project. I hereby certify that I and/or my contractor have utilized non-polluting materials as defined in the above noted permit.

Signature of Contractor

Signature of Permittee

DNREC Subaqueous Lands Permit and Water Quality Certification



STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES &
ENVIRONMENTAL CONTROL
DIVISION OF WATER
89 KINGS HIGHWAY
DOVER, DELAWARE 19901

RECEIVED
AUG 16 2016

WETLANDS & SUBAQUEOUS
LANDS SECTION

TELEPHONE (302) 739-9943
FACSIMILE (302) 739-6304

August 3, 2016

DNREC - Division of Fish and Wildlife
C/o: Larry Horan
89 Kings Highway
Dover, DE 19901

RE: Subaqueous Lands Permit and Water Quality Certification No. SP/WQ-231/16

Dear Mr. Horan:

Enclosed are the Subaqueous Lands Permit and Water Quality Certification granted by the State of Delaware for the Concord Pond Dam Spillway Improvements. Please read all of the Special Conditions carefully. The permittee and contractor are responsible to ensure that all conditions are strictly adhered to.

Also enclosed is the Contractors Post-Construction Completion Report. Within ten days of the completion of construction, the contractor must mail the completed and signed Post-Construction Completion Report to this office.

If you have any questions, please feel free to contact this office at (302) 739-9386.

Sincerely,

A handwritten signature in cursive script, reading "Katie Huegel".

Katie Huegel
Environmental Scientist
Wetlands & Subaqueous Lands Section

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STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES &
ENVIRONMENTAL CONTROL
DIVISION OF WATER
89 KINGS HIGHWAY
DOVER, DELAWARE 19901

WETLANDS & SUBAQUEOUS
LANDS SECTION

TELEPHONE (302) 739-9943
FAX (302) 739-6304

**SUBAQUEOUS LANDS PERMIT AND WATER QUALITY
CERTIFICATION
CONTRACTOR'S COMPLETION REPORT
POST-CONSTRUCTION**

Subaqueous Lands Permit / Water Quality Certification Number: SP/WQ-231/16

Name: DNREC - Division of Fish and Wildlife
C/o: Larry Horan

Address: In Concord Pond
Concord Pond Road
Seaford, DE 19973

Parcel #: 231-17.00-12.00

I hereby certify that I have constructed the project authorized by the above-referenced Subaqueous Lands Permit in accordance with the approved plans for the project.

Printed Name of Contractor

Name of Company

Contractor's Signature

Date

Telephone Number

Upon completion of construction, this form shall be completed, signed by the contractor, and mailed to the Wetlands and Subaqueous Lands Section at:

**DNREC
Wetlands and Subaqueous Lands Section
89 Kings Highway
Dover, Delaware 19901**

Or faxed to the Wetlands and Subaqueous Lands Section at: **302-739-6304**

This form must be received by the Department within ten days of the date that construction is completed.

For official use only

Compliance inspection date _____ *Built in accordance with plans* ☐ Yes ☐ No

Scientist: _____

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STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES &
ENVIRONMENTAL CONTROL
DIVISION OF WATER
89 KINGS HIGHWAY
DOVER, DELAWARE 19901

GENERAL CONDITIONS

1. The permittee and contractor shall at all times comply with all applicable laws and regulations of the Department of Natural Resources and Environmental Control.
2. The activities authorized herein shall be undertaken in accordance with the Permit conditions, the final stamped and approved plans, and with the information provided in the Permit application.
3. A copy of this Permit and the stamped approved plans shall be available on-site during all phases of construction activity.
4. The conditions contained herein shall be incorporated into any and all construction contracts associated with the construction authorized herein. The permittee and contractor are responsible to ensure that the workers executing the activities authorized by this Permit have full knowledge of, and abide by, the terms and conditions of this Permit.
5. No portion of the structure shall be constructed using creosote treated lumber.
6. No portion of the structure(s) authorized by this Permit shall exceed the dimensions for that structure identified on Page One of this Permit.
7. The activities authorized herein shall be conducted so as not to violate the State of Delaware's Surface Water Quality Standards in effect at the date of Permit authorization.
8. The issuance of this Permit does not constitute approval for any activities that may be required by any other local, state or federal government agency.
9. The issuance of this Permit does not imply approval of any other part, phase, or portion of any overall project the permittee may be contemplating.
10. This Permit authorizes only the activities described herein. Modifications to the project may require a supplemental approval from this office prior to the initiation of construction. A determination of the need for a supplemental approval will be made by this office pursuant to the permittee submitting written notification and revised plans indicating project changes. Failure to contact the Department prior to executing changes to the project shall constitute reason for this Permit being revoked.
11. The Contractors Completion Report shall be filled out and returned within 10 days of completion of the authorized work.
12. The permittee shall protect and hold the State of Delaware harmless from any loss, cost or damage resulting from the activities authorized herein.
13. Representatives of the Department of Natural Resources and Environmental Control shall be allowed to access the property to inspect all work during any phase of the construction and may conduct pre and post-construction inspections, collect any samples or conduct any tests that are deemed necessary.
14. The permittee shall maintain all authorized structures and activities in a good and safe condition.

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15. All construction materials, waste or debris associated with this activity shall be properly disposed of and contained at all times to prevent its entry into waters or wetlands. Construction materials shall not be stockpiled in subaqueous lands or wetlands.
16. The permittee and contractor shall employ measures during construction to prevent spills of fuels, lubricants or other hazardous substances. In the event of a spill, the permittee and contractor shall make every effort to stop the leak and contain the spill, and shall immediately contact the Hazardous Spill Response Team (HAZMAT) at 1-800-662-8802 and this office at (302) 739-9943. The permittee and contractor are responsible to comply with all directives to contain and clean up the spilled material(s) as stipulated by the HAZMAT team, and to restore the site as may be required by this office.
17. No construction shall occur after the construction expiration date identified on Page One of this Permit. The permittee may file a construction expiration date extension request of up to one (1) year if necessary to complete the authorized work. Such requests must be received by the Department at least thirty (30) days prior to the construction expiration date.
18. Any actions, operations or installations which are found by the Department to be contrary to the public interest may constitute reason for the discontinuance and/or removal of said action, operation or installation. Removal and restoration shall be at the expense of the permittee and/or upland property owner within thirty (30) days of receipt of written notice of revocation and demand for removal.
19. Disturbance of subaqueous lands or wetlands adjacent to the authorized structures or activities is prohibited unless specifically addressed in the special conditions of this Permit. Disturbance of subaqueous lands or wetlands in the path of construction activities shall be minimized. Any temporarily impacted subaqueous lands or wetlands shall be returned to pre-disturbance elevations and conditions.
20. This Permit is personal and may not be transferred without the prior written consent of the Department. Prior to the transfer of the adjacent upland property, the permittee shall obtain the written consent of the Department to transfer the Permit to the new upland property owner. Failure to obtain such written consent may result in the revocation of this Permit and the removal of all structures authorized by this Permit at the expense of the permittee.
21. The permittee shall notify the Wetlands and Subaqueous Lands Section prior to the commencement of the work authorized by this Permit.
22. No portion of the structure shall be installed within ten (10) feet of the adjacent property lines.
23. No portion of the structure shall exceed 20% of the width of the water body as measured at mean low water.
24. The structures authorized by this Permit shall be constructed and maintained in a manner so as to assure water access to adjacent properties.
25. This Permit does not authorize any future repairs below the water line, or any additions or modifications to the structures authorized herein. Such activities require separate written authorization from the Department of Natural Resources and Environmental Control.
26. Failure to comply with any of the terms or conditions of this Permit may result in enforcement action which could include the revocation of this Permit and subsequent restoration of the site to preconstruction conditions.



STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES &
ENVIRONMENTAL CONTROL
DIVISION OF WATER
89 KINGS HIGHWAY
DOVER, DELAWARE 19901

WETLANDS & SUBAQUEOUS
LANDS SECTION

TELEPHONE (302) 739-9943
FAX (302) 739-6304

DNREC - Division of Fish and Wildlife
C/o: Larry Horan
89 Kings Highway
Dover, DE 19901
Tax Parcel: 231-17.00-12.00

Subaqueous Lands Permit: SP-231/16
Water Quality Certification: WQ-231/16
Date of Issuance: 8/8/2016
Construction Expiration Date: 8/8/2019
Amended Date: N/A

**SUBAQUEOUS LANDS PERMIT AND WATER QUALITY CERTIFICATION
GRANTED TO:**

DNREC – Division of Fish and Wildlife

FOR THE FOLLOWING ACTIVITIES:

- To remove existing timber flashboards and their foundations and replace them with 8 manually-operated steel gates
- To install a temporary cofferdam
- To dredge 18 cubic yards of material for the new gates concrete foundation
- To place 12 cubic yards of concrete and 6 cubic yards of stone fill for the new gates foundation and 27 cubic yards of rip-rap replenishment in the Concord Pond spillway

LOCATED ON PUBLIC SUBAQUEOUS LANDS:

**In Concord Pond
On Concord Pond Road
Seaford, Sussex County, Delaware**

Pursuant to the provisions of 7 Del. C., §7205, and the Department's Regulations Governing the Use of Subaqueous Lands and 7 Del. C., Section 6003, the Department's Regulations Governing the Control of Water Pollution and Section 401 of the Clean Water Act, permission is hereby granted on this 8th day of August A.D. 2016, to construct the above-referenced project in accordance with the approved plans (7 sheets), as approved on August 3, 2016; and the application dated June 6, 2016, and received by this Division on June 7, 2016.

WHEREAS, DNREC – Division of Fish and Wildlife, the underwater land owners of Concord Pond, have applied for permission to conduct the indicated activities; and;

WHEREAS, pursuant to the provisions of 7 Del. C., §7203, and 7 Del. C., §6604, the Secretary of the Department of Natural Resources and Environmental Control through his duly

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authorized representative finds that it is not contrary to the public interest if this project is approved subject to the terms and conditions herein set forth.

NOW THEREFORE, this Permit/Certification is issued subject to the attached Subaqueous Lands Permit General Conditions and the following special conditions:

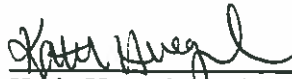
SPECIAL CONDITIONS

1. This approval is in accordance with the plans and application submitted to the Department of Natural Resources and Environmental Control, a copy of which is attached hereto and made a part hereof.
2. The work authorized by this Permit/Certification shall not alter existing water levels or flow in Concord Pond or downstream of the project location.
3. The boat ramp and parking area are open to the public. Larry Horan of the Fisheries Section in the Division of Fish and Wildlife shall be notified when the work authorized by this Permit/Certification is scheduled so that a press release can be coordinated.
4. To avoid impacts to freshwater mussels, measures shall be taken to decrease sedimentation during construction activities.
5. The work authorized herein shall be completed in accordance with the terms and conditions of the appropriate Department of the Army Corps. of Engineers Nationwide Permit.
6. There shall be no stockpiling of material within regulated subaqueous lands.
7. There shall be no movement of equipment within subaqueous lands not specifically authorized by this Permit/Certification. Any areas disturbed, as authorized by this Permit, shall be returned to pre-construction conditions and elevations and appropriately stabilized.
8. Erosion and sediment control measures shall be implemented in accordance with the specifications and criteria in the current Delaware Erosion and Sediment Control Handbook so as to minimize entry and dispersal of sediment and other contaminants in surface waters.
9. All work shall be planned for periods of low waterway base flows. In the event that sediment and erosion controls are damaged or destroyed due to storm events, such controls shall be repaired and/or replaced immediately.
10. All fill materials associated with the proposed project shall be clean and free from oils, grease, asphalt and other contaminants.

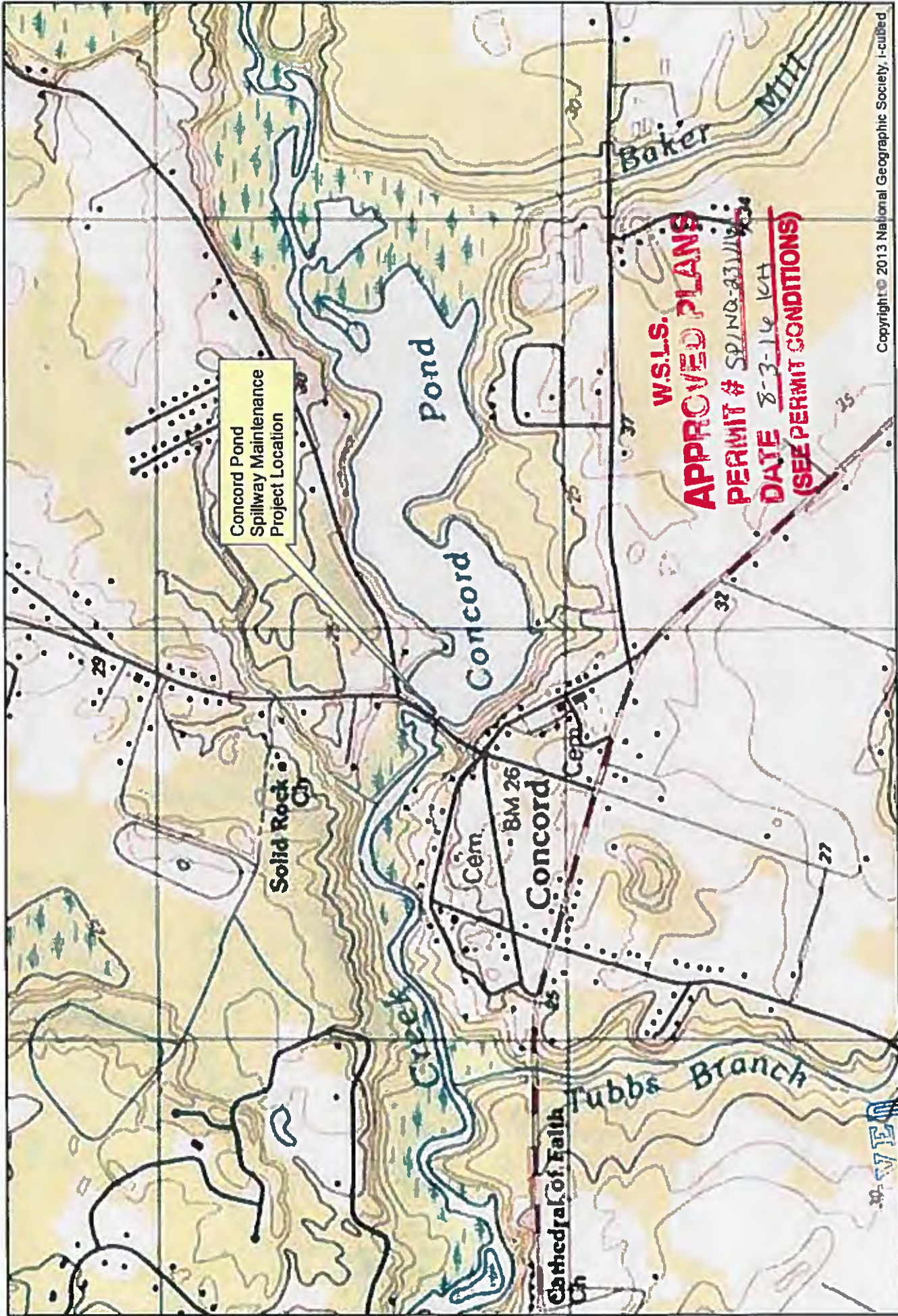
IN WITNESS WHEREOF, I, Steven M. Smailer, the duly authorized representative of David S. Small, Secretary of the Department of Natural Resources and Environmental Control, have hereunto set my hand this 8th day of August, 2016.



By Steven M. Smailer, Section Manager
the duly authorized representative of the Secretary of the
Department of Natural Resources and Environmental Control



Katie Huegel, Environmental Scientist
Wetlands and Subaqueous Lands Section



Feet
1,000 0 1,000
1 inch = 1,000 feet

This map was compiled by the DNREC, Division of Watershed Stewardship, Drainage Program. Ditch locations and all features are approximate and based on field information, other agency layers and original tax ditch maps. This map does not replace legal tax ditch instruments on file at the county prothonotary office.

Property lines are approximate and may have changed since the date this map was made.
Map Created on: 1/11/2016 at 2:52:36 PM
Map Created by: nelsonshubert

JUN 07 2016
Concord Pond
Dam Spillway Improvements
Topographic Map

[illegible]

(SEE PERMIT CONDITIONS)

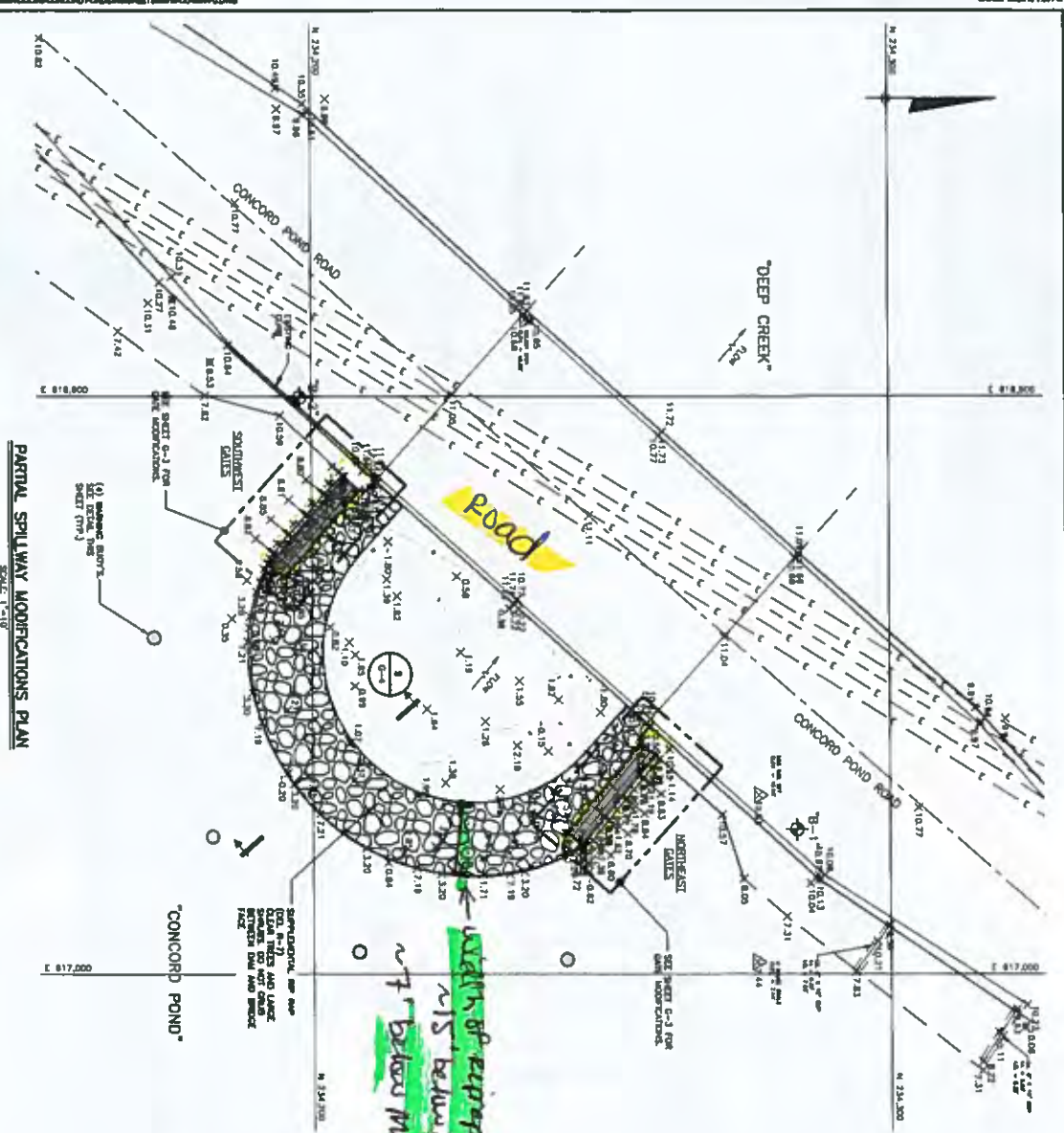
FILE NO.	G-3
DATE 11/20/2003	

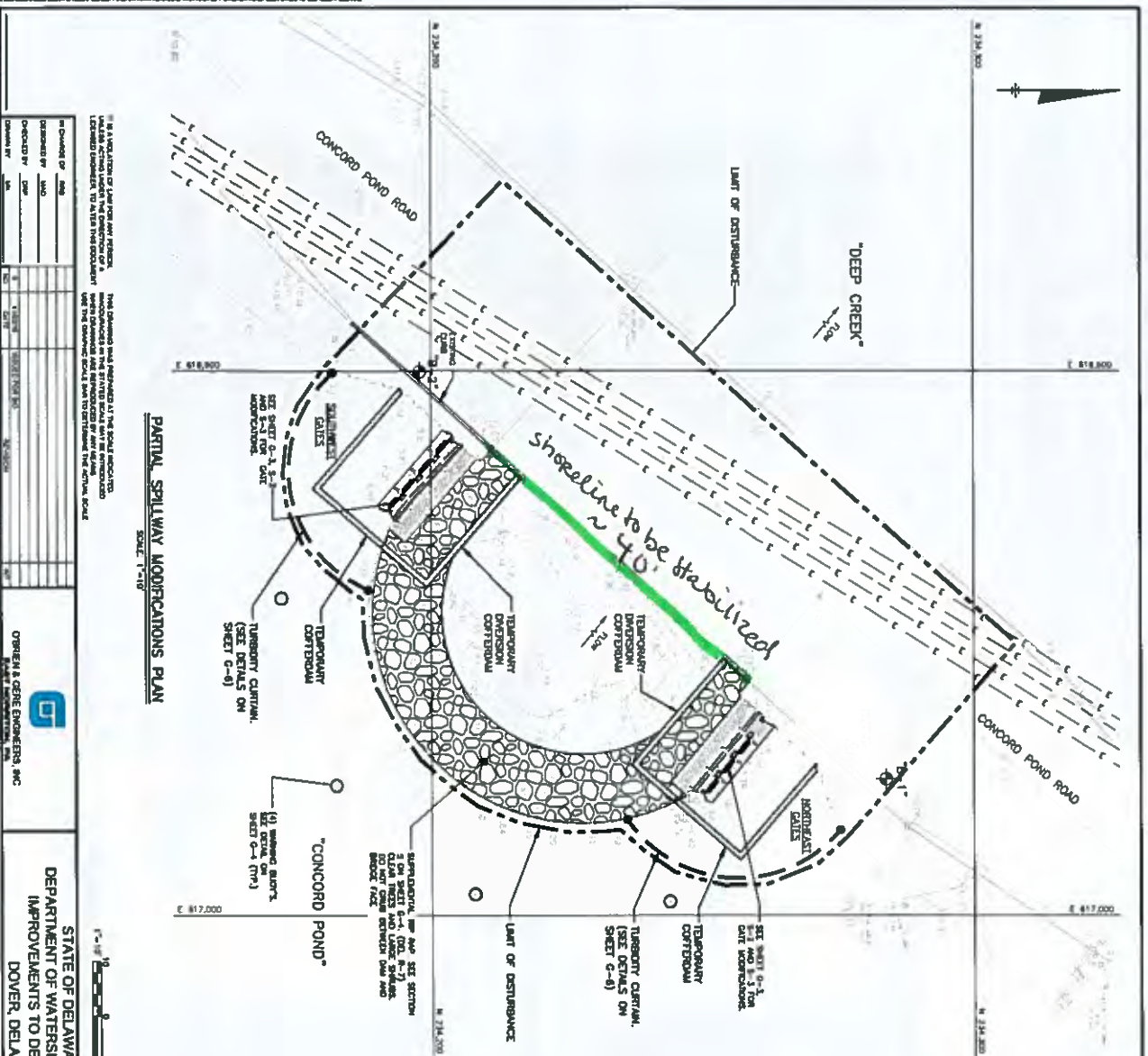
THE DRAWING IS A PARTIAL PLAN OF THE DOVER DAM AND IS NOT TO BE USED FOR ANY OTHER PURPOSE. THE DRAWING IS NOT TO BE USED FOR ANY OTHER PURPOSE. THE DRAWING IS NOT TO BE USED FOR ANY OTHER PURPOSE.

DESIGNED BY: JMD
CHECKED BY: JMD
DATE: 03/28/2019

STATE OF DELAWARE DNRDC
DEPARTMENT OF WATERSHED STEWARDSHIP
DOVER, DELAWARE

DNRDC CONTRACT NO.: NAT 15003-FLOODPLAIN
IMPROVEMENTS TO CONCORD POND DAM
SPILLWAY IMPROVEMENTS PLAN
DATE: 03/28/2019
G-4





THIS DRAWING WAS PREPARED BY THE STATE OF DELAWARE, DEPARTMENT OF WATER RESOURCES, DIVISION OF WATER CONTROL, AND IS NOT TO BE USED FOR ANY OTHER PURPOSE WITHOUT THE WRITTEN PERMISSION OF THE DIVISION OF WATER CONTROL. THE DRAWING SHALL BE USED TO OBTAIN THE ACTUAL SCALE.

