#### FIRST DISTRICT WATER DEPARTMENT



12 New Canaan Avenue Post Office Box 27 Norwalk, Connecticut 06852

Office: 203-847-7387 Fax: 203-846-3482 Email: info@firstdistrictwater.org COMMISSIONERS Thomas J. Cullen, Esq. Elsa Peterson Obuchowski, Chair Jalin T. Sead

DISTRICT TREASURER Rosa M. Murray GENERAL MANAGER Eleanor M. Militana

DISTRICT ENGINEER Donald Ukers, P.E.

CONTROLLER David Capolete

# PROJECT: DWSRF RES 2023-02, REHABILATATION OF THE GRUPES RESERVIOR DAM, NEW CANAAN CT

## BID OPENING: 10:00 A.M.

WEDNESDAY

AUGUST 20, 2025

THE ATTACHED BIDDING DOCUMENTS ARE TO BE RETURNED WITH YOUR BID THE PLANS AND SPECIFICATIONS SHALL BE RETURNED TO THE FIRST TAXING DISTRICT WATER DEPARTMENT WITHIN TEN WORKING DAYS OF THE BID OPENING

12 New Canaan Avenue

Norwalk, Connecticut 06851

203 847 7387

### First Taxing District of the City of Norwalk

#### INVITATION

#### for Constructing

# PROJECT: DWSRF RES 2023-02, REHABILITATION OF GRUPES RESERVIOR DAM, NEW CANAAN, CT

Sealed bids will be received at the Office of the District Clerk of the First Taxing District of the City of Norwalk located at 12 New Canaan Avenue, Norwalk Connecticut, 06851 for PROJECT: **DWSRF RES 2023-02, REHABILITATION OF GRUPES RESERVIOR DAM, NEW CANAAN, CT until 10:00 A.M. on WEDNESDAY, AUGUST 20, 2025** at which time and place said bids will be opened publicly and read aloud. The information for Bidders: Proposal, Form of Contract, Plans and Specifications may be examined at the Office of the District Clerk at the above address. Anyone submitting a bid for this project must have read and utilized for bidding **THE FIRST TAXING DISTRICT OF THE CITY OF NORWALK, WATER DEPARTMENT, STANDARD SPECIFICATIONS dated June 14, 2017.** The document can be obtained from the City of Norwalk First Taxing District Water Department website. The Plans and a "bid package" containing the Invitation; Labor Rates; Proposal; Special Specifications and Notes can be obtained from the City of Norwalk First Taxing District Water Department website and select bid services.

You may participate in the Bid Opening in person or online through the following Zoom link: https://us02web.zoom.us/j/81534596611?pwd=YubY40aWWxLc5q9qnp0kQs4ZMIx5KT.1 You can also participate by phone at:

#### Toll free: 1-929-205-6099 Access Code on Prompt: 153712 Meeting ID: 815-3459-6611

A non-pre-bid meeting will be held at **10:00 A.M. on Thursday, JULY 24, 2025** at the District Offices located at 12 New Canaan Avenue, Norwalk, CT. A site visit will follow the meeting at the Grupes Reservoir Dam located at 1100 Valley Road, New Canaan, Connecticut

A certified check or bid bond in the amount of fifteen percent (15%) of the total bid amount must accompany the bid. Said checks or bid bonds will be returned to the unsuccessful bidders upon Award of the Contract to the selected firm and execution of the Agreement. If any bid is not accompanied by a bid bond or check at the specified time for the bid opening, the incomplete bid will not be read and this action will constitute automatic rejection of the bid.

The Contractor shall be required to conform in all respects to the requirements contained in the Required Construction Contract Provisions Under the Connecticut Department of Public Health's Drinking Water State Revolving Fund, a copy of which will be incorporated in each Proposal for contracts so classified.

Any contract or contracts awarded under this invitation for bids is expected to be funded in part by a loan from the State of Connecticut Drinking Water State Revolving fund. Neither the State of Connecticut nor any of its Departments, agencies, or employees is or will be a party to this invitation to bids or any resulting contract.

The requirement for Minority and Women's Business Enterprise (MBE/WBE) subcontracting participation, expressed as a percentage of the total contract amount, shall be a minimum of 8% with the following makeup: MBE 3.0% WBE 5%. Failure to meet or exceed the required percentage may render a bid non-responsive and may cause the rejection of the bid. Addenda, if issued, will be issued up to 5 days prior to the date fixed for opening of bids.

The Contactor shall submit a signed and completed State of Connecticut Department of Energy and Environmental Protection Clean Water Fund Memorandum (2019-03) dated June 19, 2019 with their bid proposal verifying that they have read and understand the DBE requirements in the memorandum and will procure subcontracts whose percentages will meet or exceed the minimums listed.

Bidders shall be aware that this project shall be subject to the requirements of the Use of American Iron and Steel"(AIS) contained in Section 1452(aX9XA) of the Federal Safe Drinking Water Act. This provision requires iron and steel products used in DWSRF-funded projects to be produced in the United States.

To satisfy DWSRF program requirement, all bidders must hold a current State of Connecticut Department of Administrative Services (DAS) prequalification certificate as required by the DAS contactor prequalification program (See Connecticut General Statutes 4a-100, § 4b-101 and 4b-91) and shall submit a current certificate and DAS contractor prequalification update statement at the time of bid. Predetermination letters shall not be considered an acceptable substitute for a prequalification certificate.

Any proposal shall be deemed non-responsive which does not contain a copy of the DAS prequalification certificate. However, DAS prequalification does not preclude the right of the District to independently evaluate and make determinations regarding the responsibility of the bidders.

Any subcontractor whose subcontract exceeds \$500,000 may perform installation or construction work as a subcontractor on a project, provided that at the time of the bid submission, the subcontractor is prequalified by DAS in accordance with C.G.S. § 4a-100 (See Connecticut General Statutes § 4b-91(j).

For more information on the DAS certification process, visit their website or contact the Connecticut DAS, Construction Contractor Prequalification, 165 Capital Avenue, 5th Floor South, Hartford, CT 06106, Phone(860) 713 5280.

Every contract for construction, reconstruction, alteration, remodeling, repair or demolition of any public building or any other public work by a public agency that is paid for in whole or in part, with state funds and that is estimated to cost more than five hundred thousand dollars, the bid notice shall be posted on the State Contracting Portal.

<u>(https://portal.ct.gov/DAS/Procurement/Contracting/DAS- Procuement-State-Contracting-</u> <u>Portal-for Contracts).</u> (See Connecticut General Statutes Section 4b-91(aX2) and(4).) Project specific prevailing wage rates were obtained from the Connecticut Department of Labor, Wage and Workplace Standards Division. These rates are to be the minimum paid to workers employed in these occupations on this Project and shall remain in effect until completion, unless adjusted prior hereto. The Contractor remains fully liable for the increase in any prevailing wage rates which may be made during the course of the project.

Under the Consolidated Appropriations Act, 2016, Davis Bacon prevailing wage requirements apply to a construction project carried out in whole or in part by assistance made available by the Drinking Water State Revolving Fund. Davis Bacon wage determinations were obtained for this contract from the United States Department of Labor. The Contractor shall require that its subcontractors include the applicable wage determinations.

Award of contract will be made only to the lowest responsible responsive Bidder as will best promote the public interest. The lowest bid will be determined by the District on the basis of gross sum for which the entire work will be performed, arrived at by a correct computation of all contract pay items specified in the proposal, at the unit prices stated in the proposal. The District reserves the right to reject any or all proposals or any portion thereof, or, to award to other than the low Bidder, to waive minor informalities, to advertise for new proposals, or to proceed to do the Work otherwise, if, in its opinion, the best interests of the District will thereby be promoted.

# Addenda, if issued, will be issued up to 5 days prior to the date fixed for opening of bids.

A certified check or bid bond in the amount of **fifteen percent (15** %) **of the total bid** amount must accompany the bid. Said checks or bid bonds will be returned to the unsuccessful bidders upon Award of the Contract to the selected firm and execution of the Agreement. If any bid is not accompanied by a bid bond or check at the specified time for the bid opening, the incomplete bid will not be read, and this action will constitute automatic rejection of the bid.

The successful bidder will be required to furnish a performance bond and a labor and materials payment bond in the form as attached to the Bid Documents for the amount of one hundred **percent (100%) of the total bid amount.** A certified check cannot be substituted for either bond. The District reserves the right to alter quantities and to accept or reject any or all bids or any portion of any bids, for any or no reason, including unavailability of appropriated funds as it may deem to be in its best interests.

All bidders are to note that the award of this Contract is subject to the following conditions and contingencies:

- 1. The approval of such governmental agencies as may be required by law.
- 2. The appropriation of adequate funds by the proper agencies.

David Capolete District Clerk

# AND ITEMIZED PROPOSAL

#### For Constructing

#### PROJECT: PROJECT: DWSRF RES 2023-02, GRUPES RESEVIOR DAM REHABILITATION, NEW CANAAN, CT

#### The Work proposed herein must be completed by APRIL 7, 2028

First Taxing District of the City of Norwalk Board of Commissioners 12 New Canaan Avenue Norwalk, Connecticut 06851

To Whom It May Concern,

In submitting this bid the duly authorized undersigned declares that the entity on behalf of which this bid is made is, or they are, the only person or persons interested in the said bid; that the bid is made without any connection with any person making another bid for the same contract; that the bid is in all respects fair and without collusion, fraud or mental reservation; and that no official of the District, or any person in the employ of the District is directly or indirectly interested in said bid or in the supplies or work to which it relates, or in any portion of the profits thereof.

The undersigned also hereby declares that they have, either for themselves or on behalf of the entity they represent, carefully examined the Plans, specifications, and form of Contract for this Project, have personally inspected the actual location of the Work and have considered potential local sources of supply, and are satisfied as to all the quantities and conditions, and understands that in signing this Proposal they or the entity that they represent waives all rights to plead any misunderstanding regarding the same.

The undersigned further understands and agrees that they are to furnish and provide for the respective item price bid all the necessary material, machinery, implements, tools, labor, services, and other items of whatever nature, and to do and perform all the Work necessary under the aforesaid conditions, to complete the improvements of the Project, which Plans and specifications it is agreed are a part of this Proposal, and to accept in full compensation therefore the amount of the summation of the products of the approximate quantities multiplied by the unit prices bid. This summation will hereinafter be referred to as the gross sum bid.

The undersigned further agrees to accept the aforesaid unit bid prices in compensation for any additions or deductions caused by any variation in quantities due to more accurate measurement, or by any changes or alterations in the Plans or specifications of the Work and for use in the computation of the value of the Work performed for monthly estimates. Every Proposal must be accompanied by a certified check or bank cashier's check or bid bond payable to the District in the amount of **fifteen percent (15%) of the total bid amount**.

In case this Proposal shall be accepted by the District, and the undersigned shall fail to execute the Contract, the monies represented by such certified check or bank cashier's check or bid bond shall be regarded as liquidated damages and shall be forfeited and become the property of the District.

The undersigned understands and accepts:

- A. When Work is required in which no specific payment item is listed on the Proposal Form, the cost of such Work shall be included in the unit prices bid.
- B. All unit prices, lump sums, etc. listed in the bid Proposal are firm and not subject to change for ninety (90) days from the day bids are opened.
- C. Within ten (10) days from the date of a notice of acceptance of this Proposal, the undersigned agrees to execute the Contract and to furnish to the District a satisfactory "Faithful Performance Bond" and "Labor and Material Payment Bond" in the amount of **one hundred percent (100%) of the total bid amount.**
- D. Time is of the Essence. All Work to be performed under the Contract shall be completed within the time stated in the Agreement for the Project or within such extended time for completion as may be granted by the District.
- E. As a condition of the Contract Award, the successful Bidder shall provide proof, from the Connecticut Secretary of State's office, of its current authorization to do business in Connecticut. All Connecticut corporations must provide a Certificate of Good Standing from the Secretary of State's Office. All foreign (out of State) corporations shall provide a valid license to do business in Connecticut, in the form of a current Certificate of Authority from the Secretary of State's office and evidence of compliance with the bond requirements of the Connecticut Department of Revenue Services. These documents must be presented within thirty (30) days from the date of the bid opening.

Bidder acknowledges receipt of the Addenda listed below and further acknowledges that the provisions of each Addendum have been included in the preparation of this bid.

Addendum No.	Date Received	Addendum No.	Date Received
	E (BIDDER):		
Address of Bidd	er:		
Phone Number:	Area Code ()	)	
I hereby sign this of the named Bide information set for	document acting with der. By signing below rth in this document i	nin my authority as a /, I certify, acknowled is true, accurate and	duly authorized represer ge and affirm that the complete to the best of m
knowledge and be			

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### NON-COLLUSIVE BIDDING CERTIFICATION

By submission of the bid each Bidder and each person signing on behalf of any Bidder certifies, and in the case of a joint Bidder each party certifies as to its own organization, under penalty of perjury, that to the best of knowledge and belief:

- A. The prices in this bid have been arrived at independently without collusion, consultation, communication or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other Bidder or with any competitor.
- B. Unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the Bidder and will not knowingly be disclosed by the Bidder prior to opening, directly or indirectly, to any other Bidder or to any competitor; and
- C. No attempt has been made or will be made by the Bidder to induce any other person, partnership or corporation to submit or not to submit a bid for the purpose of restricting competition.

COMPANY NAME (BIDDER):				
Address of Bidder:				
Phone Number	Area Code	(	)	

I hereby sign this document acting within my authority as a duly authorized representative of the named Bidder. By signing below, I certify, acknowledge and affirm that the information set forth in this document is true, accurate and complete to the best of my knowledge and belief.

Signature of Bidder:	Dated:
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Name and Addresses of Members of the Firm:

#### §102-16 SPECIAL SPECIFICATIONS AND NOTES

#### 1. LIQUIDATED DAMAGES

For each calendar day that any work remains uncompleted after the date specified for the completion of the work provided in the Contract, the amount of Five Hundred Dollars (\$1,000.00) per calendar day will be deducted from any money due the Contractor, not as a penalty but as liquidated damages; provided, however, that due account shall be taken of any adjustment to the contract time of completion of the work as provided for elsewhere in the specifications. The assessing of Liquidated Damages shall be in addition to Engineering Charges as provided for in **§102-13**, "**ENGINEERING CHARGES**", of the Specifications.

#### 2. DATE OF COMPLETION

The dam rehabilitation work proposed herein must be completed by APRIL 7, 2028

#### 3. HAZARD CLASSIFICATION

The Connecticut Department of Energy and Environment Protection (CTDEEP) Dam Safety Program designates Grupes Reservoir Dam (NID ID# CT00057; State ID# 9003) as a Class "C" High Hazard Dam because of the potential for loss of life if the dam fails. The dam's spillway design flood (SDF) has been determined to be ½ of the Probable Maximum Flood (PMF) and the dam must pass this SDF without overtopping.

#### 4. GRUPES DAM DESCRIPTION

Grupes Reservoir Dam (NID No. CT 00057; State ID No. 9003) is located on Silvermine River in New Canaan, Fairfield County, Connecticut. The dam is situated off Valley Road and Deep Valley Road. The impoundment services as a drinking supply for the First Taxing District City of Norwalk Water Department of Norwalk, Connecticut. Grupes Reservoir is the fourth of four reservoirs operated by the District along Silvermine River. John D Milne Lake, Browns Reservoir, and Scotts Reservoir are all located upstream of Grupes Reservoir. Grupes Reservoir Dam was originally constructed in 1871 to impound the Grupes

Reservoir as a drinking water supply for the City of Norwalk, Connecticut. In 1901, a concrete face was added to the upstream face of the dam to reduce seepage. Other post construction changes include an auxiliary spillway beyond the right abutment, in 1905, and the construction of the current intake gatehouse, in 1933. There is evidence of post-construction grouting program (i.e., grout ports penetrating from the downstream face of the dam) that apparently was

conducted in 1962.

The main features of Grupes Reservoir Dam include:

- The dam has a maximum height of 24-feet and a total length (including spillway) of approximately 235-feet. The internal construction of the dam is cyclopean concrete. The downstream stone masonry section is the main structural element of the dam.
- The principal spillway consists of an approximately 50-foot-long, 6-footwide, broad-crested weir located at the east (left) abutment side of the dam. The spillway has a vertical drop of about 19 feet from the weir at El. 296.8 to a bedrock plunge pool at about El. 278.
- The auxiliary spillway consists of an unlined, bedrock-controlled channel is situated just beyond the dam's right abutment. excavated across the west (right) abutment down to bedrock.
- The outlet works system, which consists of:
  - Upstream gatehouse with a 24-inch pipe extending from the gatehouse connecting to a 30-inch pipe in an upper valve chamber set in the masonry part of the dam.
  - The 30-inch gate valve has an invert elevation of about 277.6, and is located 60-feet down gradient from the 24-inch outlet pipes exit from the gatehouse.
  - The 24-inch-diameter cast-iron pipe (CIP) has in invert elevation out of the gatehouse of 277.6 and extends to a downstream lower valve chamber and outlet headwall on the bank of the Silvermine River about 50 feet south of the dam

The normal operating pool elevation is controlled by the spillway crest at approximately El. 296.8 feet (NGVD29). The area of the reservoir at normal operating pool is approximately 23 acres. The area immediately adjacent to the reservoir is mostly undeveloped with some residential properties.

#### 5. TECHNICAL OBJECTIVES

In general, the technical basis and objectives of the required improvements to Grupes Reservoir Dam can be summarized as follows:

- A. Improve stability of stone masonry of the main portion of the dam;
- B. Mitigate observed seepage/leakage through the downstream vertical face of the dam;
- C. Provide spillway capacity augmentation to safely pass the design flood (1/2 Probable Maximum Flood); and
- D. Upgrade the Gatehouse, including: (a) in-kind replacement of the three 30"x 30" metal sluice gates, stems, guides, floor stand operators and decking; (b) cleaning out of wet-well; and (c) concrete repairs to exterior portions of the foundation.

#### 6. PROPOSAL, AWARD OF CONTRACT AND MEASUREMENT

In addition to the conditions documented in Section 102, Paragraph 102-02 (Proposal) and Section 103, Paragraph 103-01 (Award of Contract), the Contractor must also submit their Schedule of Prices. The District reserves the right to reject any and all proposals of any portion thereof, or, to award to other than the low Bidder, to waive informalities, to advertise for new proposals, or to proceed to do the work otherwise, if, in its opinion, the Contractor's schedule of values or the negotiation thereof, does not meet the District's approval or the best interest of the District will thereby be promoted. Under these conditions, the Award of the Contract and subsequent Execution of the Contract for Construction Services is subject to the successful negotiation and final approval of the schedule of values as presented by the Contractor.

The work includes, but is necessarily limit to the work that is outlined in Section 7 Scope of Work.

Measurement shall be based on the actual quantity of each item of the Schedule of Prices, as determined by the District, and defined in the Special Specifications 01025.

The Contractor will receive no payment for any portion of the work until it is installed. The only exception to this payment for stored materials on site if the Contractor provides for the payment of stored materials in the Schedule of Prices and provides proper documentation of costs incurred for stored materials. Partial payment may be requested for items partially installed in accordance with the requirements of the Contract Documents.

The District will pay the Prime Contractor within twenty working days after the District received payment from the funding Agency. The Contractor is advised that the District must submit the Contractor's Payment Request before noon of

the second (2<sup>nd</sup>) business day of the month to Connecticut Department of Public Health, (CT DPH) as stipulated in the Drinking Water State revolving Fund (DWSRF) program requirements. If the CT DPH receives proper documentation by noon on the second (2<sup>nd</sup>) business day of such month. The District must receive payment from CT DPH before the Contractor is reimbursed by the District for the monthly Payment Request. The Contractor is solely responsible for the process and delivery of their payment request in a timely manner and the Contractor must consider CT DPH's reimbursement schedule to ensure reimbursement from the District on a monthly basis.

#### 7. SCOPE OF WORK

The work of this Contract is located at Grupes Reservoir Dam (NID ID# CT00057; State ID# 9003) located off Valley Road and Deep Valley Road in New Canaan, Connecticut.

Furnish all labor, materials, equipment and incidentals required to perform the Work in its entirety as shown on the Drawings and specified herein. The Work includes, but is not necessarily limited to, the following:

- Raise the top of the dam by four feet to elevation 306.0 with a cast-inplace cap, and regrade at dam abutments to mitigate overtopping during the ½ PMF;
- Construct earthen embankment along east side of Grupes Reservoir and re-grade existing high ground and access road to mitigate overtopping/flooding during the ½ PMF;
- Construct parapet/retaining walls along the east side of Grupes Reservoir to mitigate over topping/flooding during the ½ PMF;
- Install pot-tensioned anchors to increase the sliding resistance and overturning stability during seismic events;
- Re-point the downstream face of the dam, and grout the stone masonry to mitigate seepage/leakage;
- Replace existing footbridge over spillway and catwalk to gate house with prefabricated footbridges;
- Demolish the gate house, raise the foundation and operating floor to El. 301.9, and construct new gatehouse;
- Install three, new 30" by 30" stainless steel slide gates at the gatehouse, and perform associated operational upgrades;
- Re-line the existing 24-inch diameter, cast iron low-level outlet pipe;
- Permanently abandon the 16-inch discharge pipe, intake screen and gate chamber at the right end of the dam using non-shrink grout;
- Demolish the existing chlorination building and other obsolete water distribution piping downstream of the dam;
- Install articulated concrete block at the auxiliary spillway invert, remove trees and boulders that could potentially obstruct discharge channel during storms;

• Replace existing culverts at the end of auxiliary spillway discharge channel with articulated block crossing.

#### 8. REQUIRED CONSTRUCTION CONTRACT PROVISIONS UNDER THE CONNECTICUT DEPARTMENT OF PUBLIC HEALTH'S DRINKING WATER STATE REVOLVING FUND (DWSRF)

The State of Connecticut, Department of Public Health shall participate financially in this project. Therefore, this project has been designated as a Drinking Water State Revolving Fund contract. The Contractor shall conform in all respects in accordance with the true intent and meaning of each and all of the requirements contained in the "Required Construction Contract Provisions Under the Connecticut Department of Public Health's Drinking Water State Revolving Fund", a copy of which, are incorporated in this Proposal and attached hereto.

The "Required Construction Contract Provision under the Connecticut Department of Public Health's Drinking Water State Revolving Fund" contains the following:

- I. Additional Articles
  - a. CTDPH Construction Contract Provisions
  - b. Governor Thomas J. Meskill Executive Order No. Three
  - c. Guidelines and Rules of State Labor Commissioner Implementing Governor's Executive Order No. Three
  - d. Governor Thomas J. Meskill Executive Order No. Seventeen
  - e. Governor John G. Rowland Executive Order No. Sixteen
- II. Wage Rate Requirements
  - a. Connecticut Requirements
  - b. Certified Payroll/Compliance Statement
  - c. Federal Requirements
  - d. Rates to be paid.

Davis-Bacon Federal Prevailing Wage Requirements and Construction Contract Language for DWSRF Projects on SFY 2012 & 2013 PPLs

- III. MBE/WBE Requirements
  - a. Interim Guidance for Minority Business Enterprise and Woman's Business Enterprise Requirements of 40 CFR § 33.240.
  - b. State of Connecticut, Department of Environmental Protection, Clean Water Fund Memorandum, July 8, 2010
  - c. Subcontractor Verification Form
  - d. State of Connecticut- Department of Public Health Drinking Water State Revolving Fund (DWSRF) MBE/WBE (DBE) Utilization Semi-Annual Reporting Form Instructions

IV. State of Connecticut Department of Administrative Services (DAS) Contractor Prequalification Update (Bid) Statement (Statement to be included within Bid)

The Contractor shall allow access to the site and project records by the Connecticut Department of Public Health, the Connecticut Department of Energy and Environmental Protection and/or authorized State representatives.

The Contractor shall comply with the Archeological and Historic Preservation Act of 1974, P.L. 93-291.

Any Contract or contracts awarded under this invitation for bids are expected to be funded in part by a loan from the State of Connecticut Drinking Water State Revolving Fund. Neither the State of Connecticut nor any of its Departments, agencies, or employees is or will be a party to this invitation for bids or any resulting contract. This procurement will be subject to the requirements contained in subsections (h), (j) and (o) of Section 22a 482-4 of the Regulations of Connecticut State Agencies, a copy of which is attached. Where any provision of Section 22a 482-4 is in conflict with the General Provisions of the First Taxing District Standard Specification, the more stringent provision shall apply.

#### 9. STATE OF CONNECTICUT, DEPARTMENT OF ADMINISTRATIVE SERVICES (DAS) PREQUALIFICATION CERTIFICATE

To satisfy the DWSRF program requirement, all bidders must hold a current State of Connecticut Department of Administrative Services (DAS) prequalification certificate as required by the DAS contractor prequalification program (See Connecticut General Statutes § 4a-100, § 4b-101 and § 4b-91) and shall submit a current certificate and DAS contractor prequalification update statement at the time of bid. Predetermination letters shall not be considered an acceptable substitute for a prequalification certificate. Any proposal shall be deemed non- responsive which does not contain a copy of the DAS prequalification certificate. However, DAS prequalification does not preclude the right of the Department to independently evaluate and make determinations regarding the responsibility of the bidders.

For more information on the DAS certification process, visit their website or contact the Connecticut DAS, Construction Contractor Prequalification, 165 Capital Avenue, 5th Floor South, Hartford, CT 06106, Phone (860) 713 5280.

#### 10. SOIL EROSION AND SEDIMENT CONTROL

All sedimentation and erosion control measures shall be constructed in accordance with the standards and specifications of the "2002 Connecticut Guidelines for Soil Erosion and Sediment Control", DEP Bulletin 34 and all Amendments and Addenda thereto prepared by The Connecticut Council on Soil

and Water Conservation in Cooperation with the Connecticut Department of Environmental Protection.

#### 11. STATE OF CONNECTICUT, DEPARTMENT OF PUBLIC HEALTH, DRINKING WATER SECTION, WATER MAIN DESIGN AND CONSTRUCTION GUIDELINES

A copy of the "State of Connecticut, Department of Public Health, Drinking Water Section, Water Main Design and Construction Guidelines" are included in **Appendix C**.

#### 12. MODIFICATION TO SECTION 102-07, INTERPRETATIONS AND ADDENDA

Delete Section 102-07, Interpretations and Addenda of the General Provisions and replace it with the following:

#### § 102-07 INTERPRETATIONS AND ADDENDA

All questions about the meaning or intent of the Contract Documents shall be submitted to the Department in writing. In order to receive consideration, questions must be received by the Department at least ten (1 0) days prior to the date fixed for the receipt of bids. Any interpretations of questions so raised which in the opinion of the Department require interpretations, will be issued by Addenda mailed or delivered to all parties recorded by the Department as having received the Proposal blank prepared by the Department for the individual contract no later than five (5) days prior to the date fixed for opening of Bids. The Department will not be responsible for oral interpretations or clarifications which anyone presumes to make on its behalf.

In addition, the Department may issue such Addenda as may be necessary to clarify, correct or change the Contract Documents.

The Bidder shall acknowledge receipt of the Addenda in the space provided in the Proposal Form and further acknowledge that the provisions of each Addendum have been included in the preparation of the bid.

#### 13. USE OF AMERICAN IRON AND STEEL

The Contractor shall be aware that this project shall be subject to the requirements of the "Use of American Iron and Steel" (AIS) provisions contained in Section 1452(a)(9)(A) of the Federal Safe Drinking Water Act. This provision requires iron and steel products used in DWSRF funded projects to be produced in the United States.

The Contactor shall review and become familiar with all AIS requirements. Included in these specifications is the guidance document issued by the United States Environmental Protection Agency (US EPA), dated March 20, 2014. This document and additional information, definitions, requirements, covered iron and steel products and waiver procedures can be found at the following website: <u>https://www.epa.gov/cwsrf/state-revolving-fund-american-iron-and-steel-ais-requirement</u>

#### 14. SUBSURFACE INFORMATION

The results of subsurface investigations are attached as *Appendix X* of the Contract Documents. The boring locations are shown on the Contract Drawings.

Boring logs and other subsurface information made available for the inspection of Bidders were obtained with reasonable care and recorded in good faith by the District.

The soil and rock descriptions shown are as determined by visual inspection of the samples from various explorations unless otherwise noted. The observed water levels and/or water conditions indicated are as recorded at the time of the exploration. These levels and/or conditions may vary considerably, with time, according to the prevailing climate, rainfall and other factors.

The subsurface information shown was obtained by the District for design and estimating purposes. It is made available to the Bidders so that they may have access to the same information available to the District. It is presented in good faith, but as with all subsurface information, it represents only a fraction of the total volume of material at the site. Interpolation between data points may not be indicative of the actual material to be encountered. Such information is not intended s a substitute for personal investigations, interpretations and judgement of the bidder. Rather, each bidder is responsible for verifying such information and obtaining all additional information necessary to properly perform the work under the Contract Agreement. The contractor shall have no claim for delay, extra compensation, or damage against the District or the Engineer on account of the incorrectness of information given or on account of the insufficiency or absence of information regarding soil, groundwater conditions, or obstructions either revealed or not revealed by the Contract Documents.

The Contractor shall be responsible for determining the existence and location of all subsurface utilities, lines, cables, and pipes that may affect performance of the Work. The Contractor shall undertake such further investigations, analyses, tests and studies as may be necessary and useful to determine all surface, subsurface or concealed conditions. If conditions are encountered at the Project Site which are subsurface or otherwise concealed physical conditions which differ materially from those indicated in the Contract Documents, then notice by the observing party shall be given to the other party no later than five (5) days after first observance of the conditions. If the Department and the Engineer verify such differing site condition, then the Contract Sum and the Project Schedule will be

reasonably adjusted. However, in no event will any adjustment be permitted in connection with a concealed or unknown condition which does not differ materially from those conditions disclosed or which reasonably should have been disclosed by the Contractor's prior inspections, tests, and reviews performed by the Contractor, or which the Contractor had the opportunity to perform, in connection with the Project.

#### 15. PROJECT SPECIFIC PREVAILING WAGE RATES

Project specific prevailing wage rates have been obtained from the Connecticut Department of labor, Wage and Workplace Standards Division and the Federal Davis Bacon Wage Rates are included within the Bid Documents, a copy of which, are incorporated into this Proposal, and attached hereto. These rates are to be the minimum paid to workers employed in the occupations on the Project and shall remain in effect until completion, unless adjusted prior thereto. The Contractor remains fully liable for the increase in any prevailing wage rates which may be made during the project.

#### 16. CONTRACTOR'S USE OF PREMISES

- A. Contractor shall limit the use of the premises for the Work and for storage to allow for:
  - a. Work by other contractors.
  - b. Department occupancy
- B. Coordinate use of premises with other contractors and Department.
- C. Contractor shall assume full responsibility for security of all its and subcontractors' materials and equipment stored on the site.
- D. If directed by the Department, move any stored items which interfere with operations of the Department or other contractors.
- E. Obtain and pay for use of additional storage or work areas if needed to perform the Work.
- F. It is possible that the Work may be completed by both Union and Non-Union Contractors working on the 173.5 West Rocks Road site simultaneously. All potential labor issues between the Contractors will be settled and resolved by the Contractors. The Department will NOT be responsible for or become party to any potential labor disputes between any and all Contractors on the site. All contractors working for the Department on the Spring Hill site will be responsible for completing their work on time and the Department will not entertain any change orders or requests for time extensions due to issues regarding the work of multiple contractors on the Spring Hill site.
- G. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner, and Department, if Department is

performing other work with Department's employees, proper and safe access to the Site, provide a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and properly coordinate the Work with theirs. Contractor shall do all cutting, filling, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering such work; provided, however, that Contractor may cut or alter others' work with the written consent of the Department with assistance from the Engineer and the others whose work will be affected.

H. If the proper execution or results of any part of a Contractor's Work depends upon work performed by others, Contractor shall inspect such other work and promptly report to Engineer in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. As stated earlier, all potential labor issues between all contracts/Contractors will be settled and resolved by the Contractors but the Engineer shall be informed in writing of any delays, defects, or deficiencies in such other work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

#### 17. PROGRESS SCHEDULE

Before starting the Work, the Contractor shall prepare and submit to the Engineer for approval, a progress schedule showing the order in which the Contractor proposes to carry on the work, the date on which it will start major items of work and the critical features and the contemplated dates for completing the same. The purpose of the progress schedule is to ensure adequate planning and execution of the work and evaluate the progress of the work.

Such schedule may be utilized to facilitate the Department's inspection and coordination of construction activities. Approval of the progress schedule shall not be construed to imply approval of any particular method or sequence of construction or to relieve the Contractor of providing sufficient materials, equipment and labor to guarantee completion of the contract in accordance with the Contract Documents. Approval shall not be construed to modify or amend the contract agreement or the date of completion therein.

On a weekly basis, or at such intervals as directed by the Engineer/District, the Contractor shall adjust the schedule to reflect any changes in the contract work, completion time, or both, and submit the adjusted schedule to the Resident Engineer.

All costs to create and update the progress schedule shall be solely the

Contractor's obligation and will be at no additional cost to the Department.

The Contractor shall also provide a two (2) week look ahead on a weekly basis.

#### 18. DEPARTMENT'S RESPONSIBILITIES

The Department shall be responsible for the following:

- a. Operate all existing and new valves to shut down and flush water mains and dam outlet piping.
- b. Controlling the reservoir elevation during construction within the limitations of the existing low-level outlet pipes and the responsibility of the District to provide water to its customers. Control of the reservoir elevation and water supply is further described in Section xx of the Special Specifications.

#### **19. CONTROL OF RESERVOIR ELEVATION DURING CONSTRUCTION**

The District will be responsible for maintaining the reservoir elevation during construction. The District will attempt to maintain the reservoir elevation at a level suitable to the Work being performed at any given time. However, the reservoir elevation is subject to the limitations of the existing low-level outlet pipes and the responsibility of the District to provide water to its customers. The Contractor is hereby notified that the reservoir may fill and the spillway may overtop during construction, particularly during storm events. The Contractor shall include the appropriate amount of risk into the bid package.

#### 20. MODIFICATION OF SECTION 109-03, PAYMENTS ON CONTRACT

Delete Section 109-03, Payments on Contract of the General Provisions and replace it with the following:

#### "§ 109-03 PAYMENTS ON CONTRACT

This Contract is funded by the State of Connecticut Drinking Water State Revolving Fund (DWSRF). The Department shall process and forward the Contractor's Application and Certificate for Payment to the DPH. Payments to the Contractor for Work satisfactorily performed will be made monthly upon the percentage basis. No monthly estimate will be rendered unless the value of the Work done equals five (5%) percent of the Contract Amount or one thousand dollars, whichever is the lesser.

The DPH requires that payment requests and evidence (Conditional Partial Release and Waiver of Liens; Certified Payroll; etc...) be submitted by noon of

the second (2<sup>nd</sup>) business day of the month. If the DPH accepts the payment request they will disburse the funds to the Department by the thirteenth (13<sup>th</sup>) business day of the month. The Department will disburse the funds within ten (10) business days of receipt of payment from the DWSRF. To meet this schedule the Contractor must submit the Application and Certificate for Payment to the Department five (5) business days prior to the second (2<sup>nd</sup>) business day of the month. The schedule and procedure for submitting payment requests will be

#### 21. CONTRACT TECHNICAL SPECIFICATIONS

For this contract, the definition of OWNER is considered the same definition as DISTRICT as document on page 3 of the Water Department Standard Specifications, dated June 14, 2017.

The following technical specifications included in the Water Department Standard Specifications, dated June 14, 2017, are part of this Project. All other technical specifications can be disregarded for this contract. In addition, the measurement and payment listed on each required technical specification can be deleted in its entirety. The measurement and payment for the entire project can be found in Section 01950 of the Specifications.

All work shall conform with the description, materials and construction details as specified and shown in the Technical Specifications.

<u>Item Number</u>	Description
Item 201	Clearing and Grubbing
Item 205	Trench Excavation and Backfill
Item 207	Borrow / Selected Borrow
Item 213	Gravel Fill
Item 304	Processed Aggregate Base
Item 305	Bedding Material
Item 700	Water Mains and Appurtenances
Item 942	Calcium Chloride for Dust Control
Item 944	Topsoil
Item 945	Fertilizing, Seeding and Mulching
Item 949	Planting
Item 971	Maintenance and Protection of Traffic
Item 975	Mobilization
Item 985	Project Survey and Stakeout
Item 1040	Chain Link Fence

Additional Specifications not included in the Water Department Standard Specifications, dated June 14, 2017 but necessary for this Project, are detailed in Section 22 below.

#### 22. SPECIAL SPECIFICATIONS

The following attached Special Specifications are incorporated and made a part of the First Taxing District City of Norwalk Water Department Standard Specifications:

ltem	
Number	Description
969	Engineer's Field Office
1040	Chain Link Fencing

#### 23. SUPPLEMENTARY TECHNICAL SPECIFICATIONS

The following attached Supplementary Specifications are incorporated and made a part of the First Taxing District City of Norwalk Water Department Standard Technical Specifications.

In the event of a discrepancy between these Specifications and the Technical Specifications included in the Water Department Standard Specifications, dated June 14, 2017, the Water Department Standard Specifications shall take precedence.

Item Number	<b>Description</b>
01060	Regulatory Requirements
01100	Special Provisions
01110	<b>Environmental Protection Procedures</b>
01200	Project Coordination and Meetings
01300	Submittals
01451	Independent Testing Services
01500	Temporary Facilities and Controls
01565	Temporary Water Control
01900	Mobilization / Demobilization
01950	Measurement & Payment
02015	Dam Instrumentation
02065	Demolition
02110	Clearing and Grubbing
02170	Temporary Coffer Dams
02200	Earthwork

02201	Rock and Boulder Excavation
02270	Stone and Riprap
02315	Tie-Down Anchors
Item Number	Description
02380	Concrete Repairs
02385	Articulated Concrete Block
02500	Gravel Roads and Trails
02615	Refurbishment of Outlet Pipe Intake Structures
02660	Ductile Iron Pipe and Fitting
02760	Abandonment of Low-level Intake Pipe
02762	Video Inspection and Cleaning of Outlets
02765 02830 02845	Permanent Fencing, Railings, and Gates
03300	Reinforced Cast-In-Place Concrete
03305	Concrete Testing
03346	Concrete Finishing, Curing, and Repairs
03348	Patterned Concrete Facing
04400	Restoration of Masonry
11131	Aluminum Stop Logs
11284	Trash Racks
11290 11295 12001	Stop Log Plates, Guides, and Other Incidental Metals Low-Level Outlet Slide Gates
16010	Electrical – General
16050	Basic Materials and Methods
16160	Cabinets and Enclosures
16400	Service and Distribution
16450	Grounding
16500	Lighting
16950	Testing Electrical Systems and Start-Up

# 24. THE CONTRACTOR SHALL SUBMIT A STATEMENT OF QUALIFICATIONS WITHIN THEIR PROPOSAL TO INCLUDE PROOF OF THE FOLLOWING:

A. All Bidders must submit a Statement of Qualifications with their Proposal. Any Proposal which does not contain a Statement of Qualifications may be deemed non-responsive. The information provided must demonstrate the Contractor's

recent experience with (a) dam concrete surface repair work, (b) the installation of aluminum handrails and railings and (c) grouting to fill voids and tremie grouting of a similar nature and scope to the Work of this Project.