ORRIS & GRIFFIN ENGINEERS, INC.
15003-1.DWG

STATE OF DELAWARE DNRDC
DEPARTMENT OF WATER-RESOURCES
IMPROVEMENTS TO DELAWARE DAMS
DOVER, DELAWARE

DNRDC CONTRACT NO.: NAT 15003-FLOODPLAIN
GENERAL
IMPROVEMENTS TO CONCORD POND DAM
EROSION & SEDIMENTATION CONTROL
PLAN & NOTES
DATE: 1-2-16
15003-1

G-5

W.S.L.S.
APPROVED PLANS
PERMIT # SD/WR-23716
DATE 1-2-16 V-1
(SEE PERMIT CONDITIONS)

LEGEND:

- 1. EX. ELEVATION CONTROL
- 2. EX. OVERSEEN UTILITY LINES
- 3. EX. EXISTING WATER
- 4. EX. EXISTING WATER
- 5. EX. EXISTING WATER
- 6. EX. EXISTING WATER
- 7. EX. EXISTING WATER
- 8. EX. EXISTING WATER
- 9. EX. EXISTING WATER
- 10. EX. EXISTING WATER
- 11. EX. EXISTING WATER
- 12. EX. EXISTING WATER

1. EXISTING APPROVED LIMITS OF DISTURBANCE WITH SHORE STABILIZATION AND EROSION CONTROL MEASURES TO BE MAINTAINED.
2. EXISTING APPROVED LIMITS OF DISTURBANCE WITH SHORE STABILIZATION AND EROSION CONTROL MEASURES TO BE MAINTAINED.
3. EXISTING APPROVED LIMITS OF DISTURBANCE WITH SHORE STABILIZATION AND EROSION CONTROL MEASURES TO BE MAINTAINED.
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9107 L 0 NOT

Participating Countries

- [illegible]

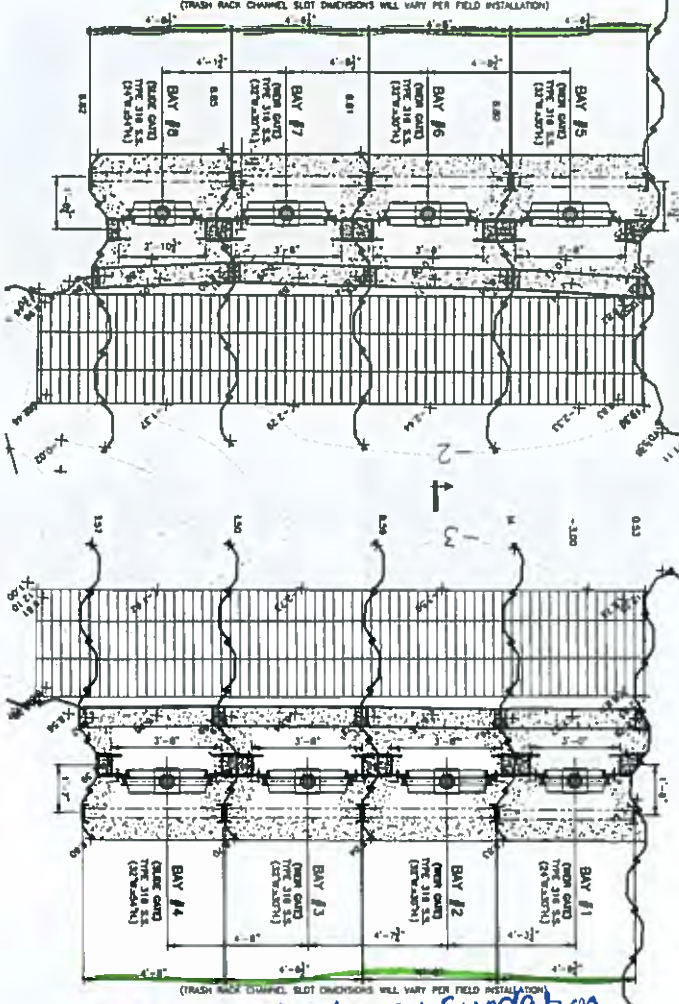
DNREC CONTRACT No.: NAT 15003-FLOODPLAIN

IMPROVEMENTS TO CONCORD POND DAM EROSION & SEDIMENTATION CONTROL NOTES & DETAILS

DATE	12/20/2018
12/20/2018	G-6

length channel ward OHW

length of foundation + structure $\approx 18'$



NOTES:

1. CONSTRUCTION TO FIELD VERIFY ALL DIMENSIONS FROM EXISTING CATCHES OR PROCEEDING WITH ANY DIMENSIONS.
2. DETAILS SHOWN ON THE DRAWING ARE REPRESENTATIVE OF GENERAL ARRANGEMENT/INSTALLATION REQUIREMENTS FOR THE STYL OR CATCH.
3. OPERATING ROOMS ARE REPRESENTATIVE AND NOT TO BE CONSIDERED AS FINAL DETAILS.
4. GATES SHALL HAVE A HIGH-STRENGTH HIGH-SIDING NON-ASTM A572 GR50 STEEL OR EQUIVALENT STEEL PROVIDED STATIONARY WITH THE FASTENERS.
5. ALL STEEL SHALL BE HOT-DIP GALVANIZED PER STRUCTURAL STEEL & ALUMINUM WORKS ON SHEET 3-1.

SOUTHWEST GATE PLAN
SCALE: 1"=4'

NORTHEAST GATE PLAN
SCALE: 1"=4'

W.S.L.S.

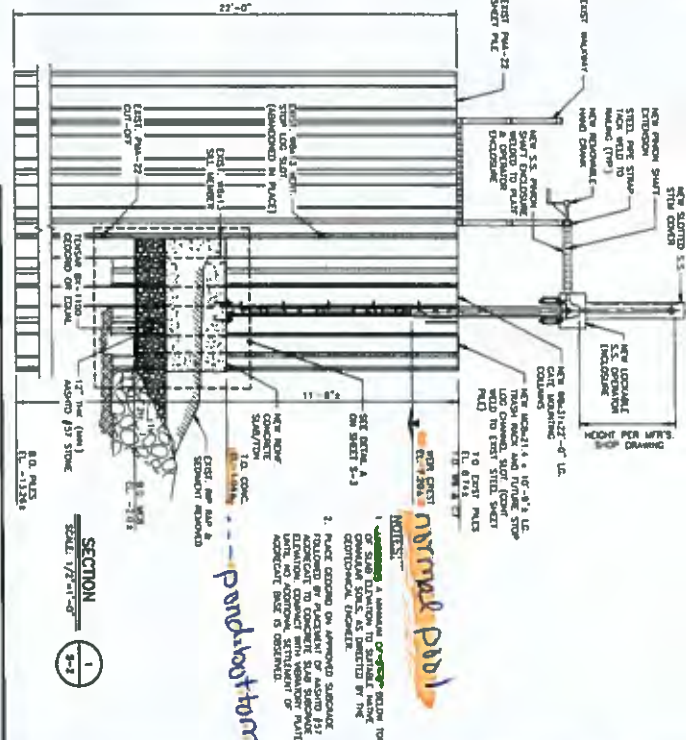
APPROVED PLANS
PERMIT # SPIND-201116
DATE 8-3-16
(SEE PERMIT CONDITIONS)

DESIGNED BY: [Signature]
CHECKED BY: [Signature]
DATE: [Date]

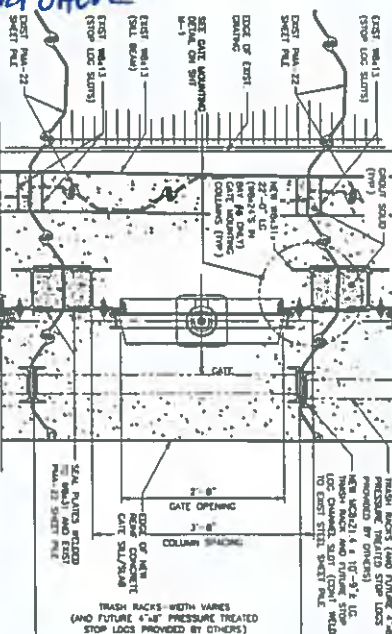


STATE OF DELAWARE DNRDC
DEPARTMENT OF WATERSHED STEWARDSHIP
IMPROVEMENTS TO DELAWARE DAMS
DOVER, DELAWARE

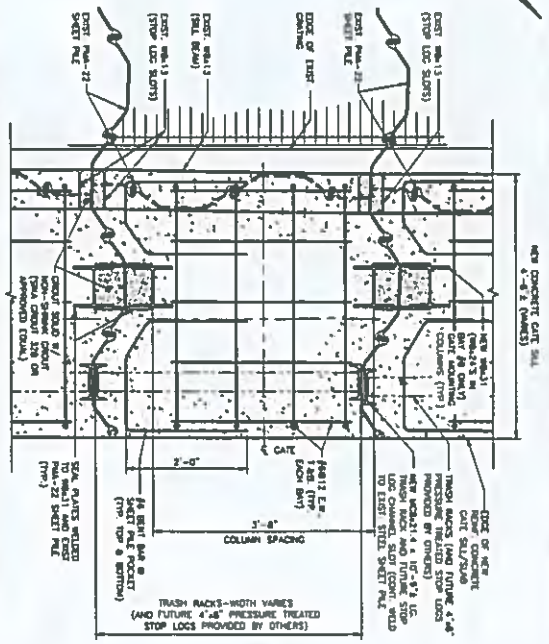
DNRDC CONTRACT NO.: NAT 15003-FLOODPLAIN
IMPROVEMENTS TO CONCORD POND DAM
NEW GATE INSTALLATION
PLANS, SECTIONS & DETAILS



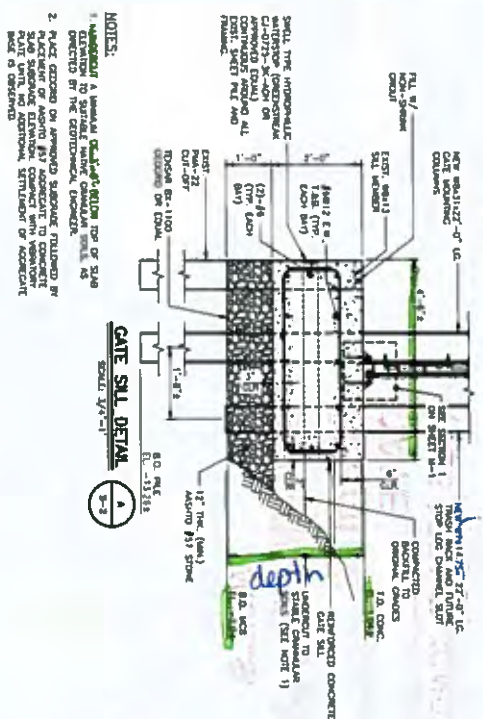
TYPICAL GATE INSTALLATION PLAN (SIMILAR ALL BAYS - BAY #2 SHOWN)
SCALE: 1"=4'



Depth of normal pool level: 7.20 normal pool elev
-1.64 pond bottom
6.16'



GATE SILL REINFORCING PLAN (SIMILAR ALL BAYS - BAY #2 SHOWN)
SCALE: 1"=1'-0"



GATE SILL DETAIL
SCALE: 1/4"=1'-0"

- NOTES:**
1. MATERIALS TO BE USED SHALL BE AS SHOWN ON THE DRAWING. ALL MATERIALS SHALL BE APPROVED BY THE ENGINEER BEFORE USE.
 2. PLACE GROUT OR APPROVED SUBGRADE FILLING BY PLACEMENT OF APPROX. 10" DEEP TO CONCRETE PLATE WITH NO ADDITIONAL SETTLEMENT OF ADJACENT BAY IS OBSERVED.

M.S.L.S.
APPROVED PLANS
PERMIT # 2016-23116
DATE 8-3-16 VLA
(SEE PERMIT CONDITIONS)

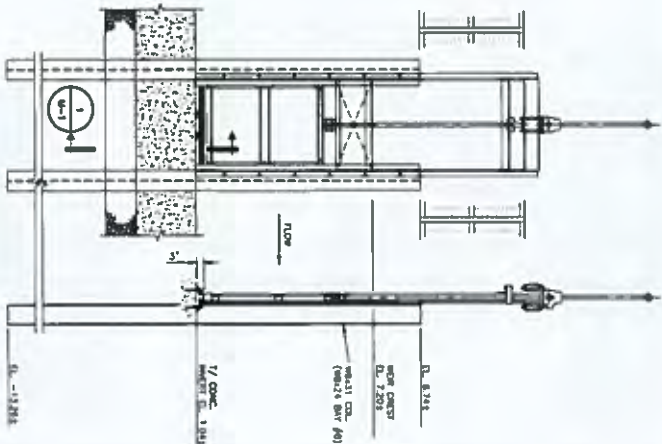
- NOTES:**
1. CONTRACTOR TO FIELD VERIFY ALL DIMENSIONS PRIOR TO CONSTRUCTION. ALL DIMENSIONS SHALL BE TO FACE UNLESS OTHERWISE NOTED.
 2. DETAILS SHOWN ON THIS DRAWING ARE REPRESENTATIVE OF COMMON PRACTICE AND NOT A GUARANTEE OF PERFORMANCE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN OF THE STRUCTURE.
 3. DETAILS SHOWN ARE REPRESENTATIVE AND ARE NOT RELATED TO THE STYLE OF GATE. REFER TO THE DRAWING FOR THE STYLE OF GATE.
 4. GATE SILL SHALL HAVE A NON-SKID, NON-SLIP, NON-REFLECTIVE SURFACE FINISH. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN OF THE FINISH.
 5. ALL STEEL SHALL BE HOT-DIPPED GALVANIZED FOR PROTECTION. STEEL & ALUMINUM NOTES ON SHEET 3-11.

THIS DRAWING WAS PREPARED AT THE FIELD OFFICE OF THE DELAWARE DEPARTMENT OF TRANSPORTATION AND CONSTRUCTION, 1000 MARKET STREET, DOVER, DELAWARE 19901. THE DRAWING IS THE PROPERTY OF THE DELAWARE DEPARTMENT OF TRANSPORTATION AND CONSTRUCTION. IT IS TO BE USED ONLY FOR THE PROJECT AND LOCATION INDICATED. IT IS NOT TO BE REPRODUCED OR COPIED IN ANY MANNER WITHOUT THE WRITTEN PERMISSION OF THE DELAWARE DEPARTMENT OF TRANSPORTATION AND CONSTRUCTION.

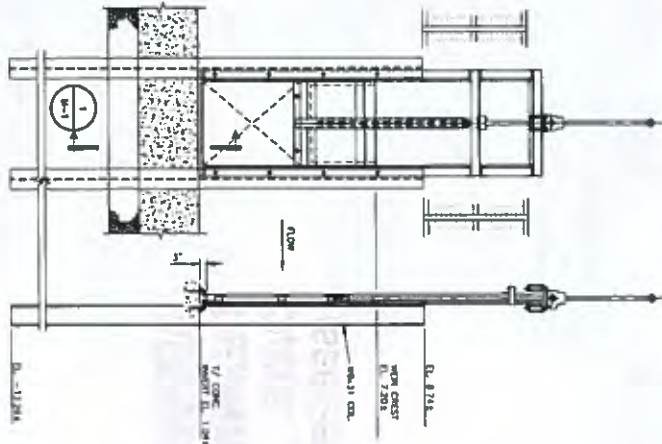
DESIGNED BY: JMD
CHECKED BY: JMD
DATE: 11/27/15
PROJECT NO.: 15003-FLOODPLAIN IMPROVEMENTS TO CONCORD POND DAM
SHEET NO.: 3-11

STATE OF DELAWARE DNRDC
DEPARTMENT OF WATERSHED STEWARDSHIP
IMPROVEMENTS TO DELAWARE DAMS
DOVER, DELAWARE

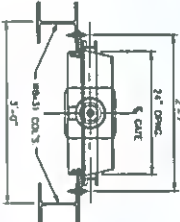
DNRDC CONTRACT NO.: NAT 15003-FLOODPLAIN IMPROVEMENTS TO CONCORD POND DAM
NEW GATE REINFORCING PLAN, SECTIONS & DETAILS
FILE NO.: 15003-FLOODPLAIN IMPROVEMENTS TO CONCORD POND DAM
DATE: 11/27/15
S-3



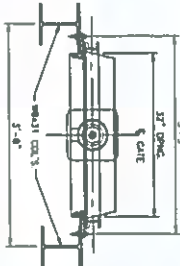
**FACE-MOUNTED
SELF-CONTAINED SLIDE GATE**
SCALE: 1/2"=1'-0"



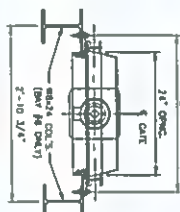
**FACE-MOUNTED
SELF-CONTAINED WEIR GATE**
SCALE: 1/2"=1'-0"



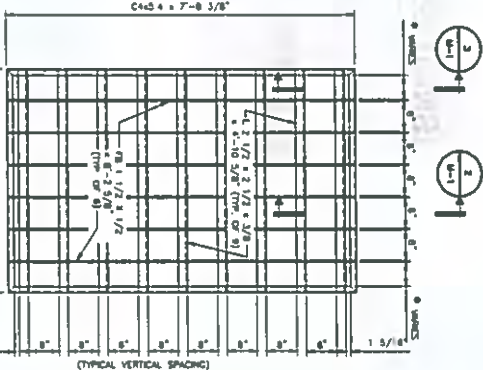
BEAM SPACING BAY #1
SCALE: 1"=1'-0"



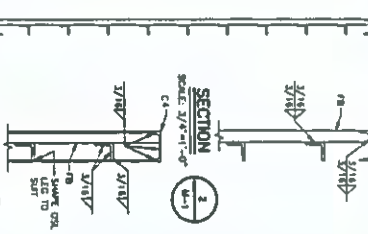
BEAM SPACING BAYS 2 THRU 7
SCALE: 1"=1'-0"



BEAM SPACING BAY #8
SCALE: 1"=1'-0"

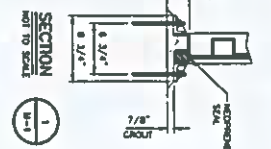


STEEL TRASH RACK DETAIL - (1) RACK PER BAY
SCALE: 1/2"=1'-0"

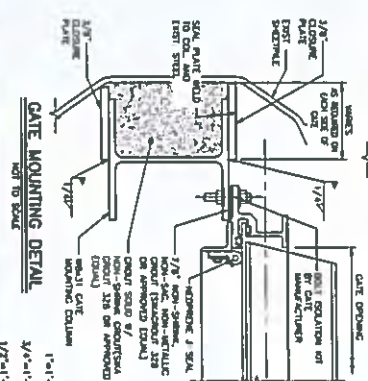


SECTION
SCALE: 1/2"=1'-0"

- PLAN GENERAL NOTES:**
- CONSTRUCTION TO FIELD VERIFY ALL DIMENSIONS FROM TO CORNER OF GATE OR PROVISIONS WITH ANY MODIFICATIONS TO WORK.
 - ALL DIMENSIONS IN CONTACT WITH CONCRETE TO BE FIELD CHECKED WITH ONE CORNER OF CONCRETE.
 - DETAILS SHOWN ON THE DRAWING ARE REPRESENTATIVE OF DESIGN. MANUFACTURER/INSTALLATION MODIFICATIONS FOR THE STATE OF DEL.
 - SPACING SHOWN ARE REPRESENTATIVE AND ARE NOT TO BE USED AS A GUIDE TO THE MANUFACTURER'S SHOP DRAWING FOR SPECIFICATION OF MATERIALS.
 - ALL ANCHOR BOLTS SHALL BE STAINLESS STEEL INSTALLED PER MANUFACTURER'S REQUIREMENTS.
 - GATES SHALL HAVE A NON-SKID, NON-SLIP, STEEL PLATING AND CHAMFER STEEL STRUCTURE. SHALL PROVIDE SOLUTIONS FOR THE FACTORS.



SECTION
SCALE: 1/2"=1'-0"



GATE MOUNTING DETAIL
SCALE: 1/2"=1'-0"

DESIGNED BY	DATE
CHECKED BY	DATE
APPROVED BY	DATE

ORIGIN & ENGINEERING, INC.
STATE OF DELAWARE

STATE OF DELAWARE DNRC
DEPARTMENT OF WATERSHED STEWARDSHIP
IMPROVEMENTS TO DELAWARE DAMS
DOVER, DELAWARE

IMPROVEMENTS TO CONCORD POND DAM
NEW GATE AND TRASH RACK
DETAILS

DATE	10/20/14
SCALE	M-1

APPROVED PLANS
PERMIT # SP/WD-03/14
DATE 8-2-16 KH
(SEE PERMIT CONDITIONS)
DNRC CONTRACT NO. WAT 15003-FLOODPLAIN



WETLANDS AND SUBAQUEOUS LANDS SECTION

PERMIT NO.: SP/WQ-231/16

CONSTRUCTION EXPIRATION DATE:

8/24/2019

TO CONDUCT THE FOLLOWING ACTIVITIES:

FOR THE FOLLOWING ACTIVITIES:

- To remove existing timber flashboards and their foundations and replace them with 8 manually-operated steel gates
- To install a temporary cofferdam
- To dredge 18 cubic yards of material for the new gates concrete foundation
- To place 12 cubic yards of concrete and 6 cubic yards of stone fill for the new gates foundation and 27 cubic yards of rip-rap replenishment in the Concord Pond spillway

LOCATED ON PUBLIC SUBAQUEOUS LANDS:

In Concord Pond
On Concord Pond Road
Seaford, Sussex County, Delaware

ISSUED TO: DNREC – Division of Fish and Wildlife, C/o: Larry Horan

LOCATION OF WORK: Same as above

**DISPLAY THIS CERTIFICATE IN A HIGHLY
VISIBLE LOCATION ON THE JOB SITE.**

Authorized by:



Delaware Coastal Management Federal Consistency Determination



RECEIVED

AUG 26 2016

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES & ENVIRONMENTAL CONTROL

DELAWARE COASTAL
MANAGEMENT PROGRAM

89 KINGS HIGHWAY
DOVER, DELAWARE 19901

Phone: (302) 739-9283
Fax: (302) 739-2048

August 22, 2016

Melissa A. Hubert
Division of Watershed Stewardship
Department of Natural Resources and Environmental Control
21309 Berlin Rd Unit #6
Georgetown, DE 19947

**RE: *Delaware Coastal Management Federal Consistency Review
Concord Pond Dam Spillway Improvements (FC# 2016.0080)***

Dear Ms. Hubert:

The Delaware Coastal Management Program (DCMP) has received and reviewed your consistency determination for the Concord Pond Dam Spillway Improvement Project (FC# 2016.0080). The project includes proposed improvements within the spillway of Concord Pond entailing replacement of timber flash boards with four new manual gates at each end of the spillway supported by reinforced concrete foundation on a crushed stone pad.

Based upon our review and pursuant to National Oceanic & Atmospheric Administration regulations (15 CFR 930), the DCMP conditionally concurs with your consistency determination for the above referenced project. Our concurrence is based on the adherence to restrictions and/or conditions placed on any and all permits issued to you for this project and the following conditions:

1. Existing water levels shall not be altered and sufficient flow shall be maintained to ensure adequate dissolved oxygen levels in the pond and downstream.
2. Sedimentation during construction activities shall be minimized to limit impacts to the state-rare freshwater mussel species, Northern Lance (*Elliptio fisheriana*).

These conditions are necessary in order to satisfy the DCMP Living Resources policy 5.11.1.1 and Nongame and Endangered Species policy 5.11.3 which refer to protecting living resources and rare/endangered wildlife in the state from adverse environmental effects. They are also necessary to be compliant with Coastal Waters Management Policies 5.3.1.4 and 5.3.1.6

Delaware's good nature depends on you!

RECEIVED
JUN 14 2016

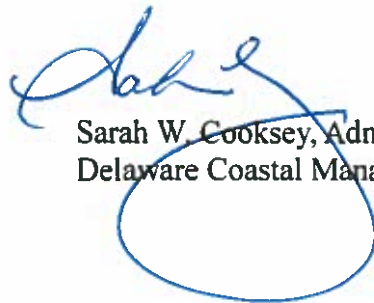
Failure to comply with the conditions above will result in this conditional concurrence henceforth being considered an objection. Under this scenario, the applicant is advised that pursuant to 15 CFR part 930, subpart H, and within 30 days from receipt of this letter, you may request that the Secretary of Commerce override the objection. In order to grant an override request, the Secretary must find that the activity is consistent with the objectives or purposes of the Coastal Management Act, or is necessary in the interest of national security. A copy of the request and supporting information must be sent to the Delaware Coastal Management Program and the federal permitting or licensing agency. The Secretary may collect fees for administering and processing your request.

The DCMP also offers the following comments for consideration:

The boat ramp and parking area are open to the public. Larry Horan of the Fisheries Section in the Division of Fish and Wildlife should be notified when the work authorized by this Permit/Certification is scheduled so that a press release can be coordinated. (302-739-9084 or Larry.Horan@state.de.us).

If you have any questions or would like to discuss the conditions or comments included in this letter, please contact me or Amanda Santoni of my staff at (302) 739-9283.

Sincerely,



Sarah W. Cooksey, Administrator
Delaware Coastal Management Program

SWC/as

cc: File 2016.0080
Kate Fleming-WSCRP
Devin Ray- USFWS
Craig Lukezic-SHPO

DNREC Standard Sediment and Stormwater Plan Approval



DNREC Division of Watershed Stewardship
89 Kings Highway
Dover, DE 19901
(302) 739-9921

GENERAL APPLICATION FOR STANDARD PLAN APPROVAL

Approval of this Standard Sediment and Stormwater Plan may be granted if all applicability items established in Technical Document Article 3.01.1 for the individual standard plan project type are met, and the owner/applicant agrees to comply with the conditions of the individual standard plan project type contained in the same Article.

Standard Plan Project Type (select one)

_____ 3.01.1.4 Agricultural Structure Construction
_____ 3.01.1.5 Tax Ditch Maintenance
_____ 3.01.1.8 BMP Construction and Retrofit
X 3.01.1.9 Minor Bridge and Culvert Construction

Site Information

Project Name: Improvements to Concord Pond Dam Parcel Total Acres (nearest 0.1ac): 87.8
Site Location: Concord pond spillway and outlet along Concord Pond Rd Disturbed Acres (nearest 0.1ac): 0.1
Tax Parcel ID: 2-31 17.00 12.00 Proposed Impervious Area: 0 sq ft / ac
Wooded area to be cleared: 0 sq ft / ac

Applicant Information

Owner: DE DNREC Division of Fish & Wildlife Applicant: DE DNREC Division of Fish & Wildlife
Mailing Address: 89 Kings Highway Dover, DE 19901 Mailing Address: 89 Kings Highway Dover, DE 19901
Owner Phone: 302-739-9910 Applicant Phone: 302-739-9910

Applicant Certification

I, the undersigned, certify that the information supplied on this Application for Standard Plan Approval is accurate, the proposed land disturbing activity meets the criteria established, and all conditions of this Standard Plan Approval will be met by the applicant, builder, contractor, and owner during construction and post construction.

Applicant Signature: Lawrence R. Horan Date: 6/3/16
Applicant Printed Name: LAWRENCE R. HORAN Title: CONSTRUCTION PROJECT MANAGER

Fees

The review fee is \$80 per disturbed acre to the nearest 0.1 acre with a minimum fee of \$80 for any standard plan approvals disturbing less than 1.0 acre. Make checks payable to Division of Watershed Stewardship.

Approval Information (for office use only)

Approval # 2016-102 Fee Paid: \$ 0 (WAIVED)
Approved by: Danell K. Green Approval Date: 10/12/16
Title: EIT Expiration Date: 10/12/21

Craigs Pond Approved Permits

Department of the Army Nationwide Permit 3

DNREC Subaqueous Lands Permit and Water Quality Certification

Delaware Coastal Management Federal Consistency Determination

DNREC Standard Sediment and Stormwater Plan Approval

Department of the Army Nationwide Permit 3



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY

PHILADELPHIA DISTRICT CORPS OF ENGINEERS
WANAMAKER BUILDING, 100 PENN SQUARE EAST
PHILADELPHIA, PENNSYLVANIA 19107-3390

OCT - 5 2016

Regulatory Branch
Application Section I

SUBJECT: CENAP-OP-R-2016-682-23 (NWP3)
Project Name: Craigs Mill Pond Spillway and Boat Ramp Repair SX
Location: 38.6275N/-75.64639W

Melissa Hubert
Delaware Division of Watershed Stewardship
21309 Berlin Road, Unit 6
Georgetown, Delaware 19947

Dear Ms. Hubert:

This is in regard to a proposal by the Delaware Division of Watershed Stewardship to discharge fill material into waters of the United States associated with the repair of an existing boat ramp and the replacement of an existing spillway structure at Craigs Mill Pond located in Seaford, Sussex County, Delaware.

Under current Federal regulations, a Department of the Army permit is required for work or structures in navigable waters of the United States and/or the discharge of dredged or fill material into waters of the United States including their adjacent wetlands.

Based upon our review of the information you have provided, it has been determined that the proposed work is approved by the existing Department of the Army Nationwide Permit (NWP) described in Enclosure 1, provided the work is conducted in compliance with the project specific special conditions listed below and the attached general conditions (Enclosure 2). Initiation of any authorized work shall constitute your agreement to comply with all of the NWP's conditions. You should also note that the authorized work may be subject to periodic inspections by a Corps of Engineers representative. The verification of a nationwide permit including all general and special conditions is not subject to appeal.

On March 16, 2012 the Division Engineer approved several Regional Conditions for NWPs within the Philadelphia District. The enclosed table (Enclosure 3) identifies those NWPs which require a preconstruction notification (PCN) to the Corps of Engineers, those which have been regionally conditioned by the Division Engineer, and those which have been denied 401 Water Quality Certification (WQC) and/or Coastal Zone Management (CZM) consistency by the Delaware Department of Natural Resources and Environmental Control (DDNREC). It should be carefully noted that DDNREC has denied the requisite WQC and CZM for certain NWP activities in ALL waters of the United States in Delaware. For other NWP activities, DDNREC

has denied the requisite WQC and CZM for projects located in waters of the United States which have been determined to be critical resource waters.

For those NWP's for which DDNREC has denied the requisite WQC and CZM, the NWP authorization is considered denied without prejudice by the Corps of Engineers until an individual, project-specific WQC and/or CZM review and approval has been obtained from DDNREC. Furthermore, copies of the WQC and CZM approvals must be provided to the Corps of Engineers before the authorized work begins. Any project-specific conditions required by DDNREC for the WQC and/or CZM approval will automatically become part of the NWP authorization as well.

Please note that CZM consistency from DDNREC is only required for those activities in or affecting Delaware's coastal zone. Additionally, some of the NWP's do not involve a discharge of dredged or fill material and, as such, do not require a 401 WQC. For those NWP's not requiring a 401 WQC, the appropriate rows and columns of the enclosed table (Enclosure 3) have been identified with the term "NA".

PROJECT SPECIFIC SPECIAL CONDITIONS:

1. All work performed in association with the above noted project shall be conducted in accordance with the project plans prepared by O'Brien and Gere Engineers, Inc., dated November 2105, titled: *Improvements to Delaware Dams, Improvements to Craigs Pond Dam*, nineteen sheets. The purpose of the project is to discharge fill material into waters of the United States associated with the repair of an existing boat ramp and the replacement of an existing spillway structure at Craigs Mill Pond located in Seaford, Sussex County, Delaware.
2. Any deviation in construction methodology or project design from that shown on the above noted drawings must be approved by this office, in writing, prior to performance of the work. All modifications to the above noted project plans shall be approved, in writing, by this office. No work shall be performed prior to written approval of this office.
3. This office shall be notified at least 10 days prior to the commencement of authorized work by completing and signing the enclosed Notification/ Certification of Work Commencement Form (Enclosure 4). This office shall also be notified within 10 days of the completion of the authorized work by completing and signing the enclosed Notification/Certification of Work Completion/Compliance Form (Enclosure 5). All notifications required by this condition shall be in writing and shall be transmitted to this office by registered mail. Oral notifications are not acceptable. Similar notification is required each time maintenance work is to be done under the terms of this Corps of Engineers permit.
4. Representatives of the U.S. Army Corps of Engineers shall be permitted to inspect the project during its phase of construction, and to collect any samples, or to conduct any tests deemed necessary.
5. The permittee is responsible for ensuring that the contractor and/or workers executing the activity(s) authorized by this permit have knowledge of the terms and conditions of the

authorization and that a copy of the permit document is at the project site throughout the period the work is underway.

6. The mechanical equipment used to execute the work authorized shall be operated in such a way as to minimize turbidity that could degrade water quality and adversely affect aquatic plant and animal life.

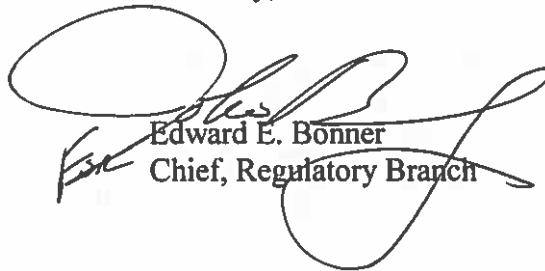
7. Every effort shall be made to keep construction debris from entering the waterway or wetland. Debris in the waterway or wetland shall be removed immediately.

8. This permit does not obviate the permittee from obtaining any State or local assent required by law for the activity authorized.

This verification is valid until the NWP is modified, reissued, or revoked. All of the existing NWPs are scheduled to be modified, reissued, or revoked prior to March 16, 2017. It is incumbent upon the permittee to remain informed of changes to the NWPs. We will issue a public notice when the NWPs are reissued. Furthermore, if you commence or are under contract to commence this activity before the date that the relevant NWP is modified or revoked, you will have 12 months from the date of the modification or revocation of the NWP to complete the activity under the present terms and conditions of this NWP.

Also enclosed is a pre-addressed postal card (Enclosure 6) soliciting your comments on the processing of your application. Any comments, positive or otherwise, on the procedures, timeliness, fairness, etc., may be made on this card. If you have any questions regarding this matter, please contact John Brundage at 302-736-9763 or write to the above address.

Sincerely,



Edward E. Bonner
Chief, Regulatory Branch

Enclosures

3. Maintenance. (a) The repair, rehabilitation, or replacement of any previously authorized, currently serviceable structure, or fill, or of any currently serviceable structure or fill authorized by 33 CFR 330.3, provided that the structure or fill is not to be put to uses differing from those uses specified or contemplated for it in the original permit or the most recently authorized modification. Minor deviations in the structure's configuration or filled area, including those due to changes in materials, construction techniques, requirements of other regulatory agencies, or current construction codes or safety standards that are necessary to make the repair, rehabilitation, or replacement are authorized. Any stream channel modification is limited to the minimum necessary for the repair, rehabilitation, or replacement of the structure or fill; such modifications, including the removal of material from the stream channel, must be immediately adjacent to the project or within the boundaries of the structure or fill. This NWP also authorizes the repair, rehabilitation, or replacement of those structures or fills destroyed or damaged by storms, floods, fire or other discrete events, provided the repair, rehabilitation, or replacement is commenced, or is under contract to commence, within two years of the date of their destruction or damage. In cases of catastrophic events, such as hurricanes or tornadoes, this two-year limit may be waived by the district engineer, provided the permittee can demonstrate funding, contract, or other similar delays.

(b) This NWP also authorizes the removal of accumulated sediments and debris in the vicinity of existing structures (e.g., bridges, culverted road crossings, water intake structures, etc.) and/or the placement of new or additional riprap to protect the structure. The removal of sediment is limited to the minimum necessary to restore the waterway in the vicinity of the structure to the approximate dimensions that existed when the structure was built, but cannot extend farther than 200 feet in any direction from the structure. This 200 foot limit does not apply to maintenance dredging to remove accumulated sediments blocking or restricting outfall and intake structures or to maintenance dredging to remove accumulated sediments from canals associated with outfall and intake structures. All dredged or excavated materials must be deposited and retained in an area that has no waters of the United States unless otherwise specifically approved by the district engineer under separate authorization. The placement of new or additional riprap must be the minimum necessary to protect the structure or to ensure the safety of the structure. Any bank stabilization measures not directly associated with the structure will require a separate authorization from the district engineer.

(c) This NWP also authorizes temporary structures, fills, and work necessary to conduct the maintenance activity. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable, when temporary structures, work, and discharges, including cofferdams, are necessary for construction activities, access fills, or dewatering of construction sites. Temporary fills must consist of materials, and be placed in a manner, that will not be eroded by expected high flows. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The areas affected by temporary fills must be revegetated, as appropriate.

(d) This NWP does not authorize maintenance dredging for the primary purpose of navigation. This NWP does not authorize beach restoration. This NWP does not authorize new stream channelization or stream relocation projects.

Notification: For activities authorized by paragraph (b) of this NWP, the permittee must submit a pre-construction notification to the district engineer prior to commencing the activity (see general condition 31). The pre-construction notification must include information regarding the original design capacities and configurations of the outfalls, intakes, small impoundments, and canals. (Sections 10 and 404)

Note: This NWP authorizes the repair, rehabilitation, or replacement of any previously authorized structure or fill that does not qualify for the Clean Water Act Section 404(f) exemption for maintenance.

NWP CZM and WQC Status Table: Delaware, New Jersey, Pennsylvania (4.4.2012)

NWP #	PCN	DE CZM	DE WQC	NJ CZM	NJ WQC	PA CZM	PA WQC
NWP 1	NO	ISSUED	N/A				
NWP 2	NO	ISSUED	N/A				
NWP 3	YES *	DENIED #	DENIED #				
NWP 4	NO	ISSUED	ISSUED				
NWP 5	NO	ISSUED	ISSUED				
NWP 6	NO	ISSUED	ISSUED				
NWP 7	YES	ISSUED	ISSUED				
NWP 8	YES	DENIED	N/A				
NWP 9	NO	ISSUED	N/A				
NWP 10	YES *	ISSUED	N/A				
NWP 11	YES*	ISSUED	N/A				
NWP 12	YES	ISSUED	ISSUED				
NWP 13	YES *	DENIED #	DENIED #				
NWP 14	YES	ISSUED	ISSUED				
NWP 15	YES *	ISSUED	ISSUED				
NWP 16	NO	ISSUED	ISSUED				
NWP 17	YES	ISSUED	ISSUED				
NWP 18	YES *	DENIED #	DENIED #				
NWP 19	YES	ISSUED	ISSUED				
NWP 20	NO	ISSUED	ISSUED				
NWP 21	YES	ISSUED	ISSUED				
NWP 22	YES *	ISSUED	ISSUED				
NWP 23	YES	ISSUED	ISSUED				
NWP 24	NO	ISSUED	N/A				
NWP 25	YES *	ISSUED	ISSUED				
NWP 27	YES *	ISSUED	ISSUED				
NWP 28	YES	ISSUED	N/A				
NWP 29	YES	DENIED #	DENIED #				
NWP 30	YES *	ISSUED	ISSUED				
NWP 31	YES	ISSUED	ISSUED				
NWP 32	N/A	ISSUED	ISSUED				
NWP 33	YES	ISSUED	ISSUED				
NWP 34	YES	ISSUED	ISSUED				
NWP 35	YES	ISSUED	N/A				
NWP 36	YES *	ISSUED	ISSUED				
NWP 37	YES	ISSUED	ISSUED				
NWP 38	YES	ISSUED	ISSUED				
NWP 39	YES	DENIED #	DENIED #				
NWP 40	YES	DENIED	DENIED				
NWP 41	YES	DENIED	DENIED				
NWP 42	YES	DENIED	DENIED				
NWP 43	YES	DENIED	DENIED				
NWP 44	YES	DENIED	DENIED				
NWP 45	YES	ISSUED	ISSUED				
NWP 46	YES	DENIED	DENIED				
NWP 48	YES	ISSUED	ISSUED				
NWP 49	YES	ISSUED	ISSUED				
NWP 50	YES	ISSUED	ISSUED				
NWP 51	YES	DENIED	DENIED				
NWP 52	YES	DENIED	DENIED				

Note: *A PCN is required under certain circumstances. Review the terms of the NWP, general conditions, or regional conditions to identify those circumstances. # The State of Delaware has denied the CZM and WQC for this NWP in critical resource waters only.

ENCLOSURE 3

NOTIFICATION/CERTIFICATION OF WORK COMMENCEMENT FORM

Permit Number: CENAP-OP-R-2016-682-23 (NWP3)
Name of Permittee: DDNREC Watershed Stewardship
Project Name: Craigs Mill Pond Spillway and Boat Ramp Repair
Waterway: Craigs Mill Pond
County: Sussex State: Delaware_
Compensation/Mitigation Work Required: Yes ☐ No ☒

TO: U.S. Army Corps of Engineers, Philadelphia District
Wanamaker Building - 100 Penn Square East
Philadelphia, Pennsylvania 19107-3390
Attention: CENAP-OP-R

I have received authorization to discharge fill material into waters of the United States associated with the repair of an existing boat ramp and the replacement of an existing spillway structure at Craigs Mill Pond located in Seaford, Sussex County, Delaware.

The work will be performed by:

Name of Person or Firm _____

Address: _____

I hereby certify that I have reviewed the approved plans, have read the terms and conditions of the above referenced permit, and shall perform the authorized work in strict accordance with the permit document. The authorized work will begin on or about _____ and should be completed on or about _____.

Please note that the permitted activity is subject to compliance inspections by the Army Corps of Engineers. If you fail to return this notification form or fail to comply with the terms or conditions of the permit, you are subject to permit suspension, modification, revocation, and/or penalties.

Permittee (Signature and Date)

Telephone Number

Contractor (Signature and Date)

Telephone Number

NOTE: This form shall be completed/signed and returned to the Philadelphia District Office a minimum of 10 days prior to commencing work.

NOTIFICATION/CERTIFICATION OF WORK COMPLETION/COMPLIANCE FORM

Permit Number: CENAP-OP-R-2016-682-23 (NWP3)
Name of Permittee: DDNREC Watershed Stewardship

Name of Contractor: _____
Project Name: Craigs Mill Pond Spillway and Boat Ramp Repair
County: Sussex State: Delaware
Waterway: Craigs Mill Pond

Within 10 days of completion of the activity authorized by this permit, please sign this certification and return it to the following address:

U.S. Army Corps of Engineers, Philadelphia District
Wanamaker Building - 100 Penn Square East
Philadelphia, Pennsylvania 19107-3390
Attention: CENAP-OP-R

Please note that the permitted activity is subject to a compliance inspection by an Army Corps of Engineers representative. If you fail to return this notification form or fail to perform work in compliance with the permit, you are subject to administrative, civil and/or criminal penalties. Further, the subject permit may be suspended or revoked.

The authorized work was commenced on _____.

The authorized work was completed on _____.

I hereby certify that the work authorized by the above referenced permit has been completed in accordance with the terms and conditions of the above noted permit.

Signature of Contractor

Signature of Permittee

Address: _____

Address: _____

Telephone Number: _____

Telephone Number: _____

For project located in areas identified as shellfish habitat, you must include with this form a bill of lading; sales order or any other document(s) demonstrating non-polluting materials were purchased and utilized for your project. I hereby certify that I and/or my contractor have utilized non-polluting materials as defined in the above noted permit.

Signature of Contractor

Signature of Permittee

DNREC Subaqueous Lands Permit and Water Quality Certification



RECEIVED

SEP 28 2016

STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES &
ENVIRONMENTAL CONTROL
DIVISION OF WATER
89 KINGS HIGHWAY
DOVER, DELAWARE 19901

WETLANDS & SUBAQUEOUS
LANDS SECTION

TELEPHONE (302) 739-9943
FAX (302) 739-6304

September 26, 2016

DNREC – Division of Fish & Wildlife
C/o: Larry Horan
89 Kings Highway
Dover, DE 19901

RE: Subaqueous Lands Permit and Water Quality Certification No. SP/WQ-286/16

Dear Mr. Horan:

Enclosed are the Subaqueous Lands Permit and Water Quality Certification granted by the State of Delaware for the spillway improvements at Craig's Mill Pond in Seaford. Please read all of the Special Conditions carefully. The permittee and contractor are responsible to ensure that all conditions are strictly adhered to.

Also enclosed is the Contractors Post-Construction Completion Report. Within ten days of the completion of construction, the contractor must mail the completed and signed Post-Construction Completion Report to this office.

If you have any questions, please feel free to contact this office at (302) 739-9386.

Sincerely,

A handwritten signature in cursive script, appearing to read "Katie Huegel".

Katie Huegel
Environmental Scientist
Wetlands & Subaqueous Lands Section

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STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES &
ENVIRONMENTAL CONTROL
DIVISION OF WATER
89 KINGS HIGHWAY
DOVER, DELAWARE 19901

WETLANDS & SUBAQUEOUS
LANDS SECTION

TELEPHONE (302) 739-9943
FAX (302) 739-6304

**SUBAQUEOUS LANDS PERMIT AND WATER QUALITY
CERTIFICATION
CONTRACTOR'S COMPLETION REPORT
POST-CONSTRUCTION**

Subaqueous Lands Permit / Water Quality Certification Number: SP/WQ-286/16

Name: DNREC - Division of Fish & Wildlife
C/o: Larry Horan
89 Kings Highway
Dover, DE 19901

Address: Craig's Mill Road
Seaford, DE 19973

Parcel #: 531-12.00-101.00

I hereby certify that I have constructed the project authorized by the above-referenced Subaqueous Lands Permit in accordance with the approved plans for the project.

Printed Name of Contractor

Name of Company

Contractor's Signature

Date

Telephone Number

Upon completion of construction, this form shall be completed, signed by the contractor, and mailed to the Wetlands and Subaqueous Lands Section at:

**DNREC
Wetlands and Subaqueous Lands Section
89 Kings Highway
Dover, Delaware 19901**

Or faxed to the Wetlands and Subaqueous Lands Section at: **302-739-6304**

This form must be received by the Department within ten days of the date that construction is completed.

For official use only

Compliance inspection date _____ *Built in accordance with plans* ☐ Yes ☐ No

Scientist: _____

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Affix
Proper
Postage
Here

Mail to:

**DNREC – Wetlands and Subaqueous Lands Section
89 Kings Highway
Dover, DE 19901**



STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES &
ENVIRONMENTAL CONTROL
DIVISION OF WATER
89 KINGS HIGHWAY
DOVER, DELAWARE 19901

GENERAL CONDITIONS

1. The permittee and contractor shall at all times comply with all applicable laws and regulations of the Department of Natural Resources and Environmental Control.
2. The activities authorized herein shall be undertaken in accordance with the Permit conditions, the final stamped and approved plans, and with the information provided in the Permit application.
3. A copy of this Permit and the stamped approved plans shall be available on-site during all phases of construction activity.
4. The conditions contained herein shall be incorporated into any and all construction contracts associated with the construction authorized herein. The permittee and contractor are responsible to ensure that the workers executing the activities authorized by this Permit have full knowledge of, and abide by, the terms and conditions of this Permit.
5. No portion of the structure shall be constructed using creosote treated lumber.
6. No portion of the structure(s) authorized by this Permit shall exceed the dimensions for that structure identified on Page One of this Permit.
7. The activities authorized herein shall be conducted so as not to violate the State of Delaware's Surface Water Quality Standards in effect at the date of Permit authorization.
8. The issuance of this Permit does not constitute approval for any activities that may be required by any other local, state or federal government agency.
9. The issuance of this Permit does not imply approval of any other part, phase, or portion of any overall project the permittee may be contemplating.
10. This Permit authorizes only the activities described herein. Modifications to the project may require a supplemental approval from this office prior to the initiation of construction. A determination of the need for a supplemental approval will be made by this office pursuant to the permittee submitting written notification and revised plans indicating project changes. Failure to contact the Department prior to executing changes to the project shall constitute reason for this Permit being revoked.
11. The Contractors Completion Report shall be filled out and returned within 10 days of completion of the authorized work.
12. The permittee shall protect and hold the State of Delaware harmless from any loss, cost or damage resulting from the activities authorized herein.
13. Representatives of the Department of Natural Resources and Environmental Control shall be allowed to access the property to inspect all work during any phase of the construction and may conduct pre and post-construction inspections, collect any samples or conduct any tests that are deemed necessary.
14. The permittee shall maintain all authorized structures and activities in a good and safe condition.

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15. All construction materials, waste or debris associated with this activity shall be properly disposed of and contained at all times to prevent its entry into waters or wetlands. Construction materials shall not be stockpiled in subaqueous lands or wetlands.
16. The permittee and contractor shall employ measures during construction to prevent spills of fuels, lubricants or other hazardous substances. In the event of a spill, the permittee and contractor shall make every effort to stop the leak and contain the spill, and shall immediately contact the Hazardous Spill Response Team (HAZMAT) at 1-800-662-8802 and this office at (302) 739-9943. The permittee and contractor are responsible to comply with all directives to contain and clean up the spilled material(s) as stipulated by the HAZMAT team, and to restore the site as may be required by this office.
17. No construction shall occur after the construction expiration date identified on Page One of this Permit. The permittee may file a construction expiration date extension request of up to one (1) year if necessary to complete the authorized work. Such requests must be received by the Department at least thirty (30) days prior to the construction expiration date.
18. Any actions, operations or installations which are found by the Department to be contrary to the public interest may constitute reason for the discontinuance and/or removal of said action, operation or installation. Removal and restoration shall be at the expense of the permittee and/or upland property owner within thirty (30) days of receipt of written notice of revocation and demand for removal.
19. Disturbance of subaqueous lands or wetlands adjacent to the authorized structures or activities is prohibited unless specifically addressed in the special conditions of this Permit. Disturbance of subaqueous lands or wetlands in the path of construction activities shall be minimized. Any temporarily impacted subaqueous lands or wetlands shall be returned to pre-disturbance elevations and conditions.
20. This Permit is personal and may not be transferred without the prior written consent of the Department. Prior to the transfer of the adjacent upland property, the permittee shall obtain the written consent of the Department to transfer the Permit to the new upland property owner. Failure to obtain such written consent may result in the revocation of this Permit and the removal of all structures authorized by this Permit at the expense of the permittee.
21. The permittee shall notify the Wetlands and Subaqueous Lands Section prior to the commencement of the work authorized by this Permit.
22. No portion of the structure shall be installed within ten (10) feet of the adjacent property lines.
23. No portion of the structure shall exceed 20% of the width of the water body as measured at mean low water.
24. The structures authorized by this Permit shall be constructed and maintained in a manner so as to assure water access to adjacent properties.
25. This Permit does not authorize any future repairs below the water line, or any additions or modifications to the structures authorized herein. Such activities require separate written authorization from the Department of Natural Resources and Environmental Control.
26. Failure to comply with any of the terms or conditions of this Permit may result in enforcement action which could include the revocation of this Permit and subsequent restoration of the site to preconstruction conditions.



STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES &
ENVIRONMENTAL CONTROL
DIVISION OF WATER
89 KINGS HIGHWAY
DOVER, DELAWARE 19901

WETLANDS & SUBAQUEOUS
LANDS SECTION

TELEPHONE (302) 739-9943
FAX (302) 739-6304

DNREC – Division of Fish & Wildlife
C/o: Larry Horan
89 Kings Highway
Dover, DE 19901
Tax Parcel: 531-12.00-101.00

Subaqueous Lands Permit: SP-286/16
Water Quality Certification: WQ-286/16
Date of Issuance: 9/22/2016
Construction Expiration Date: 9/22/2019
Amended Date: N/A

**SUBAQUEOUS LANDS PERMIT AND WATER QUALITY CERTIFICATION
GRANTED TO:**

DNREC – Division of Fish & Wildlife

FOR THE FOLLOWING ACTIVITIES:

- To install a temporary diversion cofferdam upstream of the existing spillway
- To remove an existing 15 foot long, 36-inch diameter low-level outlet pipe with associated portion of vertical sheet pile wall
- To place 4.66 cubic yards of stone and concrete fill for a new pile foundation
- To install a two-cell box culvert containing a weir and slide gate
- To install a 3.5 foot wide by 20 foot long catwalk to access the two-cell box culvert
- To remove existing concrete slope protection adjacent to the spillway and install a vertical sheet pile wall and place 4.29 cubic yards of stone concrete fill for the new concrete slope protection
- To remove existing concrete slope protection adjacent to the boat ramp and install a vertical sheet pile wall adjacent to the ordinary water line
- To install a temporary cofferdam and to remove an existing 15 foot wide by 15 foot long boat ramp and install a 15 foot wide by 35 foot long boat ramp by placing 28.06 cubic yards of stone and concrete fill
- To place an additional 9.34 cubic yards of rip-rap replenishment in the spillway

LOCATED ON PUBLIC SUBAQUEOUS LANDS:

**In Craig's Mill Pond
On Craig's Mill Road
Seaford, Sussex County, Delaware**

Pursuant to the provisions of 7 Del. C., §7205, and the Department's Regulations Governing the Use of Subaqueous Lands and 7 Del. C., §6003, the Department's Regulations Governing the Control of Water Pollution and Section 401 of the Clean Water Act, permission is hereby granted on this 22nd day of September A.D. 2016, to construct the above-referenced project in

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accordance with the approved plans (16 sheets), as approved on September 16, 2016; and the application dated and received by this Division on July 15, 2016.

WHEREAS, the State of Delaware, the recipient of an easement to Craig's Mill Pond, has applied for permission to conduct the indicated activities; and;

WHEREAS, pursuant to the provisions of 7 Del. C., §7203, and 7 Del. C., §6604, the Secretary of the Department of Natural Resources and Environmental Control through his duly authorized representative finds that it is not contrary to the public interest if this project is approved subject to the terms and conditions herein set forth.

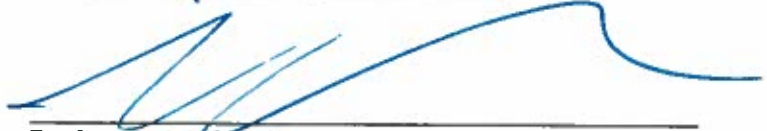
NOW THEREFORE, this Permit/Certification is issued subject to the attached Subaqueous Lands Permit General Conditions and the following special conditions:

SPECIAL CONDITIONS

1. This approval is in accordance with the plans and application submitted to the Department of Natural Resources and Environmental Control, a copy of which is attached hereto and made a part hereof.
2. The boat ramp and parking area are currently open to the public. Larry Horan of the Fisheries Section in the Division of Fish and Wildlife shall be notified when the work authorized by this Permit/Certification is scheduled so that a press release can be coordinated.
3. The temporary cofferdams shall be removed immediately after the completion of construction
4. The work authorized by this Permit/Certification shall not alter existing water levels or flow in Craig's Mill Pond. Any changes to these conditions shall be reported DNREC's Wetlands and Subaqueous Lands Section and to Edna Stetzar of the Division of Fish and Wildlife.
5. State-rare freshwater mussel species Northern Lance (*Elliptio fisheriana*), Alewife floater (*Anodonta impicate*) and Eastern Pondmussel have been documented upstream and/or downstream of Craig's Mill Pond. To avoid adverse impacts to these freshwater mussels, measures shall be taken to decrease sedimentation during construction activities.
6. State-rare snakes have been documented downstream of the project site. To avoid adverse impacts to these snakes, attempts shall be made to avoid and not harm them if observed during construction.
7. There shall be no stockpiling of material within regulated subaqueous lands. The rip-rap temporarily being removed shall be stockpiled in an upland, non-jurisdictional area.
8. There shall be no movement of equipment within subaqueous lands not specifically authorized by this Permit/Certification. Any areas disturbed, as authorized by this Permit/Certification, shall be returned to pre-construction conditions and elevations and appropriately stabilized.
9. Erosion and sediment control measures shall be implemented in accordance with the specifications and criteria in the current Delaware Erosion and Sediment Control Handbook so as to minimize entry and dispersal of sediment and other contaminants in surface waters.

10. All work shall be planned for periods of low waterway base flows. In the event that sediment and erosion controls are damaged or destroyed due to storm events, such controls shall be repaired and/or replaced immediately.
11. All fill materials associated with the proposed project shall be clean and free from oils, grease, asphalt and other contaminants.
12. The attached Contractors Completion Report shall be filled out and returned within 10 days of completion of the authorized work.
13. The work authorized herein shall be completed in accordance with the terms and conditions of the appropriate Department of the Army Nationwide Permit.

IN WITNESS WHEREOF, I, Steven M. Smailer, the duly authorized representative of David S. Small, Secretary of the Department of Natural Resources and Environmental Control, have hereunto set my hand this 22nd day of September, 2016.



By Steven M. Smailer, Section Manager
the duly authorized representative of the Secretary of the
Department of Natural Resources and Environmental Control

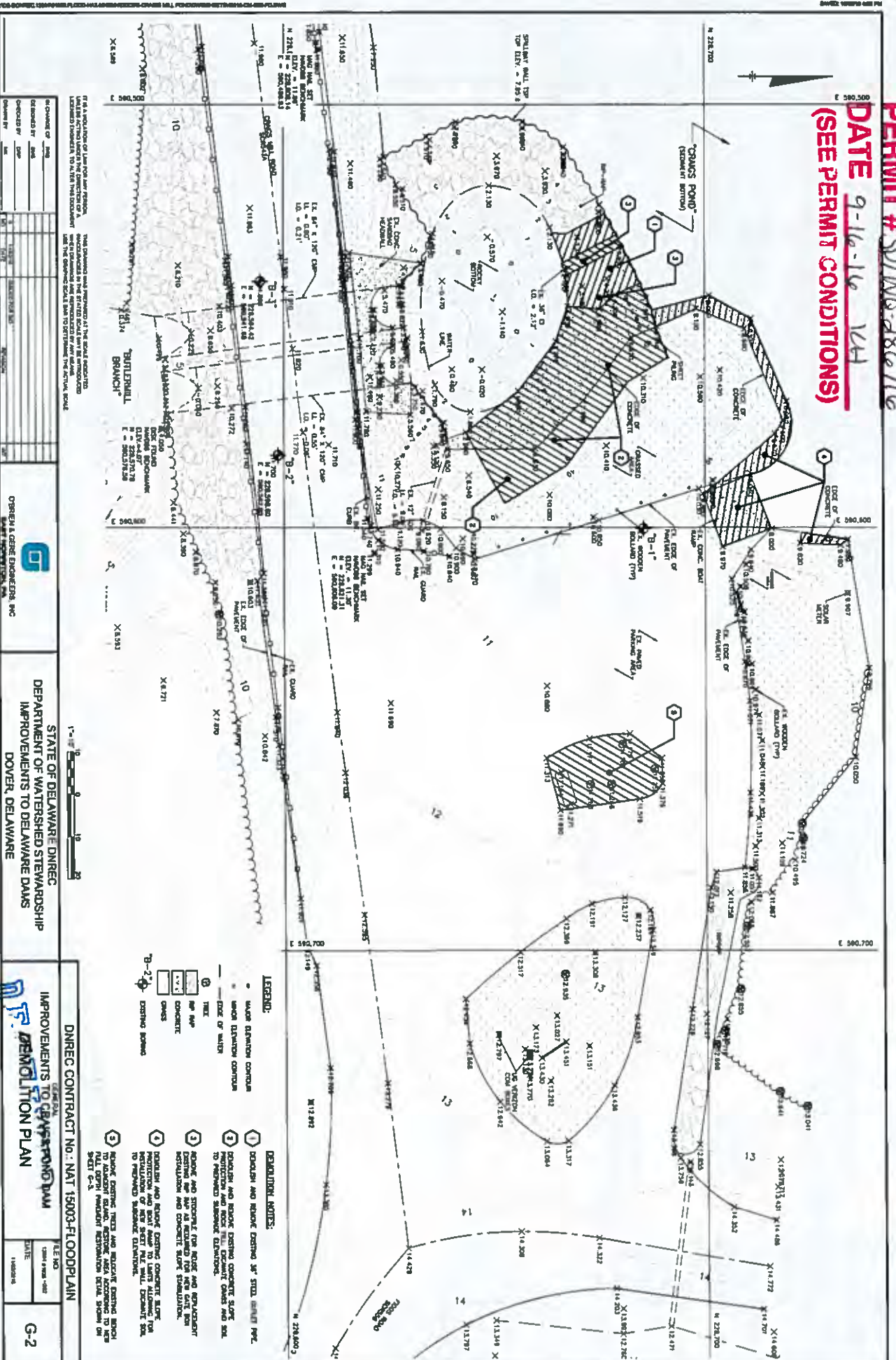


Katie Huegel, Environmental Scientist
Wetlands and Subaqueous Lands Section

APPROVED PLANS

PERMIT # SD/LWB-286116

DATE 9-16-16 14
(SEE PERMIT CONDITIONS)



THIS DRAWING WAS PREPARED AT THE STATE OF DELAWARE, DEPARTMENT OF WATER RESOURCES, DIVISION OF DAMS AND LEVEES, UNDER THE SUPERVISION OF THE ENGINEER OF DAMS AND LEVEES, AND THE DRAWING SCALE WAS TO REPRESENT THE ACTUAL SCALE.

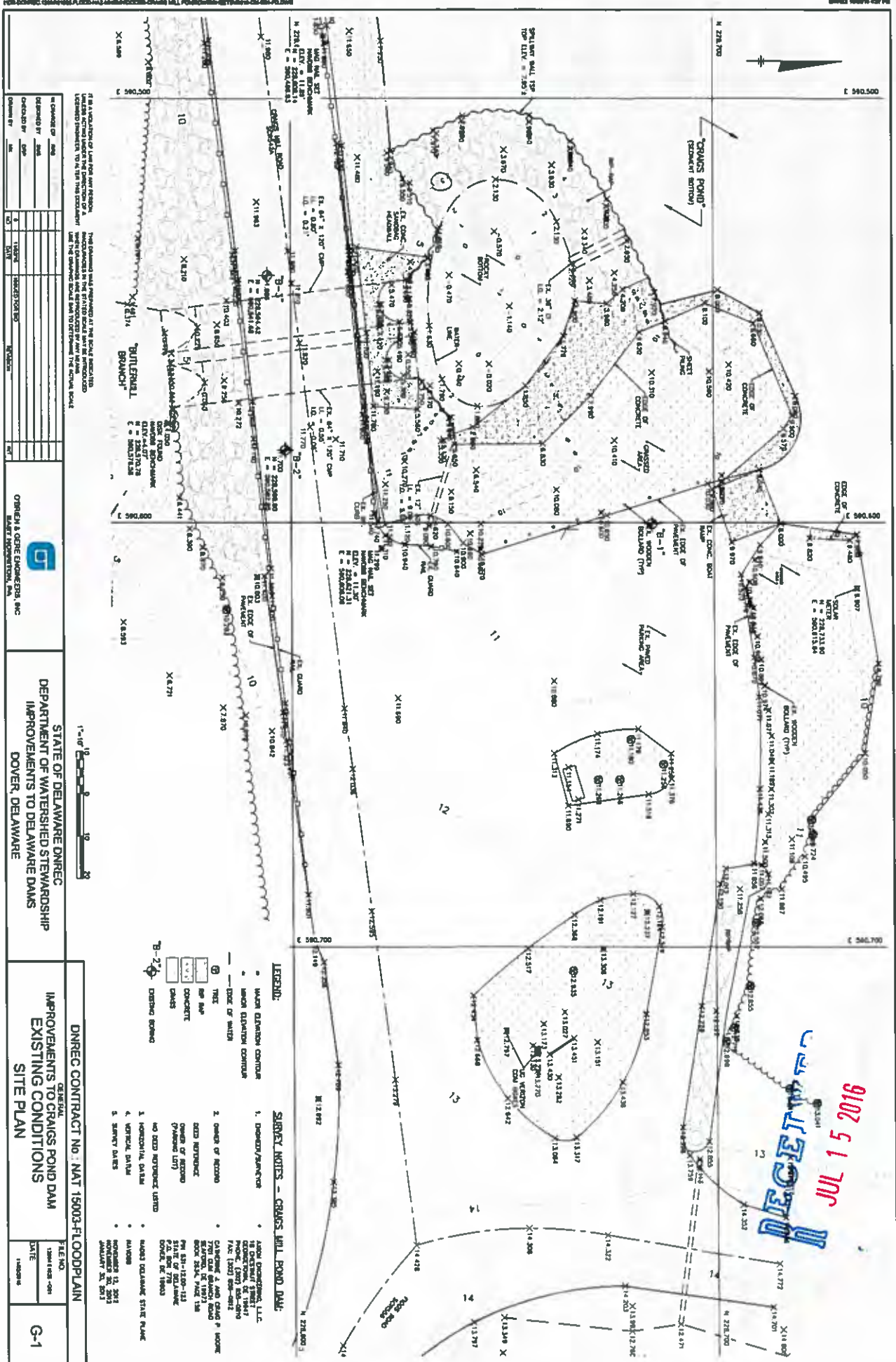
DESIGNED BY: [Signature]
CHECKED BY: [Signature]
DATE: [Date]

STATE OF DELAWARE - DNR
DEPARTMENT OF WATER RESOURCES
IMPROVEMENTS TO DELAWARE DAMS
DOVER, DELAWARE

DNR CONTRACT NO.: NAT 15003-FLOODPLAIN
IMPROVEMENTS TO CHESAPEAKE DAM
DEMOLITION PLAN

DATE: 11/03/16
G-2

BY: [Signature]
JUL 15 2016



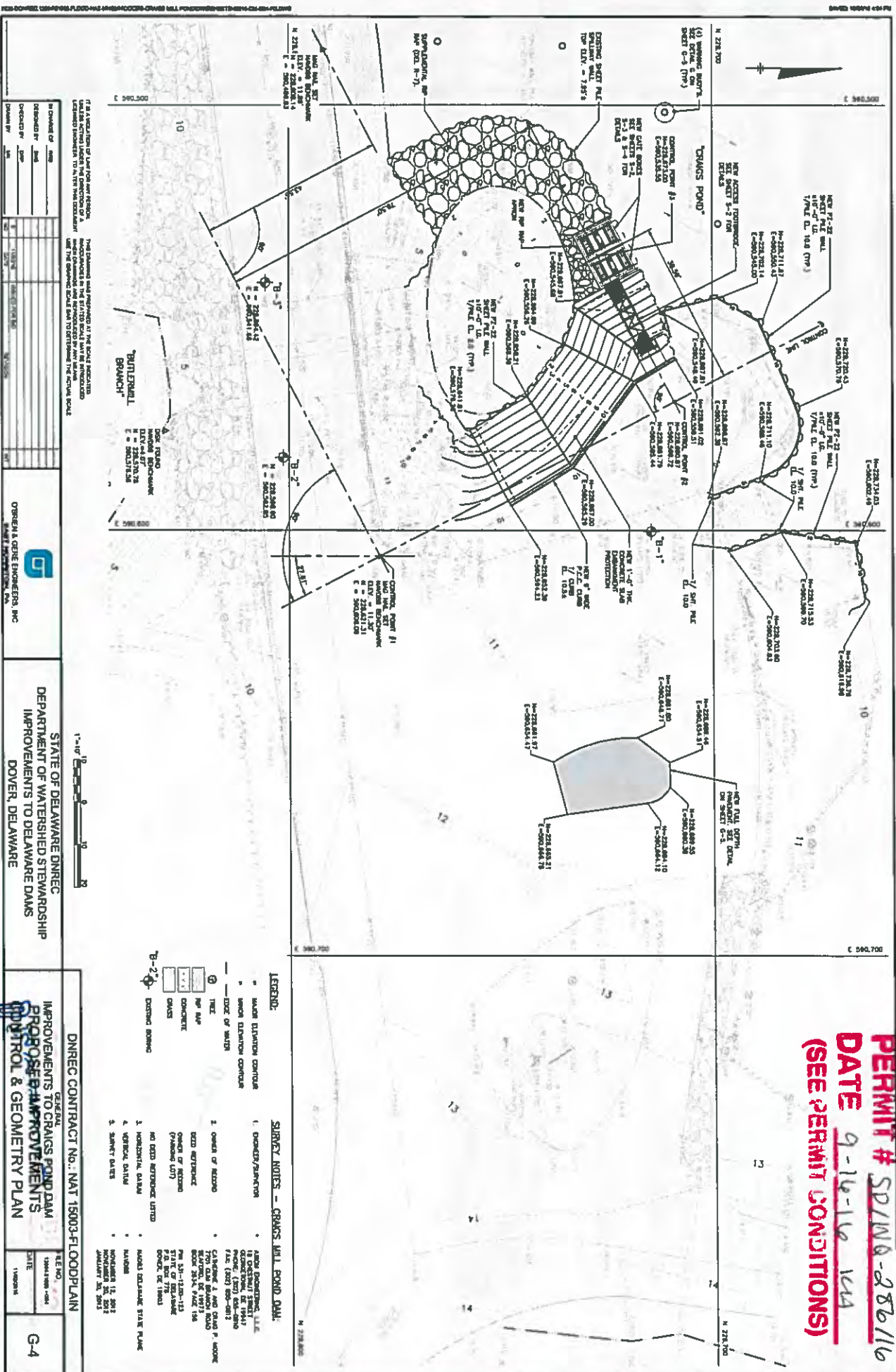
APPROVED PLANS
PERMIT # SP/NO-286/16

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W.S.L.S.

APPROVED PLANS

PERMIT # SP/100-286116
DATE 9-16-16 1614
(SEE PERMIT CONDITIONS)



JUL 15 2016

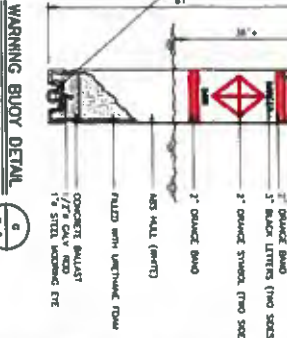
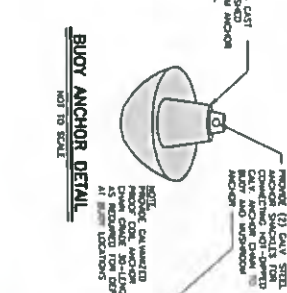
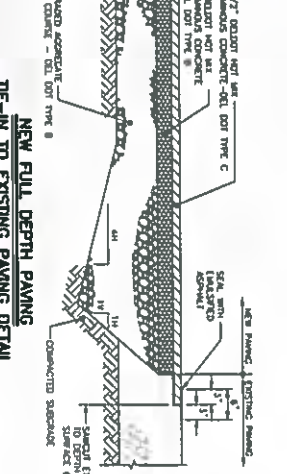
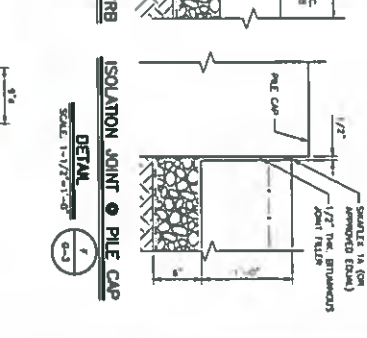
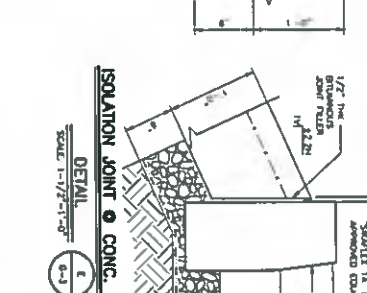
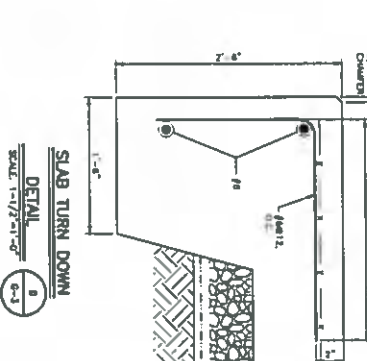
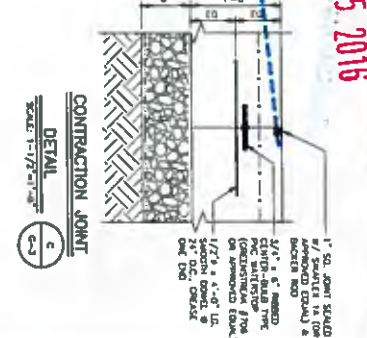
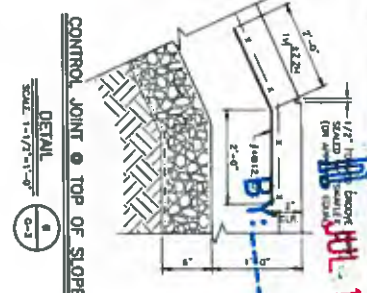
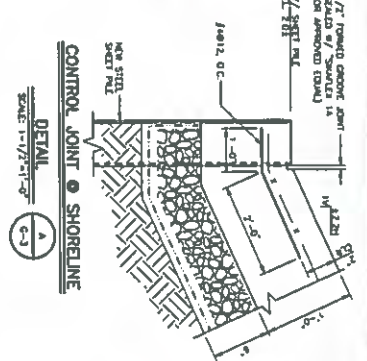
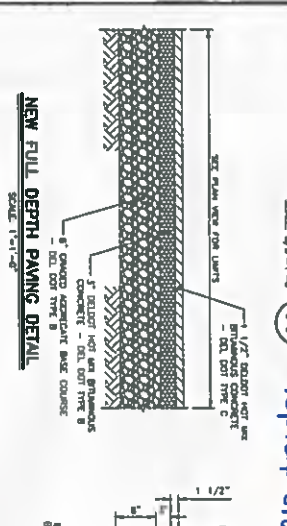
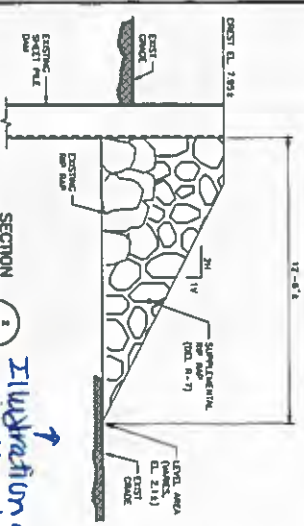
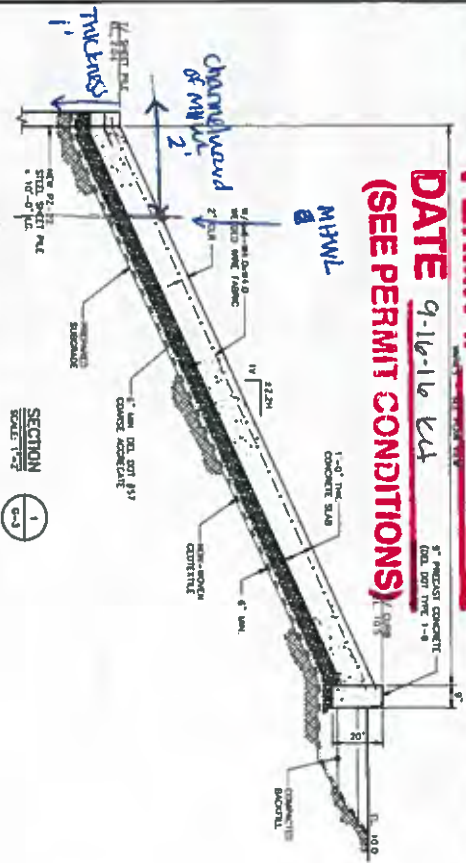
BY: [Signature]