- B. The Bidder (Contractor) and/or the subcontractor(s)/supplier(s) providing and/or performing the work tasks outlined above must be identified in the bid. A statement of qualifications must be submitted for each of the above entities with the bid.
- C. Bidders and subcontractors outlined above shall provide at least three (3) references for which they have completed similar dam repair/rehabilitation projects in the last ten (10) years, all of which may be subject to verification by the District to help evaluate the ability of the Bidder to perform the work. All bidders shall be required to demonstrate to the satisfaction of the District that they have adequate financial resources, experienced personnel, and expertise to perform the work of this Contract and shall furnish such information and/or proof of these qualifications upon request.
- D. No contract will be awarded to any bidder who, as determined by the District, is not qualified to perform satisfactory service due to an unsatisfactory record or inadequate experience or who lacks the necessary capital, organization and equipment to conduct and complete the work in strict accordance with the Contract Documents.
- E. Contractor shall provide a company organizational chart that includes personnel who may be assigned to this project and shows the number of employees. Include resumes and applicable experience for key staff and those that may be involved in this project, included the proposed Project Manager.
- F. The Contractor shall describe company's management methods and approach, including quality management procedures, and methods and tools used to monitor and control project schedules and costs.
- G. The Contractor shall provide a Company Profile that includes the following following:
  - 1. The number of years the company has been in business as a Contractor.
  - 2. If a corporation, the date of incorporation, State of incorporation, President's name, Vice-president's name(s), Secretary's or Clerk's name, and Treasurer's name.
  - 3. If individual, or partnership, or limited liability company, the date of organization and the name and address of all partners or members.

(State whether general or limited partnership and whether members are managing partners).

- 4. For other than corporation of partnership, describe vendor organization and name principals.
- 5. Has any contract to which you have been a party been terminated by the owner; have you ever terminated work on a project prior to its completion for any reason; has any surety which issued a performance bond on your behalf ever completed the work in its own name or financed such completion on your behalf; has any surety expended any monies in connection with a contract for which they furnished a bond on your behalf; has your bid surety ever been forfeited? If the answer to any portion of this question is "yes," please furnish the details of all such occurrences.

#### H. Minimum General Contractor and/or Subcontractor Qualifications

- 1. The firm proposing to serve as General Contractor must have a minimum of five (5) years of recent and continuous demonstrable experience as a General Contractor in construction work similar to that proposed under the Scope of Work of this Contract.
- 2. The Contractor shall submit a list of all proposed subcontractors to be involved in the conduct of any of the work items listed herein. A summary description of the Contractor's (if undertaking the work himself) or each proposed subcontractor's qualifications for the respective work items shall also be included under this item.
- 3. The Bidder's overall project site manager must have a minimum of five (5) years' experience in a supervisory capacity with similar projects.
- 4. The site superintendent for each of the subcontractors tasked to perform work items must also have a minimum of five (5) years' experience in a supervisory capacity with similar projects concerning their respective specialty.
- The firm proposing to serve as General Contractor must list and describe below a minimum of three (3) projects completed by them or their Subcontractors within the last ten (10) years which involve elements similar to that proposed under the scope of work contained within this Project. The following information is required for each project: (a) Project Name; (b) Project Location; (c) Owner Name and Address; (d) Contract Price; (e) Start and Completion Date; (f) Description of Project; and (g)

Owner Contact Person Name, Email and Telephone Number.

I. The District may make such investigations as it deems necessary to determine the ability of any bidder to perform the work, and the bidder shall furnish to the District all such information and data for this purpose as it may request. The District reserves the right to reject any bid if the evidence submitted by, or investigation of, such bidder fails to satisfy the District that such bidder is properly qualified to carry out the obligations of the contract and to complete the work contemplated therein. Conditional bids will not be accepted.

#### 25. STATEMENT OF NON-COLLUSION

Each Bidder shall complete, sign, and return the Non-Collusion Affidavit with their Itemized Proposal.

#### 26. STATE OF CONNECTICUT, DEPARTMENT OF PUBLIC HEALTH, DWSRF PROJECT SIGN REQUIREMENTS

The Contractor shall erect a sign at the project identifying the project and indicating that the Connecticut Department of Public Health is providing funding for the construction of the project. The project sign shall be erected **prior to the start of any construction work**, and shall be in accordance with the specifications noted below and the attached project sign detail. The sign shall be furnished, erected, and maintained by the Contractor at a location designated by the Engineer.

The names of the Commissioner of Public Health and the Governor of the State of Connecticut as shown on the sign shall be kept current, and shall be revised within 30 days of such notice to the Contractor that a change has occurred, at no cost to the Department. No additional information shall be placed on the project sign beyond that shown in the project sign detail. If the owner desires to erect a supplemental sign with additional detail regarding the project or its sponsors, that sign shall be placed in a manner that the project sign is not obscured from public view.

The sign shall be constructed of ¾" minimum thickness exterior plywood (A-B) or APA high density overlay plywood (HDO). All fasteners shall be of a rustproof nature. The sign face background shall consist of at least three (3) coats of white outdoor enamel paint. The sign shall be fastened securely in an upright position and maintained in a location on the construction site clearly visible to the public and to visitors to the site.

The Department of Public Health will provide the appropriate logo stickers for use

on the project sign. The logos may be placed anywhere in the blank areas on either side of the text in the center. They should be placed so as to allow sufficient clearance between logos, as may be required.

ITEM	ESTIMATED	STIMATED	UNIT BID PRICE		AMOUNT BID	
NUMBER	QUANTITY	ITEM WITH UNIT PRICE WRITTEN IN WORDS	DOLLARS	CTS	DOLLARS	CTS
1.0	1	LUMP SUM PAYMENT AND PERFORMANCE BOND				
		For –				
2.0	1	LUMP SUM MOBILIZATION/DEMOBILIZATION				
		For –				
3.0	1	LUMP SUM TEMPORARY FACILITIES, SITE PREP, AND CLEAR/GRUB/STRIP				
		For				
4.0	1	LUMP SUM SEDIMENTATION AND EROSION CONTROL				
		For –				

ITEM	ESTIMATED	STIMATED	UNIT BID PRICE		AMOUNT BID	
NUMBER	QUANTITY	ITEM WITH UNIT PRICE WRITTEN IN WORDS	DOLLARS	CTS	DOLLARS	CTS
5.0	1					
		TEMPORARY WATER CONTROL AND COFFERDAMS				
		For –				
6.0	1					
		GAUGES				
		For –				
 7.0		LUMP SUM				
		DEMOLITION AND DISPOSAL –				
		DOWNSTREAM STRUCTURES AND				
		EXISTING WATER MAINS/PIPING				
		For –				
 8.0	1	LUMP SUM				·
		EARTH WORK				
		For –				
9.0		SQUARE YARD				
		ARTICULATED CONCRETE BLOCK FOR				
		AUXILLIARY SPILLWAY CREST AND				

ITEM	ESTIMATED		UNIT BID PRICE		AMOUNT BID	
NUMBER	QUANTITY	ITEM WITH UNIT PRICE WRITTEN IN WORDS	DOLLARS	CTS	DOLLARS	CTS
		CHANNEL CROSSING				
		For –				
10.0	1	LUMP SUM				
		TESTING, AND INSTALLATION				
		For –				
		LUMP SUM				
		DECOMMISION AND BACKFILL RIGHT ABUTMENT INTAKE AND VALVE CHAMBER				
		For –				
		LUMP SUM				
		VIDEO INSPECTION AND CLEANING OF				
		OUTLET PIPES (RIGHT ABUTMENT AND LOW-LEVEL OUTLET)				
		For -				
13.0	1	LUMP SUM				
		<b>RE-LINE LOW-LEVEL OUTLET PIPE</b>				
		For –				

	ESTIMATED	STIMATED	UNIT BID PRICE		AMOUNT BID	
	QUANTIT		DOLLARS		DOLLARS	
14.0	1	LUMP SUM SAFETY RAILINGS				
		For –				
15.0	1	LUMP SUM CAST-IN-PLACE, REINFORCED CONCRETE (AND ACCESSORIES) AT TOP OF DAM AND SPILLWAY For –				
16.0	1	LUMP SUM CAST-IN-PLACE, REINFORCED CONCRETE (AND ACCESSORIES) FOR RETAING WALLS For –				
17.0	1	LUMP SUM CAST-IN-PLACE, REINFORCED CONCRETE FOR GATEHOUSE FOUNDATION AND FLOOR SLAB				
		For –	_			

ITEM	ESTIMATED		UNIT BID PRICE		AMOUNT BID	
NUMBER	QUANTITY	ITEM WITH UNIT PRICE WRITTEN IN WORDS	DOLLARS	CTS	DOLLARS	CTS
18.0	1	LUMP SUM GATE HOUSE SCAFFOLD SUPPORTS				
		For –				
19.0	1	LUMP SUM PREFABRICATED PEDESTRIAN BRIDGES AND ACCESSORIES				
		For –				
20.0	1	LUMP SUM GATEHOUSE WET WALL CONTROLS AND ACCESS-STOP LOGS, SCREENS, GATES, OPERATORS, LADDERS, AND HATCHES				
		For –				
21.0	1	LUMP SUM GATE HOUSE SUPER STRUCTURE RECONSTRUCTION				
		For –				
22.0	1	LUMP SUM ELECTRICAL CONSTRUCTION –				

ITEM NUMBER	ESTIMATED QUANTITY	ITEM WITH UNIT PRICE WRITTEN IN WORDS	UNIT BID PRICE		AMOUNT BID	
			DOLLARS	CTS	DOLLARS	CTS
		GATEHOUSE AND SERVICE				
		TO GATEHOUSE				
		For –				
23.0	1	LUMP SUM WATER MAIN REPLACEMENT				·
		For –				
24.0	360	CUBIC YARD IMPORTED COMMON FILL FOR				
		BERM				
		For –				
25.0	1000	CUBIC YARD IMPORTED GRANULAR FILL FOR				
		STRUCTURE BACKFILL AND				
		FOUNDATIONS				
		For –				
 26.0	280	CUBIC YARD IMPORTED GRANULAR ROAD BASE				·

ITEM NUMBER	ESTIMATED QUANTITY	ITEM WITH UNIT PRICE WRITTEN IN WORDS	UNIT BID PRICE		AMOUNT BID	
			DOLLARS	C15	DOLLARS	
		For –				
27.0	30	EACH ADDITIONAL WATER TESTING FOR ANCHORS - ALLOWANCE				
		For –				
28.0	10,000	SQUARE FOOT PATTERNED STONE FACING FOR CAST – IN - PLACE CONCRETE				 
		For –				
29.0	3,000	SQUARE FOOT MASONRY RESTORATION/ REPOINTING				
		For –				
TOTAL OF	R GROSS SUM IN	WORDS:				
				\$		

# **CIVIL SPECIFICATIONS**

#### SECTION 01010 SUMMARY OF WORK

#### PART I – GENERAL

#### 1.01 INTENT OF THE WORK

The rehabilitation of Grupes Reservoir Dam, located in New Canaan, Connecticut, is intended to address dam safety deficiencies by providing increased freeboard at the regulatory flood level; increasing stability of the downstream masonry portion of the dam; reconstructing the existing gatehouse; and improving the existing water distribution system. The Dam is owned and operated by the First Taxing District of the City of Norwalk, CT, Water Department. Upon completion of the Work of this contract, Grupes Reservoir Dam will have been repaired in accordance with the Plans and Specifications provided as part of the Bid Documents.

The Contractor is referred to the Contract Drawings, which along with these Specifications, define the required work.

#### 1.02 LOCATION OF THE WORK

Grupes Reservoir Dam is accessed from the west side of Valley Road between Deep Valley Rd. and N. Wilton Rd. in New Canaan, Connecticut. The dam impounds the 23-acre Grupes Reservoir and is classified as <u>Large</u> in size, <u>High</u> in hazard potential and <u>Poor</u> in condition based on the last visual inspection performed by GZA in May 2021.

The Contract Drawings specifically delineate the project boundaries, including staging and lay-down areas for the Contractor, as well as areas not to be disturbed. The Contractor shall be strictly monitored for compliance with these boundaries. Proper environmental and housekeeping procedures by the Contractor are of the highest priority, as required by the environmental permits secured for the work.

#### 1.03 DESCRIPTION OF THE SITE

The dam has a maximum height of 24-feet and a total length (including spillway) of approximately 235-feet. The internal construction of the dam is cyclopean concrete. The downstream stone masonry section is the main structural element of the dam. In 1901, a 3-foot-thick concrete facing was constructed on the upstream side of the masonry, along with an upstream earth embankment. The stone masonry part of the dam has a vertical downstream face and is the only part of the dam visible with the reservoir at normal pool. The top of the dam at El. 302.0 is approximately 5.2 feet above normal pool (i.e., fixed crest of the principal spillway).

The principal spillway consists of an approximately 50-foot-long, 6 foot wide, broad-crested weir located at the east (left) abutment side of the dam. The spillway has a vertical drop of about 19 feet from the weir at El. 296.8 to a bedrock plunge pool at about El. 278. A metal pedestrian access bridge crosses the spillway from the east side access road to the dam crest. The principal spillway is construction of stone masonry with a vertical downstream face. The upstream side was also bolstered with a 3-foot-thick concrete wall. The vertical face of this wall was set on a battered slope based on drawings provided in the Phase I dam inspection report (USACE, 1979). An auxiliary spillway consisting of an unlined, bedrock-controlled channel is situated just beyond the dam's right abutment. excavated across the west (right) abutment down to bedrock. The weir configuration at the auxiliary spillway approximates an open channel (discharge coefficient = 3.017) with a crest (invert) elevation of 297.3. The alignment of the auxiliary spillway discharge channel is irregular but approximates a semi-circle as the channel curves through the abutment and exits about 230 feet downstream from the
dam into the Silvermine River. GZA estimates that the maximum discharge capacity of the principal and auxiliary spillways (at the top of dam elevation 302.0) are 1,840- and 1,730-cfs, respectively. As discussed in Section 2.1 above the elevation of the service roadway on the east (left) abutment is, in areas, as much as four feet lower than the dam crest. Consequently, as presently configured, the service roadway would overtop more often than the dam and allow flooding in areas immediately east of the dam.

The outlet works consists of an upstream gatehouse with a 24-inch pipe extending from the gatehouse connecting to a 30-inch pipe in an upper valve chamber set in the masonry part of the dam. This 30-inch gate valve has an invert elevation of about 277.6 and is located 60-feet down gradient from the 24-inch outlet pipes exit from the gatehouse. A 24-inch-diameter cast-iron pipe (CIP) has in invert elevation out of the gatehouse of 277.6 and extends to a downstream lower valve chamber and outlet headwall on the bank of the Silvermine River about 50 feet south of the dam. The 30-inch gate valve is apparently original to the dam's construction, while the 24-inch CIP and downstream valve chamber was installed in 1933 and serves as a blow-off to the river. The 24-inch CIP bifurcates just down gradient from the dam connects to the District's water supply system. There is also an abandoned 16-inch outlet pipe and stone masonry outlet chamber on the west end of the dam.

The gatehouse was also constructed in 1933 and consists of a reinforced concrete foundation set on a 4-foot-thick concrete foundation. Original design drawings by Nicholas S. Hill Jr., Consulting Engineer of New York City, indicate that the vertical foundation walls are constructed on a slight batter. The gatehouse's one-story red brick superstructure with slate shingled roof houses three, hand operated gate hoists controlling 30-inch by 30-inch cast iron sluice gates seated at various levels on the inside walls of the foundation. The operating gatehouse floor is at elevation 301.9, approximately coincident with the top of the dam. The gatehouse is accessed from the top of dam via a metal grate catwalk constructed in the early 1970's. The total depth of the gatehouse wet well is 25 feet. Based on dimensional survey conduct by Hearn, the approximate centerline elevations of the three sluice gates are 278.5 (upstream face), 284.1 (right wall), and 290.2 (left wall). These gates formerly allowed intake of reservoir water from one of three levels. Two rows of vertical grooves, running the full depth of the wet well are located immediately down gradient from the sluicegates and are fitted with wooden framed stop planks and screens.

## 1.04 <u>GENERAL SCOPE OF THE WORK</u>

- A. The work of this project will consist of a rehabilitation of Grupes Reservoir Dam. Repairs are intended to address existing deficiencies and to improve overall dam safety. To achieve the desired improvements, major components of the rehabilitation will include:
  - 1. Sediment and erosion controls;
  - 2. Site preparation and site demolition;
  - 3. Replacement of existing water mains;
  - 4. Earthwork and cast-in-place retaining walls on the east side of the reservoir to address overtopping and provide freeboard during the spillway design flood.
  - 5. Complete re-construction of the gatehouse, including raising the foundation, replacement of the gates and operators, stoplogs, and re-lining of the existing outlet pipe.

- 6. Repairs to the masonry portion of the dam, including construction of a cast-in-place concrete cap to increase freeboard, and installation of post-tensioned anchors to increase stability of the dam.
- 7. Replacement of the existing catwalks over the spillway and to the gatehouse with pedestrian bridges.
- 8. Rehabilitation of the auxiliary spillway, including construction of a fixed-invert, removal of debris from the lower portion of the spillway channel, and removal of the existing culvert crossing.
- 9. Construction of fences and railings.
- 10. Abandonment of unused valve chambers, outlet pipes, and intakes.
- 11. Restoration of disturbed areas.
- B. The following provides information regarding access to the general site area, access to the work site and location/access regarding the staging/laydown area:
  - 1. <u>Project Location:</u> Access to the general project location is via Valley Road in New Canaan, Connecticut. It should be noted that several public roads to the site may have geometric or load restrictions that may limit passage by certain vehicles, equipment, or trailers.
  - 2. <u>Site:</u> Access to the left and right sides of the dam are separated by the existing downstream channel, which cannot be crossed. The left (east) side of the site is accessible from Valley Road, and the right (west) side of the downstream area is accessed via Deep Valley Rd. Access by vehicle is through existing unpaved, single lane roads.
  - 3. <u>Work, Staging, Laydown and Stockpile Area</u>: Access to the proposed work and staging areas is via the two existing paths, described above. The Contract Drawings specifically delineate staging and lay-down areas for the Contractor, as well as areas not to be disturbed. The Contractor shall submit a detailed layout plan to the District for approval. Proper environmental and housekeeping procedures by the Contractor are required. If the Contractor feels additional staging or lay-down areas are required, the Contractor shall request an extension of the boundaries to the District in writing.

The work required by the Contract Drawings and Specifications shall include furnishing all labor, skill, supervision, tools, construction plant, equipment and materials and performing all operations necessary for the proper completion of the Contract Work as shown on the Plans and Specifications, and as required by the Owner.

The Contractors shall also provide all materials, fuels, labor, and other items necessary for the protection of the Work from hot weather, freezing weather, precipitation, surface water flow, groundwater, or other potentially adverse conditions which might cause harm to completed work or work underway. The Contractor shall be prepared to remove personnel, equipment, and materials from areas of potential inundation in the event of excessive flows and be prepared to restore any damage and resume work at the site.

#### 1.05 ENVIRONMENTALLY SENSITIVE WORK

The Contractor is informed that the Work of the Project is within and around environmentally sensitive areas. The Contract Drawings specifically delineate staging and lay-down areas for the Contractor, as well as areas not to be disturbed. The Contractor shall be strictly monitored for compliance with these boundaries. Proper environmental and housekeeping procedures by the Contractor are of highest priority.

The Contractor is, therefore, strongly urged to become intimately familiar with access and other issues at the dam to better develop a comprehensive work plan and a more informed bid. The Contractor is encouraged to spend as much time as is needed at the site to develop an understanding of the location and the proposed Work.

### 1.06 ARRANGEMENT OF CONTRACT DOCUMENTS

The Contract documents consist of several major parts, including the Invitation to Bid, Bidder Experience and Reference Form, Form for Bid and Signature Page, Contract Drawings and Technical Specifications (including Supplemental General Conditions and Special Conditions) and other related Documents. All information is contained in a single electronic volume.

The Supplemental General Conditions contains information in addition to the Standard Conditions which governs the work. The Special Conditions and the Specifications modify and supplement these with detailed requirements for the Work.

The location and general character of the work are shown on the following Contract Drawings:

Drawing No.	Title	
G0	Cover Sheet and Index of Drawings	
G1	General Notes	
G2	Existing Conditions Site Plan	
G3-G5	Existing Conditions and Sedimentation & Erosion Control Plan (3 Sheets)	
G6	Sedimentation and Erosion Notes	
G7	Sedimentation and Erosion Details	
G8	Temporary Access and Staging Area Plan	
C1	Demolition Plan	
C2-C4	Proposed Conditions Plan (3 Sheets)	
C5-C8	East Service Road Typical Sections (4 Sheets)	
С9	Auxiliary Spillway Improvements	
C10	Typical Details and Proposed Abutment Modifications	
C11	Proposed Chain Link Fence Location Plan	
<b>S</b> 1	Post-Tensioned Anchor Layout Plan	
S2	Post-Tensioned Anchor Layout Sections	
S3	Post-Tensioned Strand Anchor Details	
S4-S5	Cast-in-Place Concrete Sections & Details (2 Sheets)	
<b>S</b> 6	Gatehouse and Spillway Footbridge Details and Notes	
GH1-GH2	Existing Conditions and Demolition at Gatehouse (2 Sheets)	
GH3	Gatehouse Construction/Maintenance Access Bracket Details	
GH4	Gatehouse Floor Raising Plan & Details – Gatehouse Deck Plan	
GH5-GH8	Gatehouse Floor Raising Plan & Details – Deck and Wall Section (4 Sheets)	
GH9-GH10	Gatehouse Concrete Wall & Bridge Seat Reinforcing Plan & Details	
GH11-GH12	Gatehouse Operator Improvements (2 Sheets)	

WM1-WM2	Water Main Plan (2 Sheets)
WM3-WM4	Water Main Details (2 Sheets)
E0	Electrical Symbols, Notes, Abbreviations, and Schedules
E1	Electrical Site Plan
E2	Electrical Details and One Line Power, Communications, and Riser Diagram
E3	Electrical Details
A1	Plans, Elevations, and Sections
A2-A3	Details (2 Sheets)

The work shall be constructed in accordance with said plans and such further working and/or detail plans as may be furnished from time to time by the District. Details shown on said plans are indicative of the types of rehabilitation required and are subject to revision, alteration, modification, and variation. Such revisions, alterations, modifications, or variations in said plans are as desirable in the opinion of the District, on account of conditions encountered or for other reasons, shall not be considered a variation of terms of this contract and the assent of the surety on the bond accompanying this contract to such revisions, alterations, modifications, or variations shall not be required.

All said plans, general and detail, and the specifications shall be considered together, so that any work shown on the plans, though not mentioned in this contract and any work mentioned in the contract, though not shown on the plans, shall be executed by the Contractor as part of the performance of this contract. Figured dimensions shall prevail over scaled. All things which in the opinion of the District may fairly be inferred from the plans shall be executed by the Contractor as part of the contract, and the District shall be the sole judge as to whether the detail plans conform to the general plans.

Plans, calculations, estimates of quantities, and any statements made in the Information for Bidders or otherwise as to the conditions under which the work shall be performed, are not guaranteed by the District to be correct or to be a complete representation of all existing data on the conditions affecting the work, and the Contractor agrees that he has made his own examination and will make no claim for damages on account of any errors, inaccuracies, or omissions that may be found. The Contractor shall not take any advantage or have any claim for damages on account of any discrepancy, error or omission in any plans, calculations, estimates of quantities, or any statements made in the Information for Bidders or otherwise as to the conditions under which the work is to be performed, and he shall report such discrepancy, error, or omission to the District in writing as soon as it comes to his knowledge, and before proceeding with work relating to such discrepancy, error, or omission.

Any correction or modification of the plans or specifications may be made by the District when necessary for the proper fulfillment of their purpose or for their proper interpretation. When there is a conflict between the plans and the specifications, the District shall be the sole judge of which provision shall be controlling.

### 1.07 <u>DESCRIPTION OF WORK</u>

- A. Project Identification: The name of the project is: Grupes Reservoir Dam Rehabilitation Project, New Canaan, Connecticut.
- B. In all cases within the Contract Documents, references to the "Owner" and/or the "District" shall be taken to mean the First Taxing District of the City of Norwalk, Connecticut, Water Department.

- C. References to the "Contractor" within the Contract Documents and Technical Specifications shall mean the entity legally contracted by First Taxing District of the City of Norwalk, Connecticut, Water Department to perform and complete the work of this Contract.
- D. References to the "Resident Engineer" within the Contract Documents and Technical Specifications shall mean the employee or employees of the First Taxing District of the City of Norwalk, Connecticut, Water Department assigned to observe and monitor the work of the Contractor at the project site, and/or the engineering firm contracted by First Taxing District of the City of Norwalk, Connecticut, Water Department to provide observation and monitoring services during construction.
- E. References to the "Designer Engineer," the "Design Consultant," "Engineer," or the "Consultant" within the Contract Documents and Technical Specifications shall mean the engineering firm contracted by First Taxing District of the City of Norwalk, Connecticut, Water Department to design the project. The "Design Engineer," "Engineer," and "Consultant" is GZA GeoEnvironmental, Inc. of Norwood, Massachusetts.

# PART 2 – PRODUCTS

Not Used

# PART 3 - EXECUTION

## 3.01 <u>SUMMARY OF WORK</u>

- A. The work required by the Contract Drawings and Specifications shall include furnishing all labor, skill, supervision, tools, construction plant, equipment and materials and performing all operations necessary for the proper completion of the contract work as shown on the Plans and Specifications, and as required by the District and/or Resident Engineer. The work shall generally consist of, but not be limited to, the following:
  - 1. Develop project schedule, prepare SWPPP, apply for any necessary additional permits (e.g., Connecticut Construction General Permit), and begin preparation of submittals prior to start of work at site.
  - 2. Mobilize all necessary equipment, personnel, and material to the site and deploy temporary sediment and erosion control measures, including perimeter silt fence barriers, compost socks, construction entrances, and other BMPs. Notify the District, Engineer, and permitting/regulatory agencies. If required, schedule and conduct site walk to inspect sediment and erosion control measures.
  - 3. Modify sediment and erosion control measures as required. Work may proceed once approval has been provided by the District, Engineer, and permitting/regulatory agencies.
  - 4. Clear and grub staging areas and provide construction access to the site. Provide temporary facilities as described in the Contract Documents.
  - 5. Clear and grub work areas along east side of Grupes Reservoir.

- 6. In conjunction with the District, lower the level of Grupes Reservoir in order to perform repairs to the dam and ancillary structures in the dry (to the extent practicable). Lowering of Grupes Reservoir SHALL NOT exceed 18 months <u>and</u> one growing season (April through September).
- 7. Re-locate overhead wires and/or underground utilities as necessary and as described in the Contract Documents. Install new electrical service as shown.
- 8. Construct new water main as described in the Contract Documents prior to or in conjunction with berm and wall construction.
- 9. Construct parapet/retaining walls along east side of Grupes Reservoir (may require lowered reservoir levels in some areas).
- 10. Construct earthen embankment along east side of Grupes Reservoir, and re-grade existing high ground and access road as shown on the Drawings.
- 11. Demolish existing stone masonry wall in area of proposed cast-in-place training/retaining wall. Repair remainder of stone masonry at the dam abutment, to remain. (will require lowered reservoir level to complete).
- 12. Construct cast-in-place training/retaining wall. (may require lowered reservoir levels in some areas).
- 13. Remove valve within existing 30-inch chamber in line with gatehouse and replace with solid section of pipe. Abandon chamber by backfilling with grout or CLSM. (will require lowered reservoir level to complete).
- 14. Abandon 16-inch valve chamber by backfilling with grout or CLSM. (will require lowered reservoir level to complete).
- 15. Construct cast in place concrete cap on top of dam. (may require lowered reservoir levels in some areas).
- 16. Construct new cast in place retaining wall, stairs, and earthen embankment at left abutment.
- 17. Demolish existing stairs at right abutment.
- 18. Remove and replace existing bridge over spillway and catwalk to gatehouse.
- 19. Re-point downstream face of dam.
- 20. Install post-tensioned anchors along top of dam.
- 21. Construct earthen berm at right dam abutment.
- 22. Construct auxiliary spillway invert sill at right dam abutment. (may require lowered reservoir levels in some areas).
- 23. Remove loose boulders and trees from auxiliary spillway channel, and re-grade channel side slopes, as necessary.
- 24. Demolish existing auxiliary spillway channel crossing and install new articulated block crossing.
- 25. Demolish existing chlorination building foundation to 4" below grade and backfill.
- 26. Re-line low-level outlet pipe to gatehouse. (will require dewatered reservoir to complete).
- 27. Raise gatehouse floor and re-construct gatehouse (may require lowered reservoir levels in some areas).

- 28. Replace operators and gates within gatehouse. (may require lowered reservoir levels in some areas).
- 29. Loam and seed re-worked areas as noted on the Contract Documents. Restore all disturbed areas; cover or mulch newly seeded areas.
- 30. Make all miscellaneous site restorations to staging areas, fencing, utilities, pavement, or other facilities caused as a result of the Work and/or mobilization/demobilization.
- 31. Demobilize from the job site; remove all temporary structures, trash, debris, and other material from the site. Remove temporary sediment and erosion controls where appropriate. Notify the District, Engineer, and permitting/regulatory agencies of final stabilization. Schedule and conduct site walk to inspect site, if necessary.
- 32. Provide ongoing maintenance and monitoring of newly vegetated and restored areas per the Contract Documents.

## 3.02 OBSERVATION BY RESIDENT ENGINEER

- A. The District will employ a Resident Engineer (Construction Engineer, Owner's Representative) to perform full or part-time on-site observation and selected testing during all phases of Work. The services of the Resident Engineer will include, but not be limited to, the following:
  - 1. Observation during installation of erosion controls and related sediment controls.
  - 2. Observation of temporary water control.
  - 3. Observation of earthwork and excavation.
  - 4. Observation of concrete work and anchoring at the dam and spillway.
- B. During the course of construction, the Resident Engineer will advise the District and Contractor in writing, if at any time the work does not, in the opinion of the Resident Engineer, conform to the plans and specifications.
- C. The Resident Engineer's presence does not include supervision or direction of the actual work by the Contractor, his/her employees, or agents. Neither the presence of the Resident Engineer or District, nor any observations and testing performed by him/her, or any notice or failure to give notice, shall excuse the Contractor from defects discovered in his/her work.

## PART 4 – MEASUREMENT AND PAYMENT

No measurement shall be made of any work performed under this section. No separate payment shall be made for any work performed under this section. The cost of any work done, or facilities provided under this section shall be included under other bid items within the Contract.

### \*\*\*END OF SECTION\*\*\*

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## SECTION 01050 FIELD ENGINEERING

## PART 1 - GENERAL

#### 1.01 <u>DESCRIPTION</u>

- A. The Contractor shall lay out all work and establish lines, grades, and benchmarks for the project. The Contractor shall verify all existing lines, levels, dimensions, and existing conditions indicated on the Drawings and shall report all inconsistencies to the Engineer prior to commencing work, ordering materials or equipment.
- B. The Contractor shall be responsible for establishing elevations, lines, levels, reference marks, batter boards, etc. Contractor shall be responsible for staking easements.
- C. The base map for the Contract Drawings was prepared by William Hearn, L.S. Elevations are referenced to NGVD29. Horizontal datum is referenced to NAD27 (CTGS 3330417).

#### 1.02 LINES, GRADES AND MEASUREMENTS

- A. The Contractor's engineer or surveyor shall provide field engineering services. Establish benchmarks, elevations, lines, levels, reference marks, batter boards, etc., utilizing recognized engineering survey practices needed by the Contractor during the progress of the Work, and from time to verify such marks by instrument or other appropriate means.
- B. The Contractor shall submit a certificate signed by the Professional Engineer or Land Surveyor registered in the State of Connecticut that the elevations and locations of the Work are in conformance with the Contract Documents.
- C. The Owner and Engineer shall be permitted at all times to check the lines, elevations, reference marks, batter boards, etc., set by the Contractor, who shall correct any errors in lines, elevations, reference marks, batter boards, etc., disclosed by such check. Such a check shall not be construed to be an approval of the Contractor's work and shall not relieve or diminish in any way the responsibility of the Contractor for the accurate and satisfactory construction and completion of the entire Work.
- D. The Contractor shall make, check, and be responsible for all measurements and dimensions necessary for the proper construction of and the prevention of mis-fittings in the Work.
- E. The Contractor shall provide stationing along the east berm/access roadway, or at other locations acceptable to the Owner or Engineer

### 1.03 <u>RELATED SECTIONS</u>

- A. District Standard Specification Item No. 985
- B. Section 01055 As-Built Drawings

# PART 2 – PRODUCTS

Not Used

## **PART 3 – EXECUTION**

Not Used

## PART 4 - MEASUREMENT AND PAYMENT

No measurement shall be made of any work performed under this section. No separate payment shall be made for any work performed under this section. The cost of any work done, or facilities provided under this section shall be included under other bid items within the Contract.

## \* \* \* END OF SECTION \* \* \*

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## SECTION 01055 AS-BUILT DRAWINGS

## PART 1 - GENERAL

#### 1.01 <u>SCOPE</u>

- A. The Work of this Section shall include the ongoing preparation of As-Built Documents and Record Drawings by the Contractor to record progress and changes at the project site. The As-Built Documents and Record Drawings shall be continuously updated by the Contractor's on-site superintendent and his RLS.
- B. Provision of the services of a Registered Land Surveyor (RLS) (Connecticut) to provide site layout, control points, temporary and permanent benchmarks, and other similar work specified under Section 01050 is included as part of the Bid Item for this Section.

### 1.02 <u>REQUIREMENTS</u>

- A. In addition to the requirements of the General Conditions, Contractor shall maintain and provide the Engineer with as-built documents as specified below.
- B. Maintenance of Documents:
  - 1. Maintain in clean, dry, legible condition complete sets of the following: Contract Drawings, Specifications, Addenda, approved Shop Drawings, Samples, Photographs, Change Orders, other modifications of Contract Documents, Test Records, Field Orders, and all other documents pertinent to Contractor's Work. The drawings shall be neatly and clearly marked in color during construction to record all variations made during construction.
  - 2. Provide files and racks for proper storage and easy access. File in accordance with filing format of Construction Specifications Institute (CSI), unless otherwise approved by the Engineer.
  - 3. Make documents available at all times for inspection by the Owner and Consultant.
  - 4. As-built documents shall not be used for any other purpose and shall not be removed from the Contractor's office without the Owner's approval.
- C. Recording:
  - 1. Keep as-built documents current. Drawings shall be updated at a minimum once per week.
  - 2. Do not permanently conceal any Work until required information has been recorded.
  - 3. Contract Drawings: Legibly mark to record actual construction.
  - 4. Subsurface conditions: Record information on sub-surface conditions encountered at the site, either on the Contract Drawings, on a separate exploration log, or a combination of both.
  - 5. Specifications and Addenda: Legibly mark up each Section,
  - 6. Shop Drawings: Maintain as record documents and legibly annotate drawings to record changes made after review.

### 1.03 <u>RELATED SECTIONS</u>

- A. District Standard Specification Item No. 985
- B. Section 01050 Field Engineering

## 1.04 FINAL TOPOGRAPHIC SURVEY PLAN

In addition to the requirements listed above, the Contractor shall provide a surveyed topographic plan of the final conditions at the site at the conclusions of the work, with a similar level of detail as included in the "Existing Conditions" sheets of the Contract Drawings. Record drawing shall be prepared and stamped by a Registered Land Surveyor licensed in the State of Connecticut.

## 1.05 <u>SUBMITTALS</u>

The Contractor shall submit the following documents. Refer to Section 01300 - Submittals for additional information.

- A. Within five (5) days of Notice to Proceed, submit the resume and contact information of the CT Registered Land Surveyor performing construction and as-built survey at the site.
- B. At completion of Project, but before final payment, deliver three hard copies of the As-Built Drawings (marked up Contract Drawings + Contractor's Final Conditions Topographic Survey Plan) including electronic versions (PDF and AutoCAD) of these documents including all other associated documents to the Owner.

## PART 2 PRODUCTS

This Section Not Used

## PART 3 – EXECUTION

### 3.01 MARK UP OF CONTRACT DRAWINGS

The Contractor shall continuously mark up a set of the Contract Drawings based on the field changes and as-built conditions. The marked up set of Contract Drawings shall be available on site at all times. The Contractor shall bring the updated set to each construction meeting. A complete set of marked up Contract Drawings shall be provided to the Owner and Consultant at the completion of the project.

### 3.02 <u>"AS-BUILT" PLAN</u>

A. The Contractor shall engage a licensed CT land surveyor to prepare a topographic "as built" survey plan of the site after the completion of all work which will result in permanent changes to the site and/or its grades. Do not show temporary structures on the "as built."

- B. The final "As Built" plan shall be substantially similar to the base map shown in the Contract Drawings in that it shall use the same horizontal and vertical datums, provide the same contour intervals, and show (at minimum) the same features. The limits of all work performed, and all materials placed under the work of this contract shall be shown on the "As Built" plan. The plan shall, at minimum, show the same extents as the base plan and shall be extended if necessary to cover all work areas. The "As Built" plan shall be at the same or smaller scale at the base map. Property lines shall be established and shown, as necessary.
- C. A draft of the "As Built" plan shall be submitted to the Owner. Upon acceptance, a final version, stamped by the surveyor, shall be submitted. Three plans with original stamps shall be provided, along with CADD files.

## 3.03 BENCHMARKS AND PROJECT MARKERS

Permanent project benchmarks and/or survey control points set during performance of the work by the Contractor's licensed land surveyor shall be shown on the final "As Built" plan.

## PART 4 - MEASUREMENT AND PAYMENT

No measurement shall be made of any work performed under this section. No separate payment shall be made for any work performed under this section. The cost of any work done, or facilities provided under this section shall be included under other bid items within the Contract.