APPROVED PLANS

PERMIT # 501WB-25616

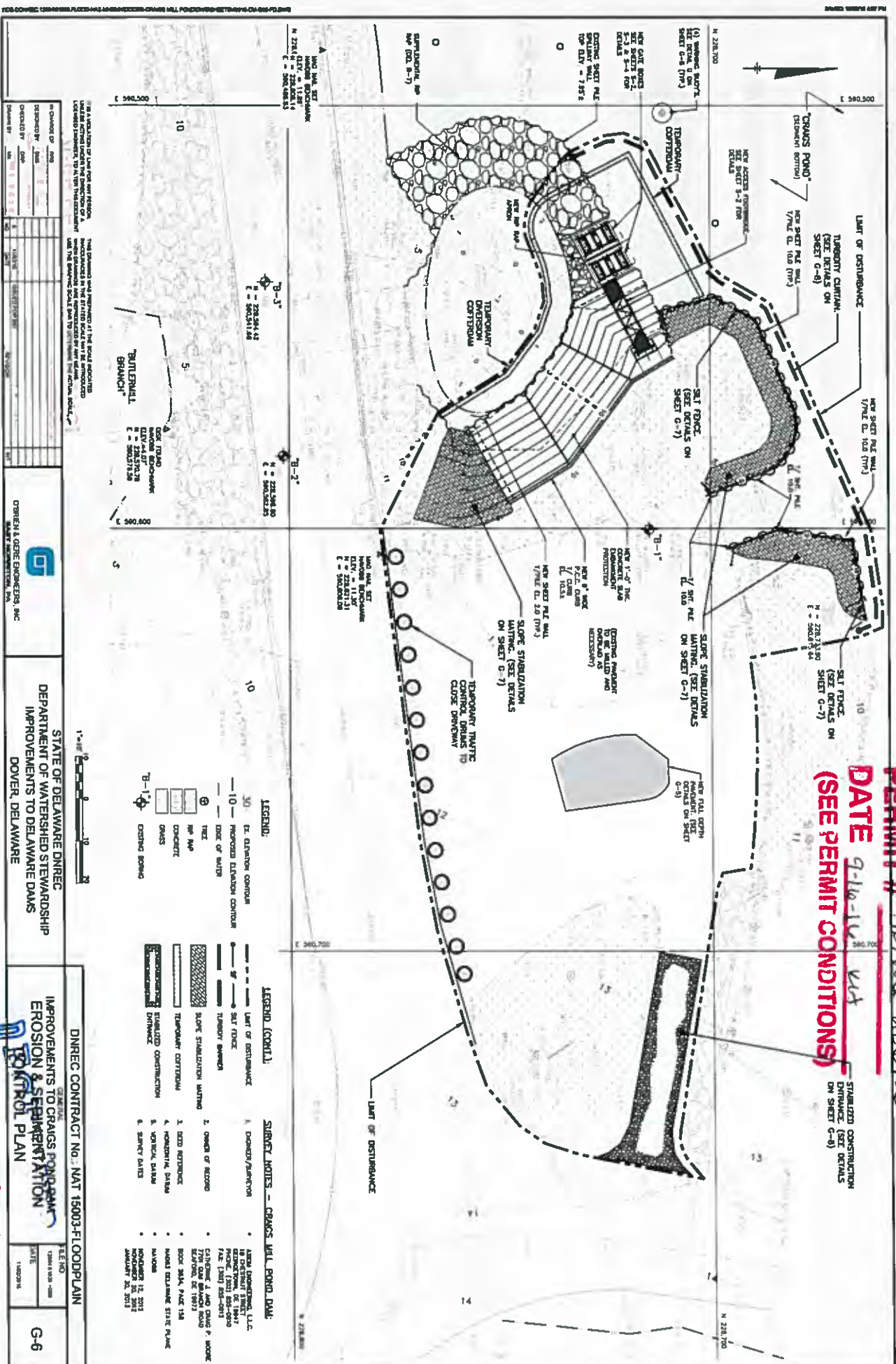
DATE 9-16-16 by (SEE PERMIT CONDITIONS)

DATE 1.5.2016



<p>THIS DRAWING IS A PART OF THE PROJECT AND IS NOT TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT THE WRITTEN PERMISSION OF THE ENGINEER.</p>	
<p>DESIGNED BY: [Signature]</p>	<p>CHECKED BY: [Signature]</p>
<p>DATE: 9/16/16</p>	<p>SCALE: 1"=1'-0"</p>
<p>STATE OF DELAWARE DNREC DEPARTMENT OF WATERSHED STEWARDSHIP IMPROVEMENTS TO DELAWARE DAMS DOVER, DELAWARE</p>	
<p>GENERAL DNREC CONTRACT NO.: NAT 15003-FL00DPLAIN</p>	
<p>PROJECT NO.: 15003-FL00DPLAIN</p>	<p>SECTION: G-5</p>

DATE 9-10-14 **(SEE PERMIT CONDITIONS)**



SAMPLE OF DISCUSSION

- [illegible]

APPROVED PLANS

DATE 9-16-16 **BY** KA
(SEE PERMIT CONDITIONS)

IMPROVEMENTS TO CRAIGS POND DAM EROSION & SEDIMENTATION CONTROL NOTES & DETAILS SHEET 1	GENERAL
	DRAWING NO.

Standard Detail 2 - Section 1000
Substructure below the Slab - Steps

Notes: Reinforcement bars must be placed in the wall and slab. The wall must be at least 12 inches thick. The footing must be at least 18 inches deep. The slab must be at least 4 inches thick. The wall must be finished with a smooth surface. The slab must be finished with a smooth surface. The wall must be finished with a smooth surface. The slab must be finished with a smooth surface.

Construction Notes:

1. Prepare and lay the footing using standard practices of the building and code.
2. Lay the wall on the footing by making the wall 12 inches thick. Lay the wall on the footing by making the wall 12 inches thick. Lay the wall on the footing by making the wall 12 inches thick.
3. Lay the wall on the footing by making the wall 12 inches thick. Lay the wall on the footing by making the wall 12 inches thick. Lay the wall on the footing by making the wall 12 inches thick.
4. Lay the wall on the footing by making the wall 12 inches thick. Lay the wall on the footing by making the wall 12 inches thick. Lay the wall on the footing by making the wall 12 inches thick.
5. Lay the wall on the footing by making the wall 12 inches thick. Lay the wall on the footing by making the wall 12 inches thick. Lay the wall on the footing by making the wall 12 inches thick.

Standard Detail 3 - Section 1000
Substructure below the Slab - Steps

Notes: Reinforcement bars must be placed in the wall and slab. The wall must be at least 12 inches thick. The footing must be at least 18 inches deep. The slab must be at least 4 inches thick. The wall must be finished with a smooth surface. The slab must be finished with a smooth surface. The wall must be finished with a smooth surface. The slab must be finished with a smooth surface.

Construction Notes:

1. Prepare and lay the footing using standard practices of the building and code.
2. Lay the wall on the footing by making the wall 12 inches thick. Lay the wall on the footing by making the wall 12 inches thick. Lay the wall on the footing by making the wall 12 inches thick.
3. Lay the wall on the footing by making the wall 12 inches thick. Lay the wall on the footing by making the wall 12 inches thick. Lay the wall on the footing by making the wall 12 inches thick.
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5. Lay the wall on the footing by making the wall 12 inches thick. Lay the wall on the footing by making the wall 12 inches thick. Lay the wall on the footing by making the wall 12 inches thick.

JUL 15 2016

[illegible][illegible]

W.S.L.S.
APPROVED PLANS
PERMIT # SD1WA-282116
DATE 9-16-16 VKT
(SEE PERMIT CONDITIONS)

JUL 15 2016

トモ

PRECAST CONCRETE NOTES (CONTINUED)

7. THE CONTRACTOR SHALL SUBMIT SHOP FABRICATION & INSTALLATION DRAWINGS FOR APPROVAL BY THE ARCHITECT & THE ENGINEER PRIOR TO BEGINNING THE WORK.

- [illegible]

2. ALL REPAIRS SHALL BE PERFORMED BY CERTIFIED

- [illegible]

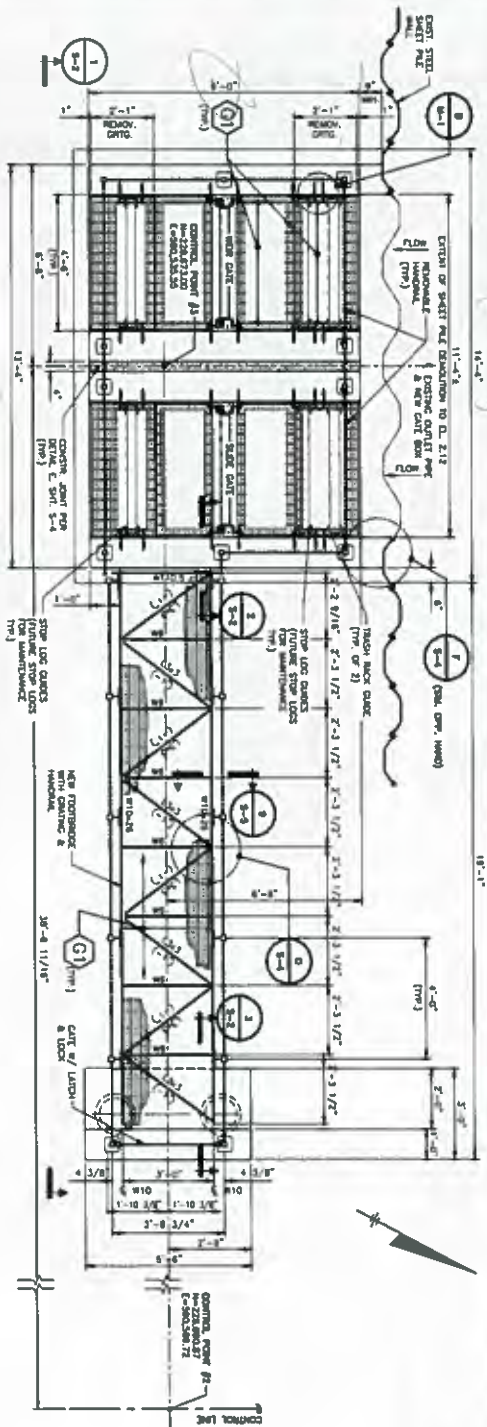
COMPRESSIVE STRENGTH AT 28-D

15. SHIELD SPEC. EXPOSED FOR VIBRATION AND DIRECTION OF PROTECTION. THE SHIELD SHALL BE 1/2" THICK AND SHALL BE 1/2" WIDE. THE SHIELD SHALL BE 1/2" WIDE AND SHALL BE 1/2" WIDE.
16. THE SHIELD SHALL BE 1/2" THICK AND SHALL BE 1/2" WIDE. THE SHIELD SHALL BE 1/2" THICK AND SHALL BE 1/2" WIDE.
17. THE SHIELD SHALL BE 1/2" THICK AND SHALL BE 1/2" WIDE. THE SHIELD SHALL BE 1/2" THICK AND SHALL BE 1/2" WIDE.
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STRUCTURAL IMPROVEMENTS TO CRAIGS POND DAM STRUCTURAL GENERAL NOTES AND SPECIFICATIONS	P. L.C. INC. 12004 L. WIS. - 881	S-1
	DATE _____ 1/20/2016	

STRUCTURAL IMPROVEMENTS TO CRAIGS POND DAM STRUCTURAL GENERAL NOTES AND SPECIFICATIONS	P. L.C. INC. 12004 L. WIS. - 881	S-1
	DATE _____ 1/20/2016	

5-1



GATE BOX AND BRIDGE PLAN @ EL. 10.12

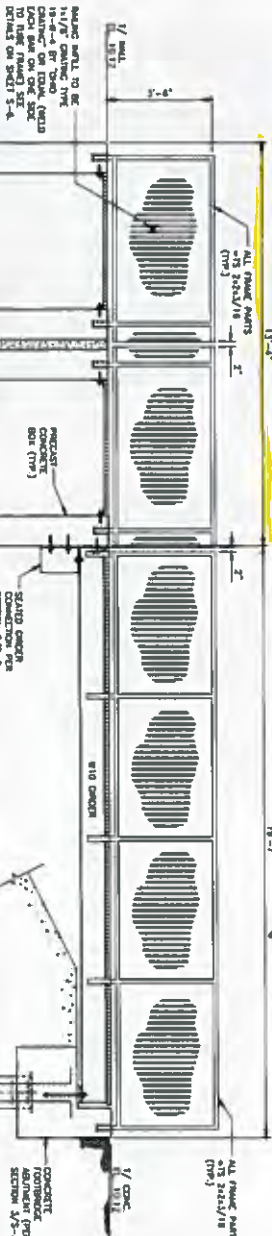
SCALE: 1/2" = 1'-0"

above water

SECTION 2

SCALE: 1" = 1'-0"

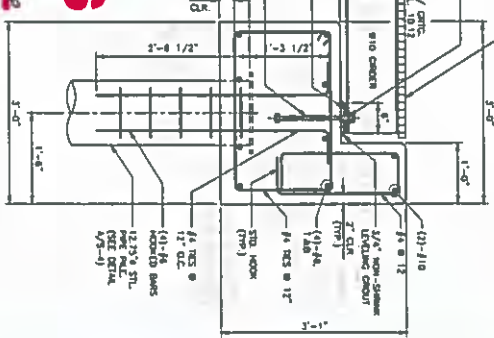
NOTES:
1. ALL ANCHORS SHALL BE #4.3 12 INCHES AND 18 INCHES
200 ADHESIVE (E.P.O.)



PLAN GENERAL NOTES:

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2. 1/2" DIA. 489 UNLESS NOTED THIS (-) ON PLAN FROM TOP OF STIL ELEVATION.
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20. 1/2" DIA. 489 UNLESS NOTED THIS (-) ON PLAN FROM TOP OF STIL ELEVATION.

W.S.L.
APPROVED PLANS
PERMIT # 2016-286116
DATE 9-16-16 Kit
(SEE PERMIT CONDITIONS)



DESIGNED BY	DATE
CHECKED BY	DATE
APPROVED BY	DATE

OTHEEN & DEERE ENGINEERS, INC.
P.O. BOX 1000
DOVER, DELAWARE 19901

STATE OF DELAWARE DNR
DEPARTMENT OF WATERSHED STEWARDSHIP
IMPROVEMENTS TO DELAWARE DAMS
DOVER, DELAWARE

DNR CONTRACT NO.: NAT 15003-FL000PLAN
IMPROVEMENTS TO GRAVE-SPRING-DAM
GATE BOX & BRIDGE FOUNDATION
PLAN & SECTIONS

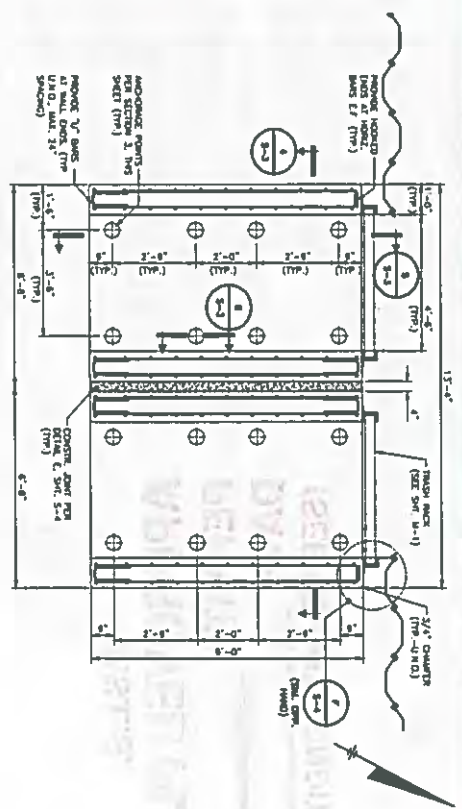
DATE	10/1/2016
DATE	10/1/2016
DATE	10/1/2016

S-2

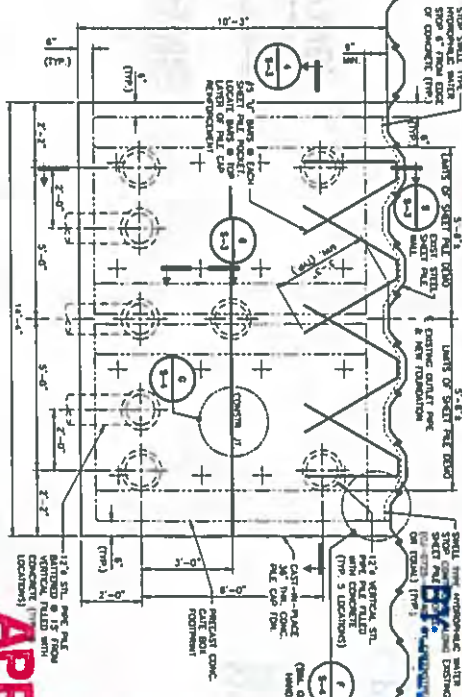
JUL 15 2016

BY: _____

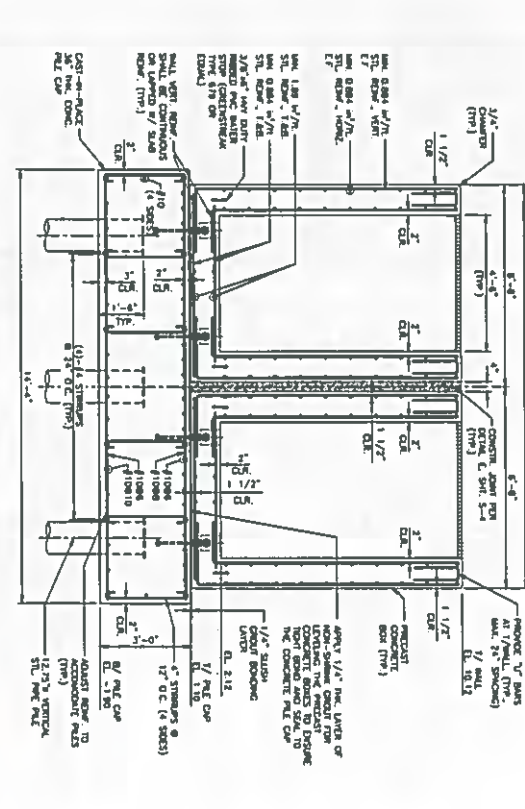
JUL 15 2016



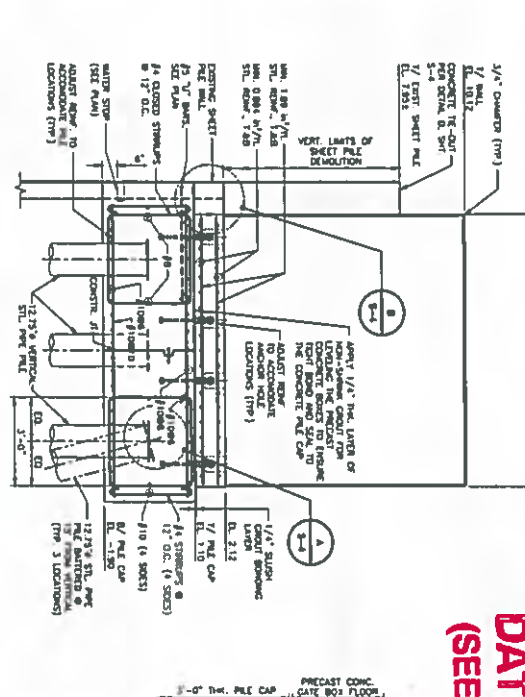
GATE BOX PLAN @ EL. 3.0
SCALE 1/2"=1'-0"



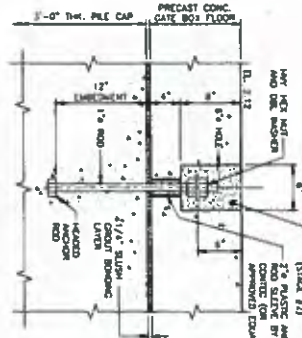
GATE BOX FOUNDATION PLAN @ EL. 1.10
SCALE 1/2"=1'-0"



SECTION 1-1
SCALE 1/2"=1'-0"



SECTION 2-2
SCALE 1/2"=1'-0"



TYPICAL GATE BOX ANCHOR ASSEMBLY
SCALE 1/2"=1'-0"

- DETAIL NOTES:**
- SEE SHEET S-1 FOR STRUCTURAL NOTES AND MATERIAL SPECIFICATIONS.
 - ANCHOR SHALL BE CORRODED WITH THE APPROVED ANCHOR, SHIP DRAWING.
 - LOCATION OF THE PRECAST CONCRETE GATE BOX IS BASED ON THE CENTERLINE OF THE GATE BOX. THE CENTERLINE OF THE GATE BOX SHALL BE USED TO LOCATE THE GATE BOX. THE CENTERLINE OF THE GATE BOX SHALL BE USED TO LOCATE THE GATE BOX. THE CENTERLINE OF THE GATE BOX SHALL BE USED TO LOCATE THE GATE BOX.
 - SEE DETAIL 4 ON SHEET S-1 FOR PILE DETAILS.

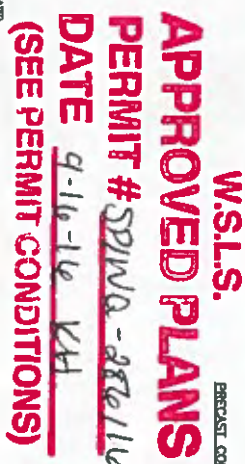
W.S.L.S
APPROVED PLANS
PERMIT # SP/NO. 280116
DATE 9-10-16 BY
(SEE PERMIT CONDITIONS)

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DESIGNED BY: **OSWALD & DEER ENGINEERS, INC.**
CHECKED BY: **OSWALD & DEER ENGINEERS, INC.**
DATE: **9-10-16**

STATE OF DELAWARE DNR&C
DEPARTMENT OF WATERSHED STEWARDSHIP
IMPROVEMENTS TO DELAWARE DAMS
DOVER, DELAWARE

DNR&C CONTRACT NO.: NAT 15003-FLOODPLAIN
IMPROVEMENTS TO CRAIGS POND DAM
GATE BOX FOUNDATION & CONCRETE
REINFORCING PLANS & SECTIONS
S-3



1. DAILY LATITUDE, LONGITUDE, AND COORDINATES OF THE FIRST STEEL SHEET PILE AND PILE DRILLS (AND FACIES) IS NOT KNOWN AT THE TIME AND MUST BE OBTAINED AT THE FIELD OF THE CONTRACTOR.
2. THE DRILL IS CAPABLE OF PROVIDING A 30°-45° ANGLE, WITH-TWO FEET BETWEEN THE PILELAYS (PILINGS).
3. THE DRILL IS DESIGNED TO PENETRATE TO A DEPTH OF 100-120 FT. IN THE USUAL SOIL CONDITIONS (SAND, CLAY, GRAVEL, SILT, AND COARSE SAND).
4. THE DRILL MUST BE STATIONED INLAND, NEAR, AND SHALL BE IN CONFORMANCE WITH ALL CITY, STATE, AND FEDERAL REGULATIONS.
5. THE CONTRACTOR MUST FOLLOW THE REGULATION SCHEDULE TO ENSURE THE DRILL FUNCTIONS PROPERLY.

- [illegible]

- PLAN NOTES:**
1. SEE SHEET S-1 FOR STRUCTURAL NOTES AND MATERIAL SPECIFICATIONS
 2. ALL STEEL SHALL BE HOT-DIPPED GALVANIZED
 3. STL & ALUMINUM NOTES ON SHEET S-1.

JUL 15 2016

OTDRIN & GIERE ENGINEERS, INC.
EAST HARTFORD, PA

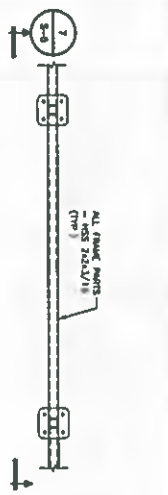
OTDRIN & GIERE ENGINEERS, INC.
EAST HARTFORD, PA

STATE OF DELAWARE UNITED
DEPARTMENT OF WATERSHED STEWARDSHIP
IMPROVEMENTS TO DELAWARE DAMS
DOVER, DELAWARE

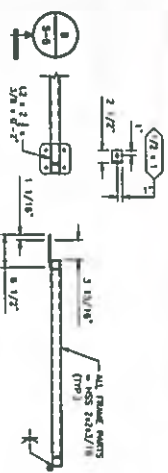
DIRECT CONTRACT No.: NAT 15003-FLOODPLAIN
 IMPROVEMENTS TO CRAIGS POND DAM
 MISCELLANEOUS STRUCTURAL
 SECTIONS & DETAILS SHEET 1

SHEET NO. 1
 DATE 11/08/2015

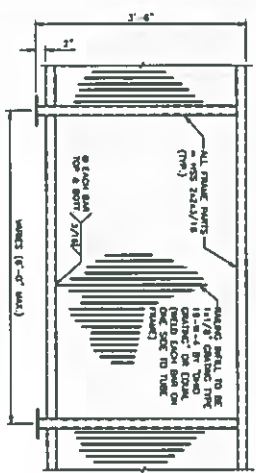
54



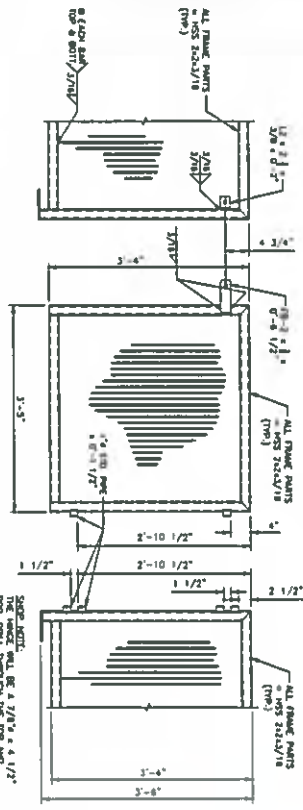
PLAN - TYPICAL SPAN
SCALE: 1/4"=1'-0"



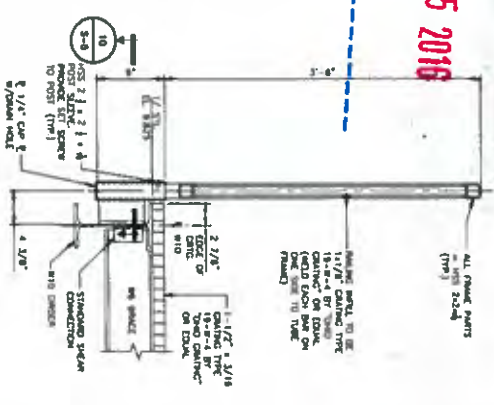
PLAN - AT GATE
SCALE: 1/4"=1'-0"



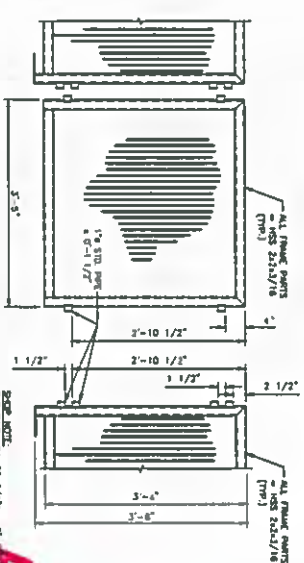
SECTION 1
SCALE: 1/4"=1'-0"



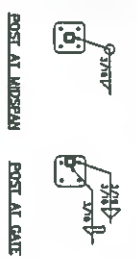
SECTION 2
SCALE: 1/4"=1'-0"



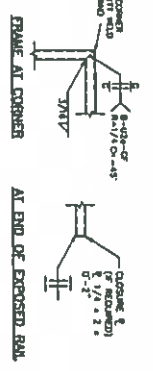
SECTION 3
SCALE: 1/4"=1'-0"



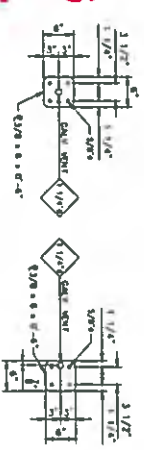
REMOVABLE HANDRAIL SECTION
SCALE: 1/4"=1'-0"



WELD CRITERIA
SCALE: 1/4"=1'-0"



SECTION 10
SCALE: 1/4"=1'-0"



W.S.L.S.
APPROVED PLANS
PERMIT #SP1WA-226116
DATE 9-16-16 V.H.
(SEE PERMIT CONDITIONS)

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DESIGNED BY: **OTBEN & GORE ENGINEERS, INC.**
CHECKED BY: **OTBEN & GORE ENGINEERS, INC.**
DATE: **9-16-16**

STATE OF DELAWARE DNREC
DEPARTMENT OF WATERSHED STEWARDSHIP
IMPROVEMENTS TO DELAWARE DAMS
DOVER, DELAWARE

DNREC CONTRACT NO.: NAT 15003-FLOODPLAIN
IMPROVEMENTS TO CRAIGS POND DAM
MISCELLANEOUS STRUCTURAL
SECTIONS & DETAILS SHEET 2

FILE NO.: **S-5**
DATE: **11/20/2014**

JUL 15 2016

BY: _____

(SEE SHEET 011000002)
 DWG
 150003-FLOODPLAIN
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 150003-FLOODPLAIN

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DESIGNED BY AND
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STATE OF DELAWARE DNREC
 DEPARTMENT OF WATERSHED STEWARDSHIP
 IMPROVEMENTS TO DELAWARE DAMS
 DOVER, DELAWARE

DNREC CONTRACT NO.: NAT 15003-FLOODPLAIN
 STRUCTURAL
 IMPROVEMENTS TO CRAIGS BOND DAM
 -NEW BENT RAMP DETAILS
 S.E. NO.
 15003-FLOODPLAIN
 DATE
 11/02/16
 S-6

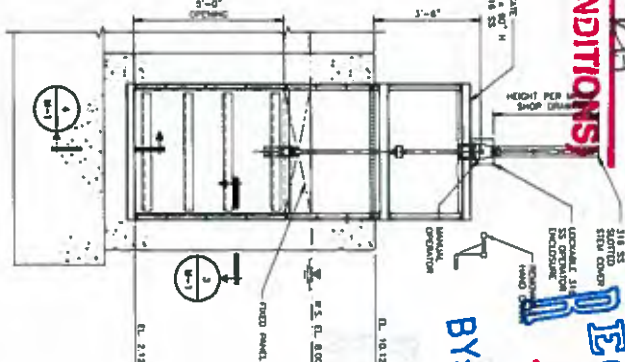
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 sheet
 1 JUL 15 2016
 BY: _____
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PERMIT # SP/WS-2526116

JUL 15 2016

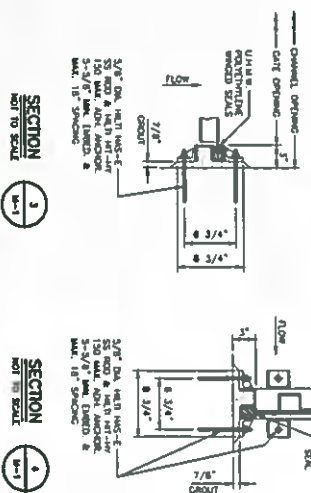
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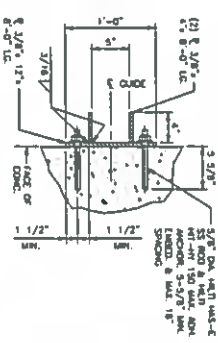
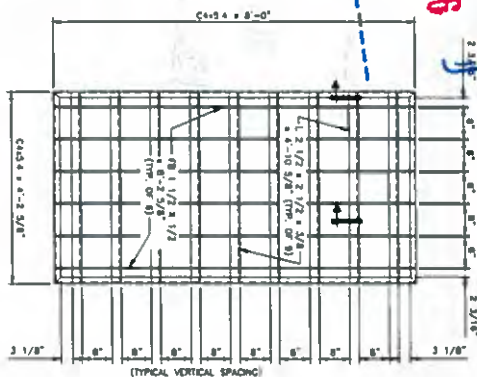


SCALE: 1/2"=1'-0"

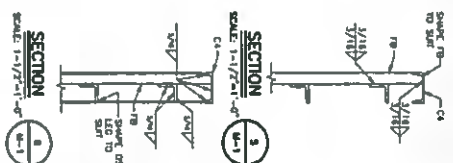
0-1=I/I : TNC



DETAIL


$$D-1 = 1/2 \text{ TMS}$$


CROSS SECTION



CONTRACTOR TO FIELD VERIFY ALL DIMENSIONS

1. CONTRIBUTION TO FIELD VISIT. ALL EMPLOYEES OF THE BUREAU OF LAND MANAGEMENT WHO PARTICIPATE IN FIELD VISITS SHALL BE REQUIRED TO CONDUCT THEMSELVES IN A MANNER BECOMING TO THE SERVICE AND TO THE AGENCY.
2. ATTENDED SERVICES IN CONTACT WITH THE PUBLIC. EMPLOYEES SHALL BE REQUIRED TO CONDUCT THEMSELVES IN A MANNER BECOMING TO THE SERVICE AND TO THE AGENCY.
3. RETAIL SHOPPING ON THE BUREAU AND AGENCY PROPERTY. EMPLOYEES SHALL BE REQUIRED TO CONDUCT THEMSELVES IN A MANNER BECOMING TO THE SERVICE AND TO THE AGENCY.
4. OPERATIONS ON THE BUREAU AND AGENCY PROPERTY. EMPLOYEES SHALL BE REQUIRED TO CONDUCT THEMSELVES IN A MANNER BECOMING TO THE SERVICE AND TO THE AGENCY.
5. ALL EMPLOYEES SHALL BE REQUIRED TO CONDUCT THEMSELVES IN A MANNER BECOMING TO THE SERVICE AND TO THE AGENCY.

THE GRADING WAS PERFORMED AT THE SCALE INDICATED
RECORDED IN THE STATED SCALE MAY BE ANTICIPATED
WHICH GRADINGS ARE ANTICIPATED BY ANY GRADING
USE THE GRADING SCALE DATA TO DETERMINE THE ACTUAL SCALE

[illegible]

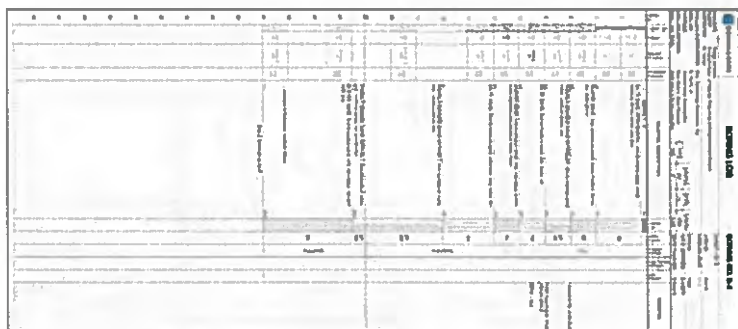
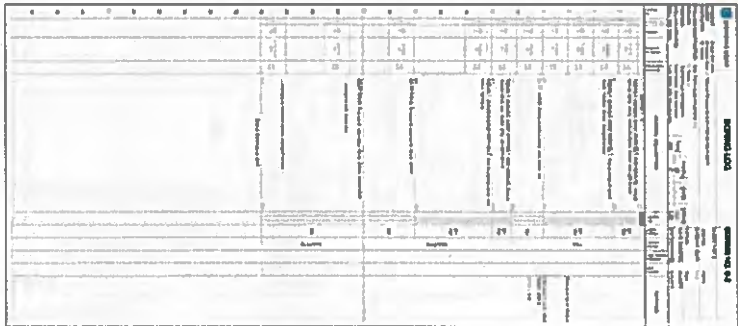
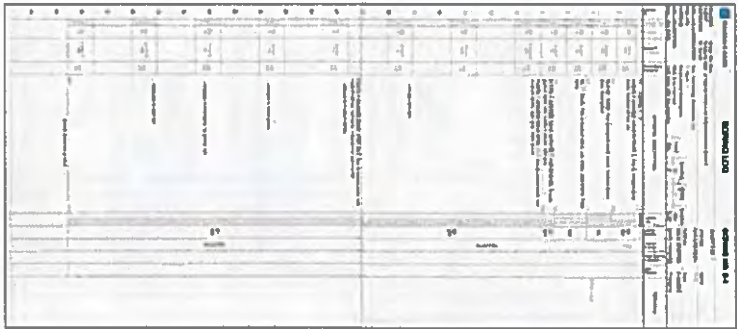
O'BRIEN & GERE ENGINEERS, INC.
EAST HAVEN, PA

STATE OF DELAWARE DNREC
DEPARTMENT OF WATERSHED STEWARDSHIP
IMPROVEMENTS TO DELAWARE DAMS
DOVER, DELAWARE

DNR&C CONTRACT NO.: NAT 15003-FLOODPLAIN MECHANICAL IMPROVEMENTS TO CRAMS POND DAM NEW GATES, TRASH RACK & STOP LOG GUIDE DETAILS	FILE NO.
	DRAWING NO. 15003-001 DATE 1/18/2011

M-

W.S.L.S.
APPROVED PLANS
PERMIT # SP1114.886116
DATE 9-16-16
(SEE PERMIT CONDITIONS)



JUL 15 2016

BY: [Signature]

IT IS A REQUIREMENT OF THE DELAWARE DEPARTMENT OF WATER RESOURCES THAT THE BORING LOGS BE PREPARED BY A LICENSED PROFESSIONAL ENGINEER OR A LICENSED PROFESSIONAL SURVEYOR. THE BORING LOGS MUST BE PREPARED IN ACCORDANCE WITH THE DELAWARE DEPARTMENT OF WATER RESOURCES BORING LOG SPECIFICATIONS. THE BORING LOGS MUST BE PREPARED IN ACCORDANCE WITH THE DELAWARE DEPARTMENT OF WATER RESOURCES BORING LOG SPECIFICATIONS. THE BORING LOGS MUST BE PREPARED IN ACCORDANCE WITH THE DELAWARE DEPARTMENT OF WATER RESOURCES BORING LOG SPECIFICATIONS.

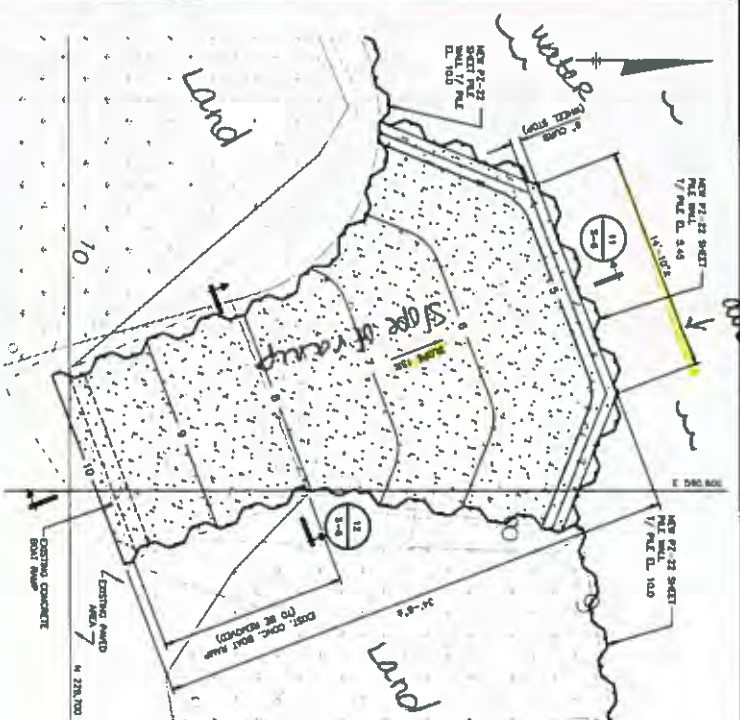


STATE OF DELAWARE DNREC
DEPARTMENT OF WATERSHED STEWARDSHIP
IMPROVEMENTS TO DELAWARE DAMS
DOVER, DELAWARE

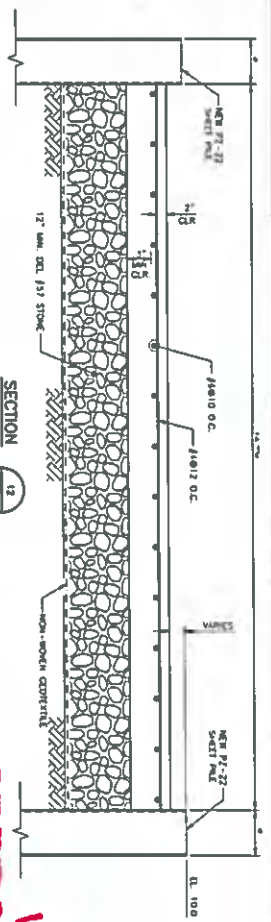
DNREC CONTRACT NO. NAT 15003-FL000PLAIN
REFERENCE
IMPROVEMENTS TO CRAIGS POND DAM
BORING LOGS

FILE NO.
DATE
REF-1

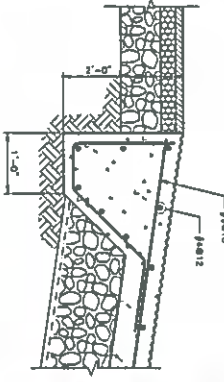
average width of new return



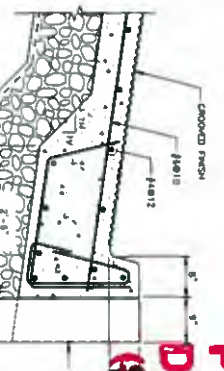
PLAN - NEW CONCRETE BOAT RAMP
SCALE: 1/8"=1'-0"



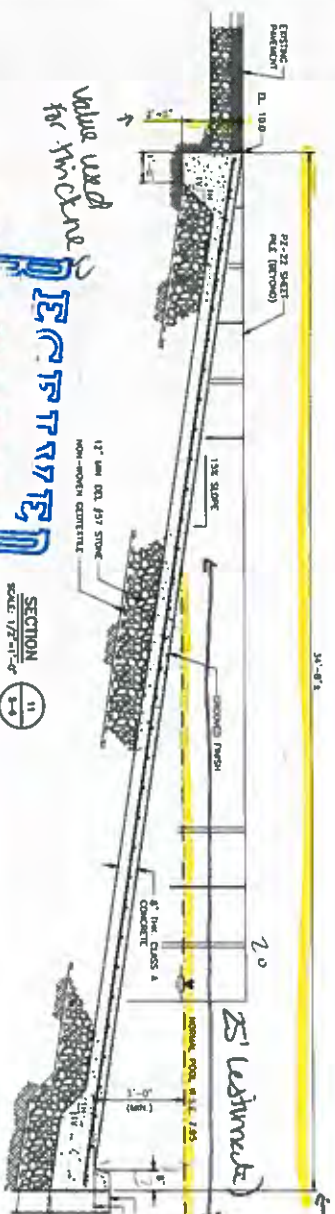
SECTION 11
SCALE: 1/2"=1'-0"



DETAIL 1
SCALE: 1/4"=1'-0"



DETAIL 2
SCALE: 1/4"=1'-0"



SECTION 12
SCALE: 1/2"=1'-0"

← length of Boat ramp ~ 35'

25' (estimate) →
→ remove pool / return

value used for structure

DESIGNED BY	DATE	REVISION	BY

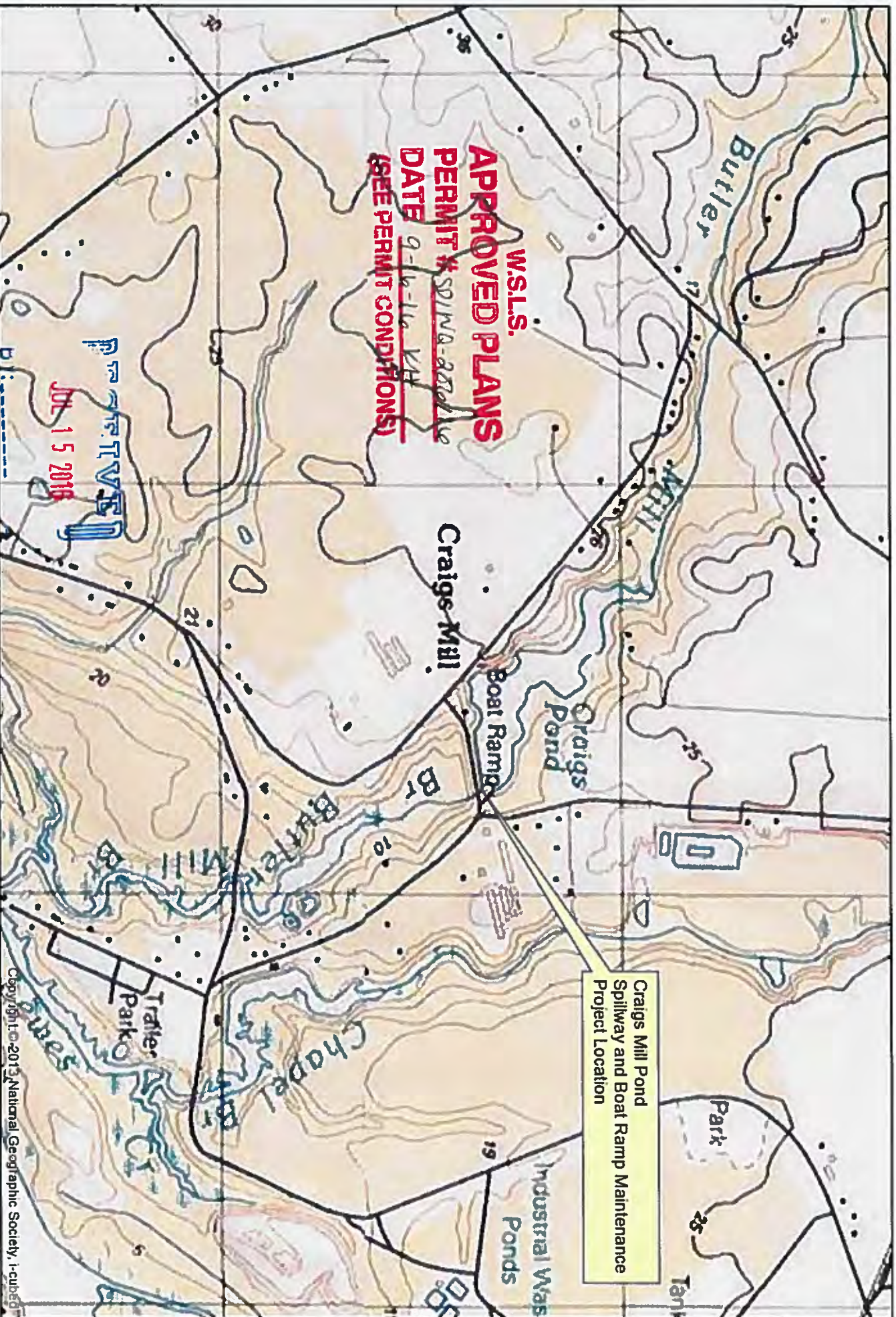
O'BRIEN & GIER ENGINEERS, INC.
1001 W. 10TH STREET, SUITE 100
DOVER, DELAWARE 19901

STATE OF DELAWARE DNREC
DEPARTMENT OF WATERSHED STEWARDSHIP
IMPROVEMENTS TO DELAWARE DAMS
DOVER, DELAWARE

DNREC CONTRACT NO.: NAT 15003-FLOODPLAIN	STRUCTURAL	DATE	1/24/2018	1/24/2018
IMPROVEMENTS TO CRAIGS POND DAM	NEW BOAT RAMP DETAILS	DATE	1/24/2018	1/24/2018

S-6

W.S.L.S.
APPROVED PLANS
PERMIT # SP16-282114
DATE 9-16-16 let
(SEE PERMIT CONDITIONS)

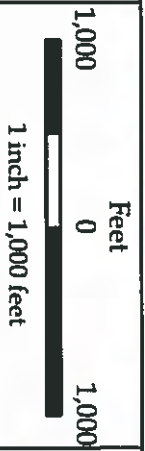


Craig's Mill Pond
 Dam Spillway & Boat Ramp Improvements
 Topographic Map

This map was compiled by the DNR, Division of Watershed Stewardship, Drainage Program. Ditch locations and all features are approximate and based on field information, other agency layers and original (as ditch) maps. This map does not replace legal ditch measurements on file at the county professional office.

Property lines are approximate and may have changed since the date this map was made.