### \* \* \* END OF SECTION \* \* \*

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## SECTION 01060 REGULATORY REQUIREMENTS

## PART 1 - GENERAL

#### 1.01 <u>PERMITS AND LICENSES</u>

- A. No portion of the Work within and/or adjacent to Grupes Reservoir, or adjacent to existing resource areas shall be begun until all necessary and required permits have been secured.
- B. The following permits, notifications, and/or approvals have been obtained by the Owner and are attached to this section:
  - CT Department of Energy & Environmental Protection: 401 Water Quality Certification (33 U.S.C. 1341); Permit No. WQC-201814641;
  - CT Department of Energy & Environmental Protection: Dam Safety Construction Permit (CGS Sec. 22a-403); Permit No. DS-201814638;
  - CT Department of Public Health: Water Company Land Permit (CGS Sec. 25-37c-1 and 25-37d); Permit No. WCL #2018-20
  - US Army Corps of Engineers: 404 Programmatic General Permit Category 1 (Self Verification) to be submitted after Contract is awarded.

Copies of any permits/approvals outstanding as of the bids due date will be forwarded to the Contractor by addendum after they have been issued by the permitting agencies. These permits/approvals are to be considered as part of the Contract Documents. The Contractor shall be responsible for adhering to the conditions stipulated in all permits/approvals. No Work shall begin until all required permits have been secured to cover the Work.

The Terms and Conditions which will accompany the required permits, licenses, and approvals still to be issued are not expected to deviate substantially from the requirements of these Contract Documents and the Technical Specifications. No additional payment shall be made for adherence to the terms and conditions of permits, licenses, and approvals yet to be issued for the Project. In the event that compliance with terms and conditions of a permit (applied for by the Owner) requires substantial additional work on the part of the Contractor, a Contract Amendment will be negotiated. No additional payment will be made in any event for compliance with permits obtained by the Contractor.

- C. A temporary permit (local) may be required for field trailers or other temporary facilities and, if so, shall be obtained by Contractor. Copies of all required permits and licenses shall be forwarded to the Owner prior to the beginning of the Work. The Contractor shall be responsible for conducting his/her work in accordance with all provisions of said permits.
- D. The Contractor shall procure all other required permits and licenses (e.g., CTDEEP Construction General Permit, Building Permit for Gatehouse, Permit for new/modified Electrical Service), pay all charges, fees and taxes and shall give all notices necessary and incidental to the due and lawful prosecution of the work under this Contract. The cost thereof shall be included in the prices bid for the various items specified herein for the work of this Contract. Copies of all required permits and licenses shall be filed with the District and Consultant prior to the beginning of the work.

E. The disturbance area at the site will be more than one acre in total and therefore under the jurisdiction of the NPDES general construction permit process. The Contractor shall prepare and submit a site-specific Stormwater Pollution Control Plan (SWPCP) for sediment and erosion control. The Contractor(s) shall adhere to the requirements of this plan and shall be responsible for implementing the controls and BMPs shown on the Contract Drawings and other applicable Specifications; however, it shall be understood that these measures called for in the specifications and on the plans represent the MINIMUM acceptable level of sediment and erosion control. The SWPCP shall be adjusted to account for the Contractor's anticipated work plan, construction sequence, and anticipated level of disturbance.

## 1.02 <u>ADHERENCE TO AUTHORIZATIONS, PERMIT AND LICENSE CONDITIONS AND</u> <u>REQUIREMENTS</u>

The Contractor shall strictly adhere to all conditions and requirements set forth in the authorizations, permits, licenses, etc. issued in relation to the Work of this Contract. The Contractor shall undertake all incidental work necessary to meet the conditions and requirements of the authorizations, permits and licenses and shall perform the Work of the Contract in accord with said conditions and requirements. The cost thereof shall be included in the prices bid for the various items specified herein for the work of this Contract.

The Contractor shall be solely responsible for monitoring and complying with the conditions and requirements of all authorizations, permits and licenses. The Contractor shall solely be responsible for any and all penalties, sanctions, and fines that result from non-compliance with the conditions and requirements of all authorizations, permits and licenses. The Contractor shall be aware that the attached Contract Drawings are a key condition of the permits granted by the Connecticut Department of Energy and Environmental Protection (DEEP). Deviation from the Contract Drawings, including the Construction Sequence and Water Handling Plan, shall not be made without the permission of the Resident Engineer and Owner, and consent of regulatory authorities. Neither the Owner nor the Owner's Consultant will be held responsible for any penalties which result from Contractor violations of the conditions and requirements of permits and licenses.

No additional payment will be made for compliance with the conditions and requirements of the authorizations, permits, variances, or approvals.

Copies of all permits shall be maintained at the site by the Contractor during the Work.

## 1.03 AIR, SOIL, AND WATER POLLUTION AND NOISE CONTROL

The Contractor shall comply with the applicable local, state, and federal regulations pertaining to Open Burning, and Dust, Odor, Construction and Demolition; and his/her attention is called to applicable Enforcement Provisions in regard to these and other pertinent and applicable regulations. The Contractor shall comply with the provisions of the Clean Air Act of 1970, 42USC, Sections 1857-1857f.

The Work of this Contract falls within the jurisdiction of the Connecticut Department of Energy and Environmental Protection (CTDEEP). As per the General Permit for the Discharge of Stormwater and Dewatering Wastewaters from Construction Activities (Construction General Permit), sites where more than 1 acre of land is to be disturbed require the filing of a CTDEEP Construction General Permit. <u>A</u> CTDEEP Construction General Permit is required for the Work of this Contract.

It shall be the Contractor's responsibility to apply for a CTDEEP Construction General Permit). As part of the CTDEEP's Construction General Permit, the Contractor will be required to prepare and submit a Stormwater Pollution Control Plan and a Spill Prevention and Control Plan. The Spill Prevention and Control Plan shall also include a description of the designated re-fueling area(s) to be established at each dam, the equipment to be refueled in the refueling area(s), and details for a secondary containment system to be used to mitigate a possible spill into the reservoir. The secondary containment equipment shall be sized to contain the most likely volume of fuel to be spilled during a fuel transfer.

It shall be the Contractor's responsibility to prepare and file the required the SWPCP inspection forms and/or information with the CTDEEP. The SWPCP must be kept on-site at all times. It shall be the Contractor's responsibility to maintain the site in accordance with SWPCP and all terms and conditions of the CTDEEP Construction General Permit.

Sediment and Erosion Control measures, details, and notes are included within the Contract Drawings. The information contained in the plans and specifications may be used as the basis for the preparation of any sediment and erosion control plan but shall be considered the <u>MINIMUM</u> acceptable measures. The final content and responsibility for implementation are the Contractor's alone.

## 1.04 SPILL PREVENTION CONTROL AND COUNTERMEASURES PLAN

The work of this contract is being conducted within and adjacent to Grupes Reservoir at the Owner's Grupes Reservoir Dam site. Grupes Reservoir and its surrounding wetlands is a sensitive water resource which provides habitat for fish and other wildlife. The Contractor shall take every precaution to prevent the chemical contamination of soil, groundwater, and Pond water caused by spilling or leaking of oil, hazardous material, or other chemicals and materials used in the construction operation. The Contractor shall be especially careful not to discharge or spill any oil, grout, concrete, or other contaminants in or onto the waters adjacent to the work.

The Contractor's written Spill Prevention Plan shall include, at a minimum, (1) a plan for containing anticipated construction materials to prevent possible spills; (2) telephone numbers of key management personnel including local and state public safety agencies; (3) an inventory of spill mitigation equipment such as sorbent booms, etc. which are to be kept on site; and (4) standard procedures for containing possible spills.

Clean-up of such spills, leaks or other contamination shall be undertaken immediately by the Contractor. The clean-up work shall be done to the satisfaction of the Construction Engineer and Owner. All spills, leaks, or other contamination shall be immediately reported to both the Construction Engineer and Owner. In the event that such a spill or leak is not cleaned up by the Contractor, the Owner reserves the right to have the spill or leak cleaned up by its own forces or by others and the expense of such removal and disposal will be charged to the Contractor.

The Storm Water Pollution Prevention Plan and the spill prevention control and countermeasures / emergency action plan may be combined into one document.

## 1.05 <u>HEALTH AND SAFETY</u>

The Contractor shall be responsible for complying with all local, state, and Federal laws, codes, ordinances, rules, requirements, standards, regulations, and orders governing workplace and site health and safety. Health and Safety on the project site shall be the sole responsibility of the Contractor.

The Contractor shall be responsible for monitoring the health and safety practices of his own personnel and those of all sub-contractors present on the site. The Contractor shall be responsible for knowledge of and compliance with all relevant OSHA regulations, as well as all other Federal, state, and local laws, ordinances, codes, and regulations pertaining to health and safety.

A general and a site-specific Health and Safety plan must be in place prior to the Start of the Work. <u>The Contractor is hereby notified that Owner shall place the utmost importance on the proper planning</u>, execution, and adherence to the safety plan and all required general safety procedures. Review of this plan by Owner and/or its Consultant in no way implies acceptance of responsibility for job site safety by the Owner and/or its Consultant. The Contractor shall be solely responsible for job site safety.

The site-specific Health and Safety Plan shall specifically address fall protection, water safety, and traffic safety, as well as all other areas deemed necessary by the Contractor.

Neither the professional activities of Owner, its Construction Engineer, or its Consultant, nor the presence of the Owner, its Construction Engineer, or its Consultant's employees and/or subcontractors will be construed by any party to imply that the Owner, its Construction Engineer, or its Consultant has any responsibility for any Contractor's methods of work performance, procedures, superintendence, sequencing of operations, or safety in, on or about the project site. With respect to site safety, the Owner will be responsible solely for the on-site activities of its own employees and this responsibility will not be construed to relieve the Contractor from his obligations to maintain a safe project site.

## 1.07 <u>SUBMITTALS</u>

The Contractor shall submit the following documents. Refer to Section 01300 - Submittals for additional information.

- 1. All applicable permit/approval applications requested to perform the Work at the site. Copies of all approved permit/approval documentation shall be submitted to the Owner and the Consultant as they are received.
- 2. Stormwater Pollution Control Plan and Spill Prevention Control and Countermeasures Plan
- 3. Contractor's Health and Safety Plan FOR INFORMATION ONLY

### PART 2 - PRODUCTS

Not used

## **PART 3 - EXECUTION**

Not used

# PART 4 - MEASUREMENT AND PAYMENT

No measurement shall be made of any work performed under this section. No separate payment shall be made for any work performed under this section. The cost of any work done, or facilities provided under this section shall be included under other bid items within the Contract.

# \* \* \* END OF SECTION \* \* \*

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### SECTION 01100 SPECIAL PROVISIONS

#### PART 1 - GENERAL

#### 1.01 GENERAL OBLIGATIONS OF THE CONTRACTOR

A. General obligations of the Contractor shall be as set forth in the Contract Documents. Unless special payment is specifically provided for, all incidental work and expense in connection with the completion of work under the Contract will be considered a subsidiary obligation of the Contractor and all such costs shall be included in the Bid Form in connection with which the costs are incurred.

### 1.02 <u>SITE INVESTIGATION</u>

A. The Contractor shall satisfy himself as to the conditions existing within the project area, the type of equipment required to perform the work, the character, quality and quantity of the subsurface materials to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, as well as from information presented by the Drawings and related Sections. Any failure of the Contractor to acquaint himself with the available information will not relieve him from the responsibility for estimating properly the difficulty or cost of successfully performing the work. The District assumes no responsibility for any conclusions or interpretation made by the Contractor on the basis of the information made available by the District.

### 1.03 <u>TEMPORARY SURFACE WATER CONTROL</u>

- A. The District will attempt to manage the water level in Grupes Reservoir by limiting outflows from Milne Dam if needed during the Work. The normal operating pool elevation for Grupes Reservoir Lake is about El. 297. Following the start of construction, the District will attempt to lower the reservoir level below the spillway crest elevation to allow the Contractor to access as much of the delineated upstream repair areas as practicable.
- B. To the extent practicable, the District will attempt to maintain the reduced water level in Grupes Reservoir to assist the Contractor in performing the repairs to the gatehouse, outlets, upstream retaining/training walls, and upstream repairs at Grupes Dam. <u>The District makes no guarantee that the level of Grupes Reservoir will not rise above the reduced level.</u> The reservoir water surface elevations will be influenced by rainfall, inflows, evaporation, and other climatic conditions which are beyond the control of the District.

### 1.04 <u>SUBSURFACE UTILITIES</u>

- A. Call Before You Dig
  - 1. Notify Call Before You Dig at 1-800-922-4455 at least 72 hours before digging, trenching, blasting, demolishing, boring, grading, landscaping or other earth moving operations in any public ways, rights of way and easements.

- B. Utility Conflicts General
  - 1. The Contractor shall exercise extreme caution when excavating in the vicinity of utility structures to avoid any damage. The Contractor shall be responsible for coordinating and scheduling all aspects of work required by private utilities during construction, including the relocation, the protection, and the support of utility infrastructures.
  - 2. Any damage to the utility structures that is a result of the Contractor's actions shall be the responsibility of the Contractor.
  - 3. Comply with requirements of private utility companies when working in the area of their utilities.
- C. Private Storm Drains; Private Sanitary Services; Water, Gas, and Electrical Services; Overhead Utilities and Other Utility Services.
  - 1. Not all of the private storm drains; private sanitary services; water, gas, and electrical services; overhead utilities and other utilities are shown on the Contract Drawings. The Contractor shall have these services located prior to making any excavation. All services shall be protected from damage and shall be reconnected or be repaired by the Contractor at no additional cost to the District. The Contractor shall pay particular attention to safety issues relating to electrical facilities, both overhead and underground.

# 1.05 <u>PERMITS</u>

A. The Contractor shall obtain all necessary permits required for proper execution of the project. Fill out all forms and furnish all drawings required to obtain the permits. A copy of each permit shall be submitted to the District. All fees associated with these permits shall be paid by the Contractor as part of the work. Work shall not commence on any phase of the work requiring a permit until the permit is obtained. Refer to Section 01060 for more information related to environmental permits and requirements.

## 1.06 PROTECTION OF EXISTING DISTRICT PROPERTY

A. During the performance and up to the date of final acceptance, the Contractor must take all reasonable precautions to protect the property of the District, The Town of New Canaan, and abutting residences/properties, from loss, damage or destruction resulting from his/her Subcontractor's operations under this Contract.

## 1.07 <u>SITE ACCESS CONTROL</u>

A. The Work of the Contract shall include all necessary measures to exclude the general public from the construction area. This shall include the provision of appropriate fencing, gates, signage, and barriers, as needed. Travelers on public ways shall also be protected from construction traffic in areas when construction vehicles are entering or exiting the job site.

# PART 2 – PRODUCTS

This section Not Used

## PART 3 – EXECUTION

This section Not Used

## PART 4 - MEASUREMENT AND PAYMENT

No measurement shall be made of any work performed under this section. No separate payment shall be made for any work performed under this section. The cost of any work done, or facilities provided under this section shall be included under other bid items within the Contract.

## \* \* \* END OF SECTION \* \* \*

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### SECTION 01200 PROJECT COORDINATION AND MEETINGS

## PART 1 - GENERAL

#### 1.01 <u>SUMMARY</u>

- A. The Contractor shall be required to attend meetings prior to and during execution of the Work, or as necessary to facilitate the smooth and orderly execution of the Work. All meetings shall be held at a location designated by the District.
- B. The Contractor shall conduct daily site safety briefings as necessary for Contractor and Subcontractor employees working the site
- C. All meetings with the District (or its representative) shall be attended by the Contractor's Superintendent and other personnel having authority to legally bind Contractor to issues discussed and resolved during the meetings. The Contractor's subcontractor(s) may also be required to attend such meetings. Subcontractor attendance shall be at the discretion of the Resident Engineer and/or the District.
- D. Formal meetings that require attendance by the Contractor are as follows:
  - 1. Pre-Construction Conference
  - 2. Pre-Construction Visit by local permitting authorities having jurisdiction. (if required)
  - 3. Weekly Progress and Coordination Meetings (if/as scheduled)
  - 4. Other Special Meetings
  - 5. Punch-list Meeting and Final Walkthrough by local permitting authorities having jurisdiction (if required)
  - 6. Final Closeout

Note, above meetings may be combined at the discretion of the District.

E. The Contractor shall be required to attend all meetings ordered or requested by representatives of regulatory agencies with jurisdiction over the site or any aspect of the work being performed at the site, either by the Contractor or others. Some meetings may be after hours.

### 1.02 <u>PRE-CONSTRUCTION CONFERENCE</u>

The Contractor shall not commence Work at the Site until a pre-construction conference has been held at the Site or another mutually agreed on location at which representatives of the Contractor, District and Engineer are present. The pre-construction conference(s) will be arranged by the District or his agent and is intended to establish lines of communication between the parties involved, establish project schedules, discuss proposed performance methods, and coordinate Work to be performed by subcontractors. The time and place of the pre-construction conference(s) shall be determined after the Contract has been executed by the Contractor and the District.

### 1.03 <u>WEEKLY PROGRESS MEETINGS</u>

- A. The Contractor and all Subcontractors shall be required to attend a Weekly Progress Meeting conducted by the District and/or Resident Engineer at the work site. The purpose of these meetings is to coordinate the efforts of all Contractors and to update the District with respect to progress and resolve outstanding issues.
- B. Weekly Progress Meetings will be held at a time to be determined by the District.
- C. The Contractor shall be prepared to discuss progress, resolutions to problems and anticipated problems that could delay timely completion of the work. The Contractor shall bring to each meeting: updated schedule, daily work summaries, safety meeting minutes, daily progress reports and other pertinent information as requested by the District, daily.
- D. The Resident Engineer will record the meeting minutes and distribute them to the Contractor, Subcontractors and Attendees.
- E. The District and/or Resident Engineer may waive the Weekly Progress Meetings individually if appropriate. It is expected that weekly meetings between the District, Resident Engineer and Contractor would not necessarily be required so long as the Resident Engineer's on-site representative is satisfied with the progress and conformance of the Work.

## 1.04 <u>SPECIAL MEETINGS</u>

From time to time, the Contractor shall be required to attend Special Meetings on site as requested by the District and/or Resident Engineer . The purpose of these meetings is to address Contractor and/or his Subcontractor's performance, schedule, change orders, modifications, alternatives, substitutions, safety, payment, or other issues as they relate to the Work. Special meetings may also include meetings with regulatory agencies or others.

### 1.05 <u>PUNCHLIST MEETING</u>

Upon substantial completion of the project, the Contractor shall attend a "punch list" meeting with the District and their Resident Engineer. The purpose of this meeting shall be to discuss and list all items which require additional attention or work by the Contractor prior to final acceptance. A "punch list" memo will be produced by the District following this meeting and provided to the Contractor.

## 1.06 <u>CLOSEOUT (FINAL ACCEPTANCE) MEETING</u>

Upon resolution of all items listed on the "punch list," the Contractor shall meet with the District and the Resident Engineer at the project site to verify completion such that the District can issue final acceptance. At this meeting, the Contractor shall provide to the District with all outstanding documentation, records, spares, maintenance items, or other information and materials.

### 1.07 JOB SITE ADMINISTRATION

A. The Contractor shall keep a competent and authorized supervisory representative at the project location during all working hours who shall function as the agent of the Contractor. The supervisory representative's responsibilities shall include ensuring all issues/questions raised by the District and/or Resident Engineer are addressed in a timely fashion.

- B. The supervisory representative shall be a competent English-speaking superintendent capable of reading and thoroughly understanding the Drawings and Specifications, with full authority to fulfill the Contractor's duties and responsibilities on the job. If, in the opinion of the District and/or Resident Engineer, the supervisory representative, or any of his successors is incompetent, or otherwise not satisfactory, then the Contractor shall replace him upon written request by the District.
- C. The Contractor shall only employ competent workers on the job who have received training applicable to the nature and extent of the work they are employed to perform. Whenever the District notifies the Contractor in writing that, in his opinion, any workmen on the job, whether employed by the Contractor or any of his subcontractors, is incompetent, unfaithful, disorderly, or otherwise unsatisfactory, such workmen shall be discharged from the contract Work and shall not be employed on it, except with the written consent of the District.

### 1.08 <u>SUBMITTALS</u>

- A. Within five (5) days of the Notice to Proceed, the Contractor shall submit the names and contact information for the following persons involved with the Work of the Contract. Contact information shall include cell phone and home phone numbers and an e-mail address.
  - 1. Owner or Chief Executive of Prime Contracting Company.
  - 2. Contractor's Project Manager
  - 3. Contractor's Site Superintendent
  - 4. Contractor's Safety Officer
  - 5. Contractor's Environmental Compliance Responsible Party

## **PART 2 - PRODUCTS**

Not Used

## **PART 3 - EXECUTION**

Not Used

## PART 4 - MEASUREMENT AND PAYMENT

No measurement shall be made of any work performed under this section. No separate payment shall be made for any work performed under this section. The cost of any work done, or facilities provided under this section shall be included under other bid items within the Contract.

### \* \* \* END OF SECTION \* \* \*

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## SECTION 01300 SUBMITTALS

## PART 1 – GENERAL

#### 1.01 DESCRIPTION

A. This section specifies the general requirements and procedures for preparing and transmitting data to the Engineer and the District for information or review. Required submittals are specified herein as well as under applicable sections of the Contract Specifications.

#### 1.02 CONTRACTOR'S DRAWINGS

- A. The Contract Drawings and these Specifications show the general arrangement, and such details as are necessary to provide a description of the work to be performed.
- B. The Contractor shall prepare shop and working drawings, for temporary and permanent work as required under the applicable sections of the Contract Specifications, complete with all relevant calculations, descriptions, technical and performance data, as necessary to adequately perform the work. The Contractor shall take responsibility for such drawings and for the safe and successful construction of the work.
- C. Shop drawings shall be presented in a clear and thorough manner, complete with respect to dimensions, design criteria, materials of construction, and like information to enable Consultant to review information as required.
- D. Sheet size: 11" x 17" or larger, as required. Typically, significant shop drawings shall be 24" x 36".

#### 1.03 CONSTRUCTION PROGRESS SCHEDULES

- A. Submit three (3) copies of overall project schedule no later than five (5) working days after Notice to Proceed.
- B. The overall project schedule shall be prepared in Gantt chart format. The schedule shall identify all major work items or activities, including material procurement, and shall provide an estimate of start date, duration, completion date, and float (if any) for each item or activity. The schedule shall identify dependencies among work items or activities and project milestones.
- C. Submit revised schedules with each Application for Payment, identifying changes since the previous version, and indicating status of all work items or activities.

### 1.04 <u>SAMPLES</u>

- A. Submit samples as necessary and as stipulated within each individual section of these Specifications to illustrate functional and aesthetic characteristics of the Product, with integral parts and attachment devices.
- B. Any samples shall be clearly identified as to material, manufacturer, any pertinent catalog numbers, and use for which intended, and shall be of sufficient size and quantity to clearly illustrate functional characteristics of item, with integrally related parts and attachment devices.

### 1.05 <u>RELATED WORK SPECIFIED ELSEWHERE</u>

Required submittals are listed under the relevant Section of the Contract and Specifications. It shall be the Contractor's responsibility to read each Section and provide the submittal required therein.

#### 1.06 <u>CONTRACTOR RESPONSIBILITIES</u>

- A. Review shop drawings and samples prior to submission.
- B. Determine and verify:
  - 1. Field measurements.
  - 2. Field construction criteria.
  - 3. Catalog numbers and similar data.
  - 4. Conformance to specifications.
- C. Coordinate each submittal with requirements of work and of Contract Documents.
- D. Notify the Engineer and District in writing, at time of submission, of any deviations in submittals from requirements of Contract Documents. Any such deviations permitted by District will require modifications to the Contract Documents.
- E. Begin no fabrication or work which requires submittals until submittals have been approved by the District.

#### 1.07 <u>SUBMISSION REQUIREMENTS</u>

- A. Make submittals to the District promptly in accordance with approved schedule and in such sequence as to cause no delay in work. Allow five (5) working days following receipt of submittal or resubmittal for review.
- B. At a minimum, submittals shall be provided to the District, to the District's Designated Representative, and to the Engineer.
- C. In general, electronic (\*.pdf) format submissions are acceptable in lieu of multiple paper copies. Requirements for the number of copies may be contained in the specific Specification sections. Additional copies may be required as per the Supplementary General Conditions.
- C. <u>Shop Drawings</u>: Shop Drawings shall be submitted as necessary to the District and Engineer for review and comment for the limited purpose of checking for conformance with information given in the design concept expressed in the Contract Documents. Shop drawings shall be presented in a clear and thorough manner, complete with respect to dimensions, design criteria, materials of construction, and the like information to enable the District and Engineer to review information as required. Sheet size shall be 11" x 17" or larger.
- D. In addition, submittals shall contain:
  - 1. Date and number of submission.
  - 2. Project title and number.
  - 3. Names of:
    - a. Contractor
    - b. Manufacturer/Supplier

- 4. Identification of product, with specification section number.
- 5. Field dimensions, clearly identified as such.
- 6. Relation to adjacent or critical features of work or materials.
- 7. Applicable standards, such as ASTM or other applicable federal or state regulations.
- 8. Identification of deviations from Contract Documents.
- 9. Identification of revisions on re-submittals.
- 10. Calculations and drawings certified and stamped by a Professional Engineer licensed in the State of Connecticut, if required.
- E. Each submittal shall be numbered. The numbering system shall utilize the Section number to which the submittal pertains and then a sequential number designating the order of the submittal for that Section. For instance, the first submittal applying to Earthwork shall be numbered as 02200-1. The second submittal applying to Earthwork shall be numbered as 02200-2.
- F. Resubmission Requirements: Make any corrections, additions, and/or changes in submittals required by the District and re-submit revised editions. Revised submittals shall be designated with a revision number. For instance, the first revision to the second Earthwork submittal shall be numbered as 02200-2 rev. 1.

## 1.08 <u>CERTIFICATES</u>

- A. When specified in individual specification sections, submit certification by the manufacturer, installation/application subcontractor.
- B. Indicate material or Product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certificates as appropriate.
- C. Certificates may be recent or previous test results on material or Product but must be acceptable to the District.

### 1.09 <u>DISTRIBUTION</u>

A. The Contractor will distribute submittals to concerned parties as appropriate. Promptly report any inability to comply with revisions. At a minimum, the submittals shall be provided to the District, the District's Designated Representative, and the Engineer.

### 1.10 ENGINEER DUTIES

- A. The Design Engineer (Engineer) for the District will review submittals only for general conformance to design concept of project and compliance with information given in Contract Documents. Review shall not extend to means, methods, sequences, techniques, or procedures of performing the Work or to safety precautions or program incident thereto. Review of a separate item as such will not indicate approval of assembly in which item functions.
- B. The Engineer will return submittals to the District with the Engineer's written opinion as to the general conformance of the submittal with the Contract Documents. The District will then return the submittal to the Contractor for distribution or for resubmission, if required by the Contract Documents and/or due to the Engineer's opinion of their non-compliance and/or incompleteness. The Engineer will respond to all submittals within five (5) working days from the date of receipt. Re-submittals required as a result of Engineer's review and comment shall be re-submitted promptly by the Contractor. Work shall not commence until all submittals related to it are submitted and accepted.

C. The Engineer's review of submittals shall not relieve Contractor from responsibility for any deviations from Contract Documents unless Contractor has, in writing, called attention to such deviation at time of submission and has received written concurrence pursuant to Contract Documents to specific deviation, nor shall any concurrence in submittals.

## 1.11 <u>OWNER DUTIES</u>

- A. The District will receive comments from the Engineer and return the submittal to the Contractor.
- B. The District will have the final authority to judge the adequacy of the Contractor's submittal and shall have final authority for approval or rejection.

### 1.12 ANTICIPATED SUBMITTALS PRIOR TO INITIATION OF WORK

The following is a listing of the submittals anticipated prior to the initiation of Work at the site or in advance of the Work of each Section. All of the following submittals shall be made per the schedule below unless stricter requirements are provided by the District or specified in the respective Specification sections.

Refer to individual Specification sections for further details regarding the content of each submittal, or other submittals not itemized below but required as per the Contract Specifications, to be provided prior to the initiation of the respective Work item.

Specification Section	General Submittal Description	Submission Schedule
01055	Resume and Contact Information for Contractor's Registered Land Surveyor	Within 5 working days of NTP
01060	Stormwater Pollution Control Plan and Spill Prevention Control and Countermeasures Plan	Within 15 working days of Award
01060	Applicable Permit Approvals obtained by Contractor	>5 days prior to start of Work
01060	Site Specific Health and Safety Plan	>5 days prior to start of Work
01200	Contact Information for Contractor Staff	Within 5 days of NTP
01436	Qualifications and Draft Pre-Construction Survey Reports	At least 15 days before any construction activity, but no later than within 15 days of NTP
01436	Contractor Work Plan	>15 working days prior to activities listed in Section 01436 §1.04.A.2.
01451	Qualifications, Experience, and Certifications of each Proposed Independent Testing Service.	>15 working days prior to activities requiring independent testing services.
01500	Description of Temporary Facilities	>10 days prior to bringing facilities on-site
01560	Temporary Sedimentation and Erosion Control Plan	Within 15 working days of Award (or as part of SWPCP Submission)
01565	Temporary Dewatering and Groundwater Control Plans	>10 working days prior to start of dewatering work
01740	Site Restoration Methods and Materials (as needed)	>10 days prior to start of related work

Specification Section	General Submittal Description	Submission Schedule
02065	Demolition Work Plan, Including Disposal Location(s)	>15 working days prior to demolition activities
02110	Clear/Grub/Strip Work Plan and Stockpile Locations	>10 working days prior to mobilization
02200	Proposed Disposal Locations(s) for Spoil Materials	Within 2 weeks of NTP
02455	Anchor Subcontractor Qualifications	With Contractor's Bid
02455	Anchor Design Calculations and Shop Drawings	>30 working days prior to fabrication or delivery
02455	Drilling, Grouting, and Strand Anchor Installation Submittals	>15 working days prior to start of associated work.
02457	Load Testing Submittal – Test and Production Anchors	>30 working days prior to commencement of anchor work.
02760	Work Plan for Pipe, Valve, and Chamber Decommissioning	>10 calendar days prior to start of pipeline / valve / chamber decommissioning work.
02762	Qualifications of Pipeline Video and Cleaning Subcontractor and Work Plan	> 10 working days prior to start of related activities.
02765	Qualifications of Pipeline Rehabilitation Subcontractor	Within 10 calendar days of NTP
02765	Pipeline Rehabilitation Proposed Work Plan and Products	> 10 calendar days prior to start of related activities.
03300	Concrete Work Plan (see Section 03300 §1.05.A.11)	Within 5 days of NTP
03348	Patterned Concrete Submittal	Within 14 days of NTP
04400	Stone Mason Subcontractor Qualifications	Within 14 days of NTP
05500	Scaffold Support Calculations, Shop Drawings, Fabricator Qualifications, and Material Information	>14 days prior to assembly or fabrication
05501	Decorative Railing Shop Drawings, Design, Fabricator Qualifications, and Material Information	>14 days prior to assembly or fabrication
05730	Aluminum Safety Railing Shop Drawings, Design, Fabricator Qualifications, and Material Information	>14 days prior to assembly or fabrication
11131	Stop Panel and Screens - Shop Drawings, Design Calculations and Material Information	>14 days prior to assembly or fabrication
11295	Slide Gate and Operators - Shop Drawings, Design Calculations and Material Information	>14 days prior to assembly or fabrication
13123	Prefabricated Bridge Supplier Qualifications (if not pre-qualified)	With Contractor's Bid
13123	Prefabricated Bridge Shop Drawings, Design Calculations and Material Information	>14 days prior to assembly or fabrication

## 1.13 ANTICIPATED SUBMITTALS DURING THE COURSE OF WORK

The following is a summary of the Contractor submittals anticipated under the respective Specification sections in the Contract Documents. It should be noted that this list is not comprehensive and will depend on the Contractor's work plan or proposed approach. Refer to individual Specification sections for further details regarding the content of each submittal, or other submittals not itemized below but required as per the Contract Specifications. Unless otherwise noted, submittals shall be provided no less than 5 working days prior to the initiation of that portion of the Work.

Specification Section	General Submittal Description	Submission Schedule
01055	Draft and Final As-Built Drawings	At completion of project, prior to final payment
01436	Additional Deformation/Vibration Monitoring Locations (as needed)	>5 days prior to start of related work requiring additional monitoring points
02015	Staff Gauge Cutsheets and/or Shop Drawings	>5 days prior to purchase
02200	Multiple Material and Procedural Submissions	Refer to Section 02200
02201	Means and Methods of Rock Excavation	>5 days prior to start of related work
02270	Stone, Rock, and Riprap Source and Physical Properties	>10 working days prior to delivery of materials to site
02270	Geotextile Filter Fabric Information	>5 days prior to delivery of materials to site
02385	Articulated Concrete Block Information	>14 days prior to assembly or fabrication
02457	Test Anchor Results	Within 10 calendar days of completing the load test on the test anchor.
02762	Inspection Reports and Video Recordings	Within 10 calendar days of completing the pipeline cleaning/inspections (separate submissions post-cleaning and post- lining)
03300	Multiple Material and Procedural Submissions	Refer to Section 03300
03305	Independent Laboratory Testing Reports	Within 5 days of testing or inspection of concrete.
03348	Patterned Concrete Mockup / Sample	>30 days prior to concrete pours involving patterned concrete
04400	Stone Masonry Restoration Work Plan and Products	>10 working days prior to start of related work
11131	Stop Panel Certification Form	Within 5 days of successful testing of stop panels.

### 1.14 <u>REVIEW OF SHOP DRAWINGS, PRODUCT DATA AND SAMPLES</u>

- A. The review of shop drawings, data and samples will be done by Engineer (i.e., Design Engineer) for general conformance with the design concept and Contract Documents. They shall not be construed:
  - 1. as permitting any departure from the Contract requirements;
  - 2. as relieving the Contractor of responsibility for any errors, including details, dimensions, and materials;
  - 3. as approving departures from details furnished by the Engineer, except as otherwise provided herein.
- B. The Contractor remains responsible for details and accuracy, for coordinating the work with all other associated work and trades, for selecting fabrication processes, for techniques of assembly, and for performing work in a safe manner.
- C. If the shop drawings, data or samples as submitted describe variations and show a departure from the Contract requirements which the Engineer finds to be in the interest of the District and to be so minor as not to involve a change in Contract Price or Contract Time, the Consultant may return the reviewed drawings without noting an exception.
- D. Submittals will be returned to the Contractor under one of the following codes:
  - Code 1 "REVIEWED" This code is assigned when there are no notations or comments on the submittal. When returned under this code the Contractor may release the equipment material for manufacture.
  - Code 2 "REVIEWED AS NOTED" This code is assigned when a confirmation of the notations and comments IS NOT required by the Contractor. The Contractor may release the equipment or material for manufacture; however, all notations and comments must be incorporated into the final product.
  - Code 3 "REVIEWED AS NOTED/RESUBMISSION REQUIRED" This combination of codes is assigned when a confirmation of the notations and comments IS required by the Contractor. The Contractor may, at his own risk, release the equipment or material for manufacture; however, all notations and comments must be incorporated into the final product. This confirmation shall specifically address each omission and nonconforming item that was noted. Confirmation is to be received by the Engineer within 15 calendar days of the date of the Engineer's transmittal requiring the confirmation.
  - Code 4 "REVISE AND RESUBMIT" This combination of codes is assigned when notations and comments are extensive enough to require a re-submittal of the package. This re-submittal is to address all comments, omissions and non-conforming items that were noted. Re-submittal is to be received by the Engineer within 15 calendar days of the date of the Engineer's transmittal requiring the re-submittal.
  - Code 5 "REJECTED"- This code is assigned when the submittal does not meet the intent of the Contract Documents. The Contractor must resubmit the entire package revised to bring the submittal into conformance. It may be necessary to resubmit using a different product to meet the intent Contract Documents.

- Code 6 "COMMENTS ATTACHED" This code is assigned where there are comments attached to the returned submittal which provide additional data to aid the Contractor.
- Code 7 "RECEIPT ACKNOWLEDGED" This code is assigned to acknowledge receipt of a submittal that is not subject to the Engineer's review and approval; and is being filed for informational purposes only.

Codes 1 through 5 designate the status of the reviewed submittal with Code 6 showing there has been an attachment of additional data.

- E. Re-submittals will be handled in the same manner as first submittals. On re-submittals the Contractor shall identify all revisions made to the submittals, either in writing on the letter of transmittal or on the shop drawings by use of revision triangles or other similar methods. The re-submittal shall clearly respond to each comment made by the Engineer on the previous submission. Additionally, the Contractor shall direct specific attention to any revisions made other than the corrections requested by the Engineer on previous submissions.
- F. Partial submittals may not be reviewed at the discretion of the Engineer; the Engineer will be the only judge as to the completeness of a submittal. Submittals not complete will be returned to the Contractor and will be considered "REJECTED" until resubmitted. The Engineer may at his option provide a list or mark the submittal directing the Contractor to the areas that are incomplete.
- G. Repetitive Review
  - 1. Re-submissions of shop drawings and other submittals will be reviewed no more than once at the District's expense. At the District's discretion, all subsequent reviews will be performed at times convenient to the Engineer and at the Contractor's expense, based on the Engineers then prevailing rates. The Contractor shall reimburse the District for all such fees invoiced to the by the Engineer. Submittals are required until approved.
  - 2. Any need for more than one resubmission, or any other delay in obtaining Engineer's review of submittals, will not entitle Contractor to extension of the Contract Time.
- H. If the Contractor considers any correction indicated on the shop drawings to constitute a change to the Contract Documents, the Contractor shall give written notice thereof to the Engineer at least 7 working days prior to release for manufacture.
- I. When the shop drawings have been completed to the satisfaction of the District/Engineer, the Contractor shall conduct the construction in accordance therewith and shall make no further changes therein except upon written instructions from the Engineer.

## PART 2 – PRODUCTS

This Section Not Used

# PART 3 - EXECUTION

This Section Not used.

## PART 4 - MEASUREMENT AND PAYMENT

No measurement shall be made of any work performed under this section. No separate payment shall be made for any work performed under this section. The cost of any work done, or facilities provided under this section shall be included under other bid items within the Contract.