Map Created by: malsbach@dnr.gov
 Map Created on: 1/15/2016 at 12:01:32 PM





WETLANDS AND SUBAQUEOUS LANDS SECTION

PERMIT NO.: SP/WQ-286/16

CONSTRUCTION EXPIRATION DATE: 9/22/2019

FOR THE FOLLOWING ACTIVITIES:

- To install a temporary diversion cofferdam upstream of the existing spillway
- To remove an existing 15 foot long, 36-inch diameter low-level outlet pipe with associated portion of vertical sheet pile wall
- To place 4.66 cubic yards of stone and concrete fill for a new pile foundation
- To install a two-cell box culvert containing a weir and slide gate
- To install a 3.5 foot wide by 20 foot long catwalk to access the two-cell box culvert
- To remove existing concrete slope protection adjacent to the spillway and install a vertical sheet pile wall and place 4.29 cubic yards of stone concrete fill for the new concrete slope protection
- To remove existing concrete slope protection adjacent to the boat ramp and install a vertical sheet pile wall adjacent to the ordinary water line
- To install a temporary cofferdam and to remove an existing 15 foot wide by 15 foot long boat ramp and install a 15 foot wide by 35 foot long boat ramp by placing 28.06 cubic yards of stone and concrete fill
- To place an additional 9.34 cubic yards of rip-rap replenishment in the spillway

LOCATED ON PUBLIC SUBAQUEOUS LANDS:

In Craig's Mill Pond
On Craig's Mill Road
Seaford, Sussex County, Delaware

ISSUED TO: DNREC – Division of Fish & Wildlife, C/o: Larry Horan

LOCATION OF WORK: Same as above

**DISPLAY THIS CERTIFICATE IN A HIGHLY
VISIBLE LOCATION ON THE JOB SITE.**

Authorized by:

Delaware Coastal Management Federal Consistency Determination



STATE OF DELAWARE
DEPARTMENT OF NATURAL RESOURCES & ENVIRONMENTAL CONTROL

DELAWARE COASTAL
MANAGEMENT PROGRAM

89 KINGS HIGHWAY
DOVER, DELAWARE 19901

Phone: (302) 739- 9283
Fax: (302) 739-2048

September 19, 2016

RECEIVED

SEP 23 2016

Melissa A. Hubert
Division of Watershed Stewardship
Department of Natural Resources and Environmental Control
21309 Berlin Rd Unit #6
Georgetown, DE 19947

**RE: *Delaware Coastal Management Federal Consistency Review
Craigs Mill Pond Dam Spillway Improvements (FC# 2016.0119)***

Dear Ms. Hubert:

The Delaware Coastal Management Program (DCMP) has received and reviewed your consistency determination for the Craigs Mill Pond Dam Spillway Improvement Project (FC# 2016.0119). The project includes proposed improvements to the Craigs Mill Pond Dam which will be replaced by a two-cell box culvert weir, slide gate, and catwalk as well as maintenance to the existing boat ramp.

Based upon our review and pursuant to National Oceanic & Atmospheric Administration regulations (15 CFR 930), the DCMP conditionally concurs with your consistency determination for the above referenced project. Our concurrence is based on the adherence to restrictions and/or conditions placed on any and all permits issued to you for this project and the following conditions:

1. Existing water levels shall not be altered and sufficient flow shall be maintained to ensure adequate dissolved oxygen levels in the pond and downstream.
2. Sedimentation during construction activities shall be minimized to limit impacts to the state-rare freshwater mussel species, Northern Lance (*Elliptio fisheriana*).
3. State-rare snakes have been documented downstream of the project site. If a snake is observed during project activities, attempts shall be made to avoid them and not to harm them.

These conditions are necessary in order to satisfy the DCMP Living Resources policy 5.11.1.1 and Nongame and Endangered Species policy 5.11.3 which refer to protecting

Delaware's good nature depends on you!

living resources and rare/endangered wildlife in the state from adverse environmental effects. They are also necessary to be compliant with Coastal Waters Management Policies 5.3.1.4 and 5.3.1.6

Failure to comply with the conditions above will result in this conditional concurrence henceforth being considered an objection. Under this scenario, the applicant is advised that pursuant to 15 CFR part 930, subpart H, and within 30 days from receipt of this letter, you may request that the Secretary of Commerce override the objection. In order to grant an override request, the Secretary must find that the activity is consistent with the objectives or purposes of the Coastal Management Act, or is necessary in the interest of national security. A copy of the request and supporting information must be sent to the Delaware Coastal Management Program and the federal permitting or licensing agency. The Secretary may collect fees for administering and processing your request.

The DCMP also offers the following comments for consideration:

The boat ramp and parking area are open to the public. Larry Horan of the Fisheries Section in the Division of Fish and Wildlife should be notified when the work authorized by this Permit/Certification is scheduled so that a press release can be coordinated. (302-739-9084 or Larry.Horan@state.de.us).

If you have any questions or would like to discuss the conditions or comments included in this letter, please contact me or Amanda Santoni of my staff at (302) 739-9283.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Dr. Scarborough', is written over a faint circular official stamp.

Dr. Robert Scarborough, Acting Administrator
Delaware Coastal Management Program

SWC/as

cc: File 2016.0080
Devin Ray- USFWS
Kate Fleming-WSCR
Craig Lukezic-SHPO

DNREC Standard Sediment and Stormwater Plan Approval



DNREC Division of Watershed Stewardship
89 Kings Highway
Dover, DE 19901
(302) 739-9921

APPLICATION FOR STANDARD PLAN APPROVAL
**NON-RESIDENTIAL CONSTRUCTION
WITH LESS THAN 1.0 ACRE DISTURBED**

Approval of this Standard Sediment and Stormwater Plan may be granted if all of the following criteria are met:

1. The disturbed area for construction of the improvements will not exceed 1.0 acre.
2. Within the disturbed area, the pre-development land use is not classified as "wooded" based on the 2007 Delaware Land Use/Land Cover data.
3. One of the following is met:
 - a. Project site location is within an area previously managed for stormwater quantity and quality under an approved Sediment and Stormwater Plan, AND the post construction condition meets the original stormwater design criteria, OR
 - b. Comparison of the existing parcel curve number (CN), based upon 2007 Delaware Land Use/Land Cover data to the proposed CN for the parcel after non-residential construction results in less than one whole number change in the CN, OR
 - c. No new impervious area is proposed as a result of construction.

Site Information

Project Name: <u>Improvements to Craigs Pond Dam</u>	Parcel Total Acres (nearest 0.1ac): <u>1.9</u>
Site Location: <u>West side of Rd#556 (Figgs Road)</u>	Disturbed Acres (nearest 0.1ac): <u>0.3</u>
Previous Plan Name: <u>N/A</u>	Proposed Impervious Area (square feet): <u>0</u>
Previous Plan Approval Number: <u>N/A</u>	Wooded area to be cleared: <u>0</u>
Tax Parcel ID: <u>5-31 12.00 123.00</u>	Pre CN: <u>37</u> Post CN: <u>37</u>

Applicant Information

Owner: <u>State of Delaware</u>	Applicant: <u>DE DNREC Division of Fish & Wildlife</u>
Mailing Address: <u>PO Box 778 Dover, DE 19903</u>	Mailing Address: <u>89 Kings Highway Dover, DE 19901</u>
Owner Phone: _____	Applicant Phone: <u>302-739-9910</u>

Fees

The review fee is \$80 per disturbed acre to the nearest 0.1 acre with a minimum fee of \$80 for any standard plan approvals disturbing less than 1.0 acre. Make checks payable to Division of Watershed Stewardship.

Approval Information (for office use only)

Approval # <u>2016-103</u>	Fee Paid: \$ <u>0 (WAIVED)</u>
Approved by: <u>Randall K. Green</u>	Approval Date: <u>10/12/16</u>
Title: <u>E II</u>	Expiration Date: <u>10/12/21</u>

Applicant Certification

I, the undersigned, certify that the information supplied on this Application for Standard Plan Approval is accurate, the proposed land disturbing activity meets the criteria established, and all conditions of this Standard Plan Approval will be met by the applicant, builder, contractor, and owner during construction and post construction.

Applicant Signature: Loren K. Thom

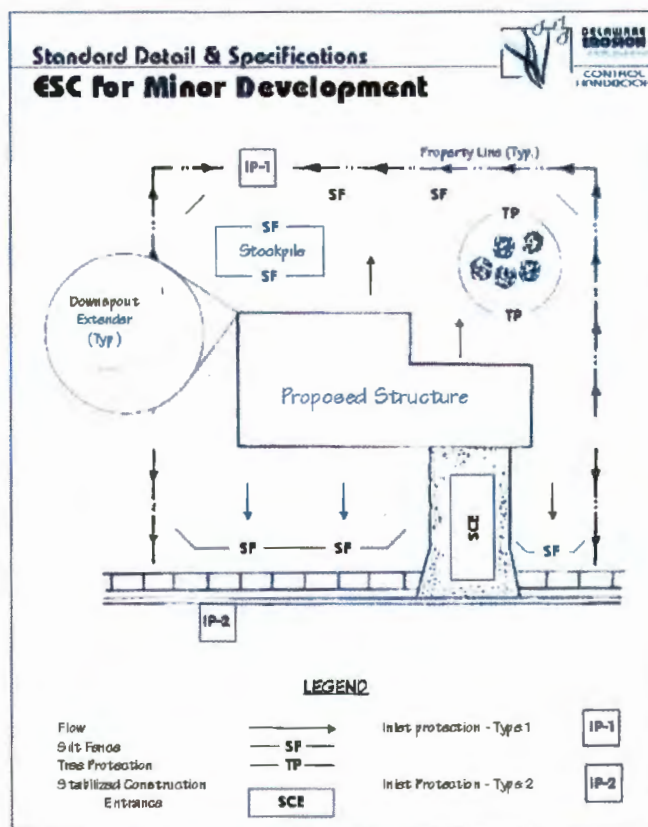
Date: 6/3/16

Applicant Printed Name: LAWRENCE R. HORAN

Title: CONSTRUCTION PROJECT MANAGER

Conditions

1. Discharges from rooftops will be disconnected using one of the following methods or another method approved by the Department or Delegated Agency:
 - a. Individual downspouts will discharge to lawn or landscape area.
 - b. Discharges from downspouts will be collected to discharge to a rain garden.
 - c. Discharges from downspouts will be collected in rain barrels or cisterns for reuse.
2. Driveways, sidewalks, patios, and other impervious surfaces will be graded to sheet flow to lawn or other pervious areas to the maximum extent practicable.
3. Construction site stormwater management best management practices will be used. *Sample best management practices provided in the standard detail below.*



Stabilization Conditions

1. Following initial soil disturbance or redistribution, temporary or permanent stabilization with seed and mulch shall be completed within 14 calendar days to the surface of all disturbed areas not actively under construction.
2. Specific stabilization recommendations may be found in the Delaware Erosion and Sediment Control Handbook, 3.4.3 Standard and Specifications for Vegetative Stabilization.

THIS INDENTURE, made this 30th day of August, A. D. 1962, BETWEEN

MAITLAND C. JOHNSON and VERCIE M. JOHNSON, his wife, ALLEN D. FIGGS and HELEN E. FIGGS, his wife, FLOYD A. TULL and VIRGINIA E. TULL, his wife, all of Seaford, Sussex County, Delaware, parties of the first part,

AND

THE STATE OF DELAWARE, for the use of the Board of Game and Fish Commissioners, Dover, Kent County, Delaware, party of the second part.

WITNESSETH: That the parties of the first part for and in consideration of the sum of one dollar (\$1.00), lawful money of the United States of America, to them in hand paid by the party of the second part, the receipt whereof is hereby acknowledged, do hereby grant and convey unto the party of the second part, its successors and assigns, forever,

ALL the easement, right and privilege of flowing with water all the lands of the parties of the first part caused by raising the water level of the waters known as Craig's Mill, near Seaford, Sussex County, State of Delaware, to a level of nine (9) feet above sea level, TOGETHER with the easement, license, right and privilege of doing all acts necessary and proper for the erection and maintenance of a clean and pure pond.

TO HAVE AND TO HOLD said easements, rights and privileges together with all and singular the hereditaments and appurtenances thereunto belonging or in anywise appertaining, to the party of the second part, its successors and assigns, forever.

IN WITNESS WHEREOF, the parties of the first part have
hereunto set their hands and seals the day and year aforesaid,

Signed, Sealed and Delivered
in the Presence of:

Reuben B. Hardesty
As To All

Maitland C. Johnson (SEAL)
Maitland C. Johnson

Vercie M. Johnson (SEAL)
Vercie M. Johnson

Allen D. Figgs (SEAL)
Allen D. Figgs

Helen E. Figgs (SEAL)
Helen E. Figgs

Floyd A. Tull (SEAL)
Floyd A. Tull

Virginia E. Tull (SEAL)
Virginia E. Tull

STATE OF DELAWARE X
 : SS.
COUNTY OF SUSSEX X

BE IT REMEMBERED, that on this 30th day of August,
A. D. 1962, personally came before me, the Subscriber, a Notary
Public for the State and County aforesaid, MAITLAND C. JOHNSON,
VERCIE M. JOHNSON, ALLEN D. FIGGS, HELEN E. FIGGS, FLOYD A. TULL
and VIRGINIA E. TULL, parties to this indenture, known to me
personally to be such and they acknowledged this indenture to be
their act and deed.

GIVEN under my Hand and Seal of Office the day and
year aforesaid.

Reuben B. Hardesty
Notary Public

RECEIVED FOR RECORD

September 27 A. D. 1962
G. EDWARD VEASEY, Recorder



APPENDIX B
DETOUR PLAN FOR CHIPMANS POND ROAD

PORTABLE CHANGEABLE MESSAGE SIGNS

PRIOR TO DETOUR
(10 DAYS PRIOR TO BEGINNING OF DETOUR)

PCMS-1

CHIPMANS
POND RD
TO CLOSE

STARTING
XX/XX/XX

DURING DETOUR
(DISPLAY FOR 5 DAYS AFTER IMPLEMENTATION OF DETOUR)

PCMS-1

CHIPMANS
POND RD
CLOSED

FOLLOW
DETOUR

SPECIAL SIGNS

Y

Chipmans
Pond Rd
CLOSED
East of
Fire Tower
Rd

FOLLOW
DETOUR

6" C

6" C

6" C

6" C

6" C

6" C

6" C

72"

48"

* D/G RETROREFLECTIVE
FLUORESCENT ORANGE

LEGEND

A

DETOUR

M4-9-DE

B

DETOUR

M4-9

C

DETOUR

M4-9

D

DETOUR

M4-9

E

DETOUR

M4-9

F

DETOUR

M4-9

G

DETOUR

M4-9

H

DETOUR

M4-9

I

DETOUR

M4-9

J

END
DETOUR

M4-8a

K

DETOUR
AHEAD

W20-2

L

DETOUR
1000 FT

W20-2

M

DETOUR
500 FT

W20-2

N

ROAD
CLOSED
AHEAD

W20-3

O

ROAD
CLOSED
1000 FT

W20-3

P

ROAD
CLOSED
500 FT

W20-3

Q

ROAD
CLOSED

R11-2

R

DETOUR

M4-10(L)

S

DETOUR

M4-10(R)

T

ROAD CLOSED
XX MILES AHEAD
LOCAL TRAFFIC ONLY

R11-3a

U

BRIDGE OUT
XX MILES AHEAD
LOCAL TRAFFIC ONLY

R11-3b

V

ROAD CLOSED
TO
THRU TRAFFIC

R11-4

W

X

GENERAL NOTES

1. ALL DETOUR SIGNING, INCLUDING TRAILBLAZERS, ARE TO BE SUPPLIED AND MAINTAINED BY THE GENERAL CONTRACTOR IN COMPLIANCE WITH "THE DELAWARE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (DE MUTCD.)

2. THE CONTRACTOR SHALL COMPLY WITH GUIDELINES IN "THE DELAWARE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (DE MUTCD PART 6) FOR BARRICADES AND SIGNS (AS PER LATEST REVISION.)

3. DESIGN OF ALL SIGNS SHALL BE IN ACCORDANCE WITH THE FHWA STANDARD HIGHWAY SIGNS BOOK.

4. SIZES OF ALL SIGNS SHALL BE IN ACCORDANCE WITH "THE DELAWARE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (DE MUTCD.) SIZE OF SIGN SHALL BE BASED ON TYPE OF ROADWAY ON WHICH THE SIGN IS INSTALLED.

5. SIGNS NO LONGER IN USE SHALL BE COMPLETELY COVERED WITH NO RETROREFLECTIVE MATERIAL SHOWING, OR SHALL BE REMOVED, AS DIRECTED BY THE ENGINEER.

6. FIELD CONDITIONS MAY DICTATE CHANGES AT SOME TIME DURING THE LIFE OF THE CONTRACT. IN THE EVENT OF OMISSIONS OR CORRECTIONS, THE SIGNING PROVISIONS OF "THE DELAWARE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (DE MUTCD) WILL PREVAIL.

7. SIGNS "N" THROUGH "Q" AND "T" AND "V", THE WORD "ROAD" SHOULD BE CHANGED TO "RAMP", "RR XING", OR "BRIDGE" WHERE APPLICABLE.

8. WARNING SIGNS AND DETOUR TRAILBLAZERS SHALL BE MOUNTED ON BREAKAWAY POSTS AND HAVE RETROREFLECTIVE FLUORESCENT ORANGE SHEETING.

9. "W" BARRICADES SHALL COMPLETELY RUN THE FULL WIDTH OF THE ROADWAY.

10. BARRICADES SHALL BE A MINIMUM OF 6 FEET WIDE UNLESS DIRECTED BY THE ENGINEER.

RECOMMENDED <i>Rev. R. Post</i> DATE: 10/26/15	RECOMMENDED _____ DATE: _____	RECOMMENDED _____ DATE: _____	APPROVED CHIEF SAFETY OFFICER <i>Michael J. ...</i> DATE: 11-2-15	APPROVED TRAFFIC ENGINEER <i>AW</i> DATE: 11/3/15				
DELAWARE DEPARTMENT OF TRANSPORTATION	ADDENDUM / REVISIONS		NOT TO SCALE	IMPROVEMENTS TO DELAWARE DAMS CHIPMANS POND DAM	CONTRACT	PERMIT NO.	VEHICULAR DETOUR PLAN CHIPMANS POND ROAD	SHEET NO.
					N/A	DESIGNED BY: S. SZEWCAK		1
					COUNTY	CHECKED BY: D. PIZARRO		TOTAL SHTS.
					SUSSEX			1

APPENDIX C
DETOUR PLAN FOR CONCORD POND ROAD

PORTABLE CHANGEABLE MESSAGE SIGNS

PRIOR TO DETOUR
(10 DAYS PRIOR TO BEGINNING OF DETOUR)

PCMS-1

CONCORD
POND RD
TO CLOSE

STARTING
XX/XX/XX

DURING DETOUR
(DISPLAY FOR 5 DAYS AFTER IMPLEMENTATION OF DETOUR)

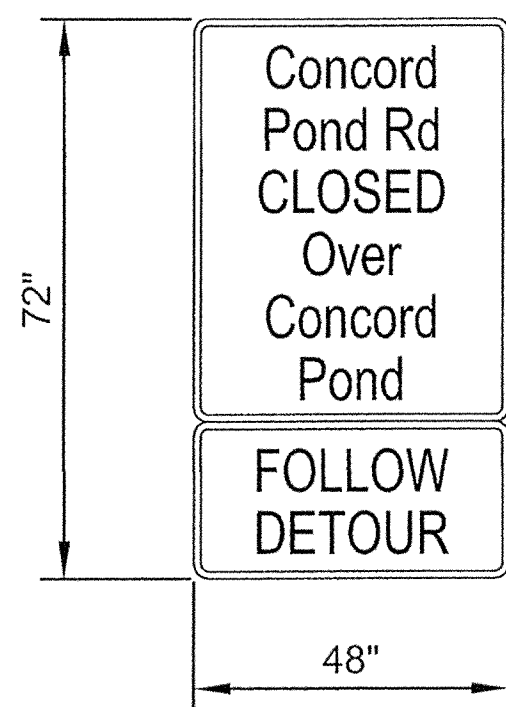
PCMS-1

CONCORD
POND RD
CLOSED

FOLLOW
DETOUR

SPECIAL SIGNS

Y



6" C
6" C
6" C
6" C
6" C
6" C

* D/G RETROREFLECTIVE
FLUORESCENT ORANGE



LEGEND

Legend showing various traffic signs and symbols used in the plan, including detour signs (A-E), road closed signs (F-J), and other traffic control devices (K-V).

(A) DETOUR M4-9-DE
(B) DETOUR M4-9
(C) DETOUR M4-9
(D) DETOUR M4-9
(E) DETOUR M4-9
(F) DETOUR M4-9
(G) DETOUR M4-9
(H) DETOUR M4-9
(I) DETOUR M4-9
(J) END DETOUR M4-8a
(K) DETOUR AHEAD W20-2
(L) DETOUR 1000 FT W20-2
(M) DETOUR 500 FT W20-2
(N) ROAD CLOSED AHEAD W20-3
(O) ROAD CLOSED 1000 FT W20-3
(P) ROAD CLOSED 500 FT W20-3
(Q) ROAD CLOSED R11-2
(R) DETOUR M4-10(L)
(S) DETOUR M4-10(R)
(T) ROAD CLOSED XX MILES AHEAD LOCAL TRAFFIC ONLY R11-3a
(U) BRIDGE OUT XX MILES AHEAD LOCAL TRAFFIC ONLY R11-3b
(V) ROAD CLOSED TO THRU TRAFFIC R11-4
(W) BARRICADE
(X) BARRICADE

GENERAL NOTES

- ALL DETOUR SIGNING, INCLUDING TRAILBLAZERS, ARE TO BE SUPPLIED AND MAINTAINED BY THE GENERAL CONTRACTOR IN COMPLIANCE WITH "THE DELAWARE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (DE MUTCD.)
- THE CONTRACTOR SHALL COMPLY WITH GUIDELINES IN "THE DELAWARE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (DE MUTCD PART 6) FOR BARRICADES AND SIGNS (AS PER LATEST REVISION.)
- DESIGN OF ALL SIGNS SHALL BE IN ACCORDANCE WITH THE FHWA STANDARD HIGHWAY SIGNS BOOK.
- SIZES OF ALL SIGNS SHALL BE IN ACCORDANCE WITH "THE DELAWARE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (DE MUTCD.) SIZE OF SIGN SHALL BE BASED ON TYPE OF ROADWAY ON WHICH THE SIGN IS INSTALLED.
- SIGNS NO LONGER IN USE SHALL BE COMPLETELY COVERED WITH NO RETROREFLECTIVE MATERIAL SHOWING, OR SHALL BE REMOVED, AS DIRECTED BY THE ENGINEER.
- FIELD CONDITIONS MAY DICTATE CHANGES AT SOME TIME DURING THE LIFE OF THE CONTRACT. IN THE EVENT OF OMISSIONS OR CORRECTIONS, THE SIGNING PROVISIONS OF "THE DELAWARE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (DE MUTCD) WILL PREVAIL.
- SIGNS "N" THROUGH "Q" AND "T" AND "V", THE WORD "ROAD" SHOULD BE CHANGED TO "RAMP", "RR XING", OR "BRIDGE" WHERE APPLICABLE.
- WARNING SIGNS AND DETOUR TRAILBLAZERS SHALL BE MOUNTED ON BREAKAWAY POSTS AND HAVE RETROREFLECTIVE FLUORESCENT ORANGE SHEETING.
- "W" BARRICADES SHALL COMPLETELY RUN THE FULL WIDTH OF THE ROADWAY.
- BARRICADES SHALL BE A MINIMUM OF 6 FEET WIDE UNLESS DIRECTED BY THE ENGINEER.

RECOMMENDED *Robert B. Rowers* DATE: 10/26/15

RECOMMENDED _____ DATE: _____

RECOMMENDED _____ DATE: _____

APPROVED CHIEF SAFETY OFFICER *William H. Hays* DATE: 11-2-15

APPROVED TRAFFIC ENGINEER *John H. Hays* DATE: 11/2/15



ADDENDUM / REVISIONS	

NOT TO SCALE

IMPROVEMENTS TO
DELAWARE DAMS
CONCORD POND DAM

CONTRACT	PERMIT NO.
N/A	DESIGNED BY: S. SZEWCZAK
COUNTY	CHECKED BY: D. PIZARRO
SUSSEX	

VEHICULAR DETOUR PLAN
CONCORD POND ROAD

SHEET NO.
1
TOTAL SHTS.
1

APPENDIX D
TRAFFIC MANAGEMENT PLAN FOR CRAIGS MILL ROAD

TRAFFIC MANAGEMENT PLAN IMPROVEMENTS TO CRAIGS POND DAM

INTRODUCTION

Craigs Pond Dam is located in the Town of Seaford, Sussex County, Delaware across the Butler Mill Branch, a tributary to the Nanticoke River. The site is shown on [Figure 1](#). The dam impounds Craigs Pond and is jointly owned by the Delaware Department of Natural Resources and Environmental Control (DNREC) and the Delaware Department of Transportation (DelDOT).

Craigs Pond Dam is an earth embankment dam, primarily comprised of the embankment carrying Craigs Mill Road. The outlet consists of a sheet pile weir with a height of approximately 7 feet. A 36" diameter ductile iron pipe through the sheet pile comprises the low level outlet for the dam. The pipe inlet is controlled by a stop log structure. Discharge from the pond spills over the sheet pile weir into a small rock lined basin upstream of two corrugated metal pipe culverts carrying the Butler Mill Branch beneath Craigs Mill Road. The dam is primarily used for recreational purposes. A parking area and boat ramp are located just east of the dam.