## \* \* \* END OF SECTION \* \* \*

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## SECTION 01436 PRE- AND POST-CONSTRUCTION SURVEYS AND MONITORING

### PART 1 - GENERAL

#### 1.01 <u>SCOPE OF WORK</u>

The work of this Section includes:

- A. Pre-construction and post-construction inspection surveys of existing conditions of the dam and other existing structures, utilities, and facilities within 100 feet of the proposed Work, to be completed by the Contractor and which include, but may not be limited to, Grupes Reservoir Dam and portions of Valley Road.
- B. Notifying the Engineer and the District prior to conducting any vibration producing activity and/or any activity that could potentially cause damage to the existing masonry dam structure.
- C. The Contractor shall be responsible for providing safe access for the Engineer to install and maintain vibration and settlement/deformation monitoring points and crack monitors prior to the start of work.
- D. The Contractor shall be responsible for protecting vibration and movement monitoring equipment, benchmarks, deformation monitoring points, crack monitors, and other monitoring equipment installed by the Engineer from damage resulting from the Contractor's (or their Subcontractors) operations.
- E. The work specified under this Section includes conducting all activities on the project in such a manner that damage is prevented to the dam, adjacent structures, facilities, utilities, equipment, property, and work.

### 1.02 EXISTING CONDITIONS

- A. The Contractor's attention is called to the fact that the Grupes Reservoir Dam is a 120 plus year old dam partially constructed with stone masonry and will require a higher standard of construction practices and quality for work on and around the dam. Typical construction practices may require modification or adjustment to meet dam construction standards. In addition, additional care is required since the consequences of construction mishaps could extend beyond the project site were a dam failure to result. Special care and precautions shall be undertaken to protect the dam, as well as other structures and utilities, within and nearby the Work.
- B. The Contractor shall review the historic data regarding the dam to be fully informed on all existing conditions and limitations as they apply to this work and its relation to other construction work. Historic drawings of the dam are on file with the District.

#### 1.03 <u>RELATED WORK</u>

The following is a list of related work items that shall be performed or furnished under other Section of these Specifications as indicated.

- A. Site Protection and Restoration Section 01740
- B. Earthwork Section 02200
- C. Stone and Riprap Section 02270
- D. Strand Anchors Section 02455

### 1.04 <u>SUBMITTALS</u>

The Contractor shall submit the following documents. Refer to Section 01300 - Submittals for additional information.

- A. Pre- and Post-Construction Surveys
  - 1. Submit Qualifications and Draft Reports for the pre- and post-construction surveys to the District and Engineer:
    - a. Qualifications for the firm or engineer performing the pre- and post-construction survey should be submitted for review at least two weeks prior to beginning the survey. The surveys should be performed under the responsible charge of a professional engineer, registered in Connecticut who has completed at least five similar assignments over the last five years.
    - b. Original, plus three (3) copies of the pre- and post-construction survey reports for each structure with captioned photographs and narrated videos shall be submitted. The Contractor shall retain one (1) additional copy for their records.
    - c. Make any changes or corrections to the draft report required by the District or Engineer.
    - d. Draft pre-construction survey reports shall be submitted at least 15 days before any construction related activity but no later than within 15 days of Notice to Proceed.
  - 2. Submit Final Reports for the pre- and post-construction surveys to the District:
    - a. After review, submit five (5) copies of the approved report; four copies and the original. The Contractor shall retain one (1) additional copy for their records.
- B. Vibration and Movement Monitoring
  - 1. Contractor shall submit a work plan and schedule indicating the start date and duration of each item anticipated to induce vibration and or displacement. At a minimum, these include, clearing, grubbing, excavation, fill or rock placement and compaction, demolition of existing structures, anchor drilling, grouting, and anchor tensioning/testing.
  - 2. The Engineer will be responsible for performing vibration and deformation monitoring of the existing downstream masonry face during the proposed Work. However, based on the results of the pre-construction survey and their proposed work plan, and means

and methods, the Contractor may submit proposed additional locations where in their opinion, vibration, crack, and/or deformation monitoring may be warranted.

- 3. The Engineer will prepare a monitoring and response plan prior to the outset of the work. The plan will include Threshold and Limiting values for vibration and deformation, which may affect the progress of the work. The Contractor shall prepare and submit the response plan indicating what measures will be undertaken in the event that a Threshold or Limiting value is exceeded.
- 4. The engineer will share the results of deformation monitoring, crack monitors, and vibration monitoring in the format and at a frequency suited to the nature of the ongoing work.

## PART 2 PRODUCTS

This Section not used.

## PART 3 - EXECUTION

#### 3.01 <u>GENERAL</u>

- A. In addition to the instrumentation and monitoring points installed by the Engineer, the Contractor may install and monitor instrumentation he/she deems necessary to ensure performance of the Work in accordance with the Contract Documents.
- B. The intent of the monitoring program is to provide pre-construction baseline data for comparison with construction data and post-construction data to determine whether any utilities, public roadways, facilities, or structures have been adversely affected by construction activities, and to provide warning of pending conditions that could require remedial measures or alternative construction approaches.
- C. No work shall be conducted by the Contractor that may result in vibrations or deformation/settlement, as determined by the District/Engineer, until all instrumentation has been installed, initialized, and a series of suitable baseline readings have been recorded.
- D. The Contractor shall:
  - 1. Provide access and cooperate with installation of monitoring components.
  - 2. Protect installed instruments.
  - 3. Replace any damaged instruments at their own expense.
  - 4. Adjust construction activities, and implement remedial measures based on interpretations of the monitoring program data by the Engineer, at no additional cost to the District, as required.

E. The Contractor may provide, install, and monitor additional instrumentation at the site as an independent check of the Engineer's supplied instrumentation and monitoring program. The Contractor shall coordinate their Work with the Engineer and provide safe access by the Engineer at all times. Additional monitoring will be at the sole expense of the Contractor.

## 3.02 PRE-CONSTRUCTION SURVEY

- A. Prior to starting work, the Contractor, their Survey Subcontractor, the Engineer, and the District shall make a joint walk-through of the existing structures within 100 ft of the work area to observe and document their present conditions for inclusion in the survey.
- B. The Contractor, their Survey Subcontractor, the Engineer, and the District shall also make a joint assessment of public roadways in the vicinity of the site to document their present conditions for inclusion in the survey.
- C. The survey shall consist of a description of interior and exterior conditions. Descriptions shall locate cracks, damage or other defects existing and shall include information to make it possible to determine the effect, if any, of the construction operations on the defect. Where significant cracks or damage exists, or for defects too complicated to describe in words, photographs shall be taken and made part of the record. Photographs shall be taken to record any cracks or other evidence of structural distress in the structure. Potential crack monitor locations shall be identified during the pre-construction survey.
- D. Baseline survey readings of structure elevations, monitoring point plan location, crack location documentation, and the placement of crack monitors shall be performed prior to the start of construction activity. All readings shall be referenced to suitable benchmarks, sufficiently remote as to be unaffected by any construction activity.
- E. The Contractor shall prepare a report for each structure (including the downstream stone masonry wall and other structures of the dam) documenting all pre-existing conditions, verified by the photographs, and signed by the personnel participating in the investigation and, if practicable, by the District and Engineer, whether or not they are present at the examinations.
- F. It shall be the responsibility of the Contractor to notify and coordinate with private structure owners for the pre-construction survey.
- G. If the property owner of a structure refuses the survey, the inspector shall request that he/she sign a waiver of the survey. If the owner or occupant refuses to sign a waiver, the inspector shall sign the waiver attesting to the refusal.
- H. Three attempts shall be made to contact property owners to offer the survey. If no response is made after the second attempt, or the owner refuses to sign a survey waiver, a notice offering the survey shall be sent via any carrier capable of providing a receipt of delivery. A receipt of delivery shall satisfy this requirement.

### 3.03 <u>POST-CONSTRUCTION SURVEY</u>

A. Within 30 days after completion of all work on or near Grupes Reservoir Dam, the Contractor will perform an examination similar to the pre-construction survey. The post-construction survey and inspection shall include all areas and items inspected in the pre-construction survey,
and shall also include properties, buildings, sites, and structures where written or verbal complaints of damage have been received, or damage claims have been filed. 72-hour notice shall be given to the District or Engineer so that they may be present during final examination.

- B. The post-construction survey shall include all areas included in the pre-construction survey, with photographs and videos taken from the same viewpoints, plus areas of where additional damage or distress is noted or where complaints of such have been received by the District, Engineer, or Contractor.
- C. Records of the final examination shall be distributed in the same manner as the original preconstruction survey

# PART 4 - MEASUREMENT AND PAYMENT

Refer to Section 01950 – Measurement and Payment for the measurement and payment items related to this Section.

# \* \* \* END OF SECTION \* \* \*

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## SECTION 01451 INDEPENDENT TESTING SERVICES

## PART 1 – GENERAL

## 1.01 <u>SUMMARY</u>

- A. Section Includes
  - 1. Independent testing services including concrete and steel inspection and testing.
  - 2. Testing laboratory services

### B. Related Sections

- 1. District Standard Specification Item No. 601
- 2. Section 02200, Earthwork
- 3. Section 02455, Strand Anchors
- 4. Section 02457, Load Tests for Strand Anchors
- 5. Section 03300, Cast-in-Place Concrete
- 6. Section 03305, Concrete Testing

### 1.02 <u>REFERENCES</u>

- A. General: ASTM E329 Standard Specifications for Agencies Engaged in the Testing Inspection of Materials used in Construction.
- B. Soil Testing: American Association of State Highway and Transportation Officials (ASHTO)
- C. Concrete Testing: Cement and Concrete Reference Laboratory (CCRL)

## 1.03 <u>SUBMITTALS</u>

The Contractor shall submit the following documents. Refer to Section 01300 - Submittals for additional information.

- A. Qualifications, experience, and certifications of each proposed testing service.
- B. Certificate of calibration for testing equipment (if requested).

## 1.04 QUALITY ASSURANCE

- A. General
  - 1. Testing services shall have the following general qualifications:
    - a. Minimum five years as a firm with the type of testing specified.
    - b. Ability to provide timely field-testing services to minimize the impact of the testing requirements on construction progress.
    - c. Certification to perform the specified services in the state in which the Work is to be performed.
  - 2. Testing services proposed by the Contractor shall be subject to review by the Owner and its Engineering Consultant. Any testing firm not acceptable to the Owner or Engineering Consultant will be rejected.
- B. All testing agencies and laboratories must meet the requirements of ASTM E329.
- C. Testing company shall have been in business for a minimum of the last 5 years providing applicable testing services.
- D. Testing equipment shall be calibrated at maximum 12-month intervals by devices of accuracy traceable to National Bureau of Standards. Submit copy of certificate of calibration made by accredited calibration agency.
- E. Testing shall be in accordance with applicable codes and regulations referenced in individual Specification Sections, and with selected standards of the American Society for Testing and Materials.

## PART 2 – PRODUCTS

This Section Not Used

## PART 3 - EXECUTION

## 3.01 <u>TESTING SERVICES - GENERAL</u>

- A. Contractor to provide testing services meeting the following:
  - 1. Provide qualified personnel promptly on notice.
  - 2. Perform inspections required by the Contract Documents. Sample and test materials and observe methods of construction to determine compliance with applicable standards and with the requirements of the Contract Documents.
  - 3. Take specimens and samples for testing, as required in individual Specification Sections. Provide all sampling equipment and deliver all specimens and Samples.

- 4. Promptly notify the Owner and the Engineering Consultant of irregularities or deficiencies in the Work which are observed during performance of services.
- 5. Promptly submit electronic copies of reports of inspections and tests to the Owner, and one copy to the Engineering Consultant including:
  - a. Date issued
  - b. Project title and number
  - c. Testing laboratory or agency name and address
  - d. Name and signature of inspector
  - e. Date of inspection or sampling
  - f. Record of temperature and weather
  - g. Date of test
  - h. Identification of product and Specification Section
  - i. Location of Project
  - j. Type of inspection or test
  - k. Results of tests and observations regarding compliance with Contract Documents
- B. Perform additional tests and services as required to assure compliance with the Contract Documents.
- C. Obtain Owner's approval of testing laboratory before performing testing services.
- D. Coordinate with testing laboratory

### 3.02 GEOTECHNICAL TESTING

A. Provide field testing and laboratory services for geotechnical soil testing required in Section 02200.

### 3.03 <u>CONCRETE TESTING</u>

- A. Provide qualified independent field and laboratory testing service to perform the concrete testing required in Sections 02455, 03300, or elsewhere.
- B. The concrete testing laboratory shall have been inspected by the CCRL within the past five years.
- C. The testing laboratory shall be a licensed concrete testing laboratory by the State of Connecticut.

## 3.04 <u>COORDINATION WITH TESTING LABORATORY</u>

- A. Provide testing laboratory personnel access to site and manufacturer's operations.
- B. Provide laboratory with representative samples of materials to be tested in required quantities.
- C. Furnish labor and facilities:
  - 1. To provide access to Work to be tested.
  - 2. To facilitate inspections and tests.
  - 3. For laboratory's exclusive use for storage and curing of test samples.
  - 4. To provide forms for preparing concrete test beams and cylinders.
- D. Notify laboratory sufficiently in advance of operations to allow for assignment of personnel and scheduling of tests.
- E. Arrange with laboratory and pay for additional inspections, samples, and tests required for Contractor's convenience.

## PART 4 – MEASURMENT AND PAYMENT

No measurement shall be made of any work performed under this section. No separate payment shall be made for any work performed under this section. The cost of any work done, or facilities provided under this section is incidental to the work shall be included under other bid items within the Contract.

### \* \* \* END OF SECTION \* \* \*

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### SECTION 01500 TEMPORARY FACILITIES & CONTROLS

## PART 1 - GENERAL

#### 1.01 <u>SCOPE</u>

- A. This Section includes requirements for temporary facilities and controls.
- B. Possible Contractor staging areas are shown on the Contract Drawings. The locations of the temporary facilities and staging areas described must be coordinated with and approved by the District.
- C. The Contractor may separately provide for a field office trailer to be shared with the District's Designated Representative or Resident Engineer.
- D. All temporary facilities provided by the Contractor under this Section as specified herein shall meet all federal, state, and local codes and requirements for such temporary installations. All temporary field office facilities shall be provided and maintained so as not to create fire or safety hazards. Costs necessary to satisfy all requirements specified herein shall be borne by the Contractor. All necessary permits for setup and utility installation shall be the responsibility of the Contractor. All temporary field office facilities shall be entirely removed upon completion of the work and the site shall be left in a clean condition to the satisfaction of the District.
- E. The Contractor shall be responsible for installing, providing, maintaining, and decommissioning all temporary utility service to the site. The cost of all utilities shall be considered incidental to the Unit Cost of this item.
- F. The Contractor shall provide the District, Resident Engineer, and District's Designated Representative, including its Engineer, with access to and use of all temporary facilities and services provided by the Contractor.
- G. The Work of this Section shall also include the fabrication, provision, installation, and removal of Project Signs (Project Description Sign and any other signage required by regulatory agencies), as specified by the District.

### 1.02 <u>SUBMITTALS</u>

The Contractor shall submit the following documents. Refer to Section 01300 - Submittals for additional information.

A. At least ten (10) days prior to bringing the facilities on site, the Contractor shall develop and submit a description of the temporary facilities and services to be used by the Contractor, including the location of laydown/storage areas, fueling areas, fencing, proposed temporary office trailer, and any other temporary facilities.

## 1.03 <u>TEMPORARY OFFICES FOR CONTRACTOR AND RESIDENT ENGINEER</u>

- A. Contractor shall refer to the First Taxing District of the City of Norwalk, Water Department, Standard Specifications, Item 969, dated June 11, 2009, for requirements of the Engineer's Field Office.
- B. Temporary offices shall be established in laydown areas shown on the Contract Drawings or where approved by the District/Resident Engineer, adequately furnished, and maintained in a clean, orderly condition by the Contractor. The structure must comply with all applicable local, state, and federal standards and codes.
- C. The Contractor is not required to provide a portable trailer or other such structure as his/her own temporary project field office. If the Contractor chooses to do so, such structures must comply with all applicable local, state, and federal standards and codes. Location of the field office at the site shall be approved by the District. All necessary permits for setup and utility installation shall be the responsibility of the Contractor.

## 1.04 <u>TEMPORARY ELECTRICITY</u>

- A. The Contractor is <u>not</u> required to otherwise provide temporary electricity at the site but may elect to do so. If temporary electricity is provided, all applicable local, state, and federal standards and codes must be obeyed.
- B. Temporary electricity, if judged necessary by the Contractor for light and power shall be provided and maintained by the Contractor, with a separate meter billed to the Contractor. Alternatively, the Contractor may choose to provide electricity to the Site by means of temporary on-site generators, if needed. Temporary lighting and wiring shall be installed in accordance with all local, state, and federal regulations. On-site generators must comply with local ordinances on noise control.
- C. Ground fault circuit interrupters shall be required on all electrical equipment.

### 1.05 <u>TELEPHONE AND INTERNET SERVICE</u>

- A. The Contractor is <u>not</u> required to maintain his own temporary "landline" phone service but may elect to do so. If telephone service is provided, all applicable local, state, and federal standards and codes must be obeyed.
- B. A working phone connection **MUST** be maintained by the Contractor at the site such that the site may be reached at all times during business hours. A cellular phone is acceptable, provided reception is consistent and adequate.

### 1.06 <u>TEMPORARY WATER SERVICE</u>

A. The Contractor is responsible for providing all materials equipment, labor, and incidentals necessary to collect and transport water to work zones as needed in accordance with all applicable local, state, and federal policies and procedures. Such materials include but are not limited to water meters, appropriate check valves and flow meters required by the District. All charges, tariffs, and fees, as applicable, for the use of temporary water service shall be borne by the Contractor at no additional cost to the District. The Contractor is responsible for

coordinating with the District to arrange for the provision of water from their system, if available.

B. The Contractor shall furnish drinking water with suitable containers and cups for use of workers. Drinking water dispensers shall be conveniently located where Work is in progress, but outside of the Work Zones.

### 1.07 <u>TEMPORARY SANITARY FACILITIES</u>

A. The Contractor shall provide, as needed, temporary sanitary facilities at the site outside of the Work Zone to be used by the Contractor. The Contractor shall maintain these facilities in a clean and sanitary condition and in such a manner as required or approved by the District. These conveniences shall be maintained at all times without nuisance. Upon completion of the Work, the sanitary facilities shall be removed from the premises by the Contractor, and any associated waste, debris, or spillage shall be cleaned.

## 1.08 <u>TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES</u>

- A. The Contractor may elect to install temporary lighting to illuminate the worksite for work after dark. However, the Contractor is subject to all local and state work ordinances and must file appropriate applications and receive acceptance prior to performing work outside of the approved window. The use of temporary lighting for work after dark shall be only with prior approval of the District.
- B. Ground fault circuit interrupters shall be required on all lighting equipment.
- C. Provide guard cages or tempered glass enclosures where temporary lighting may be exposed to breakage. Provide exterior fixtures where temporary lighting may be exposed to moisture.

## 1.09 TEMPORARY BARRIERS, PROTECTION, AND TRAFFIC CONTROLS

- A. The Contractor shall utilize existing fences and gates or provide additional temporary barriers and signage to prevent unauthorized entry to construction, staging, and storage areas; to delineate temporary contractor staging areas; and to protect existing facilities, adjacent properties, and the public from damage from construction operations. Temporary barriers and signage may be required on the site, as determined by the District and/or its Resident Engineer and shall be provided at no extra cost.
- B. Traffic controls or signage on paved public roads shall conform to Connecticut DOT standards. Flaggers shall be provided as needed to maintain traffic on the road. The Contractor shall submit any plan for traffic controls necessary on paved public roads to the District for approval a minimum of 10 days prior to the work. At a minimum, signs notifying the public of construction activities and/or trucks entering the roadway shall be placed on Valley Road and Deep Valley Road, approaching the site.
- C. Contractor shall refer to the First Taxing District of the City of Norwalk, Water Department, Standard Specifications, Item 971, dated June 11, 2009, for other requirements for Maintenance and Protection of Traffic that may be necessary for the Contractor to execute this work.

D. The Contractor shall provide protection for the District's existing facilities, including outlet structure, fences and gates, existing instrumentation, and drainage structures, and replace those damaged during construction at no additional cost to the District.

### 1.10 <u>DUST CONTROL</u>

A. The Contractor shall control dust on the dam, excavation and fill areas, stockpiles, staging areas, and all other areas of the Site in accordance with Section 01562 – Dust Control.

#### 1.11 PROTECTION OF INSTALLED WORK AND EXCAVATIONS

- A. The Contractor shall protect installed work and excavations and provide special protection where necessary.
- B. The Contractor shall provide temporary and removable protection for equipment and open excavations and shall control activity in the immediate work area to minimize damage.

### 1.12 <u>SECURITY</u>

A. The Contractor shall be responsible for providing and maintaining security for protection of his work, equipment, supplies and employees and shall be responsible for protecting same from unauthorized entry, vandalism, or theft.

#### 1.14 PROTECTION OF WORK FROM HEAT AND COLD AND WEATHER-RELATED EFFECTS

- A. In the event that hot temperatures occur during construction, the Contractor shall take all measures and provide all necessary items to protect the Work of the project. This includes provisions for proper curing of concrete, grout and/or mortar (if any).
- B. In the event that cold temperatures occur during construction, the Contractor shall take all measures and provide all necessary items to protect the Work of the project. This includes provisions for proper curing of concrete grout and/or mortar (if any).
- A. The Contractor shall provide all such temporary facilities needed to protect completed and ongoing work and on-site materials from inclement weather, including rain, heat, snow, and cold. This shall include, but not be limited to, the provision of covers, shelters, heaters, etc. The use of rigid barriers for weather protection shall be used as required and as directed by the Engineering Consultant.
- D. Temporary heating units shall have been tested and labeled by UL, FM, or other recognized association related to the type of fuel being used and maintain reasonable temperatures within the temporary enclosures.
- E. The Contractor shall be responsible for maintaining and/or restoring access and appropriate working conditions at the site in the event of inclement weather. This shall include, but not be limited to, providing for plowing and ice removal in the event of snow and freezing temperatures.
- F. Snow plowed or removed by the Contractor may not be disposed of in Grupes Reservoir, the downstream channel or any other waterway or wetland resource area.

## 1.15 <u>REMOVAL OF TEMPORARY FACILITIES AND CONTROLS</u>

- A. The Contractor shall remove temporary equipment, facilities, and materials after completion and acceptance of work at the Site. Lawfully dispose of all waste, trash, and other debris generated during the Work of the Contract.
- B. The Contractor shall clean and repair damage caused by installation or use of temporary Work at no additional cost to the District.
- C. Restore existing and permanent facilities used during construction to original or better condition at no additional cost to the District.

## 1.16 <u>TEMPORARY FIRE PROTECTION</u>

- A. All operations on the site premises shall be so performed that no fire hazards are created or are permitted to exist. If the Contract Work involves a fire hazard, sufficient firefighting equipment with trained, capable operators shall be in the area to contain any fire until the local fire District arrives. The Contractor shall make sure that persons employed directly or indirectly by him, while on the site premises, comply with all pertinent local, state, and federal fire regulations. The Contractor shall have a procedure for burning that starts to get out of control. The Contractor shall be responsible for compliance by personnel of his organization for their cooperation in fire prevention, fire reporting and protective measures to minimize loss.
- B. Provide portable UL-rated, Class A fire extinguishers for temporary offices and similar spaces. In other locations, provide portable UL-rated Class ABC dry chemical extinguishers or a combination of NEPA recommended Classes for the exposure. Comply with NEPA 10 and 241 for classification, extinguishing agent and size required by location and class of fire exposure.
- C. No burning of material or debris shall be allowed.

### 1.17 <u>MISCELLANEOUS REQUIREMENTS</u>

- A. The Contractor shall provide temporary medical and first-aid supplies at the work site, adequately equipped, maintained, and located, to serve the needs of the workers and employees of the Contractor, subcontractors and assigned contractors.
- B. The Contractor shall provide all other temporary facilities, controls, services, and other items required by any General and Supplementary General Conditions that may be included in these Contract Documents.
- C. Where the provisions of General Performance Obligations of the Contractor of the Contract Documents differ from those contained in this Section, the more stringent provisions shall govern.

### PART 2 - PRODUCTS

#### 2.01 TEMPORARY OFFICE FOR DISTRICT/RESIDENT ENGINEER

A. Contractor shall refer to the First Taxing District of the City of Norwalk, Water Department, Standard Specifications, Item 969, dated June 11, 2009, for requirements of the Engineer's Field Office.

#### 2.02 <u>EQUIPMENT</u>

- A. The Contractor shall provide all necessary equipment related to the requirements of this Section such that the work of the Contract can be conducted in accordance with the applicable Contract Documents.
- B. All temporary equipment, facilities, and controls shall be clean and in good working order. All temporary equipment, facilities, and controls shall be drained of water and flushed with clean water prior to being brought on site.

## **PART 3 - EXECUTION**

### 3.01 <u>GENERAL</u>

- A. The Contractor shall sweep and clean as necessary to maintain neat, orderly work areas.
- B. The Contractor shall furnish all materials and perform all work necessary, including excavation and backfill. No disturbance will be allowed in areas outside those indicated on the plans, without prior approval from the District. The Contractor will be responsible for repairing all cuts made for temporary utilities and for the removal of temporary utilities and post-removal restoration.

#### 3.02 MAINTENANCE AND SERVICING

A. The Contractor shall furnish full maintenance and service for all Temporary Facilities and Controls. Trash, garbage, and other wastes shall be lawfully, properly, and satisfactorily disposed of by the Contractor at regular intervals.

### 3.03 <u>SIGNAGE</u>

- A. Maintain signage throughout the duration of the project. The Contractor shall repair or replace the signage at his sole expense in the event of damage.
- B. Remove all temporary signage at the completion of the project and lawfully dispose. Fill post holes.

### 3.04 <u>PUBLIC INFORMATION</u>

A. The District may request the Contractor to take certain steps to assist in providing information to the public regarding this project. This assistance may take the shape of additional informational signage, newspaper ads, or other similar outreach actions.

- B. The District will provide the Contractor with the form and text of any requested public information steps which are to be executed under this item.
- C. The Work of this Section is separate from any required public information steps which are required in other Sections of the Work and/or by permit conditions. The cost of public information notices and other similar steps (including but not limited to signs, newspaper ads, etc.) required under other Sections of the Work and/or by Permit Conditions shall be included in the price bid for other Items.

## PART 4 - MEASUREMENT AND PAYMENT

Refer to Section 01950 – Measurement and Payment for the measurement and payment items related to this Section.

#### \* \* \* END OF SECTION \* \* \*

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### SECTION 01560 TEMPORARY EROSION AND SEDIMENTATION CONTROLS

### PART 1 - GENERAL

#### 1.01 DESCRIPTION

- A. The Contractor shall furnish all labor, materials and equipment and shall perform all work required to install, maintain, and remove erosion, sedimentation, and siltation control measures to protect the site, and upstream and downstream wetlands, water bodies, streams, and drainage structures from siltation and sedimentation damage and accumulation or damage from other byproducts of the work during this Contract, as specified herein and as directed by the District or its Engineer.
- B. The scope of the Work of this Section shall include the installation of Silt Fence, Compost Filter Socks, turbidity curtain, construction entrances and all other sediment and erosion control Best Management Practices (BMPs), as shown on the Contract Drawings, and as needed elsewhere. This work shall also include the monitoring, cleaning, maintenance, and repair of all installed erosion control measures and their proper removal and disposal after final stabilization of the site.
- C. Erosion control measures are used to prevent the displacement of soil. Such measures may include, but not be limited to, grading, erosion control matting, plastic coverings, mulching, temporary seeding, riprap, check dams, cross tracking, and other items intended to stabilize soil material and/or reduce the erosive potential of water.
- D. Sedimentation and siltation control measures are used to prevent the movement and transport of soil particles. Sedimentation and siltation control measures may include, but not be limited to, use of compost filter socks, pumped water filter bag(s), silt fences, siltation sumps, and other items as necessary to contain sediment and other deleterious material produced from excavation and filling, construction dewatering / water control, and other related contract operations.
- E. It is the intent of this Section that the Contractor shall be responsible for the use of all Best Management Practices (BMPs), both structural and operational, to reduce, to the greatest extent possible, the erosion and transport of soil and sediment. The Contractor shall be responsible for implementing all measures which are both prudent under good construction practices and required under local, state, and Federal regulations and law. The Contractor shall also be responsible for all monitoring, maintenance, and repair of all BMPs utilized. In the event of the failure of sediment and erosion control BMPs, the Contractor shall be responsible, at no additional cost to the District, for all work necessary to mitigate and correct the situation, including, but not limited to, the removal of transported sediment.
- F. The Contractor shall be responsible for monitoring, maintenance, and repair of BMPs at the site. The work of this Section shall include sediment and erosion control both upstream and downstream of the work area, as well as in and around all disturbed areas, including staging and laydown areas.
- G. The Work of this Item specifically include all measures necessary for control of the movement of sediments and soil which might occur as part of the Contractor's efforts to de-water excavated soils and dispose of them on-site. The Contractor, at no additional cost to the District, shall implement all means, measures, and BMPs necessary to confine and stabilize spoil stockpiles, limit sediment transport away from such stockpiles, and filter or otherwise treat runoff or decant water from the stockpiles.

## 1.02 <u>SCOPE OF WORK</u>

- A. The scope of the Work of this Section shall include the installation of compost filter socks, turbidity curtains, and silt fences, and other required erosion control measures as shown on the Contract Drawings, and as needed elsewhere. This work shall also include the monitoring, cleaning, maintenance, and repair/replacement of all installed compost filter socks, silt fences and other siltation and water control/handling devices as well as proper removal and disposal of same after final stabilization of the site.
- B. General work covered and paid for under this Section shall include the installation of all other sediment and erosion control BMPs, as shown on the Contract Drawings, and as needed elsewhere. This work shall also include the monitoring, cleaning, maintenance, and repair of all installed sediment and erosion control BMPs and disposal after final stabilization of the site. General work covered and paid for under this Section shall also include all other work, including record keeping and reporting, necessary to meet the conditions of the Contract Documents, Permits, Approvals, Licenses issued for the project and all relevant codes, rules, regulations, laws, and ordinances applicable to sediment and erosion control.
- C. In-water sedimentation controls for this project (if used) have been envisioned to consist of turbidity curtain upstream of the dam. However, the Contractor may use whichever method is compatible with his or her construction methods and sequence of water control and Work. Adequacy of the in-water sedimentation controls shall be judged by the Resident Engineer based on observed performance and shall be adjusted or supplemented by the Contractor as necessary to achieve the goals of this Section.

## 1.03 SPECIAL CONDITIONS

- A. All work shall comply with all codes, rules, regulations, laws, and ordinances under the jurisdiction of the First Taxing District of the City of Norwalk, State of Connecticut Department of Energy and Environmental Protection (CTDEEP), the U.S. Army Corps of Engineers, U.S. Environmental Protection Agency (EPA) and all other authorities having jurisdiction within the project areas. All work necessary to make site preparation comply with such requirements shall be provided without additional cost to the District.
- B. Copies of all permits and licenses listed under Section 01060 will be forwarded to the Contractor prior to the beginning of the work, if not otherwise provided in this Document. The Contractor shall be responsible for conducting his/her work in accordance with all provisions of said permits.
- C. The Contractor shall procure any and all required permits and licenses, (except for those already obtained by the District as stated in Section 01060), pay all charges, fees, and taxes, and shall give all notices necessary and incidental to the due and lawful prosecution of the work under this Contract. The cost thereof shall be included in the prices bid for the various items specified herein for the work of this Contract. Copies of all required permits and licenses shall be filed with the District prior to the beginning of the work.
- D. As part of the Construction General Permit the Contractor shall be responsible for developing a Stormwater Pollution Control Plan (SWPCP), which includes site-specific Sediment and Erosion Controls, and shall be submitted to the Owner, prior to the start of work. The Contractor's plan shall incorporate the requirements of this Section and the controls and BMPs shown on the Contract Drawings; however, it shall be understood that these measures called for in the specifications and on the plans represent the MINIMUM acceptable level of sediment and erosion

control. The Contractor's plan shall be designed to account for the anticipated work plan, construction sequence, and anticipated level of disturbance.

E. No work of any type in any area shall commence until sedimentation control measures are in place to the satisfaction of the District, the Engineer and permitting agencies/representatives having jurisdiction.

### 1.04 <u>IMPLEMENTATION</u>

- A. The Contractor shall familiarize themselves with the nature of work to be performed. The Contractor shall be responsible for scheduling his submittals and/or meetings, if required, with the applicable regulatory agencies.
- B. BMPs and erosion control measures may include, but are not limited to, the following:
  - Compost Filter Socks
  - Silt fences and/or turbidity curtains
  - Stabilized construction entrances
  - Sediment Settling Tanks or Filtration Bags
  - Filling and stabilizing of erosion gullies with gravel.
  - Application of weed-free straw (or other) mulch
  - Track-roughening of slopes to slow runoff flow
  - Temporary swales to divert drainage flow.
  - Energy dissipaters for pipe, culvert, and hose discharge points

## 1.05 LOCATION AND STORAGE OF MATERIALS

A. No materials shall be dispersed or stockpiled in any areas beyond the authorized limits of disturbance, except in areas specifically designated for spoil disposal. No excavated materials or materials to be used in backfilling shall be deposited within fifty feet (50') of any spillways, open water bodies, and related areas, watercourses, wetland areas or drainage facilities <u>unless</u> appropriate and approved measures are specifically taken to protect the adjacent resource area. Materials rejected for use in the Work shall be removed and disposed of as soon as practical to do so. Adequate protective measures shall be taken to prevent the erosion of stockpiled and/or placed materials and resultant sedimentation of adjacent spillways and related areas, watercourses, wetland areas or drainage facilities, during the course of performing the work.

### 1.06 PROTECTION OF THE RESERVOIR AND RELATED WATER RESOURCES

- A. The Contractor shall employ Best Management Practices (BMP's) throughout the conduct of the work of this Contract and ensure that impact on Grupes Reservoir, surrounding wetlands and downstream channel is minimized.
- B. The Contractor shall not store or discharge fuel oil, sewage, septic water or other deleterious substances into the Reservoir, stream, groundwater supplies or wetlands areas. The storage of fuel oil and refueling of equipment shall be restricted to designated areas approved by the Engineer, the District, and regulatory agencies. Machinery shall not be refueled or washed within 100 feet of any resource area. Any spillage of deleterious substance (fuel oil, hazardous material, sewage, septic waste, etc.) shall be reported to the Construction District's Designated Representative, the District, and appropriate regulatory agency, by the Contractor and appropriate measures taken, (at costs solely borne by the Contractor) as determined by the regulatory agency, to contain and to

clean up the affected areas. Sedimentation barriers shall be cleaned and/or replaced periodically to ensure effective control and protection of wetlands and water resource areas.

- C. The contractor shall collect all debris generated from demolition activities and shall dispose of it in accordance with the local state and agency regulations. A portion of the repairs to be performed will be on the upstream face of the dam and will require demolition of the existing concrete within the lake. The concrete debris generated from demolition activities must be contained and removed without allowing any debris to escape into the lake.
- D. The general sediment control performance standard is outlined in the Connecticut Guidelines for Soil Erosion and Sediment Control. The Contractor shall ensure that temporary erosion and sediment controls are adequate to ensure compliance with these regulations, or other more stringent regulations, as needed.

## 1.07 <u>RELATED WORK SPECIFIED ELSEWHERE</u>

- A. The following is a list of related work items that shall be performed or furnished under other Sections of these Specifications as indicated.
  - 1. District Standard Specification Item No. 210
  - 2. Regulatory Requirements: Section 01060
  - 3. Submittals: Section 01300
  - 4. Temporary Water Control: Section 01565
  - 5. Clearing, Grubbing and Stripping: District Standard Specification Item 201
  - 6. Earthwork: Section 02200

### 1.08 <u>SUBMITTALS</u>

The Contractor shall complete and submit to the District all of the following submittal items consistent with submittal requirements prior to beginning any work on the Contract. All submittals shall be made within fifteen (15) working days after the Notice of Contract Award and prior to the Start of Work unless otherwise noted. The Contractor may elect to provide the information required under this Section as part of their SWPCP and SPCC submissions under Section 01060.

- A. A written plan detailing the methods and layout of BMPs proposed to contain sediments, soils, and debris at the Site must be submitted to the District for review and approval prior to proceeding with the Work. If required by Permit, the plan shall also be submitted to CT DEEP or the first Taxing District of the City of Norwalk.
  - 1. No work shall begin until the pollution, water, and erosion control schedules and plans have been approved by the District and Engineer.
  - 2. If conditions change during construction, the Contractor shall revise the plan and resubmit to the District and Engineer for review and approval.
- B. The methods and materials for proposed construction of individual BMP's, including compost filter tubes, sedimentation control fences or silt fence barriers shall be submitted to the District for review and approval prior to proceeding with the work of this Section.

- C. The written plan shall detail the phasing of the installation and removal of the proposed BMPs, including which ones are to be left in place.
- D. Submit a chemical and oil spill prevention and cleanup plan to be implemented by the Contractor in the event of any actual or suspected spill of any chemical, petroleum product, or wastewater.

## PART 2 - PRODUCTS

#### 2.01 <u>TEMPORARY GRASS SEED</u>

A. Grass seed for temporary erosion control shall be Annual Ryegrass applied at a minimum rate of 2 pounds per 1,000 SF.

#### 2.02 <u>COMPOST FILTER SOCKS</u>

- A. Compost filled filter socks for use as a sedimentation control device shall be 12" minimum diameter by 10 feet long SiltSoxx as manufactured by Filter International, LLC of Grafton, Ohio, or approved equivalent. The sock shall be designed to provide intimate contact with the ground surface to prevent blowouts or undermining. At the same time, the sock shall allow water to flow through the compost, minimizing overtopping, slowing high water flow velocities, and intercepting and stopping silt movement.
- B. Stakes for affixing compost filter socks in place shall be wooden, 2" square by a minimum of 36" long. Stakes shall be installed in accordance with SiltSoxx manufacturer's instructions.

#### 2.03 <u>SILT FENCE</u>

- A. Siltation fence shall be made of woven 5 mil industrial polypropylene (2.5 oz/s.y.) fabric. Coefficient of permeability shall be 0.009 cm./sec. with a water flow rate of 35 min./gal./s.f. Opening size shall be a maximum of 20 (U.S. Standard Sieve) with a minimum solids retention efficiency of 75%. Fabric shall be stable against ultraviolet radiation. Fabric width shall be three feet.
- B. Siltation fence shall be "Envirofence" as manufactured by Mirafi Inc. Charlotte, North Carolina, or approved equivalent. Stakes for anchoring the silt fence shall be two-inch by two-inch (2" x 2") construction grade timber. If necessary, the Contractor shall provide a backing mesh to provide stability to the silt fence fabric against blow over or knock down.

#### 2.04 STABILIZED CONSTRUCTION SITE ENTRANCE

- A. A stabilized construction access is defined by a point of entrance/exit to a construction site that is stabilized to reduce the tracking of mud and dirt onto public roads by construction vehicles.
- B. The stabilized construction site entrance shall be a minimum of 50 feet long and sized with sufficient width for construction vehicles using the site (minimum 15 feet).
- C. The stabilized construction site entrance shall be constructed of 3-inch minus clean crushed stone with a minimum layer thickness of 6 inches. Crushed stone shall be placed upon filter fabric as needed.

- D. Construct features to channel runoff away from the road and towards sediment and erosion BMPs.
- E. Inspect and clean as needed to maintain efficiency.
- F. Remove and properly dispose of all material prior to site stabilization.

### 2.05 <u>TURBIDITY CURTAIN</u>

- A. A pre-assembled medium duty system consisting of a geotextile curtain, flotation system, bottom weight and anchorage or securing mechanism shall be furnished suitable for use in waters subject to wind, waves, and currents.
  - 1. Downstream turbidity curtain shall be Triton Type 3 Permeable Silt Barrier or approved equal.
  - 2. Upstream turbidity curtain shall be Triton Type 2 Permeable Silt Barrier or approved equal.
- B. The flotation system shall be closed cell polystyrene and shall be sufficient freeboard to prevent overtopping.
- C. Hardware such as stakes, ballast chain, connection bolts, reinforcement, tension cables and other shall be galvanized, stainless steel, aluminum or otherwise corrosion resistant. The ballast chain shall be sufficient to maintain the curtain in a vertical position.
- D. The length of turbidity curtain shall be selected to provide no greater than 1-foot of separation between the bottom of the channel and the bottom of the curtain.

### 2.06 SEDIMENT SETTLING TANKS

- A. The Contractor shall provide settling tanks, for the purpose of treating discharge from all pumping systems, including but not limited to groundwater dewatering systems. Settling tanks shall be constructed of metal with watertight seams and sufficient stiffness to accommodate full tank levels. The Contractor shall size the tanks sufficient to provide residence time commensurate with pumping rates and sediment grain size. Baffles and booms shall be provided as needed.
- B. An acceptable substitute for sediment settling tanks may be so-called dewatering bag. Such bags shall be made from permeable non-woven geotextile fabric into which water is pumped. Sediment is filtered on the inside of the bag and water diffuses out. The Contractor may propose dewatering bags as a substitute for settling tanks, provided the bags are sized appropriately, the apparent opening size of the geotextile is suitable for the sediment grain size distribution, the bags are placed on a gravel bedding, and surrounded by a silt fence. Silt fence enclosing a de-watering bag shall NOT be measured for payment. Full dewatering bags must be removed from site and disposed of in a lawful manner.

### 2.07 <u>PUMPED WATER FILTER BAG</u>

A. Pumped water filter bags used as sedimentation control and filtration of water generated from dewatering activities shall be a Dirtbag® pumped sediment control device(s) (Model 53 or 55) as detailed on the Drawings or approved equivalent. The Dirtbag® pumped-silt control system is marketed by ACF Environmental, Inc., Richmond, Virginia.

- B. The Dirtbag® shall be a nonwoven geotextile bag which is sewn with a double needle matching using a high strength thread. Seams shall have an average width strength per ASTM D-4884 as follows: Dirtbag® 53 ASTM D-4884 60 lb./in, Dirtbag® 55 ASTM D-4884 100 lb./in.
- C. Each standard Dirtbag® has a fill spout large enough to accommodate a 4" discharge hose. Attached are straps to secure the hose and prevent pumped water from escaping without being filtered.
- D. The geotextile fabric shall be nonwoven fabric with the following properties:

<b>Properties</b>	Test Method	Units	Nonwoven	
			<u>53</u>	<u>55</u>
Weight	ASTM D-3776	Oz/yd.	8	10
Grab Tensile	ASTM D-4632	Lbs.	203	250
Puncture	ASTM D-4833	Lbs.	130	165
Flow Rate	ASTM D-4491	Gal/Min/Ft <sup>2</sup>	80	70
Permittivity	ASTM D-4491	Sec. <sup>-1</sup>	1.5	1.3
Mullen Burst	ASTM D-3786	Lbs./in <sup>2</sup>	400	550
UV Resistant	ASTM D-4355	%	70	70
AOS % Retained	ASTM D-4751	%	100	100

## 2.08 OTHER MATERIALS

A. Other materials required for completion of the work in this Section shall be of adequate quality and construction such that intended performance is satisfied.

## PART 3 - EXECUTION

## 3.01 ANTICIPATED CONSTRUCTION SEQUENCE

The Anticipated Construction Sequence provided on the Contract Drawings is intended to provide guidance to the Contractor to help minimize the potential for events that result in transport of sediment outside of the work area. Changes to the Anticipated Construction Sequence may be warranted due to the field, construction, and weather conditions during the course of performing the work.

## 3.02 INITIAL CONSTRUCTION ACTIVITIES AND PRELIMINARY DRAINAGE CONTROL

- A. The Contract Drawings show the deployment of silt fence and filter socks around the work areas as well as around adjacent staging areas. The limits of these controls have been established based on anticipated site conditions at the start of construction. Prior to the installation of any silt fence and filter socks, the Contractor, District, and/or Engineer shall meet on site to discuss conditions. Any adjustments to the configuration shown on the Contract Drawings shall be discussed at that time and mutually agreed upon.
- B. Prior to beginning any repair work at the site, the Contractor shall perform the following sequence of implementation of sedimentation and siltation control measures.
  - 1. Perform all necessary work to install all anticipated sedimentation barriers including but not necessarily limited to silt fence, compost filter socks, stabilized construction entrances, and

other items, as necessary. Provide all necessary sedimentation and siltation control measures as required by the District and/or Engineer and regulatory agencies, to minimize sedimentation or siltation from occurring beyond the immediate limits of work.

- 2. In addition to initial sedimentation and siltation control set-up measures, take additional steps as necessary to minimize sedimentation and siltation within work areas and eliminate sedimentation and siltation outside of work areas throughout the conduct of the Work at no additional cost to the District.
- 3. Following initial setup of sediment and erosion controls, the site shall be inspected by the District and/or Engineer. No work can continue until the Erosion controls meet the approval of the aforementioned.
- 4. Damaged or loose erosion control measures shall be replaced as necessary to maintain their function of controlling sedimentation and siltation.
- C. Remove any accumulation of silt or soil build up behind silt fence and compost filter socks or other erosion control barriers or siltation dams, as it occurs. Remove accumulations of silt and soil build up from silt traps as necessary to properly maintain their function.
- D. Following periodic cleaning of all sedimentation controls and upon completion of the use of the controls, the accumulated sediment shall be allowed to dry prior to transporting to lawful off-site upland disposal locations.
- E. The Contractor shall repair any damage resulting from sedimentation or siltation during any optional subsurface exploration program or related activities and restore property to its prior condition at no additional cost to the District.

## 3.03 ADDITIONAL EROSION AND SEDIMENTATION CONTROLS

- A. The District or Engineer shall make periodic inspections of the site and shall advise the Contractor of the need for additional erosion and sedimentation controls necessary to meet the performance standards of this Section. Representatives of the Owner and of regulatory agencies may also make inspections.
- B. Additional erosion and sedimentation control necessary to deal with transient conditions on the site, such as following the placement of topsoil but prior to the establishment of grass cover, shall be provided by the Contractor as needed and at no additional cost to the District.
- C. Additional erosion and sedimentation controls may be necessary to deal with the cutting fluids, concrete debris, grout, concrete, and bonding agent required for the concrete surface repairs of the dam structure.

## 3.04 INSPECTION AND MAINTENANCE

A. Throughout the entire duration of the Contract (including periods when actual site work is being conducted), the Contractor shall perform weekly inspections of erosion and sediment control installations. Additional inspections shall be required immediately after each rain event exceeding one-half (0.5) inches in a 24-hour period. The Contractor shall develop a checklist to assist with periodic inspection and maintenance and shall keep completed copies of the checklist for each inspection on file along with the sediment and erosion control plan.

- B. Throughout the entire duration of the Contract (including periods when actual site work is being conducted), the Contractor shall repair any damage resulting from sedimentation or erosion during construction and/or construction related activities and restore property to its prior condition at no additional cost to the District.
- C. Throughout the entire duration of the Contract (including periods when actual site work is being conducted), the Contractor shall take such steps as are necessary to maintain the sediment and erosion controls in good working order, including repair or replacing controls and cleaning or removing sediment from controls.
- D. The site entrance(s) shall be maintained in a condition that will prevent tracking or flow of mud onto public right-of-way or adjacent roadways. All materials spilled, dropped, washed, or tracked from vehicles onto roadways or into on- or off-site storm drains must be removed immediately.
- E. In the event of inclement weather, the Contractor shall protect the site and materials from damage from the weather. If, in the opinion of the District or Engineer, any portion of the Work or materials has been damaged by reason of failure on the part of the Contractor to so protect the Work, such Work and materials shall be removed and replaced with new materials and Work to the satisfaction of the District. Weather protection shall include all activities necessary to prevent the spread of sediment from wind, runoff, erosion, and other causes.

### 3.05 <u>REMOVAL AND CLEANUP</u>

After the site has been fully stabilized against erosion and upon the approval of the District, remove sediment control devices and accumulated silt. Legally dispose of on-site all accumulated sediment and grade and seed in-place. All sedimentation and siltation control devices such as, but not limited to siltation fencing, straw bales, sandbags, and other related products shall be disposed of off-site. All removal and cleanup of sediment and erosion controls and accumulated sediment shall be done at no additional cost to the District and no separate pay item has been provided.

### 3.06 UPSTREAM SEDIMENT AND EROSION CONTROL

The upstream line for sediment and erosion control has been shown on the Contract Plans. It is the intent of the Contract that sediment and other material transport into the Reservoir be minimized to the extent possible. However, the need for erosion control will depend on the Contractor's sequence of work, and the level to which the reservoir is dewatered. To this end, two possible erosion control BMPs are specified: Compost Filter Sock or Turbidity Curtain.

### PART 4 - MEASUREMENT AND PAYMENT

Refer to Section 01950 – Measurement and Payment for the measurement and payment items related to this Section.

### \* \* \* END OF SECTION \* \* \*

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### SECTION 01565 TEMPORARY WATER CONTROL

Part A of this Section describes Temporary Surface Water Control. Part B of this Section describes Temporary Construction Dewatering and Groundwater Control.

## PART A – TEMPORARY SURFACE WATER CONTROL

## PART 1 - GENERAL

### 1.01 DESCRIPTION

- A. This section specifies the removal and control of water in the work area in order to permit all excavation, construction, installations, and repairs to be performed in the dry. Water control shall be provided such that the Work of the Contract can proceed unhindered by water and flow into or through the work area. Water control shall also extend to all provisions necessary to control water in and from the Silvermine River (upstream and downstream) and surface drainage from upland areas from flowing into, disrupting, and damaging the work area. All work shall be performed in accordance with the plans and specifications and to the satisfaction of the District. Water control is of the utmost importance.
- B. The Contractor shall be responsible for determining the need for and the means and methods of implementing water control during the work of the Contract, except as specifically stated herein and in other Sections. The Resident Engineer will monitor conditions at the site and the effects of water levels and flows on the Work. If, in the Resident Engineer's opinion, the presence of water has the potential to create a deleterious effect on the Work, then the Contractor shall take immediate measures to control such water to the satisfaction of the Resident Engineer at no additional cost to the District.
- C. The Contractor shall be responsible for determining the need for and the means and methods of implementing water control during the work of the Contract, except as specifically stated herein and in other Sections. The Engineering Consultant will monitor conditions at the site and the effects of water levels and flows on the Work. If, in the Engineering Consultant's opinion, the presence of water has the potential to create a deleterious effect on the Work, then the Contractor shall take measures to control such water to the satisfaction of the Engineering Consultant at no additional cost to the Owner.
- D. The control of surface water shall consist of installing such provisions, as needed, to divert, reduce, or stop water which may be flowing into, on, or through the work site. The Contractor will need to implement measures to protect the work area against both inflow from the impoundment of the Silvermine River within Grupes Reservoir (upstream) and backwater from the Silvermine River downstream of the Dam. The Work of this Section shall also include the maintenance of flows into the auxiliary spillway channel. The need for control of surface water may change over the course of the project depending on the work underway, as well as rainfall/runoff conditions encountered. Pumping, siphoning, and/or other methods may be required for certain activities.
- D. The District will <u>attempt</u> to completely draw down Grupes Reservoir from Nov. 1 through May 1. The primary means by which flows in the Silvermine River will be passed downstream of the Site will be via discharge of flow through the low-level outlet (LLO) at the Grupes Reservoir Dam.

No action by the Contractor is necessary or shall be allowed to modify the Grupes Reservoir Dam LLO. Water levels in the impoundment in Grupes Reservoir upstream of the Site will be a function of the inflow from Milne Reservoir upstream, and discharge capacity of the Grupes Reservoir Dam LLO.

- E. Temporary cofferdams may be necessary for completion of the Work of this Contract. Temporary water control shall act in concert with the temporary cofferdams. The temporary cofferdams will likely be necessary around the upstream portion of the gatehouse and within the discharge channel as may be necessary to divert backflow in the Silvermine River. Temporary cofferdams, if used, shall be designed, and implemented in accordance with Section 02170.
- F. Temporary construction dewatering systems to control seepage and groundwater may be necessary for completion of the Work of this Contract. The temporary construction dewatering systems shall be provided and paid for under this Section of the work as discussed in Part B. Temporary surface water control shall act in concert with the temporary construction dewatering systems.
- G. The Contractor shall take all necessary precautions during construction to provide and maintain proper equipment and facilities to remove promptly and dispose of properly, all water entering work areas and keep work areas dry, as necessary. The Contractor shall implement such temporary surface water control measures as necessary to maintain the water level such that all work, where judged necessary, proceeds in the dry. Temporary water control work may include, but shall not be limited to diversion pipes, channels, swales, pumps, siphons, culverts, temporary cofferdams, etc.
- H. Water control measures shall be in operation as needed until all work within those areas of the work zone subject to interference by surface water is complete and accepted by the District.
- I. The Contractor shall remove all channeled, pumped, diverted, or siphoned surface water away from the work area, and provide sedimentation control and recharge in accordance with all applicable local codes and laws. All water which is discharged by water control measures shall be passed through appropriate and adequate sediment and/or filtration measures such that the effluent meets the standards set out in Section 01560 and those provided below. Water diverted or pumped by the Contractor shall be discharged into the eastern raceway channel of the Silvermine River downstream of the downstream cofferdam and shall maintain water quality standards. Adequate provision for erosion control at the discharge point shall be provided as part of the Work of this Section.
- J. The Contractor shall maintain minimum flows, as specified below in Section 1.09, out of the upstream impoundment and into the spillway discharge channel of the Dam. Minimum flows are provided for the purpose of maintaining downstream environmental conditions.
- K. All temporary surface water control work shall be coordinated with temporary sedimentation and erosion control work as specified under Section 01560.
- L. The Contractor shall prepare and implement a Flood Emergency/Response Plan subject to review by the Engineering Consultant and Owner describing the measures to be implemented in the case of potential flooding of the work areas.

## 1.02 <u>SCOPE</u>

- A. The Work of this Section includes the furnishing of all labor, equipment, supplies, materials, and utilities required for the operation, maintenance, and supervision of efforts to control surface water on and around the Site such that all construction within this Contract can proceed unhindered by water and flow into or through the work area. The Work of this Section further includes the furnishing of all labor, equipment, supplies, materials, and utilities required for the operation, maintenance, and supervision of efforts to maintain the quality of surface water collected and discharged by the surface water control systems.
- B. The Work of this Section includes the furnishing of all labor, equipment, supplies, materials, and utilities required for the operation, maintenance, and supervision of efforts to maintain minimum flows, as specified, bypassed around the Work area out of the upstream impoundment and into the spillway discharge channel of the Dam.

## 1.03 ADHERENCE TO REGULATORY CONDITIONS

- A. All work shall comply with all codes, rules, regulations, laws, and ordinances and executed in conformance with any permits, licenses etc., as issued by the Town of New Canaan, State of Connecticut Department of Energy and Environmental Protection (CT DEEP), the U.S. Army Corps of Engineers (USACE), and all other authorities having jurisdiction within the project areas. All work necessary to make the work site comply with such requirements shall be provided without additional cost to the District.
- B. Copies of all permits and licenses listed under Sections 01060 are included in the Contract Documents or will be forwarded to the Contractor prior to the beginning of the work. The Contractor shall be responsible for conducting his/her work in accordance with all provisions of said permits.
- C. No work of any type in any area shall commence until sedimentation control measures are in place to the satisfaction of the District and its Resident Engineer.
- D. All temporary dewatering and water control measures must be installed and maintained in accordance with the approved sediment and erosion control plan (or SWPCP) Refer to Sections 01060 and 01560 for more information.

### 1.04 <u>RELATED WORK</u>

- A. The following is a list of related work items that shall be performed or furnished under other sections of these specifications as indicated:
  - 1. Regulatory Requirements Section 01060
  - 2. Temporary Erosion and Sedimentation Control See Section 01560
  - 3. Hydrologic and Hydraulic Information See Section 01566
  - 4. Temporary Cofferdams Section 02170

### 1.05 GENERAL DEWATERING AND WATER CONTROL WORK

A. The Contractor shall implement surface water control measures as necessary such that all work, including concrete placement and excavations, proceeds in the dry.

- B. The Contractor shall take such steps as are necessary to control the leakage of water through the dam, (and temporary cofferdams, if used) such that said leakage will not interfere with the Work of the Contract.
- C. The Contractor shall take all reasonable and prudent precautions during construction to provide and maintain proper equipment and facilities to remove promptly and dispose of properly, all water entering work areas and keep such areas dry so as to obtain a satisfactory undisturbed subgrade condition.
- D. Dewatering measures (and cofferdams, if used) shall be in operation until all work below normal Lake and stream elevations is complete and accepted by the Owner and Engineering Consultant.
- E. Shallow sumps may be required for surface water collection. Sumps shall be surrounded by suitable filter material. Pumping shall be continuous as necessary to maintain the work in the dry.

## 1.06 <u>SUBMITTALS</u>

- A. Not less than ten (10) days prior to the scheduled start of work, the Contractor shall submit his proposed method of controlling surface water and maintaining dry conditions, to the District for review. The submittal shall include as a minimum the following items:
  - 1. The Contractor's proposed design, sequence of operation, maintenance and supervision of the surface water and control systems, as needed for each phase of the work, and coordination with temporary groundwater control and the temporary cofferdams.
  - 2. Design of temporary cofferdams shall be submitted under Section 02170.
  - 3. The Contractor's proposed contingency plan for additional surface water measures for all systems in the event of system failure monitoring, instrumentation, on-call repair, etc.
  - 4. Scheduling requirements with regard to Sedimentation Control, groundwater control, and temporary cofferdam installation.
  - 5. The Contractor's proposed Flood Emergency/Response Plan for potential storm emergency conditions (i.e., anticipated heavy rainfall). The plan should address, but not to be limited to, measures for handling flooding of the work area, removing equipment and materials from the work area, and stabilizing exposed portions of the work area which might be subject to erosion from surface water flow either from the River or adjacent uplands.

### 1.07 WATER CONTROL RESTRICTIONS

- A. The Contractor shall abide by the conditions of all relevant permits issued to the Project which pertain to Water Control. The Contractor alone shall be responsible for meeting the conditions of the permits and shall be held accountable for penalties as a result of violations of permit conditions.
- B. In the event that dry conditions lead to naturally low levels in the upstream impoundment, the Contractor will NOT be required to take steps to raise the water level beyond what would occur naturally.

C. The Contractor is hereby made aware that the District has limited control over inflows into Grupes Reservoir. Major rainfall events and/or releases from upstream ponds may cause the level of both the impoundment to rise rapidly as flows in the river increase. This has the potential to inundation of the work site. The District operates the upstream Milne Dam for drinking water storage and will attempt to limit outflows from Milne into Grupes. No guarantee is made that such operations will prevent flooding of the Site. In the event of uncontrolled increases in upstream or downstream water surface levels, the Contractor shall undertake measures to protect existing structures and new work at no additional cost to the District.

## 1.08 MAXIMUM WATER CONTROL DISCHARGE RATE

A. The total flow rate from all Contractor water control operations shall be such that significant downstream erosion, flooding, or other damage is avoided, in the opinion of the Resident Engineer, District, or regulatory authority. The Contractor's water control plan shall not lead to an increase in downstream flood impacts. Contractor water control operations shall not reduce the capacity of the spillway at the Grupes Reservoir Dam and therefore the Work is not anticipated cause a significant increase in upstream water levels.

## 1.09 BYPASS FLOWS / MINIMUM DOWNSTREAM FLOW RATE

- A. The District is responsible for maintaining a minimum flow rate within the Silvermine River. This minimum flow varies with the time of year and must be supplied from surface water and must be discharged directly into the Silvermine River.
- B. The District will attempt to maintain minimum flows in the Silvermine River by utilizing discharges from impoundments upstream of Grupes Reservoir. However, it may become necessary for the Contractor to bypass a minimum amount of surface water around the coffer dammed portion of the Site and discharge such water into the spillway discharge channel of Dam.
- C. If necessary, the Contractor shall install, operate, and maintain a system which withdraws surface water from the upstream impoundment, pipes it around the Work area, and discharges the flow into the discharge channel before the downstream turbidity curtain. Such a system may use a siphon system, pumps, or other mechanisms to bypass flow around the work site. Cutting of open channels shall not be allowed.
- D. Intake for the bypass system shall be from a location where good quality surface water is present and no sediment and/or debris will be entrained.
- E. Flow from other surface or groundwater control systems shall not count against the minimum flow requirements.
- F. The Contractor shall assist the District in monitoring the system daily to ensure flow is continuing and assist with keeping a daily record of bypass flow discharge rate.

## 1.10 DISCHARGE OF WATER

A. Water discharged from any dewatering system in which water is collected and pumped shall be treated in such a manner as to meet the water quality performance standards described in the

SWPCP and any other water quality standards contained in law, regulations, and permits. In the event of conflict, the most stringent standard shall apply.

B. The general performance standard for the discharge of effluent into state waters states that the discharge water shall not have a significant impact on the receiving waters. The discharged water shall therefore meet the following general standards and the specific standards which follow:

<u>Solids</u> - Discharge waters shall be free from floating, suspended and settleable solids in concentrations or combinations greater than that of the receiving waters, that would cause aesthetically objectionable conditions, or that would impair the benthic biota or degrade the chemical composition of the bottom.

<u>Color and Turbidity</u> - These waters shall be free from color [including oily sheens] and turbidity in concentrations or combinations that are aesthetically objectionable or are significantly different from the receiving waters.

## 1.11 PROTECTION OF WORK FROM FLOOD CONDITIONS

- A. The Contractor shall take all such precautions necessary to protect the site and the Works of this Contract, either completed or incomplete, from flood waters and flows which would either damage the Work or the site or cause a delay to the Work.
- B. In the event of significant natural flooding, the Contractor may need to actively release water from the Reservoir via pumping or siphoning depending upon the stage of construction. If extensive flooding is expected, the Contractor shall implement the Flood Emergency/Response Plan in conjunction with the Engineering Consultant to release water from the impoundment at the maximum rate allowed to drawdown the impoundment in advance of the storm (within the allowable limits). The release of water shall not exceed the discharge rates described above or elsewhere in the contract documents including the related permits. All water releases shall be coordinated with Engineering Consultant. The Contractor shall remove all equipment and erosion-susceptible material from areas liable to be inundated or otherwise impacted by flooding. The Contractor shall secure the site and make all efforts to protect completed and incomplete work.

### 1.12 ANTICIPATED IMPOUNDMENT LEVELS AND INFLOWS

A. Hydrologic and climatological data presented by the Engineer, such as impoundment levels and river flows are presented in Section 01565. This data is presented FOR INFORMATION ONLY. It is the responsibility of the Contractor to make all inferences and conclusions regarding possible flow rates and lake levels during the Work of this Contract.

## PART 2 - PRODUCTS

## 2.01 DIVERSION BARRIER / MINOR COFFERDAM MATERIALS

A. Temporary Construction Cofferdams at the work site shall be provided as per Section 02170 – Temporary Cofferdams. All other diversions barriers and cofferdams shall be provided by the Contractor, at his discretion, under the Work of this Section.

- B. All materials used in the construction of cofferdams or diversion barriers, <u>shall be clean and free</u> of substances or materials which might lead to contamination of the River, impoundment, wetland resource areas, or other water courses.
- C. All sandbags shall be free of rips or tears which would lead to a loss of sand into the River, channel, or wetland resource areas, and bag openings shall be tied to prevent the same. Broken sandbags shall be removed and replaced.
- D. Loose soil material will NOT be an acceptable material for the construction of cofferdams or diversion barriers.

# 2.02 <u>PUMPS, HOSES, SIPHONS</u>

- A. Pumps, hoses, or siphons used at the site shall be sized appropriately and shall be maintained in good working order by the Contractor.
- B. Pumps shall be sized appropriately by the Contractor and shall operate in a manner which does not create a nuisance to abutters (i.e., quietly and without significant exhaust).
- C. Secondary containment shall be provided as stipulated in permits for gasoline or diesel-powered pumping equipment. Fueling procedures shall be as per permit conditions.

# 2.03 <u>PIPE</u>

Pipes and fittings used for water control and/or diversions shall be sized appropriately and shall be in good condition without leaks or cracks. Pipe pressure ratings shall be adequate for static head loading when pressure flow is expected. Pipe joints shall be watertight and installed as per the manufacturer's recommendations.

# PART 3 - EXECUTION

## 3.01 GENERAL SURFACE WATER CONTROLS

- A. This section defines the intent of surface water control work, but the Contractor shall ultimately be responsible for means and methods and compliance with the specification will be judged on performance criteria. The Contractor shall submit a water control plan to the District for review and may, at that time, propose alternative water control strategies. The Contractor's water control plan must however satisfy the terms and conditions of all permits issued to the project.
- B. If pumps or similar equipment is utilized, the Contractor shall maintain immediate access to back-up electrical generators, fuel, pumps, and related equipment and supplies with output capacity sufficient to maintain continuous operation of the water control systems in the event the original water control equipment or power source(s) which is in use becomes inoperable. The back-up generator, pumps and necessary equipment and supplies shall be capable of rapid deployment for replacement for the inoperable equipment.
- C. The Contractor shall take all reasonable and prudent precautions during construction to provide and maintain proper equipment and facilities to control and divert water.

- D. If necessary, water control systems shall be operated continuously during all construction specified herein. The operation time may include breaks, nights, weekends, holidays, and other times when work is not otherwise being performed on the site. Appropriate alarm systems (autodialer, etc.) shall be provided to provide alert and notification in the event of water control system failure.
- E. Surface water control in the site area shall account for the range of flow expected into Grupes Reservoir and the Silvermine River during the course of the Project. Pumps, siphons, pipes, channels, etc. shall be sized appropriately. Any cofferdam / diversion barriers shall be constructed of such materials and to such extent that they will withstand the forces and pressures exerted by flows and depths of a reasonable expected magnitude. The cofferdams / diversion barriers shall be compatible with other dewatering, water control, and sedimentation control procedures. Dewatering equipment shall be provided as needed to remove water from the interior areas of cofferdams / diversion barriers.
- F. All cofferdams / diversion barriers constructed by the Contractor shall be completely removed upon the completion of the Project. All material shall be legally disposed of off-site at the Contractor's expense. No material shall be left within the Work area.
- G. The Contractor shall make provisions to remove any impediments or obstructions (e.g., debris, material, equipment, etc.) to flow through water conveyance structures expeditiously during the entire project period and in the event of a flood event which threatens to overwhelm the water control system or cause increased water levels which might lead to damage at the Dam, or other property upstream or downstream of the Dam.
- H. If deployed by the Contractor, pumps must be operated in such a way as to not disturb abutters (e.g., noise). Pump intakes shall be placed so as to reduce the potential for sediment entrainment and pump discharge points shall make provisions for reducing erosion potential through energy dissipation, riprap protection, etc.
- I. In some instances, the Contractor may choose to work in the wet, without attempting to exclude water from the work area. The Contractor may proceed in this fashion so long as the intent of the Work underway is not violated, the quality of the finished product is not reduced, and all applicable permit conditions are satisfied. The Resident Engineer will monitor conditions at the site and the effects of water surface levels and flows on the Work. If it is judged that the Contractor cannot appropriately complete the Work under the conditions present, the District or its Resident Engineer will notify the Contractor and the Contractor shall make provision for water control.
- J. The Contractor shall install and maintain temporary staff gages and/or measurement points as necessary to provide for water level measurement during construction. A temporary staff gage shall be installed in the upstream impoundment at a location where it is readable from east service road at the Dam's left abutment. A temporary staff gage shall be installed in the downstream discharge channel downstream of the Dam such that it is visible from the west side of the channel. The Contractor shall record twice daily (am and pm) impoundment and channel water levels (in elevation based on Site Datum) on a daily basis. Water levels shall be recorded in a log and a copy provided to the Resident Engineer each day. All work and materials described in this paragraph shall be considered incidental to the Work of this Section.

## 3.02 <u>SITE SPECIFIC SURFACE WATER CONTROL REQUIREMENTS</u>

A. Water control <u>IS</u> of the utmost importance during the Work of this Contract. The Work of this Contract has been designed to allow the area of the Dam to be isolated from the flow of the Silvermine River and river flows maintained through the LLO of Grupes Reservoir Dam. The surface water control plan is intended to provide ongoing control throughout the Work of this Contract such that water levels upstream of the Dam are not materially increased nor are downstream flows materially increased with respect to existing conditions.

## 3.03 BY-PASS OF SURFACE WATER FOR MINIMUM FLOWS

- A. Surface water shall be withdrawn from the impoundment upstream of the upstream cofferdam to provide for the minimum bypass flow. Secure and mark the intake of the system and provide for protection against damage and entrainment of debris.
- B. Demonstrate to the satisfaction of the Resident Engineer that the bypass flow rate meets or exceeds the required minimum. Monitor flow during project and maintain proper function. The bypass system must be in-place and functional prior to dewatering between the cofferdams.
- C. Discharge the bypass flow downstream of the downstream cofferdam but upstream of the turbidity curtain.

# PART B – TEMPORARY CONSTRUCTION DEWATERING AND GROUNDWATER CONTROL

## PART 1 - GENERAL

### 1.01 <u>DESCRIPTION</u>

- A. This section specifies the removal and control of groundwater and hydrostatic pressures in the work area in order to permit excavation, construction, installations, and repairs to be performed in the dry. The Contractor shall provide a dewatering system which is capable of controlling of water such that the excavation and/or backfilling operation can proceed unhindered by groundwater and flow into or through the work area. All work shall be performed in accordance with the plans and specifications and to the satisfaction of the District and its Resident Engineer.
- B. The Contractor is required to implement groundwater dewatering and control measures to maintain the groundwater level such that excavation work proceeds in the dry and subgrades remain stable against heave and boiling as specified in Section 02200 Earthwork.
- C. The Contractor shall take all reasonable and prudent precautions during construction to provide and maintain proper equipment and facilities to remove promptly and dispose of properly, all groundwater entering work area and keep such areas dry so as to obtain a satisfactory undisturbed subgrade condition.
- D. Shallow sumps may be required to maintain the lowered groundwater level until work has been completed. Sumps shall be surrounded by suitable filter material. Well points may be required in place of or in addition to other dewatering techniques. Pumping shall be continuous as necessary to maintain the work in the dry.

- E. The Contractor shall remove all pumped water away from the work area and provide sedimentation control and recharge in accordance with the SWPCP and all applicable local codes and laws as well as the Sedimentation & Erosion Control and Surface Water Control Sections of the Contract Documents. All water which is discharged by dewatering measures shall be passed through appropriate and adequate sediment and/or filtration measures such that the effluent meets the standards set out in Section 01560 and 01565 and those provided below. Use of a "frac" tank or dewatering filter bag may be required to assist with dewatering water quality maintenance. Other measures shall be implemented by the Contractor as necessary to meet the performance specifications setout herein.
- F. The Contractor shall ultimately discharge all dewatering and groundwater control effluent into the spillway discharge channel, provided that the Contractor meets the discharge water quality is appropriate with respect to turbidity, dissolved oxygen, pH, and other characteristics, as stated in any permit or relevant regulation. The Contractor shall be required to monitor discharge water quality and shall be required to provide the District with equipment to independently monitor water quality.
- G. Dewatering systems shall act in concert with surface water control systems and with any temporary cofferdams erected. In particular, it is expected that the Contractor's temporary cofferdam designs will account for the need for seepage control and will provide seepage cutoff provisions (long upstream skirts, etc.) which will work in concert with the construction dewatering systems to limit seepage under the cofferdams.
- H. The Contractor is specifically informed that excavations may require significant dewatering and ground water control efforts if performed while the reservoir is at Normal (i.e., spillway crest) levels.
- J. The Contractor shall take such steps as are necessary to control and/or stop leakage of water through soil, rock, or structures, such that said leakage will not interfere with the Work of the Contract.

# 1.02 <u>SCOPE</u>

- A. The Work of this Section includes the furnishing of all labor, equipment, supplies, materials, and utilities required for the operation, maintenance, and supervision of efforts to control surface water on and around the Site such that all construction within this Contract can proceed unhindered by groundwater and seepage flow into or through the work area, including within excavations and the foundation. The Work of this Section further includes the furnishing of all labor, equipment, supplies, materials, and utilities required for the operation, maintenance, monitoring, testing, and supervision of efforts to maintain the quality of groundwater collected and discharged by the groundwater control systems.
- B. The Work of this Section includes the furnishing of all labor, equipment, supplies, materials, and utilities required for the operation, maintenance, and supervision of a portable "frac" tank (sedimentation and settling tank) or filtration bags for use as part of the discharge water quality treatment system.
- C. The Work of this Section includes the furnishing of a portable turbidity meter to the District for use at the Site. The Contractor shall supply the meter and all necessary accessories and manuals.

The Contractor shall provide training to the District's Resident Engineer on the proper use of the meter. The Contractor shall provide all materials necessary to calibrate and operate the meter for the duration of the project.

### 1.03 ADHERENCE TO REGULATORY CONDITIONS

- A. See Part A for Regulatory Conditions.
- B. No dewatering work of any type in any area shall commence until sedimentation control measures and discharge water treatment systems are in place to the satisfaction of the District and its Resident Engineer.
- C. The SWPCP will encompass the implementation of sediment, erosion, and water control performance specifications. All temporary dewatering and water control measures must be installed and maintained in accordance with the approved SWPCP. It shall be the Contractor's responsibility to maintain a copy of the SWPCP on the site at all times and abide by its requirements.

## 1.04 <u>RELATED WORK</u>

- A. The following is a list of related work items that shall be performed or furnished under other sections of these specifications as indicated:
  - 1. Regulatory Requirements Section 01060
  - 2. Temporary Erosion and Sedimentation Control See Section 01560
  - 3. Earthwork Section 02200

## 1.05 <u>WATER QUALITY STANDARDS FOR DISCHARGE OF WATER FROM DEWATERING</u> <u>SYSTEM</u>

A. See Part A for Discharge of Water requirements.

### 1.06 <u>SUBMITTALS</u>

- A. Not less than ten (10) days prior to the scheduled start of work, the Contractor shall submit his proposed method of dewatering and maintaining dry conditions, to the District for review. The submittal shall include as a minimum the following items:
  - 1. The Contractor's proposed design, sequence of operation, maintenance, and supervision of the dewatering system for the maintenance of groundwater levels as specified herein and as needed for the Contractor's operations. The submittal shall include a list of all equipment to be provided along with performance characteristics and installation methodologies.
  - 2. The Contractor's proposed contingency plan for groundwater control measures for all systems.
  - 3. Scheduling and sequencing requirements with regard to groundwater control and Sedimentation Control.

- 4. The Contractor's proposed means of controlling excessive exit gradients in excavations, including means and methods for reducing gradients and/or filtering soils to prevent the loss of foundation or embankment material, in particular within excavations and downstream of the upstream cofferdam. If judged necessary by the District, the Contractor shall provide a calculation package stamped by a Professional Engineer licensed in the State of Connecticut, which demonstrates that the bottom of excavations will remain stable against boiling and heave and that expected seepage rates can be controlled by the proposed dewatering system.
- 5. The Contractor's proposed dewatering system water treatment system. The submittal shall include information on all equipment and features to be used in the treatment system, including but not limited to, frac tank(s), filtration bags, intake filtration systems, etc. The submittal shall provide a graphical layout of the proposed location of each feature of the system including intakes, tanks, and discharge points. The submittal shall provide a schematic depiction of the treatment system and the anticipated individual efficiencies of each feature and total efficiency of the system.
- 6. The Contractor's proposed frac tank cleaning or filter bag changing procedure, including methods for maintaining dewatering operations while cleaning the frac tank or replacing the filtration bags at a frequency required by the Specifications and permit requirements.

## **PART 2 - PRODUCTS**

## 2.01 PUMPS, HOSES, SIPHONS

- A. Pumps, hoses, or siphons used at the site shall be sized appropriately and shall be maintained in good working order by the Contractor.
- B. Pumps shall be sized appropriately by the Contractor and shall operate in a manner which does not create a nuisance to abutters (i.e., quietly and without significant exhaust).
- C. Secondary containment shall be provided for gasoline or diesel-powered pumping equipment.

### 2.02 <u>PIPE</u>

Pipes used for water control and/or diversions shall be sized appropriately and shall be in good condition without leaks or cracks. Pipe pressure ratings shall be adequate for static head loading when pressure flow is expected. Pipe joints shall be watertight and installed as per the manufacturer's recommendations.

### 2.03 WELL POINTS

Well points shall include appropriate screens to prevent the removal of fine soil material from the subgrade.

### 2.04 <u>GEOTEXTILES</u>

Geotextiles used as part of the construction dewatering system shall provide for appropriate filtration capacity with respect to the site soils.

### 2.05 INTAKE SUMPS

Intake sumps shall be filtered by crushed stone. Filter fabric may also be used.