PROJECT DESCRIPTION

The proposed improvements are intended to enhance DNREC's ability to control the level of water in Craigs Pond. When practical, DNREC lowers the water level in Craigs Pond in anticipation of large storm events to reduce the potential overtopping of Craigs Mill Road. In its current configuration, operation of the existing low level outlet is difficult and hazardous to personnel.

The proposed improvements consist of the removal of the existing low level outlet and a portion of the sheet pile weir. A new concrete box structure will be installed in the weir structure to mount two stainless steel gates. A weir gate will serve to lower the water level by approximately 2.75 feet. A slide gate will serve as the low level outlet to completely drain the pond if necessary. The new outlet structure will be equipped with trash racks and slots for stop logs for maintenance. The outlet structure will be supported on concrete filled steel pipe piles. The outlet structure will be connected to the shoreline by a steel pedestrian bridge for easy access. Additional improvements include the replacement of concrete slope protection, installation of additional rock riprap downstream of the existing sheet pile weir, and improvements to the adjacent parking lot and boat ramp.

PROJECT CONTACT INFORMATION

Owner: Delaware Department of Natural Resources and Environmental Control
David Twing, P.E., State Dam Safety Engineer
89 Kings Highway
Dover, DE 19901
Email: David.Twing@state.de.us
Phone: 302-834-5557
Fax: 302-739-6724

Design Engineer: O'Brien & Gere Engineers, Inc.
Dana Pizarro, P.E., Senior Project Manager
Bentwood Campus
301 E. Germantown Pike, 3rd Floor
East Norriton, PA 19401
Email: Dana.Pizarro@obg.com
Phone: 484-804-7254
Fax: 215-628-9100

SEQUENCE OF CONSTRUCTION

The Project is anticipated to be bid in the Spring of 2016. Key steps in the construction include:

- Mobilization – The Contractor will stage equipment and materials from the existing parking lot to the east of the dam.
- Install Control of Water Measures – It is anticipated that a sheet pile cofferdam or Portadam will be installed upstream of the work area.
- Perform demolition of the existing outlet structure and sheet pile.
- Install new concrete outlet structure and gates.
- Install new access bridge and concrete slope protection.
- Place new riprap downstream of sheet pile.
- Install new shoreline protection and boat ramp.
- Restore disturbed areas, clean pavement and demobilize.

Construction is anticipated to be completed within 120 days from mobilization to the project site.

TRAFFIC MANAGEMENT PLAN

Craigs Mill Road and Figgs Road are relatively low volume local roads. Based on the project scope of work and the geometry of the project site, it is anticipated that the majority of the work can be performed with the following measures for the management of vehicular traffic:

- The existing parking area for Craigs Pond will be closed to traffic using temporary drums or removable barricades located outside of the shoulder of Craigs Mill Road and Figgs Road. Construction entrances shall be properly marked, and all construction vehicles shall utilize the designated construction entrance.
- The Contractor may temporarily close a single lane of Craigs Mill Road during daytime operations as needed in accordance with DelDOT MUTCD for Streets and Highways, Typical Application 10 (TA-10) for Lane Closure on a Two Lane Road using Flaggers.
 - » Flagger operations may be conducted between the hours of 8 AM and 4 PM, Monday through Friday.
 - » All traffic control devices must be removed from the traveled way prior to the Contractor leaving the site each day.

SPECIAL REQUIREMENTS

The following special requirements or restrictions related to DelDOT owned facilities will be placed on the Contractor:

- No cranes or other heavy equipment shall be placed on Craigs Mill Road within ten (10) feet of the pipe culverts downstream of the dam without written authorization from DelDOT.
- No guardrail shall be removed or otherwise modified unless specifically authorized by DelDOT. Any damage to the guardrail shall be immediately reported to DelDOT and shall be repaired at the Contractor's expense.
- Any damage to pavement within the DelDOT right-of-way shall be repaired to the satisfaction of the DelDOT inspector at the Contractor's expense.



DELAWARE DEPARTMENT OF NATURAL RESOURCES
AND ENVIRONMENTAL CONTROL
IMPROVEMENTS TO CRAIGS POND DAM

12804.61925-F01
OCTOBER 2015



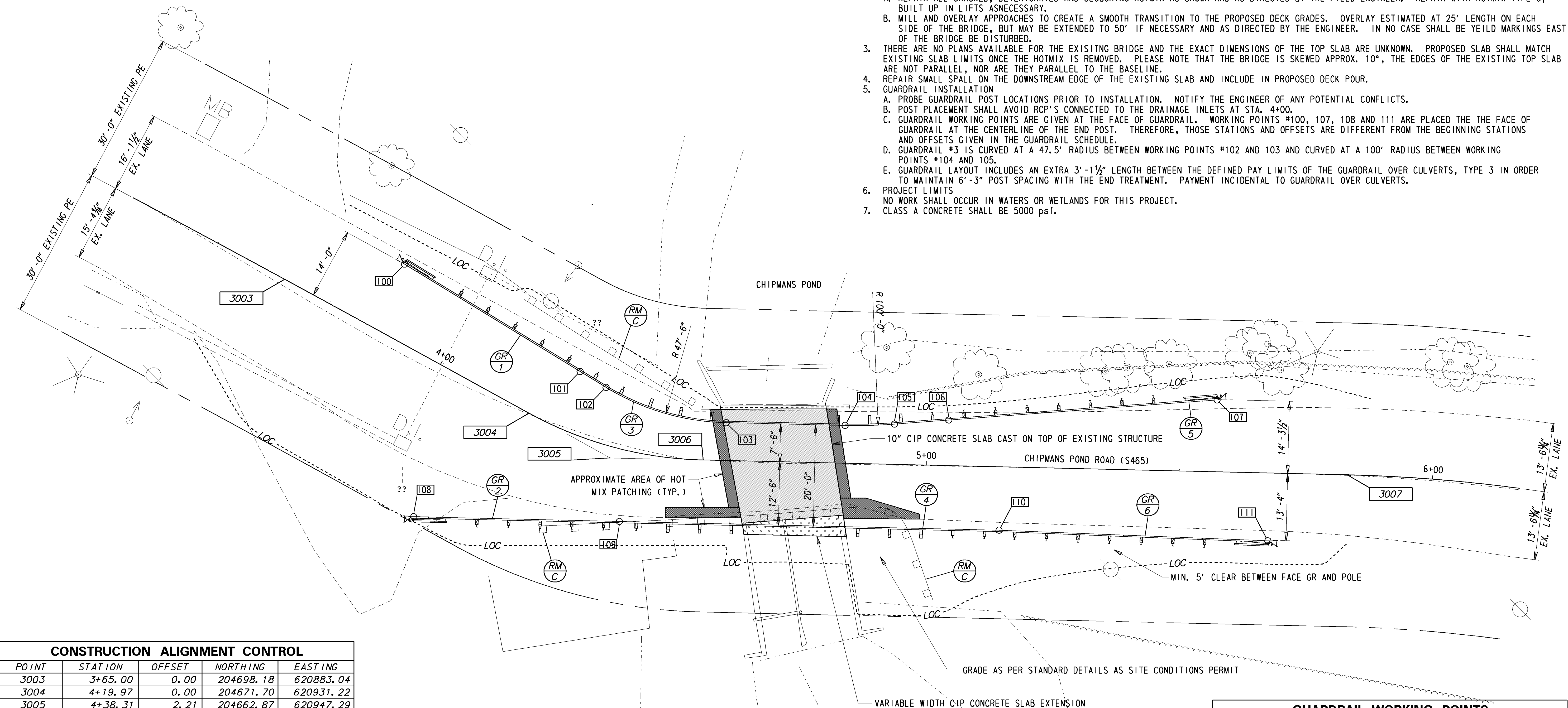
O'BRIEN & GERE ENGINEERS, INC.

APPENDIX E

REFERENCE DRAWINGS – BRIDGE 3-362 OVER CHIPMANS POND – GUARDRAIL IMPROVEMENTS

PROJECT NOTES:

- REMOVAL OF OBSTRUCTIONS
 - ALL HOTMIX AND OTHER MATERIALS SHALL BE REMOVED FROM THE AREA OF THE EXISTING TOP SLAB OF THE BRIDGE. REMOVE THE REMAINDER OF THE EXISTING HEADWALL / MILL FOUNDATION ON THE SOUTHWEST CORNER OF THE EXISTING SLAB. COLLECT ALL DEBRIS TO PREVENT CONTAMINATION OF THE STREAM.
 - REMOVE EXISTING GUARDRAIL AS NOTED ON THIS PLAN.
 - THE HEADWALL ON THE NORTH EDGE OF THE EXISTING SLAB SHALL REMAIN IN PLACE.
- HOTMIX PATCHING AND REPAIR
 - REPAIR ALL CRACKED, DETERIORATED AND SLOUGHING HOTMIX AS SHOWN AND AS DIRECTED BY THE FIELD ENGINEER. REPAIR WITH HOTMIX TYPE C, BUILT UP IN LIFTS AS NECESSARY.
 - MILL AND OVERLAY APPROACHES TO CREATE A SMOOTH TRANSITION TO THE PROPOSED DECK GRADES. OVERLAY ESTIMATED AT 25' LENGTH ON EACH SIDE OF THE BRIDGE, BUT MAY BE EXTENDED TO 50' IF NECESSARY AND AS DIRECTED BY THE ENGINEER. IN NO CASE SHALL BE YIELD MARKINGS EAST OF THE BRIDGE BE DISTURBED.
- THERE ARE NO PLANS AVAILABLE FOR THE EXISTING BRIDGE AND THE EXACT DIMENSIONS OF THE TOP SLAB ARE UNKNOWN. PROPOSED SLAB SHALL MATCH EXISTING SLAB LIMITS ONCE THE HOTMIX IS REMOVED. PLEASE NOTE THAT THE BRIDGE IS SKEWED APPROX. 10°, THE EDGES OF THE EXISTING TOP SLAB ARE NOT PARALLEL, NOR ARE THEY PARALLEL TO THE BASELINE.
- REPAIR SMALL SPALL ON THE DOWNSTREAM EDGE OF THE EXISTING SLAB AND INCLUDE IN PROPOSED DECK POUR.
- GUARDRAIL INSTALLATION
 - PROBE GUARDRAIL POST LOCATIONS PRIOR TO INSTALLATION. NOTIFY THE ENGINEER OF ANY POTENTIAL CONFLICTS.
 - POST PLACEMENT SHALL AVOID RCP'S CONNECTED TO THE DRAINAGE INLETS AT STA. 4+00.
 - GUARDRAIL WORKING POINTS ARE GIVEN AT THE FACE OF GUARDRAIL. WORKING POINTS #100, 107, 108 AND 111 ARE PLACED THE THE FACE OF GUARDRAIL AT THE CENTERLINE OF THE END POST. THEREFORE, THOSE STATIONS AND OFFSETS ARE DIFFERENT FROM THE BEGINNING STATIONS AND OFFSETS GIVEN IN THE GUARDRAIL SCHEDULE.
 - GUARDRAIL #3 IS CURVED AT A 47.5' RADIUS BETWEEN WORKING POINTS #102 AND 103 AND CURVED AT A 100' RADIUS BETWEEN WORKING POINTS #104 AND 105.
 - GUARDRAIL LAYOUT INCLUDES AN EXTRA 3'-1½" LENGTH BETWEEN THE DEFINED PAY LIMITS OF THE GUARDRAIL OVER CULVERTS, TYPE 3 IN ORDER TO MAINTAIN 6'-3" POST SPACING WITH THE END TREATMENT. PAYMENT INCIDENTAL TO GUARDRAIL OVER CULVERTS.
- PROJECT LIMITS
NO WORK SHALL OCCUR IN WATERS OR WETLANDS FOR THIS PROJECT.
- CLASS A CONCRETE SHALL BE 5000 psi.



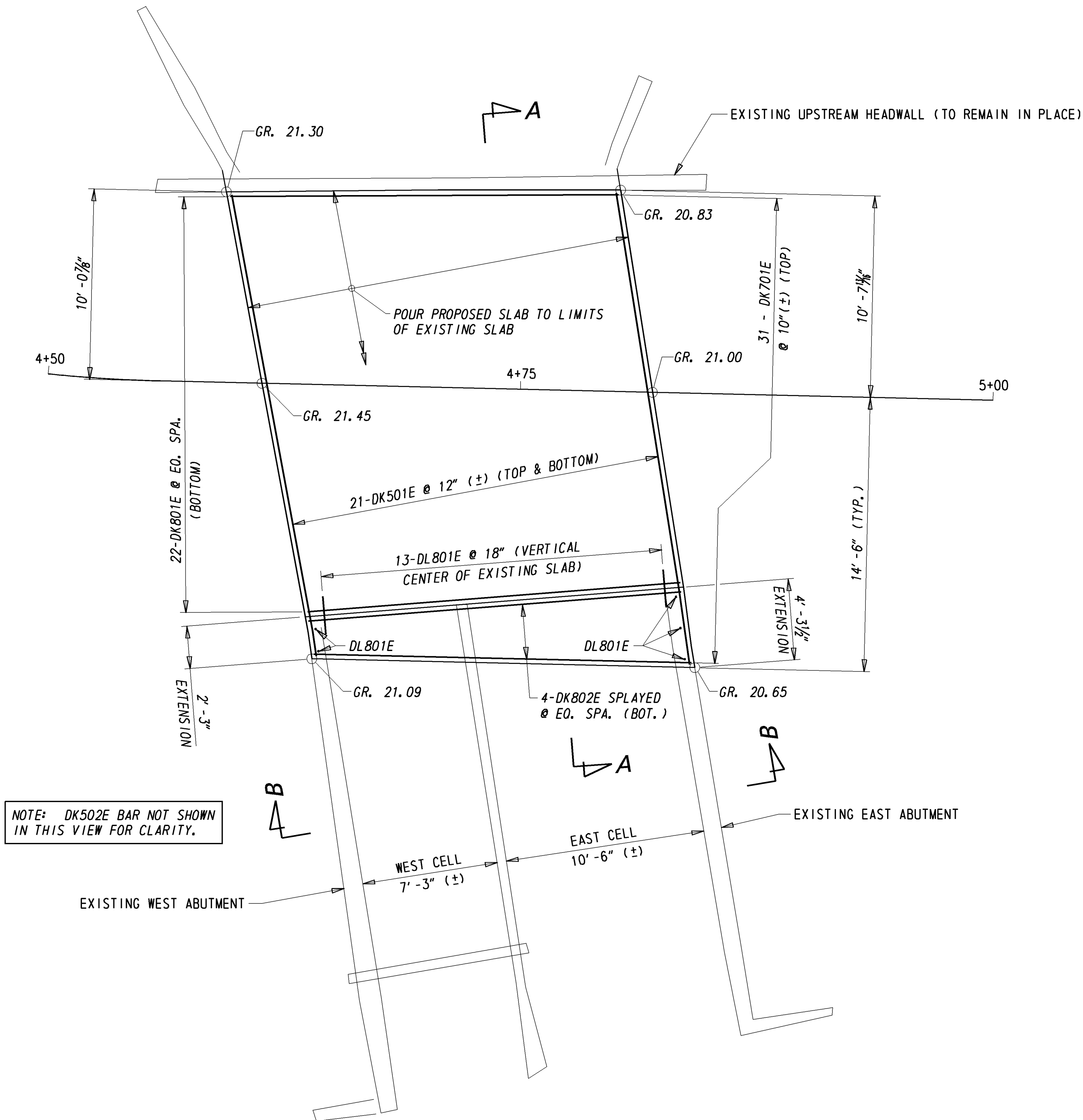
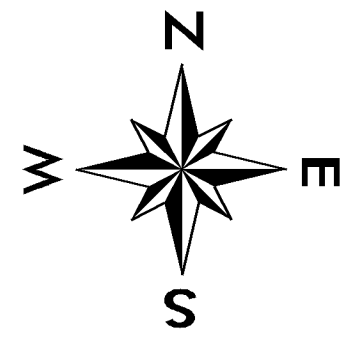
CONSTRUCTION ALIGNMENT CONTROL				
POINT	STATION	OFFSET	NORTHING	EASTING
3003	3+65.00	0.00	204698.18	620883.04
3004	4+19.97	0.00	204671.70	620931.22
3005	4+38.31	2.21	204662.87	620947.29
3006	4+55.94	0.00	204662.45	620965.62
3007	5+83.13	0.00	204659.52	621092.78

GUARDRAIL SCHEDULE				
NO.	ITEM DESCRIPTION / TYPE	BEGIN STA.	OFFSET	LENGTH
1	GUARDRAIL END TREATMENT ATTENUATOR	3+82.50	-14.00	37.50
2	GUARDRAIL END TREATMENT ATTENUATOR	4+08.22	29.62	37.50
3	GUARDRAIL OVER CULVERTS, TYPE 3 *	4+25.77	-11.90	75.00
4	GUARDRAIL OVER CULVERTS, TYPE 3	4+16.37	14.00	75.00
5	GUARDRAIL END TREATMENT ATTENUATOR	5+04.22	-9.02	50.00
6	GUARDRAIL END TREATMENT ATTENUATOR	5+14.66	12.50	50.00

* CURVED SECTIONS MODIFIED AS SHOWN. SEE NOTES.

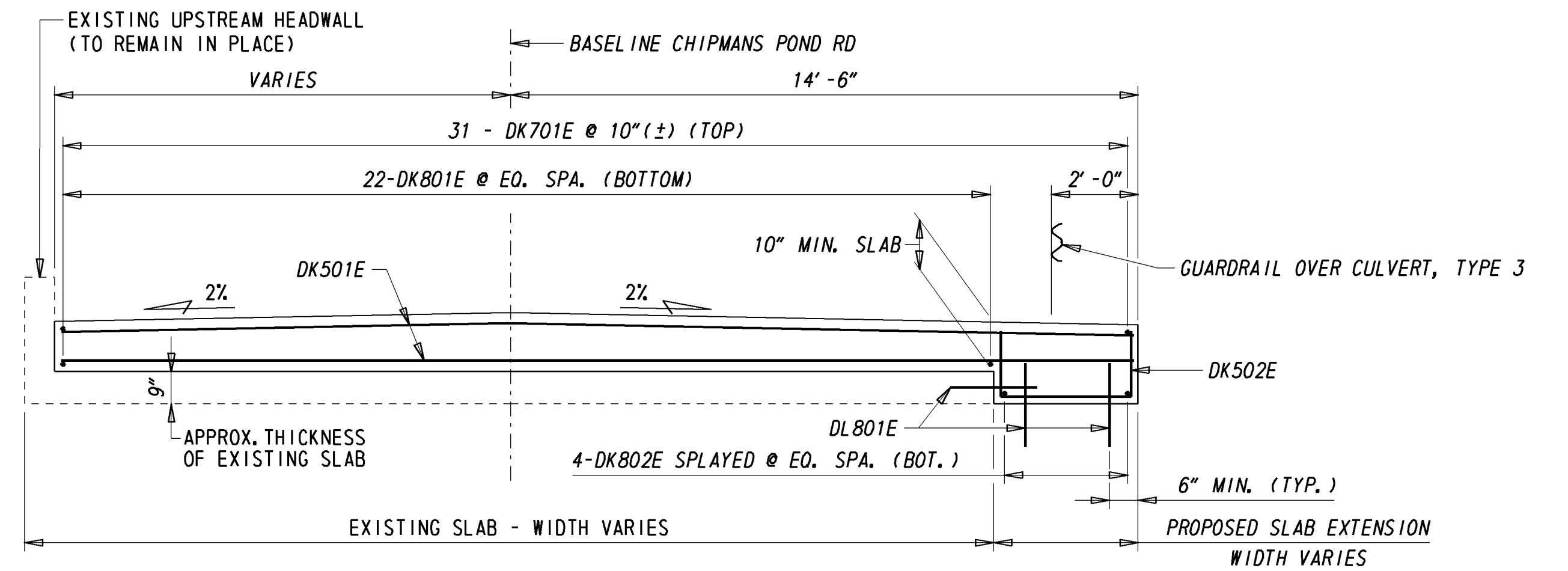
GUARDRAIL WORKING POINTS				
POINT	STATION	OFFSET	NORTHING	EASTING
100	3+84.29	-13.97	204701.15	620906.66
101	4+25.77	-11.90	204679.95	620941.31
102	4+32.75	-10.89	204676.82	620946.43
103	4+60.29	-7.50	204669.84	620970.14
104	4+83.77	-7.50	204669.30	620993.61
105	4+93.52	-7.98	204669.56	621003.37
106	5+04.22	-9.02	204670.36	621014.10
107	5+57.10	-14.21	204674.32	621067.07
108	4+09.85	28.87	204651.28	620908.44
109	4+16.37	14.00	204650.32	620949.05
110	5+14.66	12.50	204648.60	621024.03
111	5+67.77	13.35	204646.52	621077.11

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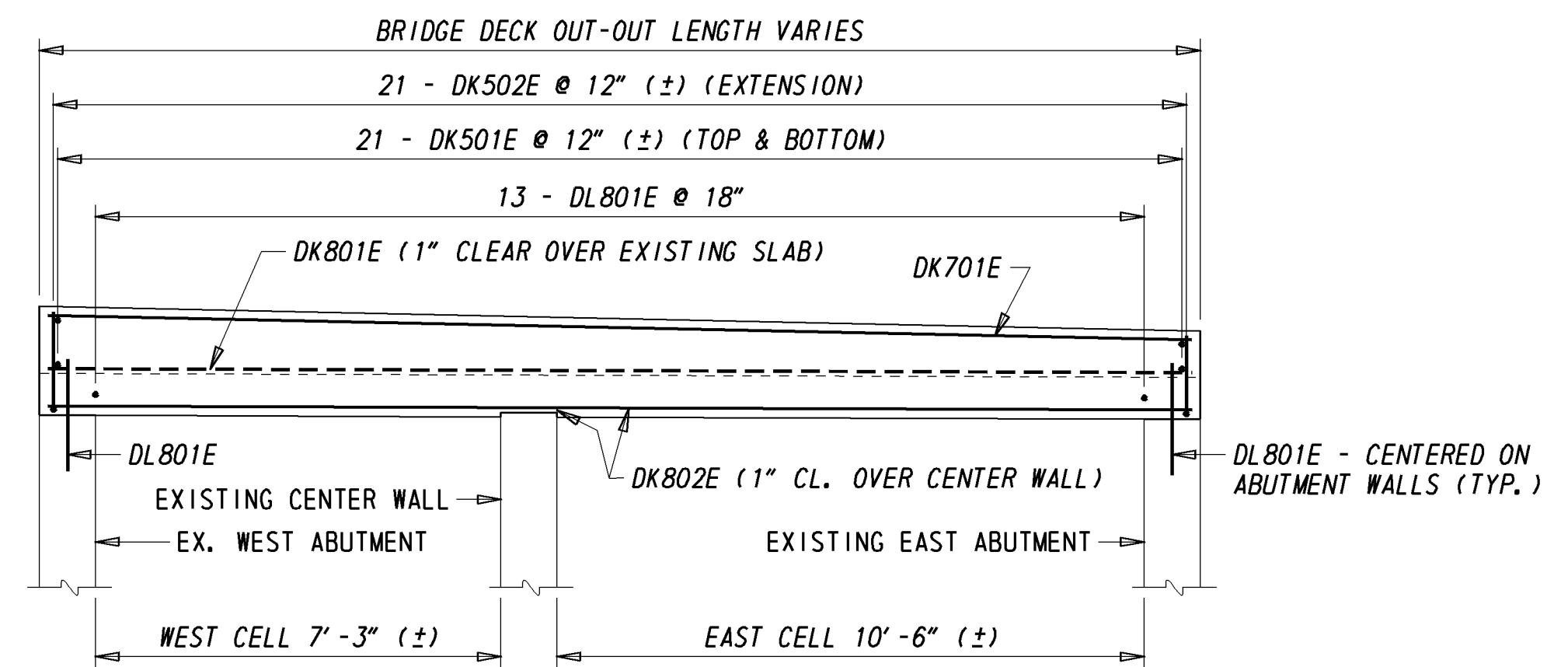


DECK PLAN
1/4" = 1' - 0"

CAST-IN-PLACE CONCRETE REINFORCING BAR LIST									
QTY.	SIZE	LENGTH	MARK	TYPE	A	B	C	D	
2x21	5	24-92	DK501E	STR		24-92			
		TO				TO			
		25-30				25-30			
1x21	5	6-43	DK502E	17		1-23	3-111	1-23	
		TO				TO		TO	
		5-12				1-71	1-11	1-71	
1x31	7	20-00	DK701E	STR		20-00			
		TO				TO			
		20-60				20-60			
1x22	8	19-90	DK801E	STR		19-90			
		TO				TO			
		20-60				20-60			
1x4	8	19-90	DK802E	STR		19-90			
		TO				TO			
		20-00				20-00			
18	8	2-00	DL801E	STR		2-00			



DECK SECTION A-A
3/8" = 1' - 0"



DOWNSTREAM ELEVATION (SECTION B-B)
3/8" = 1' - 0"