#### 2.06 DEWATERING BAGS

Dewatering bags shall be made from permeable non-woven geotextile fabric. Bags shall be sized appropriately, the apparent opening size of the geotextile shall be suitable for the sediment grain size distribution, the bags shall be placed on a gravel bedding, and surrounded by a sediment barrier.

#### 2.07 <u>SOIL MATERIAL</u>

Soil and stone used as part of the construction dewatering system shall provide for appropriate filtration capacity with respect to the site soils. All such material shall be clean and free from contaminates and shall meet the requirements of the appropriate Section of these technical specifications.

### 2.08 <u>SEDIMENT SETTLING TANKS</u>

Sediment settling, or frac, tanks shall be purpose-made, water-tight steel tanks with sufficient stiffness to accommodate full tank levels and specifically configured for providing sediment removal action. Tanks shall have internal baffles to promote settling. Booms shall be provided as needed. Tanks shall be provided with multiple-level fill and discharge ports such that inlet and discharge lines can be configured appropriately. Tanks shall have low-point cleanouts ports and preferably sloped bottoms. Tanks shall be closed top, vented, and shall provide for safe but controlled access to the interior.

#### 2.09 ENHANCED SEDIMENTATION TREATMENT

Chemical flocculants such as alum (potassium aluminum sulfate) may be used only with written approval by the District.

### 2.10 <u>PORTABLE TURBIDITY METER</u>

- A. The portable turbidity meter shall be provided as a full, operations-ready kit, with a case, cuvettes, batteries, charger, manual, and all necessary calibration and cleaning solutions.
- B. The portable turbidity meter shall be specifically designed for use in "field" conditions rather than a laboratory.
- C. The portable turbidity meter shall provide readings in NTUs and have a reading range of up to 1,000 NTUs. It shall meet or exceed performance criteria specified by USEPA method 180.1 for NTU measurement and shall be accurate to  $\pm 2\%$  or reading or  $\pm 0.01$  NTU.
- D. The Contractor shall be responsible for maintaining the meter and all supplies for the meter during the Work of the Project. The Contractor shall immediately replace the meter if it becomes non-functional. The meter and all accessories shall be the property of the District at the completion of the project.

# PART 3 - EXECUTION

### 3.01 GENERAL GROUNDWATER CONTROLS

- A. The Contractor shall provide an on-site back-up electrical generator, pumps and related equipment and supplies on-site with output capacity sufficient to maintain continuous operation of the dewatering systems in the event the original dewatering equipment becomes inoperable, or power source(s) is interrupted. The back-up generator, pumps and necessary equipment and supplies shall be connected to the operating system to the greatest degree possible prior to the start of all dewatering operations in such a manner to allow immediate replacement of the inoperable equipment. All electrical equipment shall be properly grounded and shall be provided with GFIs and meet all codes and requirements.
- B. Dewatering systems shall be operated continuously, and groundwater levels monitored and maintained at specified levels during all construction. The operation time is to include breaks, nights, weekends, holidays, and other times (including during storm events) when work is not otherwise being performed on the site. Appropriate alarm systems (autodialer, etc.) shall be provided to provide alert and notification in the event of water control system failure.
- C. Prior to dewatering, all sedimentation controls and dewatering treatment systems shall be in-place and operable. Prior to and during excavation, groundwater levels shall be lowered and maintained by the dewatering system submitted by the Contractor and approved by the Resident Engineer. Groundwater shall be maintained a minimum of one foot below the subgrade elevation in all work areas. Compliance of the dewatered levels with level specified herein shall be determined by visual observation of sumps, subgrades, etc.
- D. Where the Contractor proposes to remove groundwater from the bottom of the excavation by sumping as approved by the Resident Engineer, the sump shall be surrounded by a suitable filter to prevent removal of soil fines. Pumping from sumps which remove fines from the soil shall be immediately terminated and the dewatering method revised accordingly. If cloudy discharge water (i.e., flow containing fines) is observed, then pumping shall cease immediately. The pump discharge point shall be clearly visible to facilitate observation and inspection.
- E. Wellpoints, if used, shall be placed in the appropriate frequency and location so as to provide a uniform drawdown of groundwater across the full area of construction.
- F. Geotextiles and filter soils which are used to control boiling or piping must be sized appropriately and placed to extent and depths as are necessary to control transport of soil and prevent loss of subgrade material.
- G. All pumped water shall be discharged only after passing through the approved treatment system and shall meet water quality specifications set out in accordance with Section 01560, the conditions of the project permits, and Section 1.05 above. In the event that discharge water is found to not meet water quality standards, discharge must immediately cease and may not resume until the problem is corrected and discharge water may be verified to meet standards.
- H. All requirements of applicable local environmental and Conservation Commission Orders of Conditions shall be satisfied.

I. The Contractor may stage his dewatering plan such that dewatering, and groundwater control is limited to areas where work is or soon will be occurring. At the request of the Contractor, Groundwater control may cease only when the District and its Consultant are satisfied that groundwater will no longer affect the Work of the Contract or the integrity of the structure in the area.

### 3.02 GENERAL WATER CONTROL METHODOLOGY LIMITATIONS

In order to maintain the quality of dewatering and water control effluent and to prevent the discharge of unacceptable quantities of sediment, the following minimum restrictions shall be observed:

- A. When sumps are required, the intake must be placed within a perforated pipe and the annual space between the pipe and the sump pit (as well as the bottom of the pit) must be filled with crushed stone. Filter fabric may also be used, if necessary. Note that any crushed stone installed for the purpose of dewatering may not be left in place following dewatering activities unless specifically approved by the Resident Engineer. The presence of a continuous layer of crushed stone or other highly pervious material below spillway structures shall NOT be allowed, except as specifically shown on the Contract Drawings.
- B. All dewatering flow shall be passed through a dewatering treatment system which shall include, at minimum, a temporary Sediment Settling Tank sized appropriately for the flow rate.
- C. Additionally, discharge water may be passed through "Silt socks," "Dirt Bags," or other appropriate filtration devices which mitigate turbidity delivered to receiving waters. These devices should have a supplemental perimeter line of turbidity curtains and/or linear sedimentation barriers.
- D. The use of chemical flocculants may be necessary to achieve water quality standards. The Contractor shall be prepared to use such additives at no additional cost to the District but shall only do so with the written approval of the District and after submitting a written plan for approval.
- E. The Contractor shall monitor for all water quality parameters for which specific performance standards have been provided herein. The Contractor shall be prepared to provide numerical testing results to the District upon request and shall immediately test discharge water for all specified parameters at the request of the District. The District may require additional treatment or discontinuation of dewatering in the event that test results show non-compliance or test results are not available.

### 3.03 <u>SITE SPECIFIC GROUNDWATER CONTROL ISSUES</u>

- A. The Contractor is hereby informed that seepage may result from gradients both upstream and downstream of the Work area as both the impoundment and downstream river level may be at or above the subgrade elevations of excavations during various portions of the Work.
- B. The Contractor is hereby informed of the presence of granular sands without significant cohesion. The Contractor shall expect that special provisions will be necessary to prevent boiling and heaving of these soils which might result from excessive seepage exit gradients during the execution of the Work, particularly during excavations.
C. If turbidity testing is required by the condition of the approved SWPCP, the Contractor shall provide a functional Portable Turbidity Meter prior to the start of dewatering. If necessary, the Contractor shall train the Resident Engineer in the proper use of the meter and shall provide all necessary materials for operation during the Work of the Contract.

### Part 4 below applies to the work of both Part A and Part B of this section.

# PART 4 - MEASUREMENT AND PAYMENT

Refer to Section 01950 – Measurement and Payment for the measurement and payment items related to this Section.

### \* \* \*END OF SECTION\* \* \*

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### SECTION 01566 HYDRAULIC AND HYDROLOGIC DATA

### PART 1 - GENERAL

### 1.01 PURPOSE AND INTENT OF DATA

No known site-specific data is available regarding either Pond level fluctuations or inflow/outflow flow rates. The Engineering Design Consultant has compiled the data contained herein regarding certain theoretical hydraulic and hydrologic characteristics of the Grupes Reservoir watershed and similar watersheds, as well as data on climate in the area, and the estimated hydraulic characteristics of the spillway. This information is presented **FOR INFORMATION ONLY**. Neither the District nor the Engineering Design Consultant makes any assurances as to the accuracy of the information depicted in this section. The Contractor is responsible for making his own assumptions, interpretations, and conclusions based on the data presented herein. A bidder may, at his or her own expense, make additional investigations to confirm the information presented herein and is free to seek additional sources of data.

### 1.02 RAINFALL DATA

## Monthly Mean Precipitation<sup>1</sup> from 1991-2020 Stamford, CT

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Precip (in)	4.26	3.14	4.73	4.44	4.12	4.91	3.77	3.81	5.21	4.59	4.19	4.44

### 1.03 <u>FLOOD FLOWS</u>

The Engineering Design Consultant, GZA, has, as a part of his studies and analyses, estimated hydrologic and hydraulic characteristics regarding the watershed, pond, and spillways. This information is summarized below. This hydrologic and hydraulic information is presented for informational purposes only. No warranty, expressed or implied, is made on the accuracy of the information herein. The Contractor is responsible for making his or her own interpretation of possible precipitation and/or resultant flow conditions, and responsible for all such decisions which may affect Contractor's water control and construction methods or associated cost of construction. The information below represents analysis of data using standard statistical methods. Actual conditions may differ from those presented below.

Inflo	w Flood Results	for Grupes Res	ervoir Dam		
Storm Return	24-Hour Rainfall	Peak Inflow	Resultant Maximum Pond		
Period	(inches)	(CIS)	Elevation		
10-year	5.1	1,100	299.2		
25-year	6.4	1,500	299.6		
50-year	7.6	1,800	299.9		
100-year	9.1	2,300	300.1		
500-year	13.5	3,800	300.6		

<sup>1</sup> National Oceanic and Atmospheric Administration-National Climatic Data Center, *Monthly Station Normals of Temperature, Precipitation, and Heating and Cooling Degree Days 1991-2020.* <u>https://www.ncdc.noaa.gov/cdo-web/datatools/normals</u>

# PART 2 – PRODUCTS

Not Used

# PART 3 - EXECUTION

Not Used

## PART 4 - MEASUREMENT AND PAYMENT

No measurement shall be made of any work performed under this section. No separate payment shall be made for any work performed under this section. The cost of any work done, or facilities provided under this section shall be included under other bid items within the Contract.

### \* \* \* END OF SECTION \* \* \*

J:\170,000-179,999\171312\171312-10.MAT\Specifications\Issued for Bid\Div 1\01566 - Hydraulic and Hydrologic Information.docx

### SECTION 01567 SUBSURFACE EXPLORATIONS TECHNICAL DATA

### PART 1 – GENERAL

#### 1.01 <u>SUBSURFACE INFORMATION</u>

The available subsurface information is appended herewith.

#### 1.02 SUBSURFACE INFORMATION LIMITATIONS

- A. The District has had a limited number of test explorations performed at the site for the purpose of obtaining general knowledge about subsurface conditions.
- B. Factual subsurface information in the form of test pit and boring logs within the upstream and downstream areas of Grupes Reservoir Dam is appended herewith. Contract Drawings include the approximate locations of the borings. The logs describe subsurface conditions encountered at the exploration locations at the time explorations were made. This information should be taken as approximate and conceptual. No warranties, expressed or implied, are made as to accuracy of subsurface information provided herein.
- C. Strata or material between the exploration locations are likely not continuous. The stratification on the logs represents approximate boundaries between soil types. Actual soil transitions are more gradual.
- D. Water level readings have been observed in the explorations and instrumentation at times and under conditions stated on the logs. Fluctuations in the level of the groundwater will occur due to variations in reservoir level, rainfall, temperature, and season.
- E. The boring logs are presented for informational purposes only. The Contractor shall make his own interpretation of subsurface conditions which may affect methods or cost of construction. Bidders may, and upon approval by the District, conduct additional subsurface test borings at the site, at no additional expense to the District.

### PART 2 - PRODUCTS

This Section Not Used

### **PART 3 - EXECUTION**

This Section Not Used

### PART 4 – MEASUREMENT AND PAYMENT

No measurement shall be made of any work performed under this section. No separate payment shall be made for any work performed under this section. The cost of any work done, or facilities provided under this section shall be included under other bid items within the Contract.

#### \* \* \* END OF SECTION \* \* \*

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#### BUCK, SEIFERT AND JOST CONSULTING ENGINEERS 112 EAST 19TH STREET NEW YORK 3, N. Y.

October 31, 1962

SUBJ: 401.12

Soiltesting, Inc. 47 Pershing Drive	
Ansonia, Connecticut	
Attention: Mr. Robert De Angelis Re: First Taxing District Norwalk, Connecticut	
Gentlemen:	

3

We are enclosing herewith a drawing showing the locations for a program of test borings required by us in connection with a study for reinforcing the existing Grupe Dam of the First Taxing District of the City of Norwalk, Connecticut. The location of the Reservoir is shown on the Norwalk North Quadrangle of the U.S.G.S. maps.

The borings shall be made from the surface of the ground to ledge rock and shall be carried a minimum of five feet into the ledge rock. The borings through the overburden shall be made by the dry sample method, in which the hole is cased to the rock. Samples shall be taken every five feet and at other intervals where a change in formation is indicated, by driving the casing to the desired depth, cleaning out the hole to the bottom of the casing and by driving a sample spoon of approved design not less than eighteen inches below the bottom of the casing into the material. The number of blows per foot to drive the casing and the number of blows for each six inches of sample spoon penetration shall be recorded. Samples shall be preserved in clear glass jars with airtight covers, waxed after closing. Drilling into ledge shall be done with a core barrel and a diamond bit or other approved means which will produce a core from the rock penetrated of not less than one and three eighth inches in diameter. The drilling shall be done in such a manner as to obtain the maximum possible core recovery. Cores shall be preserved in wooden boxes in the order in which they were taken.

Copies of the logs of the borings with complete information shall be forwarded to this office as soon as possible after each hole is completed. After completion of the work the samples and rock cores shall be delivered to the office of the First Taxing District at 3 Belden Avenue, Norwalk.

The work will be performed under our supervision and field inspection.

We will appreciate it if you will submit to us a proposal for performing this work. We suggest that the proposal be in the form of a lump sum on-and-off charge, a unit price per foot for borings through the overburden and a unit price per foot for borings in the rock. The proposal should be addressed to:

> Commissioners, First Taxing District City of Norwalk, Connecticut c/o Buck, Seifert and Jost Consulting Engineers 112 East 19th Street New York 3, New York

The location of the holes will be staked in the field on Friday November 2nd, weather permitting.

We would like to have this work done coincident with or immediately following the boring program you are now doing for us for the Second Taxing District.

If you have any questions in connection with this program please let us know.

Yours very truly,

BUCK, SEIFERT AND JOST

CFJ/dm Enc. cc: Mr. Riordan



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SOILTESTING, INC. 47 Pershing Drive-Ansonia, Conn.	lst. Taxing CLIENT: Norwalk, Cor	District n.	SHEET 2 OF 1 HOLE NO
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ToB. M.N.	Grupe Dam		STATION
PECTOR	LOCATIO New Canaen,	Conn.	OFFSET
GROUND WATER OBSERVATIONS IT FT AFTER HOURS IT FT AFTER HOURS	CWSIT TYPE 237 SIZE I D. 300 HAMMER WT 244 HAMMER FALL	3/93'LER DET - 1-3/62 - 140 - 30" Die	Date Start         12/28         Date Fig.         12/28/63
CASING SAMPLE	BLOWS PER 6" COR	NG DENSITY STRATA	FIELD IDENTIFICATION OF SOIL
BLOWS PER NO TYPE PEN REC DEPTH FOOT @ BOT	(FORCE ON TUBE) PER	FT CONSIST DEPTH	REMARKS INCL. COLOR, LOSS OF Wash water, seams in rock, etc."
17 35 12 39 11			Loose fill and boulders
340/10" 1 D 8" 0" 5"8"	8 100/2	5'10"	Refusal Bottom Hole 5'10"
		Notes	Bottom Hole 5'10" Could not keep casing straight or seated due to mamerous boulder & loose fill material. Will attempt aux. Hole. Bent shoe.
GROUND SURFACE TO	USED CASING	THEN CASING	TOFT. HOLE NO. 4
D. DRY W: WASHED C: CORED	PEPIT ALAUGER	UP - UNDISTURBED PIS	TON
PRUPORT-JNS USED TRACE : 0-109	6. LITTLE : 10-20%. SOME	+ 20+35%, AND + 35+5	°% B-10

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90		Ļ				ļ <b>ļ</b>				Compa	CT.	
-79		+	<u> </u>	<b> </b>		╫───	+	<u> </u>		-		
59	2	D	18	12	11'6"	15	20	27		Moist	10 '0"	and the Coll Sand Coll Crevel
_22			ļ	L			[	ļ	ļ	Compac	<b>t</b>	Trace of silt.
26			÷	<u> </u>		₩	ł					
30		·		<b>_</b>			+			-		
82	3	1"	Ó			150	Refu	sal		1	15*0"	2 261 Engrmented STRY
				<b>_</b>		<b>  </b>	ļ	C	4	-		Shist.
									7	-		(See wash sample)
	{· ·	f	f	f				C	3			
	<u> </u>							C	10		20 "0"	
			ļ	ļ	• <u></u>	<b>  </b>	ļ	· ·	ļ			Hole completed at 20 0"
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ROUNO	SURF	CE 1	0	F1		USEC		CAS	NG	THEN	CASIN	G TOFT. HOLE NO.
0.8.4	₩:	WASH	εo	C : C	ORED	P : PI	T	A = AUGI	LR UI	UNDISTUR	RED PI	STON
	υ <b>θ</b>	UND	STUR	8£0	BALL CH	ECK	T * TH	INWALL	¥1.	VANE TEST		
ROPORT	JNS	USEO	т	RACE	: 0 - 10%	6. L'TT	LE : 10	- 20%,	\$0 ME +	20-35%, A	ND = 35-5	so% B-12

SOIL 47 Pershi	TES	TIN ive	G,	IN ia, Co	C.	CLIENT	No	t. Ta rwalk	xing D , Com	istrict			SHEE Hole	T_1_0F NO5	1
ONTRACTOR		<b>~~~</b>				PROJE	CT NO						LINE		:
REMAN	DRILL	R				PROJEC	TNAN	E					STATION		
T.B.	•	N•N•				LOCATI	ON NO	ipe D my Cai	naan. (	Corn			OFFSET		
3, 20.04															
GROUND	WAT	ER O	BSERV	ATION	s	TYP	E	c 				BAR.	Date Stars 12/	29/62 <sub>Date</sub>	Fin. 12/29/6
ăř <u></u>	FT	AFTEF	?	H0	UKS	SIZE	10. 458 W		-300-	-140			SURFACE ELE	V	
AT	FT	AFTER	<u></u>	но	URS	HAM	MER F	,	24#	30 <sup>H</sup>	Di	8.	GROUND WATE	R ELÉV	
CASING			SAM	PLE		BLO	WS PE	R 6"	CORING	DENSITY	STRATA		FIELD IDENTI	FICATION OF	\$01L
PER	NO	TYPE	PEN	REC	DEPTH @ BOT	(FOR	CEON	TUBE)	PER FT (MIN.)	CONSIST.	DEPTH		WASH WATER,	. COLOR, LOS SEAMS IN RO	3 OF CK, ETC.
27		+	+	<u> </u>	<u> </u>	0-6	0-12	12-10				Brow	C-F sand,	course a	ravel,
30	1							ļ				SOIN	coulders		
28	ł	ł	ł	<b> </b>						4				· ·	
40	-1	D	18	9"	6*6"	20	37	72							
60		<b></b>					<u>+</u>	<u> </u>			7 10"				
		+		<u></u> +		1		·····			-				
		L								1	Notes	Havi	ng trouble	to get t	ast 71
		<b> </b>		<u> </u>	<u> </u>		·		<u> </u>	4		Unat	to keep	casing a	traight.
		<u> </u>	<u>+</u>									Will	. move hole	3' East.	-
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GROUND	SURF	308	ro		۲.	USED		<u> </u>	ING	THEN	CASING	з то	FT.	HOLE	
D - DRY	w :	<b>WA</b> 5H	E D	C = C	ORED	P's Pl'	т / т:тн	NI AUGE	R UP V-V	. UNDISTUR	BED PIS	TON			
			- <b>3</b> - U M												
PROPORT	UNS	USEO	1	RACE	: 00 %	, L.TT	LE = 10	- 20%.	SOME 2	0-35%, A	ND = 35-5	0%			R-13

SOILT 7 Perchir	rES	TIN vo - A	G,	IN( 14, Co		CLIENT:	lst. Nor	Taxi wa <b>rk</b> ,	ng Dis Conne	trict			SHEET_ HOLE N	1OF_1 105Å
TRACTOR						PROJEC	TNO						LINE	
MAN -D	RILLE	R				PROJEC	TNAM	ε					STATION	
T.B.	N.N	•				LOCATI	Grup	o Dam					OFESE EAST O	 ₽ 5
ECTOR					s		New	Canaa	n, con	<b>₽</b>			J. Base C	
GROUND 5	WAT	ER OU	16	ATIONS	UAS	TYPE	1 D.	c	NING 22	55°LER 1 3/8		BAR.	Date Start 12/2 SURFACE ELEV.	9/62 <sub>Date Fin</sub> . <u>1/2/63</u>
, ,	FT	AFTER	}	но	URS	HANK	ER W	T	300	140	Br Di	f Þ	GROUND WATER	ELEV.
	1		C A M C			HAM	WS PE	8.6	CORING	DENSITT	STRATA			ATION OF SOL
BLOWS		<u> </u>			DEPTH		SAMP	LER	TINE	CONSIST	CHANGE DEPTH		REMARKS INCL	COLOR, LOSS OF
FOOT	NO	TYPE	PEN	REC	@ 80T	0-6	6-12	12-18	(MEN)	MOIST	ELEV	1	WASH WATER, SE	AWS IN ROCK, ETC.
18	-					 		 				Brow	m C-F Sand, ( Boulders (Fi	Course gravel 11)
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20	1	D	18	12	616"	23	50	65		1				
39			ļ							1				
175	<u> </u>		+								810"			
				ļ		1								
	ļ	<u> </u>						<u> </u>		-	Note:	Unab	le to get par	st 8'0". Casing
			+	<u> </u>		<u></u>						brok	e off 3 time: hole again.	s. Had. to move
		1			-					ł		0110	HAT "B"TH	
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ROUND	SURF	A.C.F.	ro		т.	USEC		<u> </u>	ING	THEN	CASIN	IQ TO.	FT.	HOLE NO. 54
DRY	w ;	WA 5 H	ED	C : (	CORED	P = PI	т	A = AUG	ER UP	UNDISTU	RBED PI	STON		
	UB	UND	STUR	BED	BALL CH	ECK	1 = 71	INWALL		ANE TEST				D-14
ROPORT	) N 5	USED	,	AACE	: 0 - 10	X6, LIT:		0 · 20%,	SOME	20-35%, A	NO = 35-	50%		ъ т <del>и</del>

SOIL' 47 Pershi	TES ng Dr	TIN	IG, Anson	IN ia, Co	C.	CLIENT:	lst. Norw	Tax: alk,	ing Dia Conn.	strict		SHEET 1 OF 1 HOLE NO. 58
TRACTOR						PROJEC	TNO					LINE
EMAN -C	RILLE	R				PROJEC	T NAM	ε ο Dei		·		STATION
T.B.	M	N•	<u>_</u>			LOCATI	New	Cana	an, Col	(171		offs4 West of #5
SHOUND Dry	WAT FT FT	ER OF AFTER AFTER	18	ATION:	S JURS JURS	TYPE SIZE HAMB	ID. AER WI	W 2 3	ASING 	SAMPLER SS 1 3/8 140 30"		BAR. Date Start 1/2/63 Date Fin. 1/3/63 SURFACE ELEV.
	1	<u></u>	SAMP	۰ <b>۲ E</b>		BLO	WS PE	R 6"	CORING	DENSITY	STRATA	
BLOWS PER FOOT	NO	TYPE	PEN	REC	ОЕРТН @ ВОТ	ON (FOR	SAMPI	.ER TUBE)	TIME PERFT. (MIN.)	OR CONSIST	CHANGE DEPTH	REMARKS INCL. COLOR, LOSS OF WASH WATER, SEAMS IN ROCK, ETC.
31 20						0-6	0-12	12-10		MOISI		Brown Course gravel and boulders. (Fill)
36 54		Ì										r - r
-55	1	D	12	6"	6'0'	39	12:	Rei	288 <u>1</u>	-	6 0"	
		È						C	29	Run #1		Drilled 3'0" Boulder
								Č Č	12	<b>n</b>		
								C	23		11'0"	Gr. C-F. Sand, C-Gravel, & bould
	-2	D	18	8"	13*6"	-19	15	39			13'6'	
								C C	7 2	Run #2		Recovered 27" fragmented shist and Quartzite
								C C	5 3			
								C	13		18 0	Bottom of hole 18'0.
	• · ·										. •	•
	· · · · · · · · ·								·		Note:	Lost some water while coring.
					+						-	
	·		/						;			
· - · · ·			+						:			
			·	····								
	·											
												LALE NO 5%
ROUND S	SURFA	CET	o	FT	•	USED.		CASI	NG T	HEN	CASING	0 TOFT.   NULL NU. UD

OIL'I Pershin	'ES g Dri	TIN vo-a	G,	<b>IN(</b> a, Coi		CLIENT:	lst. Norw	Taxi alk,	ng Dis Conn.	trict		SHEET 1 OF 1 HOLE NO. 6
RACTOR						PROJEC	TNO					, LINE
MAN - D		Ñ.				PROJEC	Grup	e Dai	2	····		STATION
CTOR						LOCATI	New	Canas	n, Con	21	"····	OFFSET
								c	ASING	SAMPLER	CORE	BAR Date Start 1/3 Date Fin1/3/63
GROUND	WAT FT /	ER OU		HO	URS	TYPE SIZE	: 10		22n	1 3/8	HL	SURFACE ELEV.
	FT	<b>IFTER</b>		но	URS	HAMM	AER WI AER FA		300	<u> </u>	Ďi	B. GROUND WATER ELEV
CASING			SAMP	LE		BLO	WS PE	R 6" ER	CORING	DENSITY OR	STRATĂ CHANGE	FIELD IDENTIFICATION OF SOLL
BLOWS PER FOOT	NO	TYPE	PEN	REC.	DEPTH @ 807	( FOR	6-12	108E)	PER FT (MIN.)	CONSIST.	DEPTH ELEV	WASH WATER, SEAMS IN ROCK, ETC.
99												Boulders & Fill
47 69												
32		n	0.	0"	510	150	Rei	usal			5 '0"	Refusal
199			-		~ ~					1		Bottom Hole \$ '0"
			ļ	- · ·		H		<u>                                      </u>		1	Note	Casing Bent & slanted unable
				[ 								3' East.
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UUND	SURF	ACE	το (Γ.Ω	۲۴ د د د	T. CORED	USE( P: PI		CAS	ER UI	* UNDISTU	RED PI	STON
UHY		- UND	:STUR	BED	BALL CH	IEC K	T : TH	INWALL	. vi	ANE TEST	•	
OPJAT		USEO	ſ	AACE	- 0 - 10 P	6 TI	1.6.10	) · 20%.	30 M E +	20-35%,	ND = 35-	50% B-16

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SOILTE	STI	NG,	IN	С.	-	lst.	Taxi	ng Dis	strict			SHEET		<u> </u>
47 Pershing I	Drive-	Anson	ia, Co	חמם.	ULIENT	Norw	alk,	Conn.				HOLE	NO	
ONTRACTOR	******	<u></u>			PROJE	CT NO				<u> </u>		LINE		
		<u>,,, , , , , , , , , , , , , , , , , , </u>			PRÖJE	T NAM	AE					STATION		
T.B. M	•N•					Grup	e Dar	1						
SPECTOR					LOCATI	on New	Canas	un, Cor	m.			3' East	of #6	
	TER O	ASERV	ATION	s			(	ASING	SAMPLER	CORE	BAR.	Date Start	/3/630-th Fin "	1/3/63
At	AFTE	R _1	_ но	URS	SIZE	E I D		22	1 3/8	<u>بر</u> ۱	<u>*</u>	SURFACE ELEN	/	<b></b>
AT	AFTE	R	нс		HAMI	MER W	T	300	- <u>140</u>	Bi D	18.	GROUND WATER	ELEV4	
		SAMI	PL F			WER F	ALL	CORING		STRATA	T T	<u>i</u>		<u> </u>
BLOWS	1	T	1	DEPTH	01	SAMP	LER	TIME	OR	CHANGE		REMARKS INCL	COLOR, LOSS O	L F
FOOT NO	TYPE	PEN	REC	@ 801	(FOR	6-12	12-18	(MIN)	MOIST	ELEV		WASH WATER, S	EAMS IN ROCK,	ETG.
88		<u> </u>			H	ļ			4		Brown	1 C-F Sand,	Course Gra	vel
52		+			<b>  </b>	<u> </u>	ļ	<u> </u>	-				(/	
39	- n	19	าค	6161	75	6	16			5 10				
15			10		<del></del>		10	<u> </u>	Med	<u> </u>			<u></u>	
17		<b> </b>	<b> </b>		ļ				Compact	;				
38 97 R	- fuse	1 07	Ca	ing			<u> </u>		-	9 '0	Dril	led 2" Boul	.der	
		F	<u> </u>	<b>†</b>						10'0				
	-	1					C	7	Run #1		Bedro	ck with sof	t bands.	
		<b>.</b>					C	3	-					2
		ł	+	+ · · · · ·		····	C	5	-					
	-	-					C	15		15 <b>*</b> ô"	Rec.	34" fragmen	ted gray s	hist
		<b>_</b>						 	.		Hole	completed a	t 15'0".	
		<b>+</b> — ;			h		<u>-</u>						·	÷
						·····			1		Note:	lost wash	water at 1	0 •
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			I									<b></b>		-61
GROUND SURF	Αςε τ	0	FT	•	USED		CASI	NG 1	THEN	CASING	1 TO	FT.	HOLE NO.	V4
DIDRY W	#A5H1	E D	C : C	ORED	P = PJT	A	AUGE	R UP	+ UNDISTURI	1CD P13	TON	•		
υĒ	UND	5 I U R B	ונט 8	HALL CHE	UK.	1 7 1 1	HWALL	¥ 1 ¥	ANE TEST				_	
PROPORTIONS	USED	T R	ACE	: 0-10%	, L!TTΣ	.E ∓ ∔0 ·	20%,	SOME + 2	0-35%, AN	D = 35 - 5	۰%		E	-17

						CLIENT.	101.	Tax:	1116 Pr-			\}	1-11 C L	
				/#, Co	ол.   		Norv	alk,	Conn.				INE	
						PROJEC	NU							
		-				PROJEC	TNAM	ε		····		S	TATION	
T.d.	M.N	•				CATI	Grug	e Der	q				FFSET	
, 2. N						2004	New	Canas	un, Co					
• -			SERV	ATIONS				с	WI 0	SAMPLER	°Df	BAR.	Date Start	-68 Date Fin 1-4-63
GROUND	WA1	AFTER	32	HO	URS	TYPE SIZE	1 D.		22	1 3/	3"	s	URFACE EL	EV
				н0	urs	НАМВ	IER W	r	300	140	- BI 154	T G	ROUND WAT	ER ELEV
						HAMA	LER FI	ALL						
CASING		· · · · ·	SAMP		DERTH	- ULO - ON	SAMP.	LER	TIME	OR	CHANGE	F A	IELD IDENT Emarks ing	L COLOR, LOSS OF
PER	NO	TYPE	PEN	REC	@ 801	(FOR	6-12	12-18	(MIN.)	MOIST	ELEV	<b>w</b>	ASH WATER,	SEAMS IN ROCK, ETC.
10	1	1		1						-		Торво		
1	ļ							- <u>c</u>	13		2.0.			at with intermity.
			<b></b>					c	5	4		soft 1	avers.	CE MICH INCOLMICCE
	<del> </del>		<b>-</b>	· • · · · · · · · · ·				C	4	1	1	Rec. 35	" white	gray and brown
								C	9	4		shist.		
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GROUND	SURF	ACE	TO	F	т,	υ\$ε		CAS	ING	THEN	CASI	NG TO	FT.	HULE NU.
	w	WASH	20	C = (	CORED	P = Pi	т	A = AUG	ER U	P = UNDISTU	ROED P	STON		
D-DRY										MANE TERT				
) - DRY	U 8	UND	STUR	80ED	BALL C	HECK	<b>T</b> = T #	RINWALL		VANE (ES)				

0.011					<b>n</b>										1 .	- 1	
SOIL	TES	THN.	G,	IN	<b>i.</b>	CLIENT:		st (	<b>Fa</b> xing	Dist	ict		с э   н	OLE		8	_
47 Pershi	ng Dr	ive—/	Anson	ia, Co	nn.		No	orwa.	lk, Co	onn.							
ONTRACTOR					-	PROJEC	CT NG						LINE				
DREMAN -	DRILLE	R				PROJEC	T NAM	E					STATION				
JD						LOCATI		rupe	Dam				OFFSET			<u> </u>	
							Ne	w.Ca	inaan.	_Conn.							
GROUND	WAT	ER O	BSERV	ATION	5	TYPE		c	WI	SAMPLER SS	CORE	BAR. I	Date Star	1	<u>/4</u> _D.	te Fia	1/4/63
κή	FT	AFTER	?	на	URS	SIZE	FD.	_	$\frac{2}{300}/2$	-1-3/	8		SURFACE	ELEV	•		
AT	РT	AFTE	₹	но	URS	HAM3 HAM3	WER W WER FI	7 <u> </u>	24"	30"	Di	a_	GROUND	WATER	е XX	non	8
CASING	1		SAM	PLE		810	WS PE	R 6"	CORING	DENSITY	STRATA	1	FIELO ID	ENTIFI	CATION (	DF 301L	
BLOWS	NO	TYPE	PEN	REC	OEPTH @ BOT	ON (FOR	SAMP CE ON	LER TUBE)	PER FT	CONSIST.	DEPTH		REMARKS Wash wa	INCL. TER. SE	COLOR, L	055 OF Rock, E	TC.
F00T	╂───	<u> </u>		<u> </u>		0-6	6-12	12-18	(#18.7	MOIST	ELEV 1 th	Top	noil				
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GROUND	SURFA	.c.£ 1	0	F1		U\$E0			NG T	HEN	_ CASING	3 TO	FT.		HOLE	NO.	8
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	U 8	UND	STUR	860	BALL CHE	СК	T=TH	NWALL	¥ • ¥2	NE TEST							
PROPORT	345	USED	۲	RACE	- 0-10%	. LITT	E = 10	• 20 <b>%</b> ,	SOME = 2	D-35%, AI	ND = 35-5	0%				B-19	

OIL	TES	TIN	G,	INC			10	t (They	cina I	lietnic		SHEET_1_OF_1
Pershir	g Dr	ive—A	nsoni	a, Coi	nn.	CLIENT:	No	rwall	c. Col	m.		HOLE NO.
RACTOR						PROJEC	TNO					LINE
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GROUND	WAT	ER 08	SERV	TIONS		туре		٩	MING	SS	UT °	Date Start 1/4 Date Fin. 1/4/03
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	<u> </u>		SAMP			BLO	WS PE	R 6"	CORING	DENSITY	STRATA	FIELD IDENTIFICATION OF SOIL
BLOWS					DEPTH	ON	SAMP	LER	TIME PER FT.	OR CONSIST	CHANGE DEPTH	REMARKS INCL COLOR, LOSS OF
FOOT	NO	TYPE	PEN	REC	@ 801	0-6	6-12	12-18	(MIN.)	MOIST	ELEY	WASH WATER, SEAMS IN ROCK, ETC.
33								ļ		{ _	12"	Topsoil
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	ł	·								{		Brown overburden Lost Wesh water
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	1	<u>+</u>						C	5	]	10,04	
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IOUND	SURF	ACE	TO	F	Τ,	USE	)	CAS		THEN	CASIN	G TOFT. HOLE NO. OA
DRY	*	: WASP	ED	С т	CORED	P : P	T	A = AUG	ER U	P = UNDISTU	RBED PH	STON
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OPORT		USED		AACE	: 0 - '0	1%, LITT	LEIS	0-20%	SOME =	20 - 35%,	AND = 35-	50% B20

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SOIL	TES	TIN	G,	IN	С.	CLIENT	lst	Taz	cing D	istric	t	·	SHEET_ HOLE N	1_0F_1 109	
F7 Person	ag Di	176	inson:	18, Co	nn.		NOI	wall	<b>c,</b> con	<u>n.</u>			LINE	-7:	
ITRACTOR						PROJEC	NU								
EMAN -	DRILLI				[	PROJEC	TNAN	4 E		· · · · · · · · · · · · · · · · · · ·			STATION		
JD	ТJ						Gru	ipe I	Dam				OFFERT		
PECTOR						LOCATI	ON Mon			Conn			OFFSET		
<u> </u>			<u> </u>				TADN		ASING	SAMPLER	CORE	BAR.	D. G. 1/	5 D	1=1-2
GROUND	WAT	ER OF	BSERV	ATIONS	5	TYPE			<u>VII</u> 21/2		<u></u> i/s		Date Start 1/	Date Fin.	121.02
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Y	FT.	AFTER	·	но	OURS	НАМ	IER F	ALL	_24#	30	)"D	ia		· · · · · · · · · · · · · · · · · · ·	
CASING			5 A M F	ינוב	<b>_</b>	810	WS PE	(R 6"	CORING	DENSITY	STRATA CHANGE		FIELD IDENTIFIC	ATION OF SOI	L
BLOWS PER FOOT	NO	TYPE	PEN	REC	OEPTH @ BOT	(FOR	CE ON	TUBE)	PER FT (MIN.)	CONSIST	DEPTH	4	WASH WATER, SE	AMS IN ROCK,	ETC.
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75	[		I	[									_	÷	
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GROUND	SURF	ACE	10	F	т,	USEC		CAS	ING	THEN	CASIN	g to_	FT.	HOLE NO.	9
D-DRY	w	WASH	ED	<b>c</b> : (	CORED	P:PI	т	A = AŬG	ER UP	UNDISTU	ROED PI	STON			
	U 8	I UND	STUR	860	BALL CI	HECK	T = T+	GAWALL	. V≠v	ANE TEST					
PRUPORT	345	USED		RACE	: 0 - 10	%, ניזז		· 20%.	50 M E + 1	D-35%. A	ND = 35-	50%		B-2	21

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UIL.	ЪЭ	I III	υ,	1111		CLIENT:	_ls	t Ta	xing ]	<u>Distri</u>	ct		HOLE	A <u>9</u> 0	_
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ACTOR						PROJEC	TNO						LINE		
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AN -D	RILLE	R				PROJEC	TNAN	A E					STATION		
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AUUND	WAT	ER OB	SEAV	TIONS	5	ΤΥΡΕ		_	WI		_DT		Date Start	Date Fin	
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					ups	нама	48.R W	T	300-		0 💵		GROUND WATER	two none	
	FT					HAMP	IER F	ALL	24.11	30	<u>v</u> D	ia –			
ASING	1		SAMP	LE		BLO	WS PI	R 6"	CORING	DENSITY	STRATA		FIELO IDENTIFIC	CATION OF SOIL	
BLOWS	-	TYPE	PEN	REC	DEPTH	(FOR	CE ON	TUBE)	PERFT	CONSIST.	DEPTH		REMARKS INCL I WASH WATER, SE	COLOR, LOSS OF Ams in Rock, Ft	c
FOOT					@ BOT	0.6	6-12	12-18	(MIN.)	MOIST	ELEV				
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ROUNO	SURF	ACE	ro		Τ,	USEC		CAS	ING	THEN	" CASIN	G TO_	F T.	HOLE NO.	7.5
ORY	w :	WASH	εo	C = 6	CORED	P : P1	r	A = AUG	ER UP	. UNDISTU		TON			
	L A		STUR	860	BALL CH	HECK	T = T		. V+V	ANE TEST					
		2.10												B-22	2
ROPORT	- ) N S	USED	Ť	RACE	- 0 - 10 *	‰, ⊾∷ττ	LE = 10	0 - 20%,	SOME + 2	10-35%,	ND + 35-	0%		~ ~	

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SOIL 47 Pershi	TES	STIN	( <b>G</b> ,	IN ia, Co	[]. 	CLIENT:		lst Norw	Taxin alk,	g Dist Conn.	rict	HOLE	rOF NO10	
REMAN	DRILL J	ER				PROJEC		re Frupe	) Dam			STATION	······	
SPECTOR		<u></u>	<u></u>				ом 1	lew C	anaan	L <u>Conr</u>	CORE		3 1/4	763
UROUNC	WAT FT FT	AFTER	BSERV RR	ATIONS HO	5 10#5 . 108\$	TYPE SIZE HAMA	ID. JER W		24"		/8	UNE STATE		
CASING BLOWS PER FOOT	NO	TYPE	SAMI	REC	DEPTH @ 80T	BLO ON (FOR	WS PE SAMP LE ON	R 6" LER TUBE)	CORING TIME PER FT (MIN.)	DENSITY OR CONSIST MOIST	STRATA CHANGE DEPTH ELEV	FIELD IDENTIF REMARKS INCL WASH WATER, S	CATION OF SOLL COLOR, LOSS OF EAMS IN ROCK, ETC.	
	>		<b>*</b>								210"	Topsoil		
								C C C	4 7 6 8	Run #1		Bedrock with small Recovered 3	soft bands 82" white:	
		+						Ċ	12	<b> </b>	7*0"	grey & brow	n shist	·
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GROUNO D. DRY	SURF W:	WASH	ED.	с : с	ORED	USED P = P17		CASI	R UP	NEN	DED PIS	3 TO FT. ITON		
	υß	= UNO	ISTUR	860	BALL CHE	EC K	TITH	NWALL	V + V	ANE TEST		.∧₽∕	B-23	3

SOIL7 7 Pershin	<b>ES</b>	TIN	G,	<b>IN</b> 10, Co		CLIENT		lst ' Norw	Taxin alk,	g Dist: Conn.	rict	SHEETOF HOLE NO
RACTOR						PROJEC	TNO					LINE
MAN -D	RILLE	R				PROJEC	TNAM	E ·		<u> </u>		STATION
FCTOR	MN			. <u> </u>		LOCATI	ON	Grup	e Dam			OFFSET
20104								New	Canaa	n, Con	n	
GROUND	WATI	ER OF	SERV	ATIONS				Ŵ	ASING	SAMPLER	CORE DT	BAR Date Start 12/21 Date Fig.
	FT A	AFTER		но	U#S	SIZE		2	1/2	13	/8	SURFACE ELEY.
•		AFTER		но	URS	HAM)	4ER W 4ER \$1	7 <del>3</del>	2/11	140	. פוי היי ווי ווי ווי ווי ווי ווי ווי ווי ווי	GROUND WATER ELEX NONO
CASING			SAMP	ν <b>Ε</b>		BLO	WS PE	R 6"	CORING	DENSITY	STRATA	FIELD IDENTIFICATION OF SOL
BLOWS PER FOOT	NO	TYPE	PEN	REC	0EPTH @ BOT	0N (FOR	SAMPICE ON	LER TUBE)	PER FT. (MIN.)	CONSIST.	DEPTH	REMARKS INCL. COLOR, LOSS OF Wash Water, Seams in Rock, etc.
14												
19	,					lf						Boulders & Loose IIII
9_			2.04		6.6.		4	F				
380/	3#2	ת	2"	0	6181	100	0				6181	Refusal
				Re	fusa	1						Bottom Hole 6'8"
											Mate	Gentury hout alouted &
						ļ					loos	e: unable to core. Will
						H					atte	mpt auxilary hole 4' east.
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IOUND S	URFA	ÇE T	o	FT		USED			NG T	HEN		TO FT. HOLE NO. 11
DRY	₩ = 1	WASH	E O	C : C	ORED	P = P   1		AUGE	R UP	UNDISTUR	BED PIS	TON
JPORT :	UB:	UND: USED	STURE	RACE :	- 0 - 10 %	ск. 6. шэтт:	.E = 10	- 20%.	30WE + 2	0-35%, AI	ND + 35-5	o% <sup>B</sup> 2≬

TRACTOR EMANDF D PECTOR GROUND F F T F CASING BLOWS PER FOOT	AJ wat	R				PROJEC	T NO			****				
EMANDF D PECTOR GROUND fF TF CASING BLOWS PER FOOT	AJ	R										LINE		
GROUND GROUND TF CASING BLOWS PER FOOT	AJ wat				//	PROJEC	TNAN	AE	w			STATION	<u>, , , , , , , , , , , , , , , , , ,</u>	
GROUND T F CASING BLOWS PER FOOT	WAT :						Gr	upe	Dam					
GROUND TF CASING BLOWS PER FOOT	WAT :					LOCATI	0 N 			(]		L' east o	of #11	
GROUND T F T F CASING BLOWS PER FOOT	WAT: FT						Ne	<u>عنا۔ w</u> ر	ASING	SANPLER	CORE	BAR. D. 6. 30/	0 0.532	121/65
T F CASING BLOWS PER FOOT	FT	ER OB	SEAV	ATIONS		TYPE		N N	$\frac{11}{172}$	$\frac{55}{1.3}$	'a <u>DT</u>		CDate PAG	164196
CASING BLOWS PER FOOT		AFTER		<del>N</del> O	UNS	SIZE	ID AER W	т <u>З</u>	00	140	81	T GROUND WATER	FLEV	
CASING BLOWS PER FOOT	F T	AFTER		но	URS	НАН	IER F	ALL	24"		<b>Di</b>	8-		
PER FOOT			SAMP	PLE		BLO		R 6"	CORING	OENSITY CR	STRATA CHANGE	FIELD IDENTIFI	CATION OF SOL	L
	NO	TYPE	PEN	REC	DEPTH @ BOT	( FOR	CE ON	TUBE)	PER FT (MIN.)	CONSIST. MOIST	DEPTH ELEV	WASH WATER, SE	AMS IN ROCK, I	тс.
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<u>11</u> 53	<b>.</b>	<b>∤</b>	ļ	<b> </b>				+		1				
16			<b>.</b>			· • • • • • • • • • • • • • • • • • • •				]				
390/1	11"			1		1					4•11	" Refusal		
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GROUND S	SURF	4	ro	F1	т.	USED		CAS	tNG	THEN	CASIN	IG TO FT.	HOLE NO.	11A
DDRY	₩:	WASH	εο	c = c	ORED	P : PI	•	A = AUGE	ER UP	UNDISTU	-	STON		

501LT 7 Pershin	'ES' g Dri	TIN vo-a	G,	IN( a, Co		CLIENT:	ls No	t Te rwal	xing .k, Co	Distri nn.	<u>ct</u>		SHEET. <u>1</u> .0F <u>1</u> HOLE NO. <u>11B</u>
RACTOR					1	PROJEC	TNO						LINE
MAN						PROJEC	T NAH	ε					STATION .
U .	AJ	-					Gr	upe	Dam	<u>.</u>			AFFERT
ECTOR						LOCATI	ON .			~			""""""""""""""""""""""""""""""""""""""
							te	<u>14. G</u> C c	ASING	SAMPLER	CORE	BAR.	12/30 - 12/30
GROUND	WATE	R OB	SERV	ATIONS		TYPE		_ <u></u> ¥		SS	-D		Date Start <u>10/04</u> Date Fin. <u>10/01</u>
410"	т <b>и</b>	FTER	ارتــ. را	р_н∘ р_н∘	URS	SIZE	ID IER WT			- <b>1</b> -/-0-	811		GROUND WATER ELEV
4.0.	י זי	AFTER		но	URS	HAME	IER FA		24"		- Di	<u>a -</u>	
CASING			SAMP	PLE		BLO	WS PE	R 6"	CORING	DENSITY	STRATA CHANGE		FIELD IDENTIFICATION OF SOIL
BLOWS PER FOOT	NO	TYPE	PEN	REC	08РТН @ 80Т	(FOR	6-12	TUBE)	PER FT (MIN.)	CONSIST MOIST	DEPTH ELEV		WASH WATER, SEAMS IN ROCK, ETC.
19												Brn	CMF sand coarse gravel
26												and	boulders; soft
			<b>.</b>	l		╂────						pos	SIDLY IIL
	1	D	18	116	16161	10	13	12					
18													
34			. <b></b> .	<b>}</b>		₽		<b> </b>				j	
38		- · - ·		<b>.</b> .		}+		<u> </u>		<b> </b>	8.0.	Grev	ish cmt sand & gravel:
100	2	D	12	10	1110	77	100	Ref	usal			some	boulders
						<b> </b>		~			11,0	11	
					  .					Run #1		Bed	rock with soit bands
							· ·	č	21	1		Rec	overed 25" fragmented
				<b></b>				C	9			qua	rtzite gniess & shist
			–	<b> </b>			<u>}</u>	_C	12		16:0	11	<del> </del>
			<u>+</u>	<u>†</u>								Bot	tom Hole 16'0"
						II							
				<b> </b>		<b> </b>						Not	e: Low recovery due to
	•••	<u>+</u>	i	╂	+			<u> </u>					sort bands
	·	t :		1		L				]	•		
		I	l	L	ļ	H				$\left\{\begin{array}{c} \\ \end{array}\right\}$			
	-					+							
	• • •			1		<u></u>		<u> </u>					
				<b>+</b>						-			
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										4			
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					<u>}</u>	₩				-			
-					1					1.			·····
IOUND	SURF	ACE .	ro	F	Τ,	U \$ 80		". C A S	ING	THEN	_" CASIN	6 TO_	HOLE NO. 11B
DRY	w:	WASH	ED	C = (	CORED	P : P]	т	A = AUGE	ER UP	UNDISTUR	RED PI	STON	
	U 8	UND	15 T U R	9 E D	BALL CH	ECK	T = TH	INWALL	٧ • ١	ANE TEST			
OPORT	JNS	USED	Ţ	RACE	: 0-109	6, LITT	LE = 10	- 20%.	50 M E # 2	20-35%, A	ND = 35-	50%	B-26

SOILTESTING, INC. 47 Parking Diver-Amonia, Comi 27 Parking Diver-Amonia, Comi 27 Parking Diver-Amonia, Comi 27 Parking Diver-Amonia, Comi 27 Parking Diver-Amonia, Comi 27 Parking Diver-Amonia, Comi 27 Parking Diver-Amonia, Comi 27 Parking Diver-Amonia, Comi 27 Parking Diver-Amonia, Comi 27 Parking Diver-Amonia, Comi 27 Parking Diver-Amonia, Comi 27 Parking Diversion of the Common 27 Parking Diversion of the Common 27 Parking Diversion of the Common 28 Parking Diversion of the Common 28 Parking Diversion of the Common 28 Parking Diversion of the Common 28 Parking Diversion of the Common 28 Parking Diversion of the Common 28 Parking Diversion of the Common 28 Parking Diversion of the Common 28 Parking Diversion of the Common 28 Parking Diversion of the Common 29 Parking Diversion of the Common 29 Parking Diversion of the Common 29 Parking Diversion of the Common 29 Parking Diversion of the Common 29 Parking Diversion of the Common 29 Parking Diversion of the Common 29 Parking Diversion of the Common 29 Parking Diversion of the Common 29 Parking Diversion of the Common 29 Parking Diversion of the Common 29 Parking Diversion of the Common 20 Parking Di					۰.		•.								
Descrition         PROJECT NO         Unit           Descrition         PROJECT NO         PROJECT NO         PROJECT NO           Descrition         Descrition         PROJECT NAME         PROJECT NO           Descrition         Descrition         Descrition         PROJECT NO           Descrition         Descrition         Descrition         PROJECT NO           descrition         Descrition         Descrition         Descrition         Descrition           descrition         risk in the rest noise of	4	5011 7 Pers	[.] bin	ES	TIN	G,	<b>IN(</b> a, Co	nn.	CLIENT:		<u>st T</u> orwa	axing lk, Co	Distr:	ict	SHEET 1 OF 1 HOLE NO. 12
Sector         PROJECT NAME         Status         s< th=""> <thstatus< th="">         Sta</thstatus<></thstatus<>	DN	RACTO	R						PROJEC	TNO	•				LINE.
TB         IN         CF UPB Jam         OFFEE Jam           ABUND VALCE OSCUVIDOS         Idention         OFFEE JAM         OFFEE JAM         OFFEE JAM           ABUND VALCE OSCUVIDOS         THE ID         271/2         J/8         Dat Sim _ 12/19 bits Fm _ 12/19           AT         THE ID         271/2         J/8         Dat Sim _ 12/19 bits Fm _ 12/19           AT         THE ID         271/2         J/8         Dat Sim _ 12/19 bits Fm _ 12/19           Construction         State ID         271/2         J/8         Dat Sim _ 12/19 bits Fm _ 12/19           Construction         State ID         State ID         200         Dat Sim _ 12/19 bits Fm _ 12/19           Construction         State ID         State ID         State ID         State ID         Once ID           Construction         State ID         State ID         State ID         Once ID         State ID         Once ID           Construction         State ID         State ID         State ID         State ID         Once ID         State ID         Once ID           Construction         State ID         State ID         State ID         Once ID         State ID         Once ID           139         State ID         State ID         State ID         State	<b>D</b> R8	MAN	-D	RILLE	R				PROJEC		ε		<u></u>		STATION
ABUMO WATCH ODSCAVATIONS         The part of the second secon	] IŠ P	B		MN					LOCATI	ON NT	rupe	Dam	Conn		OFFSET
AT         TO         AT (16)         NOR         Size 10         TOO         TAX         T		GNOU	ND	WAT	ER QE	SERV	ATIONS		TYPE	<u>IV</u>	<u>ew (</u> c	WING 2 172	335°LER	°DT' /8	Date Start <u>12/19ate Fin. 12/19</u>
CASING     SAMPLE     DOWS THE IT     CONNECTION     DESCRIPTION     TRANSPORT       Noter the set of the same to	A1	·		FT . FT .	AFTER AFTER	·	но но	URS URS	SIZE HAMI HAMI	ID AER W AER FA	T	300	<u>140</u> 30	BIT Dia	GROUND WATER ELEV
Ref       No       try rear       rearce on three       r	-	CASIN	G			SAMP	LΈ		810	WS PE	R 6"	CORING	DENSITY	STRATA CHANGE	FIELD IDENTIFICATION OF SOLL
27     Boulders & loose fill       139     512"       27     Standard       51     D. 2" 0" 512" 100       Refusel     Bottom Hole 5'2"       Note: Unable to seat casing to cose fill & bould will attempt auxilary hole 4'       1     Standard       1 <t< th=""><th>;</th><th>BLOW PER FOOT</th><th>s</th><th>NO</th><th>TYPE</th><th>PEN</th><th>REC</th><th>0EPTH @ 80T</th><th>( FOR</th><th>6-12</th><th>TUBE)</th><th>PER FT. (MIN.)</th><th>CONSIST. MOIST</th><th>DEPTH ELEV.</th><th>WASH WATER, SEAMS IN ROCK, ETC.</th></t<>	;	BLOW PER FOOT	s	NO	TYPE	PEN	REC	0EPTH @ 80T	( FOR	6-12	TUBE)	PER FT. (MIN.)	CONSIST. MOIST	DEPTH ELEV.	WASH WATER, SEAMS IN ROCK, ETC.
133		2 1	7						∦						Boulders & loose fill
35       1       D       2" O"       5'2"       Refusal         Bottom Hole 5'2"       Note: Unable to seat casing to core due to loose fill & bouldwill & boul		13	9		+ ···  ·										
Bottom Hole 5'2" Bottom Hole 5'2" Note: Unable to seat casing to coré due to loose fill & bould Will attempt auxilary hole 4' HOLE NO.12 O DAY #: WASHED CICORED P.PT A-AUGER UP: UNDISTURED PISTON UG. UNDISTUREED BALL CHECK T.THMWALL V.YARE TEST	; -	5	5	7	n	211	0.11	512	# 100					512"	Refusal
Note: Unable to seat casing to core due to loose fill & bould Will attempt auxilary hole 4' Will attempt auxilary hole 4' Note: Unable to seat casing to core due to loose fill & bould Will attempt auxilary hole 4' Note: Unable to seat casing to core due to loose fill & bould Will attempt auxilary hole 4' Note: Unable to seat casing to core due to loose fill & bould Will attempt auxilary hole 4' Note: Unable to seat casing to core due to loose fill & bould Will attempt auxilary hole 4' Note: Unable to seat casing to core due to loose fill & bould Will attempt auxilary hole 4' Note: Unable to seat casing to core due to loose fill & bould Will attempt auxilary hole 4' Note: Unable to seat casing to core due to loose fill & bould Will attempt auxilary hole 4' Note: Unable to seat casing to core due to loose fill & bould Will attempt auxilary hole 4' Note: Unable to seat casing to core due to loose fill & bould Will attempt auxilary hole 4' Note: Unable to seat casing to vill attempt auxilary hole 4' Note: Unable to seat casing to vill attempt auxilary hole 4' Note: Unable to seat casing to vill attempt auxilary hole 4' Note: Unable to seat casing to vill attempt auxilary hole 4' Note: Unable to seat casing to vill attempt auxilary hole 4' Note: Unable to seat casing to vill attempt auxilary hole 4' Note: Unable to seat casing to vill attempt auxilary hole 4' Note: Unable to seat casing to vill attempt auxilary hole 4' Note: Unable to seat casing to vill attempt auxilary hole 4' Note: Unable to seat casing to vill attempt auxilary hole 4' Note: Unable to seat casing to vill attempt auxilary hole 4' Note: Unable to seat casing to vill attempt auxilary hole 4' Note: Unable to seat casing to vill attempt auxilary hole 4' Note: Unable to seat casing to vill attempt auxilary hole 4' Note: Unable to seat casing to vill attempt auxilary hole 4' Note: Unable to seat casing to vill attempt auxilary hole 4' Note: Unable to seat casing to vill attempt auxilary hole 4' Note: Unable to vill a				<u> </u>	<u> </u>	Ref	usa	1							Bottom Hole 5'2"
GRUND SUBFACE TOTT, USEDCASING THENCASING TOTT HOLE NO.12 GRUND SUBFACE TOTT, USEDCASING THENCASING TOTT HOLE NO.12 O BY W: WASHED CIEDRED PIPAT ALAUGER UP: UNDISTUREED PISTON UB. UNDISTURBED BALL CHECK TITHINWALL V: VARE TEST									₩				4	Note	: Unable to seat casing to
ORDUND SURFACE TOTT, USEDCASING TNENCASING TOFT HOLE NO.12	) -								1					core	due to loose fill & boulder
GRUND SURFACE TOFT, USEDCASING THENCASING TOFT HOLE NO.12 0. DRV W: WASHED CLEORED PLANT ALAUGER UP- UNDISTURBED PISTON U.6. UNDISTURBED BALL CHECK T: THINWALL V: VANE TEST															
GRUUND SURFACE TOFT, USEDCASING THENCASING TOFT HOLE NO.12 O DRY WIWASKED C: CORED PIPIT ALAUGER UP: UNDISTURBED PISTON UB: UNDISTURBED BALL CHECK TITHINNALL V: VANE TEST		· · · • · · · · · · · · ·					-								
CRUND SUPFACE TOTT, USEDCASING TOFT HOLE NO.12 CRUND SUPFACE TOTT, USEDCASING TOFT HOLE NO.12 0. DRY W: WASHED C: CORED P:PIT A: AUGER UP: UNDISTURBED PISTON UB: UNDISTURBED BALL CHECK T: THINWALL V: VANE TEST	i -		 -												
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GROUND SURFACE TOFT, USEDCASING TNENCASING TOFT HOLE NO.12 O.DRY W: WASHED C:CORED P:PIT A:AUGER UP:UNDISTURBED PISTON UB:UNDISTURBED BALL CHECK T:THINWALL V:VANE TEST	1 -								#				-		
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GROUND SURFACE TOFT, USEDCASING TMENCASING TOFT HOLE NO.12 O.DRV W: WASHED C: CORED P:PIT A: AUGER UP: UNDISTURBED PISTON UB. UNDISTURBED BALL CHECK T: THINWALL V: VANE TEST			• • •			÷			<u></u>						
GROUND SURFACE TOFT, USEDCASING THENCASING TOFT HOLE NO.12 O.DRY W: WASHED C: CORED P:PIT A: AUGER UP: UNDISTURBED PISTON UB: UNDISTURBED BALL CHECK T: THINWALL V: VANE TEST BE OF	-														
GROUND SURFACE TOFT, USEDCASING THENCASING TOFT HOLE NO.12 O.DRY W: WASHED C: CORED P:PIT A: AUGER UP: UNDISTURBED PISTON UB. UNDISTURBED BALL CHECK T: THINWALL V: VANE TEST								+							
GROUND SURFACE TOFT, USEDCASING THENCASING TOFT HOLE NO.12 O DRV W: WASHED C: CORED P:PIT A: AUGER UP: UNDISTURGED PISTON UB: UNDISTURBED BALL CHECK T: THINWALL V: VANE TEST BE OF				<b>↓</b>				<u>↓</u>	<u>++</u>	• 					
GROUND SURFACE TOFT, USEDCASING THENCASING TOFT HOLE NO.12 O. DRY W: WASHED C: CORED P:PIT A: AUGER UP: UNDISTURBED PISTON UB. UNDISTURBED BALL CHECK T: THINWALL V: VANE TEST BE OF	-				,										í.
GROUND SURFACE TOFT, USEDCASING THENCASING TOFT HOLE NO.12 D. DRY W: WASHED C: CORED P:PIT A: AUGER UP: UNDISTURBED PISTON UB: UNDISTURBED BALL CHECK T: THINWALL V: VANE TEST BELOT				ļ	 	- · ·					<u>+</u>		-		
GROUND SURFACE TOFT, USEDCASING THENCASING TOFT HOLE NO.12 D. DRY W: WASHED C: CORED P:PIT A: AUGER UP: UNDISTURBED PISTON UB. UNDISTURBED BALL CHECK T: THINWALL V: VANE TEST BELOT															
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GROUND SURFACE TOFT, USEDCASING THENCASING TOFT HOLE NO.12 D. DRY W: WASHED C: CORED P:PIT A: AUGER UP: UNDISTURBED PISTON UB. UNDISTURBED BALL CHECK T: THINWALL V: VANE TEST BE OF				· · ·											
GROUND SURFACE TOFT, USEDCASING THENCASING TOFTFTCASING TOFTFTCASING TOFTCASING TOFT		<u> </u>		† 		··· ··	1		1		1	1	]		HOLE NO. 20
UB-UNDISTURBED BALL CHECK TETHINWALL VIVANE TEST		GROUN	0	SURF	ACE	to	F	Τ,	USED	•	CAS	1NG	THEN	CASING	
B= a=		DDRY		₩: UB	WASH UND	IED ISTUR	0 = C 0 3 0	BALL CH	P = Pi 180 K	⊺ 17±17⊨	A I AUGI	. V+\	ANE TEST		
PROPORTIONS USED TRACE: 0-10%, LITTLE: 10-20%, SOME: 20-35%, AND: 35-50%, D 27		PRUPO	P 7	245	JSED	т	RACE	: 0 - 10*	%, ⊾:⊺⊺		<b>) -</b> 20 <b>%</b> ,	SOWE + 2	20-35%, A	NO = 35-5	B27

x

SOILTESTING, INC.	CLIENT: 1st Ta	xing District	SHEETOF HOLE NO12A
7 Pershing Drive-Ansonia, Conn.	Norwal.	k, Eonn.	LINE
THACTOR			
EMAN -DRILLER TPB 16N	Grune	Dem	
PECTOR	LOCATION		4' east of #12
	New-Ca	DAAD, COND.	R. Due Sue 12/10 Due Sie 12/20
T -5 FT AFTER 18 HOURS	TYPE W.	$\frac{1}{1/2}$ $\frac{35}{13/8}$	SURFACE ELEV.
T -4 FT AFTER 136 HOURS	HAMMER WT	00 <u>140</u> NIT.	GROUND WATER ELEV4
CASING SAMPLE	BLOWS PER 6"	CORING DENSITY STRATA	FIELD IDENTIFICATION OF SOLL
BLOWS NO TYPE PEN REC DEPTH	ON SAMPLER (FORCE ON TUBE)	TIME OR CHANGE PER FT CONSIST DEPTH	REMARKS INCL. COLOR, LOSS OF Wash water, Seams in Rock, etc.
F00T	0-6 6-12 12-18	(MIN.) MOIST ELEV	Mongoji
20			rn. CMF sand coarse gravel
110	.₩+	3' &	boulders (possibly fill)
52 1 D 18"18"5'6"	29 50 33		ittle silt(possibly fill)
47			
25			
38			
60 2 D 12" 9" 11"	0"49   90 Refu	$\frac{10'0"}{11'0"}$	Same as above
	C	19 Run #1	Rec. 6"
		$\frac{5}{30}$   $\frac{13'0''}{800}$	Bedrock with soft bands
	C C	26	Recovered 36" green granite
		40	
	Č	59 18'0"	
			Note: Left 1'11" of core
			down in hole; unable to crac
			it off. Started to loose
	· #		
	+		
	╂		
	<u>}</u>		
ROUND SURFACE TOFT,	USED CASIN	G THEN CASING	TO HOLE NO. 12A
DRY WEWASHED CECORED	P=PIT A=AUGER	UP + UNDISTURBED PISTO	DN .
UBSUNDISTURGED BALL CH	HECK T=THINWALL ‰, LITTLE=10-20%. \$	V + VANE TEST	% B-28

47	Pershin RACTOR	g Dr	iveA	nsoni	a, Co	nn.	PROJEC	NOI T NO	walk	, Con	n.		
							000150	TPAU	F			<u> </u>	STATION
е	MANDI	RILLE 34	R				PROVEC	(1.m)		lem			
<b>P</b>	ECTOR	191	<u>r</u>				LOCATI	ON	00.1	<u>/////////////////////////////////////</u>			OFFSET
							•	New	-Car	aan	Conn_		
									Ç	ASING	SAMPLER	CORE	BAR. Data Start 1/1 Data Fin 1/1/63
_	L16	H I		18			TYPE		1	$\frac{1}{1/2}$	1 3/	/ <del>d</del> 1	
ŗ			AFTEN		HU		HAMA	ID. IER W	, <u> </u>	200		ð	
7	· ا	**	AFTER		но	URS		ER F	ALL	.2/11_		H	- SHOOND WATCH ELEV.
Ī	CASING			SAMP	LE		BLO	WS PE	R 6"	CORING	DENSITY	STRATA	FIELD IDENTIFICATION OF SOIL
l	BLOWS					DEPTH		SAMP	LER T118F)	PERFT	CONSIST.	OEPTH	REMARKS INCL. COLOR, LOSS OF
	FOOT	NO	TYPE	PEN	REÇ	@ 80T.	0-6	6-12	12-18	(MIN.)	MOIST	ELEV	WASH WATER, SEAMS IN ROCK, ETC.
t	39		[										Brn coarse to med fine sand
ľ	40										1		coarse gravel ( possibly
ſ	20						ll			ļ			fill)
ſ	16												
ļ	- 19	1_	↓ <b>D</b>	18	<u>*12</u>	16161	121	19	20		ł	510#	
$\mathbf{I}$	44						∦				1		
$\mathbf{F}$	106									<u>+</u>	1		
ł					aan ah		H				1		
ł	350		<b> </b>				H		<u> </u>		1	1010	* Same as showe
ł		2	n	0#	01	1010	#100		C	5	<b> </b>		
ł			†. <b></b> .			- <b></b>			C	13	]		Suspected bedrock
ł									C	14			
t									C	19			Recovered 36" grey-wht gran
I									C	23		15'0"	
ł		<del></del>					H	-					
			ļ			· · · · · · · · · · · · · · · · · · ·			<u> </u>				Bottom Hole 15'0"
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G	HOUND S	URFA	CE T		FT	,	0.960		UASI				
٥	: DRY	₩ =	WASH	0	C + C	ORED	P = PIT		LI AUGE	K UP	+ UNDISTUR	1660 PIS	IUN -



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	SOILT	'ES	TIN	G,	INC		CLIENT:	<u>ls</u>	st Te	ixing	Distri	ct	SHEET_1_OF_1_ HOLE NO. 14
ON	TRACTOR						PROJEC	TNO					LINE
OR	TB ECTOR	JD	R				PROJEC	T NAM GI ON		Dam	Conn		STATION
A	8880ND	WATI FT	ER OB AFTER AFTER	SERV	ATIONS	urs urs	TYPE SIZE HAMM	I D.	C T	WI° 2 1/2 300	SAMPLER SS 13/8 140	DT	BAR Date Start 1/3 Date Fin. 1/3/63 SURFACE ELEV. GROUND WATER TEV. <u>DODO</u>
-	CASING			SAM	ν. ε Γ	l	BLOWS PER 6"			CORING TIME	DENSITY	STRATA CHANGE	FIELD IDENTIFICATION OF SOIL REMARKS INCL COLOR, LOSS OF
5	PER FOOT	NO	TYPE	PEN	REC	OEPTH @ BOT	(FORC	6-12	TUBE)	PER FT (MIN.)	MOIST	ELEV	WASH WATER, SEAMS IN ROCK, ETC.
	26 140 210 390		Ref	usa	1							4'0"	Casing bent at 4'0"
- د					<u> </u>				<u> </u>				
				- <b></b>	-				<u> </u>				Bottom Hole 4.0.
<b>)</b> -			<u> </u>						ļ				
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-	GROUND	SURF	L	то	F	1 T,	USED		C A S	ING	THEN	" CASIN	G TOFT. HOLE NO4
	D:DRY	₩ # U B	WASH S UND	ED	C : ( BED	DALL CH	P : PI ECK	τ τ:τ⊦	A = AUGI	ER U/	SUNDISTUR	BEO PII	BTON
	PROPORT	DNS	υςεόρ	г	RACE	: 0-10%	5. L:FT	LE : 10	- 20%	SONE	20-35%, A	ND + 35-5	B-30

SOIL' 7 Pershi	TES ng Dr	STIN rive/	C,	IN ia, Co	nn.	CLIENT		lst Norw	Taxin alk, (	g Dist: Conn.	rict		SHEET	0F_1 14A	
TRACTOR						PROJEC	TNO	-				LINE			
	AILL	C R				PROJEC	T NAM	AE			···· · • • • • • • •	STATIO	4		
۲D	AJ	F					(	Grup	e Dam						
PECTOR						LOCATI	ON 1	Tow (			-	OFFSET	5' north	of #	14
								<u>, wow</u>	ASING	SAMPLER	CORE	BAR.	3/1		1/1/60
0 #0 wb	WAT	ER OI	BSERV	ATIONS		TYPE		-		SS	DT_	Date St	ant <u>1/4</u> D	ate Fin	1/4/03
·= Z ·	FT	^*''I	8	HU	URS	SIZE	1 D 4 E R W	т	300		. BI	SURFAC	E ELEV	-91	
T	FT	AFTEF	×	но	URS	нан	IER F	<u>Αιι _</u>	-24"-	301		GROOME	WATER ELEV.		
CASING		· · ·	SAM	LE		BLO	WS PE	R 6"	CORING	DENSITY	STRATA	FIELO	DENTIFICATION	OF SOIL	
PER	NO	TYPE	PEN	REC	DEPTH Ф вот	(FOR	CE ON	TUBE)	PERFT	CONSIST	DEPTH	REMARK Wash w	S INCL. COLOR, ATER, SEAMS IN	LOSS OF Rock. E1	rc.
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	2	D	0"	0'		100	/0"	C	3	Run #	2	Lost mos	t of wash	wate	r wher
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		+				+		C	- <u>-</u>			Recovered	30" grey	shis	st &
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CPORT	)NS .	JSED	Ŧ 6	ACE -	0-10%	. LITT.	£ = 10-	20%	SOME = 20	0-35%, AP	ND = 35-5	°∕a		B-31	
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S 47	OIL'	FES ng Dri	TI: ive—	<b>\G</b> , Anson	IN ia, Co	C.	CLIET	NT:	lst Nor	Taz wali	cing c, C	g Distr Conn.		SHEE HOLE	NO	DF 15		
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ć	HOUND	WAT	ER Q	BSERV	ATION	s	TY	PE		ŴI		SS	DT_	ם    ב	ate Start 12	/ <u>28</u> _D	te Fin. <u>12/</u>	28/6
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CASING	·	-1	5 A M	PLE	·	- BL 0	OWS P N SAM.	'ER 6" PL <b>ER</b>	CORING	DENSITY	STRATA CHANGE	FIELD IDENTIFICATION OF SOIL
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ROUND	SURIA	CE TO	D	F 1		USED			NG T	HEN	CASING	TO FT HOLE NO. 15A
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	ы <b>В</b> -	UND-S	i tur ə	FD 8	ALL CHE	C K	Ť÷ĬĦ	WALL	V + V.	ANE TEST		
el Plan	S85		14	ACE	ა- აო		5 = 10	- 20%.	SOME + 2	0-35%, AN	0:35-50	B <sup>−</sup> 33

PROPORT	NS U	SEC	<b>.</b> R	ACE -	0 · 0%	17:	.e = 10-	- 20%	50WE + 2	0-35%, AI	ID = 35-50	>%		B-	34
	<b>U B</b> :	UND':	\$TUR0	F.D.A	ALL CHE	ECK	TITH	INWALL	V = V	ANE TEST					
GROUND S	บสร∆เ พระบ	UL TI	°D	FT C = C	ORED	USED P : PIT	. ,	CASII	NG T R UP	* UNDISTUR	CASING BEDPIST	то тон	FT.	L	-
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PER FOOT	NO	TYPE	PEN	REC	DEPTH @ BOT	( FOR	CE ON	TUBE)	PER FT	CONSIST	DEPTH		NEMARKS INCL. Wash water, s	COLDR, LOSS EAMS IN ROCK	OF Etc.
CASING		T	5.8.MF	Ρί Ε Τ	γ	BLO	WS P	ER 6" PLER	CORING	DENSITY	STRATA		FIELD IDENTIF	CATION OF SC	) ( L
AT	FŤ	AF TEF	÷	нс	DURS	нан Нам	MER W MER F	ALL	<u>-300-</u> -	00			GROUND WATER	<u> </u>	one
AT	FT	AFTER		но	1U# 5	SIZE		_2_1/2		: 1_3/	8 8		SURFACE ELEV	·	
GROUND	WAT	ER 01	BSERV	ATION	5		- -	<u>с</u>	ASING	SAMPLER	CORE D	BAR	Date Start _ 12	2/29 Date Fin	12/24
SPECTOR		_				LOCAT	אסי א	Iew C	aneen	Conn			OFFSET 10	east of	f #15
JD	AJ	- M					0	rupe	Dam						
						PROJE	CT NA	ME					STATION		······
ONTRACTOR						PROJE	CT NO	NOT.MA	<u>, (</u>	<u>ющі.</u>			LINE		
47 Pershi	ng Dr	ive	1U9 Anson	ia. Co	onn.	CLIENT	:]	Lst T	axing	<u>Distr</u>		HOLE	NO. 15B		
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SOIL'	res	STIN	VG,	IN	С.	CLIENT	r:	lst 1	laxing	Distr		SHEET 1 OF 1	
7 Pershi	ng Di	ive—,	Anson	aia, Co	nn.		]	Norwa	lk, Ö	onn.			
TRACTOR						PROJE	CT NO					-	LINE
รับสามี 11						PROJE		ME					STATION
JD		ея J				Grupe Dam							
ECTOR						LOCATION							OFFSET
			······			New Canaan, Conn,							24' East of #15
GROUND	WAT	ER O	BSERV	ATIONS	5		F	c	Nº 1	SAMPLER	$\mathbf{D}^{\mathbf{T}}$	BAR	Date Start 12/29 Date Fin1/3/63
4 · · · · · · · · · · · · · · · · ·	FT	AFTER		но	UHS	\$121	E + D		2 1/2	13	/8		SURFACE ELEV
			5	нO	290	HAN	MER V	. т	300	140	81	т	GROUND WATER EXX NONO
							MER F	ALL	24"	30	<u>"D</u>	ia.	1
CASING	<b> </b>	<b>T</b> · · ·	SAM	PLE		8L)	OWS P 1 SAMP	ER 6 PLER	CORING	DENSITY	STRATA CHANGE		FIELD IDENTIFICATION OF SOIL
PER	NO	TYPE	PEN	REC	ОЕРТН @ вот	( FOF	CE ON	TUBE)	PERFT (MIN.)	CONSIST.	DEPTH		WASH WATER, SEAMS IN ROCK, ETC.
30		-		+		0-6	6-12	12-16	l	MUISI	811	Asp	halt & stone base
12			f			*	f	1					
110	1		1	1						]		Gre	y C-F sand & gravel; tra
228	<b>I</b>		ľ			1						sil	t
265	ļ	<b>_</b>	<b> </b>		<u> </u>	<b>  </b>	<u> </u>		ļ		51	ļ	
478_	1	D	6"	5"	516	<u># 17</u>	5		4	Dun I		Der	ananal fill (and the
362_	ļ	·	<u> </u>	+		╫───	+	+-C		Run #	L.	Rec.	overed o" (see wash
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000	<u>├</u>	1	t	†		<u> </u>	+		5	Run #	2		
	1 · ·	f · ·	t	† • · · ·		1	<b>†</b>	Ŭ	5		~	Rec	overed 39" grev granite
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ROUND S	URFA	.CE 1	o	FT		USED		CASI	NG T	HEN	_ CASING	TO	FT. HOLE NO. 150
DRY	w : 1	WASHE	0	<b>c</b> : c	DRED	• • • • • •	т ,	A : AUGEI		UNDISTURI		TON	•
		UND	 Sture	960 A	ALL CH	ECN	т:тн	NWALL	V + V	NE TEST			
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(CPORT )	2. <b>4 5</b> (	USED	₹ 2	RACER	0 · 0 %	, ር፡ንግ	LE 1 10	- 00%.	50 NE + 20	)-35%, AN	D = 35-5	°%	B-35

4	SOILT 7 Pershin	'ES g Dri	TIN v•-A	G,	IN( ia, Co	1 1• nn.	CLIENT:	ls No	t Ta rwal	xing_ k, Co	Distri nn.	et	1 1 SHEETOF HOLE NO16
DRE	MAN -D	RILLE					PROJEC	TNAM	E		<u></u>		STATION
ISP	JD ECTOR		AJ				LOCATI	Gr on	upe.	Dam			OFFSET
: "=="	GROUND	WATE FT A	ER OB		ATIONS	URS	TYPE 512E HAMM	I O IER W	w_Ca 	$\begin{array}{c} \begin{array}{c} \begin{array}{c} \text{CASING} \\ \text{CASING} \end{array} & \text{SAMPLER} \\ \hline \\ \text{CASING} \end{array} & \text{CORE BAR} \\ \hline \\ \begin{array}{c} \text{-} \frac{1}{12} \\ \text{-} \frac{1}{2} \\ \hline \\ \hline \\ \begin{array}{c} \text{-} \frac{1}{2} \\ \hline \\ \hline \\ \hline \\ \end{array} & \begin{array}{c} \text{-} \frac{1}{2} \\ \hline \\ \hline \\ \end{array} & \begin{array}{c} \text{Bit} \end{array} \end{array}$			BAR Date Start 12/27 Date Fin. 12/27 SURFACE ELEV
						<u>_</u>		MER FJ	ALL	244	DENSITY	STRATA	<u>ta l</u>
	CASING BLOWS		F=		1	DEPTH	ON	SAMP	LER	TIME	OR	CHANGE	FIELD IDENTIFICATION OF SOIL Remarks incl color, loss of
:	PER FOOT	NO	TYPE	PEN	REC	@ 80T	1 FOR	6-12	TUBE)	(MIN.)	MOIST	ELEV	WASH WATER, SEAMS IN ROCK, ETC.
	24 80 390	R	efus	al	,				C	1	Rur L	<u>31</u>	Topsoil 6" Brn C-F sand: some gravel
	580			• ·					<b>Q</b>		1	51	trace of silt
	65	1	D	18'	16	616"	23	28	29		{		
	410	Re	fus	al					ļ		Run = 2	78	
	144			Í	f	<b>.</b>						91	
) -	80 185	2	D	61	7'	11'6	149	5					
	100	~										16	
5 -	005		<u> </u>	Re	or of us	15'0 al	-100	·	c	4	Run 🚁	3	۰ 
	· ···								C	4			Recovered 36" fragmented grey granite
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													Bottom Hole 20'0"
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,	RUUND	SURFA	CE T	0.	FI		USED	· ·	<u> </u>	ING 1	HEN	CASIN	
, ,	0-08¥ ₽8,0087	₩.: UB .5NS	WAS	10 5108 1	C = C BED RACE	ЮНЕD ВАЦС СНЕ 1 0-10%	Р:РП Ск 17.	т : тн . Е : : Ю	- 20%.	24 UF VIV SOME 7 2	ANE TEST	WE 33-1	B- 36
# DRAFT FIELD OBSERVATION REPORT

Date <u>Mon. 03-27-06</u> Report No. \_\_\_\_\_ Page <u>1</u> of <u>1</u> Project No. <u>04446-\*-1000</u>

 PROJECT
 Grupe's Dam - Borrow Source Evaluation

 CLIENT
 1<sup>st</sup> Water District

 CONTRACTOR
 Castelli Construction

#### 

WEATHER <u>±35°F mostly cloudy</u>

DEPARTURE 6:30 p.m.

#### PERSONS CONTACTED/COMPANY

Mike Elliot (1<sup>st</sup> Water District) – client Anthony Scaife (Hardiman Company and Associates) – drilling contractor

### **GEI REPRESENTATIVE(S)**

Gary Fuerstenberg – Field Engineer

### **OBJECTIVE**

Advance test borings along proposed overflow channel (east of the reservoir).

#### Field Activities

I staked, sampled, and logged 4 test borings in the field. The test boring locations are shown on Figure 1. The test borings will be surveyed upon the completion of all explorations.

Test borings were advanced east of the reservoir and dam in a ±10 acre area between Valley Road and Grupe's Reservoir / Silvermine River. The test borings were performed by Hardiman Company and Associates using a mobile B-50 truck-mounted hydraulic drill. Test borings B1 and B2 were located near the end of the overflow channel and test borings B3 and B4 were located near the start of the overflow channel. B3 was located between TP1A and TP10A and east of the water pipe. B4 was located between TP2A and TP9 and west of the water pipe. B4 could not be located east of the water pipe due to the wooded and sloping terrain immediately east of the pipe.

Standard penetration tests and rock coring were performed to obtain soil and rock samples. Rock was cored in test boring B2 between depths of 11 and 16 feet. Forty inches of granite (55% RQD based on 40 inches of recovery) was recovered and 20 inches could not be recovered. A tri-cone roller bit verified that the rock remained in the bottom of the borehole. Rock was not cored in test boring B1 because the rock core barrel could not fit inside the hollow stem augers.

A well was installed in test boring B2. The 2-inch diameter PVC well is screened from 4 to

# DRAFT FIELD OBSERVATION REPORT

Date <u>Mon. 03-27-06</u> Report No. \_\_\_\_\_ Page <u>2</u> of <u>1</u> Project No. <u>04446-\*-1000</u>

PROJECT	Grupe's Dam - Borrow Source Evaluation
CLIENT	1 <sup>st</sup> Water District
CONTRACTOR	Castelli Construction

14 feet below ground surface and protected with a square steel stick-up tube.

The test borings were extended to auger refusal which ranged from 6 to 23 feet. The subsurface conditions typically include fill overlying glacial till, which overlies weathered and competent bedrock. The glacial till includes few to numerous cobbles. Upon completion, the test borings were backfilled with the auger cuttings. The test boring logs and well construction report are attached.

I closed and locked the gate prior to leaving the site.

By Gary J. Fuerstenberg

Date March 28, 2006



Fig. 2



#### Boring (B1)

Client:	Norwalk First District Water Department	Project Name:	Grupes Reservoir-Dam
Project Number:	044460	Site Location:	Proposed Overflow Channel
Logged By:	Gary Fuerstenberg	Boring Location:	Southern channel limits along access road (near Silvermine River)
Date Start:	March 27, 2006	Drilling Contractor:	Hardiman Company and Associates
Date End:	March 27, 2006	Driller Foreman:	Antony Scaife
Total Depth:	23 feet	Drill:	Mobile B50, truck-mounted drill
Elevation (ground):			

Bedrock

\_ioralion (ground).

Graphic Log Notes:

Weathered Bedrock

#### Drilling and Backfill Notes:

3-1/4 inch hollow stem augers

SPT advanced using 140 lb hammer with 30" drop

Cathead driven safety hammer used to advance split-barrel sampler

Water encountered at 14 feet

Numberous cobbles encountered 2 to 10 feet

Few cobbles encountered 10 to 20 feet

Rock core barrel did not fit inside hollow stem augers due to crooked augers

Glacial Till

Borehole collapsed to 10.0 feet

Backfilled with auger cuttings

Depth (feet)	Sample Type and Number	Depth (feet)	SPT Blows / 6 inches	Penetration (inches)	Recovery (inches)	Coring Time (minutes)	Strata Graphic Log	Soil/Geologic Description
1 2	S1	0.0-2.0	3 6 5	24	10			Silty Sand (SM) fine to coarse subangular to subrounded sand, ~20% non-plastic silty fines, <5% fine to coarse subangular to angular gravel, black, dry to moist, include root fibers and asphalt fragments (FILL)
3 4	S2	2.0-4.0	9 12 14 14	24	8		4	Silty Sand (SM) fine to medium subangular to subrounded sand, ~45% non-plastic silty fines, <5% fine to coarse subangular to angular gravel, brown, moist (POSSIBLE FILL)
5								
6	S3	5.0-5.3	50/3"	3	1			gravel fragments
7								
, 8	S4	7.5-8.2	30 50/2'	8	6			Widely Graded Sand with Gravel (SW) fine to coarse angular to subrounded sand, ~30% fine to coarse angular to subrounded gravel <5% non-plastic silty fines, brown, dry to moist (GLACIAL TILL)
0			00/2					
9 10								
11	S5	10.0-12.0	17	24	15			Widely Graded Sand with Gravel (SW) fine to coarse angular to subrounded sand, ~20% fine to coarse angular
40			26 26					io suorounada gravei, <o (glacial="" brown,="" dry="" hel)<="" intes,="" motel="" non-piastic="" o="" sity="" td="" to=""></o>
12			23					
13								
14								
15	S6	15.0-17.0	15	24	16			Top 8": Widely Graded Sand with Silt (SW-SM) fine to coarse sbangular to subrounded sand, ~10% non-plastic
16			20 31					silty fines, <5% fine subangular to subrounded gravel, brown, wet (GLACIAL TILL) Bottom 8": Silty Sand (SM) fine to coarse subangular to subrounded sand, ~25% non-plastic silty fines, <5% fine
17			49					to coarse subangular to angular gravel, brown, wet (GLACIAL TILL)
18								
19								
20	-57	20 0-21 2	1.7	11	-1.7			Ton 10" Widely Graded Sand with Sill (SW-SM) tine to charge shandillar to subrounded cand 11% pop plastic
21	0,	20.0-21.2	45 50/2"	14	12		21	sity fines, <5% fine subangular to subconded gravel, gray-brown, wet (GLACIAL TILL)
22			00/L					
23							- 28	I ed et i velassiae Rupes set i si si si i i i i i i i i i i i i i i
24								End of Exploration Auger refusal encountered at 23
25								



#### Boring (B2)

Client:	Norwalk First District Water Department	Project Name:	Grupes Reservoir-Dam
Project Number:	044460	Site Location:	Proposed Overflow Channel
Logged By:	Gary Fuerstenberg	Boring Location:	Southern channel limits along access road (near Silvermine River)
Date Start:	March 27, 2006	Drilling Contractor:	Hardiman Company and Associates
Date End:	March 27, 2006	Driller Foreman:	Anthony Scaife
Total Depth:	16 feet	Drill:	Mobile B50, truck-mounted drill
Elevation (ground):			

\_ioralion (ground).

Graphic Log Notes:

Weathered Bedrock Bedrock

#### Drilling and Backfill Notes:

3-1/4 inch hollow stem augers

SPT advanced using 140 lb hammer with 30" drop

Cathead driven safety hammer used to advance split-barrel sampler

Glacial Till

Few cobbles encountered ground surface to 11 feet Water encountered at 9 feet during drilling

Installed well MW2

Water encountered at 7.5 feet in well after 2 hours of stabilization

Depth (feet)	Sample Type and Number	Depth (feet)	SPT Blows / 6 inches	Penetration (inches)	Recovery (inches)	Coring Time (minutes)	Strata Graphic Log	Soil/Geologic Description
	S1	0.0-2.0	2	24	5			Silty Sand (SM) fine to medium subangular to subrounded sand, ~20% non-plastic silty fines, brown, moist,
1			2 2 2				2	Include root fibers (FILL)
2	S2	2.0-4.0	2	24	15			Widely Graded Sand with Gravel (SW) fine to coarse angular to subrounded sand, ~20% fine to coarse angular
3 4			7 17 13					to subrounded gravel, <5% non-plastic silty fines, brown, dry (GLACIAL TILL)
5								
5	S3	5.0-5.3	50/4"	4	4			Narrowly Graded Sand (SP) fine to medium subangular to subrounded sand, <5% non-plastic silty fines, <5%
6								tine subangular gravel, brown, wet (GLACIAL TILL)
7								
0								
9								
10	S4	10.0-10.9		11	11			Widely Graded Sand with Silt (SW-SM) fine to coarse sbangular to subrounded sand, ~10% non-plastic silty
11	C1	11.0-16.0		60	40	3	11	fines, <5% fine subangular to subrounded gravel, brown, wet (GLACIAL TILL) GRANITE - fine-grained quartz and biotite, gray, fresh, hard
12						3		RQD = 22/40 = 55%: 20" rock unrecovered based on roller bit - Sand entered borehole and could not continue rock Lost water at 13 feet apparent highly fractured zone
13						3		rough, undulating, fresh, 10 to 30 degrees joints
				1 1		1 1		
15						3		
15 16						3 3	16	
15 16 17						3	16	End of Exploraion
15 16 17 18						3	16	End of Exploraion
15 16 17 18 19						3 3	\$6	End of Exploraion
15 16 17 18 19 20						3	46	End of Exploraion
15 16 17 18 19 20 21						3	<b>\$6</b>	End of Exploraion
15 16 17 18 19 20 21 22						3	16	End of Exploraion
15 16 17 18 19 20 21 22 23						3	16	End of Exploraion
15 16 17 18 19 20 21 22 23 24						3	*6	End of Exploraion



#### Boring (B3)

Client:	Norwalk First District Water Department	Project Name:	Grupes Reservoir-Dam
Project Number:	044460	Site Location:	Proposed Overflow Channel
Logged By:	Gary Fuerstenberg	Boring Location:	Northern channel limits along access road (near Grupes Reservoir)
Date Start:	March 27, 2006	Drilling Contractor:	Hardiman Company and Associates
Date End:	March 27, 2006	Driller Foreman:	Anthony Scaife
Total Depth:	14 feet	Drill:	Mobile B50, truck-mounted drill
Elevation (ground):			



Fill





Drilling and Backfill Notes: 3-1/4 inch hollow stem augers SPT advanced using 140 lb hammer with 30" drop

Cathead driven safety hammer used to advance split-barrel sampler Few cobbles encountered 1 to 14 feet

Glacial Till

Water encountered at 2 feet during drilling

Depth (feet)	Sample Type and Number	Depth (feet)	SPT Blows / 6 inches	Penetration (inches)	Recovery (inches)	Coring Time (minutes)	Strata Graphic Log	Soil/Geologic Description
1							1	Topsoil
2								
3								
4								
5								
6	S1	5.0-6.5	30 48 100/6"	18	10			Widely Graded Sand with Silt and Gravel (SW-SM) fine to coarse sbangular to subrounded sand, ~20% fine to coarse subangular to subrounded gravel, ~10%non-plastic silty fines, brown, wet (GLACIAL TILL)
7								
8								
9								
10	S2	10.0-12.0	34 47	24	18			Widely Graded Sand with Silt (SW-SM) tine to coarse sbangular to subrounded sand, ~10%non-plastic silty
12			39 47					
13								
14							14	
15								End of Exploration Auger refusal encountered at 14"
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								



#### Boring (B4)

Client:	Norwalk First District Water Department	Project Name:	Grupes Reservoir-Dam
Project Number:	044460	Site Location:	Proposed Overflow Channel
Logged By:	Gary Fuerstenberg	Boring Location:	Northern channel limits along access road (near Grupes Reservoir)
Date Start:	March 27, 2006	Drilling Contractor:	Hardiman Company and Associates
Date End:	March 27, 2006	Driller Foreman:	Anthony Scaife
Total Depth:	6 feet	Drill:	Mobile B50, truck-mounted drill
Elevation (ground):			

Elevation (ground).

Graphic Log Notes:

Fill

Glacial Till

Weathered Bedrock



Drilling and Backfill Notes:

3-1/4 inch hollow stem augers

Standard Penetration tests not performed Few cobbles encountered 0 to 6 feet

Water not encountered during drilling

Coring Time (minutes) SPT Blows / 6 inches Sample Type and Number Penetration (inches) Recovery (inches) Strata Graphic Log Depth (feet) Depth (feet) Soil/Geologic Description 1 2 3 4 5 6 6 End of Exploraion Auger refusal encountered at 6' 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25



# Appendix D

Field Observation Report, Test Pit Investigation, March 20, 2006

# DRAFT FIELD OBSERVATION REPORT

Date <u>Mon. 03-20-06</u> Report No. \_\_\_\_\_ Page <u>1</u> of <u>2</u> Project No. <u>04446-\*-1000</u>

 PROJECT
 Grupe's Dam - Borrow Source Evaluation

 CLIENT
 1<sup>st</sup> Water District

 CONTRACTOR
 Castelli Construction

#### TIME OF ARRIVAL 8:30 a.m.

**WEATHER** <u>±35°F mostly cloudy</u>

DEPARTURE 6:00 p.m.

#### PERSONS CONTACTED/COMPANY

Mike Elliot (1<sup>st</sup> Water District) – client Buck Castelli (Castelli Construction) – excavation contractor

#### GEI REPRESENTATIVE(S)

Gary Fuerstenberg – Field Engineer

### **OBJECTIVE**

Excavate test pits along proposed overflow channel (east of the reservoir).

#### Field Activities

I staked, sampled, and logged 13 test pits in the field. The test pit locations are shown on Figure 1. The test pits will be surveyed upon the completion of all explorations.

Test pits were excavated east of the reservoir and dam in a  $\pm 10$  acre area between Valley Road and Grupe's Reservoir / Silvermine River. The test pits were excavated by Castoelli Construction using a Takeuchi TB175 hydraulic excavator. Upon completion, the test pits were backfilled with the excavated soil. The test pit data is summarized in Table 1.

The test pits were extended to excavator refusal or until the side walls collapsed. Excavator refusal ranged from 4½ to 6½ feet in TP6, TP6A, TP6B, TP10, and TP10A. The excavation sidewalls collapsed below the water surface resulting in a practical excavation limit that ranged from 9 to 10 feet.

The subsurface soil profile consisted of topsoil overlying native soil. The native soil included SM, GW, SW, SP, and SW-SM soil. The widely graded materials typically included numerous cobbles and occasional boulders. Fill was encountered in test pits TP3A and TP8. Slight petroleum odors were noted in the fill stratum of TP3A (likely due to asphalt slabs). The bedrock appeared to be schist or gneiss based on the recovered samples.

Slowly seeping to no water was encountered where bedrock was encountered. Water

**GEI Consultants, Inc.** 

# DRAFT FIELD OBSERVATION REPORT

Date <u>Mon. 03-20-06</u> Report No. \_\_\_\_\_ Page <u>2</u> of <u>2</u> Project No. <u>04446-\*-1000</u>

 PROJECT
 Grupe's Dam - Borrow Source Evaluation

 CLIENT
 1<sup>st</sup> Water District

 CONTRACTOR
 Castelli Construction

rapidly flowed into excavations where bedrock was not encountered. The rapidly flowing water appeared to be clear and free of silt.

Bedrock outcrops were observed in the Silvermine River immediately south of the dam.

I closed and locked the gate prior to leaving the site.

By Gary J. Fuerstenberg

Date <u>March 21, 2006</u>



#### Table 1 Test Pit Data Summary Spillway Channel Grupe's Dam 1st Water District Lewisboro New York GEI Project Number: 44460

	Number of	Topsoil	Fill	Natïve Soil	Total Pit	Depth	Qualitative				Northing	Easting	
Test Pit ID	Samples	Thickness	Thickness	Thickness	Depth	to Water	Flowrate	Notes	Comments	Location	Coordinate	Coordinate	Elevation
		(feet)	(feet)	(feet)	(feet)	(feet)					(feet)	(feet)	(feet)
TP1A	1	1	0	9	10	4	rapidly flowing	collapsed - bedrock not encountered		Channel CL			
TP2A	2	1	0	9	10	4	rapidly flowing	collapsed - bedrock not encountered		Channel CL			
TP3A	2	0.5	7.5	1	9	2	rapidly flowing	collapsed - bedrock not encountered	slight petroleum odor in fill	Channel CL			
TP4A	2	0.5	0	8.5	9	3	rapidly flowing	collapsed - bedrock not encountered		Channel CL			
TP5A	1	0.5	0	8.5	9	3	rapidly flowing	collapsed - bedrock not encountered		Channel CL			
TP6	3	0.5	0	6	6.5	none	NA	refusal on bedrock		Channel CL			
TP6A	3	0.5	0	4.5	5	none	NA	refusal on bedrock		40' west of TP6			
TP6B	4	0.5	0	4	4.5	none	NA	refusal on bedrock		80' west of TP6			
TP7	2	0.5	0	9.5	10	7.5	rapidly flowing	collapsed - bedrock not encountered		Channel CL - end			
TP8	2	0.5	3	5.5	9	5	rapidly flowing	collapsed - bedrock not encountered		near shed			
TP9	2	0.5	0	5.5	6	none	NA	refusal on bedrock		top of knoll			
TP10	1	1	0	4	5	5	slowly seeping	refusal on bedrock		Channel CL - start			
TP10A	0	1	0	4	5	4	slowly seeping	refusal on bedrock		25' south of TP10			
		Minimum	0	1	4.5								
		Average	0.8	6.1	7.5								

Minimum 0 1 Average 0.8 6.1 Maximum 7.5 9.5 10

Notes:

1. Test pits excavated on March 20, 2006

2. Topsoil typically classified as SM.

Fill typically classified as SM.
 Native soils included SM, GW, SW, SP and SW-SM types.

	TEST BORING LOG																
ć		GZA GeoE Engine	<b>Enviro</b> eers and	<b>ime</b> Scien	ntal,	, Inc.		GRUPES I NEW CANA	DAM AN, CT			EXPLORATIO SHEET: PROJECT NO REVIEWED B	N NC 1 c : 17 Y:	D.: of 2 1312	GZ-1		
Lo Di Fo	ogged By illing Co oreman:	v: W. E .: Aqui Jam	Barry fer Drillin es	ng an	d Tes	sting, Inc.	Ty Ri Dr	rpe of Rig:Skid g Model: Acker Ace illing Method: Core with drilling water	Boring L Ground S Final Bor Date Star	ocation: See Plan Surface Elev. (ft.):302+/- ring Depth (ft.): 40 rt - Finish: 7/19/2012 - 7/24/2012					H. Datum: V. Datum:		
Ha	ammer T	ype:N	A				Sa	ampler Type: NA			Data	Groundw	ater	Dep	oth (ft Dooth	.) Stab Time	
Ha Ha Au	ammer V ammer F uger or C	/eight all (in. asing	(Ib.): NA ): NA O.D./I.E	) Dia	(in.):		Sa Sa Ro	Sampler O.D. (in.): NA Sampler Length (in.):NA Rock Core Size: Core NQ			//24/12	2 0930			1'	20 min.	<u>.</u>
_	Casing	9		None Samu	<u>Ope</u>	en Hole 3"					≚ Fiold ⊂ Stratum						
De (f	oth Blows t) Core Rate	No.	Depth (ft.)	Pen (in)	Rec. (in)	Blows (per 6 in.)	SPT Value	Sample Description	on er	Rema	Test Data		(ft.)		Equip	oment Installed	
5	- 28 - 12 - 5 - 6 - 9		5 40		10	0		MASONRY STONE 10-12": Hard, MORTAR separated from stone to bottom interface 12-14": Gray, hard, piec MASONRY STONE									
10	- 18 - 21 - 23 - 15 - 2	C-2 C-3	5-10	60	46	Core	MASONRY STONE 14-17": Hard, MORTAR separated from stone top interface only 17-29": Gray, hard, MASONRY STONE 29-33": Soft, crumbled, MORTAR with Stones										
15	- 3 - 3 - 3 - 7 5 - 2 - 5 - 18	C-4	15-20	60	57	Core		33-39": Gray, hard, piec MASONRY STONE 39-42": Medium to soft, crumbled MORTAR 42-49": Gray, hard, piec MASONRY STONE C-2: 0-46": Gray, hard, of MASONRY STONE, I on all stone surface adh stone at 36"	es of pieces Mortar iered to			DAM				<b>-</b> Grout (31-0	')
20	- 24 - 5 - 4 - 12 - 18	C-5	20-25	60	51	Core		C-3: 0-8": Gray, hard, p MASONRY STONE 8-11": Medium to soft MORTAR 11-32": Gray, hard piec MASONRY STONE C-4: 0-42": Gray, white	vieces of								
25	- 10 - 5 5 - 5 - 12 - 13 - 6	C-6	25-30	60	53	Core	C-4: 0-42": Gray-white, pieces of MASONRY STONE (No visible Mortar present) C-5: Gray, pieces of MASONRY STONE (No visible Mortar present) C-6: 0-28": Grey-white, hard, pieces of MASONRY STONE										
20	2							29-34": Soft, crumbled MORTAR	of								
REMARKS	1 - Co 2 - No from 1	ing pe return 9 feet	I erformed of drillir to end o	l usin ig wa f exp	l g NQ sh wa loratio	L core barre ater at 10 fe on.	l and o eet to	conventional rotary wash of 17 feet. Drilling wash wat	drilling. er return t	o sı	I urface	at 17 to 19 feet.	Lose	e drill	ling w	I rash water return	1
BE I SE	e Log l proximat en made an those	Key for e bour at the preser	or explain daries b times a tat the	natior etwe and u times	n of en so nder the r	sample de bil and bedr the condition measureme	escript ock ty ons st ents we	ion and identification pr pes. Actual transitions ma tated. Fluctuations of grou ere made.	ocedures. ay be grac undwater i	St dual may	ratifica . Wate / occui	tion lines repre r level readings due to other fa	esent have ctors		Expl	oration No.: GZ-1	

	TEST BORING LOG														
G		GZA GeoE	ers and	<b>ime</b> Scien	ntal	, Inc.		GRUPES NEW CANA	DAM AN, CT			EXPLORATION SHEET: PROJECT NO: REVIEWED BY	N NO.: 2 of 2 : 171312 /:	GZ-1 2	
Logo Drilli Fore	ged By ing Co. eman:	: W. B Aqui: Jame	arry fer Drillin es	ng an	d Tes	sting, Inc.	Ty Ri Di	ype of Rig:Skid ig Model: Acker Ace rilling Method: Core with drilling water	Boring L Ground Final Bo Date Sta	oca Surf ring rt -	tion: S face E J Depti Finish	See Plan l <b>ev. (ft.):</b> 302+/- <b>ı (ft.):</b> 40 : 7/19/2012 - 7/24	4/2012	H. Da V. Da	tum: tum:
Ham	mer Ty	pe:N/	A				Sa	ampler Type: NA			Data	Groundw	ater Dep	oth (ft.)	Otab Time
Ham	mer W	eight III (in )	(Ib.): N/ )• NA	A			Sa	ampler O.D. (in.): NA		7	7/24/12	0930	20.	1'	20 min.
Aug	er or C	asing	0.D./I.E	) Dia	(in.):		R	ock Core Size: Core NC	ג						
Denth	Casing		;	Samp	, Ope	en Hole 3"	 	Comple Descript		ark	Field	Stratum			
(ft)	Core Rate	No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value	Modified Burmis	ter	Rem	Test Data		Elev.	Equipm	ent Installed
		C-7	30-35	60	47	Core		34-53": Gray, hard, pie	ces of						
								C-7: 0-47": Gray, soun	d, hard						
_								MASONRY STONE, tra	ace						Senser at (32')
_								amounts of Mortar on s	urface of			DAM			
35_			05.40	00											<ul> <li>Bentonite</li> <li>Sand (36-33')</li> </ul>
-		C-8	35-40	60	60	Core		C-8: 0-24": Gray, hard, of MASONRY STONE	pieces						
-								24-60": Hard, slight we	athering,			37			—Senser at (37')
-								extreme to moderate fra	acturing,						←Sand (40-36')
								= $20\%$ )	55 (RQD			BEDROCK			
40_								Find of exploration at 40	) feet	3		40			
									leel.						
-															
-															
-															
45															
-															
-															
-															
50															
00-															
	1														
55	1														
60															
REMARKS	3 - Two Geokon vibrating piezometer sensors set approximately 37 feet and 32 feet below the top of the dam surface.														
See appro been than	Log K oximate made those p	ey fo boun at the presen	r explai idaries t times a it at the	natior etwe and u times	n of en so nder the r	sample de bil and bedr the conditi measureme	escript rock ty ons si ents w	ion and identification p pes. Actual transitions m tated. Fluctuations of gro ere made.	rocedures ay be grad undwater	. St dual may	tratifica . Wate / occur	tion lines repre r level readings h due to other fac	sent nave ctors	Explo	ration No.: GZ-1

	TEST BORING LOG																			
		GZA Geo Engin	N E <b>nvi</b> i eers ai	<b>*onm</b> nd Sci	nen ienti:	tal,	Inc.		GRUPES NEW CANA	DAM AN, CT			EXPLO SHEE PROJI REVIE	ORATIO T: ECT NO WED B	N NC 1 o : 171 Y:	).: ( f 2 1312	GZ-2	1		
L D F	ogged   rilling ( oreman	<b>By:</b> W. Co.: Aqu I: Jan	Barry iifer Dr nes	filling	and	Tes	ting, Inc.	Ty Ri Di	ype of Rig:Skid ig Model: Acker Ace rilling Method: Rotary Wash/Core	Boring L Ground Final Bo Date Sta	Location: See Plan Surface Elev. (ft.):297 ring Depth (ft.): 35 Irt - Finish: 7/25/2012 - 7/30/2012					2	H. Datum: V. Datum:			
н	ammer	Type:	١A					Sa	ampler Type: NA			Data	G	iroundw	ater	er Depth (ft. Nater Depth			Stab Tin	
H H A	ammer ammer uger or	Weigh Fall (ir Casing	t (Ib.): ): NA g <b>O.D.</b>	NA / <b>I.D D</b>	)ia (i	in.):	n Holo 2"	Sa Sa Ro	Sampler O.D. (in.): NA Sampler Length (in.):NA Rock Core Size: Core NQ			//27/12	2 0	930	vva	18.5	' '	24 hrs.		
De (	pth Blov t) Co	ing ws/ re No	Dep	th Pe	mple en.F	e Rec.	Blows	SPT	SPT Sample Description Value Modified Burmister			Field Test	Stratum			E	Equipment Installed			I
1		C-1 C-2 C-2 C-2 C-2 C-2 C-2 C-2 C-2 C-2 C-2	0 : 5-1 : 10 : 15-: 5 20-:	25 6 0 6 15 6 20 6 25 6	30 30 30 30 50	<ul> <li>60</li> <li>40</li> <li>33</li> <li>48</li> <li>54</li> </ul>	Core		C-1: 0-12": Hard CON crack at 4" 12-30": Grey, hard pied MASONRY STONE 30-44": Hard, CONCRI 44-60": Hard, grey-whi broken MASONRY STO Mortar at ~57" on surfa stone piece C-2: Hard, grey-white H pieces of MASONRY S with slight amounts of M face of stone. C-3: Hard, grey-white, MASONRY STONE wi amounts of Mortar C-4: 0-54": Hard, piec grey-white, MASONRY with occasional trace at of Mortar adhered to sto surfaces C-5: 0-35": Hard, grey of MASONRY STONE with adhered to stone surface	CRETE ces of ETE te DNE with ce of oroken TONE Mortar on pieces of th trace es of STONE mounts one ,pieces with r ces	2			DAM				-0	Grout *25	-0')
2	5 - 5 - 3 - 5	C-6	25-3	30 6	30	35			Hard, grey, MASONRY with trace amounts of N	STONE Aortar	3				,	•			Sand (27- Sensor at	25') (26')
3	5																	<b>≺</b> B (;	Bentonite/ 30-27')	Sand
REMARKS	30       I																			
Sabt	ee Log oproxim een ma an thos	Key f ate bou de at th e prese	or exp ndarie le time nt at th	blanat s betv s and ne tim	tion weer d und nes th	of s n soi der f the m	sample de il and bedr the conditi neasureme	escript ock ty ons st ents w	tion and identification p ypes. Actual transitions m tated. Fluctuations of gro yere made.	rocedures ay be grad undwater	. St dual may	ratifica Wate	tion line r level re due to	es repre eadings other fac	esent have ctors	E	Expl	orat GZ	tion No 2-2	

								TEST BORIN	G LOG							
G		GZA GeoE	nviroi ers and	<b>1me</b> Scien	ntal,	Inc.		GRUPES I NEW CANA	DAM AN, CT			EX SH PR RE	PLORATIO EET: OJECT NO VIEWED E	ON NO 2 c D: 17 3Y:	D.: GZ-2 of 2 1312	
Logo Drilli Fore	ged By ng Co. man:	: W. B Aqui Jame	arry fer Drillin es	ng an	d Tes	sting, Inc.	Ty Ri Di	ype of Rig:Skid ig Model: Acker Ace rilling Method: Rotary Wash/Core	Boring L Ground S Final Bo Date Sta	.oca Surf ring rt -	ition: S face El Depth Finish	See F lev. ( 1 (ft.) : 7/25	Plan <b>ft.):</b> 297 : 35 5/2012 - 7/3	30/20 <sup>-</sup>	H. Da V. Da	atum: atum:
Ham	mer Ty	pe:N/	A				Sa	ampler Type: NA			Data		Ground	water	Depth (ft.)	Otah Time
Ham	mer W	eight	( <b>Ib.):</b> NA	A			Sa	ampler O.D. (in.): NA			/27/12	2	0930		18.5'	24 hrs.
Auge	er or C	asing	0.D./I.E	) Dia	(in.):		R	ock Core Size: Core NC	2							
	Casing			None Samr	, Ope	en Hole 3"				   <del>\</del>	Field	_	Stratum			
Depth (ft)	Blows/ Core Rate	No.	Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value	- Sample Descripti e Modified Burmist	on er	Remai	Test Data	Depth (ft.)	Descriptior	(ff.) (ff.)	Equipr	nent Installed
_	с 1	C-7	30-35	60	36			0-6": Hard, grey, small	broken			31	DAM	266.0		
	4							6-56": Hard, slight weat	thering,							
	5							extremely to moderate	0.							<ul> <li>Sand (35-30')</li> </ul>
	5							fracturing, fine grained (	GNEISS				BEDROCK	ί.		
35	5							(RQD = 22%)				35		262.0		
	3							End of exploration at 35	feet.	4						
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REMARKS	4 - 1 W	Geoi		aung	piezo			et approximately 51 leet a	nu zo iee		iow the	e top	or the cond	Jele V		
See appro been than	Log K oximate made those p	ey fo boun at the oresen	r explai idaries t times a it at the	natior betwe and u times	n of en so nder the r	sample de il and bedro the condition neasureme	script ock ty ons s nts w	tion and identification pr ypes. Actual transitions m tated. Fluctuations of grou /ere made.	ocedures ay be grac undwater	. St dual may	tratifica . Wate / occur	ition r leve due	lines repr el readings to other fa	esent have actors	Explo	oration No.: GZ-2







#### © 2012 - GZA GeoEnvironmental, Inc. GZA-J:\Geo\01.171312.00-Grupes Dam\FIGURES\171312.00\_F1\_R0\_SECTION.dwg [FIG. 2 - GZ-1 (2)] November 27, 2012 - 9:44am michael.aubin



© 2012 - GZA GeoEnvironmental, Inc. GZA-J:\Geo\01.171312.00-Grupes Dam\FiGURES\171312.00\_F1\_R0\_SECTION.dwg [FIG. 3 - GZ-2 (2)] November 27, 2012 - 9:43am michael.aubin

# SOILTESTING, INC.

тоFirst Taxing District.Water.Department	DATE August .24, .2016
ADDRESS	
SITE LOCATION 1088 Valley Road, New Canaan, CT.	
REPORT SENT TO Don Ukers	
SAMPLES SENT TO Storage (Max. 60 days)	

90 Donovan Road Oxford, Connecticut 06478-1028 203-262-9328

Branch Office: White Plains, New York 10607 914-946-4850 јов NO. G180-0478-16 Phone (203) 262-9328

Telefax (203) 264-3414 WHITE PLAINS, N.Y. (914) 946-4850

# SOILTESTING, INC.

#### 90 DONOVAN ROAD - OXFORD, CONN. 06478-1028

GEOTECHNICAL / ENVIRONMENTAL SUBSURFACE INVESTIGATIONS - Test Borings - Core Drilling Monitoring Wells - Recovery Wells - Direct Push/Probe Sampling UNDERPINNING - HELICAL PILES - SOIL NAILS

August 24, 2016

First Taxing District Water Department 12 New Canaan Avenue PO Box 27 Norwalk, CT 06852 203-505-9618

Attn: Don Ukers

Re: 1088 Valley Road New Canaan, CT G180-0478-16

Dear Mr. Ukers,

Enclosed are boring logs and location plan for the above referenced project site.

If you have any questions, please do not hesitate to contact us.

Very truly yours, **SOILTESTING, INC.** 

Detingelis amer

James A. DeAngelis President

JAD:ec





	SOIL	TE	STIN	۱G,	INC		CLIEN	T:	First	Taxin	g District	Water De	epartment	SHEET 1 O	F_1
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			D, C 2) 26	1 064	4/8 20		PROJE	CT NO	).	G180	-0478-16				
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	BD/ms													<u>.</u>	
INS	PECTOR										CASING	SAMPLER	CORE BAR	OFFSET	
								TYPE			HSA	SS		DATE START	8/22/16
GR		TER	OBSE	RVA	TIONS	5		SIZE I	.D.		4 1⁄4"	1 3/8"		DATE FINISH	8/22/16
	none obs	erved		TER_	<u>0_</u> HC	URS		HAMM		ſ.		140#	BIT	SURFACE ELEV.	
Ê								нами				30		GROUND WATER ELEV.	
			г— 1	SAMI											
DEPTH	CASING BLOWS PER	NO	Туре	PEN	REC	DEPTH	BLOV ON (FOR 0 - 6	WS PEF SAMP CE ON 6 - 12	R 6 IN LER TUBE) 12- 18	CORE TIME PER FT	OR CONSIST	CHANGE DEPTH	INCL. COL	OR, LOSS OF WASH WA	TER, SEAMS
$\vdash$	1001			<u> </u>		@ BOT			T	(MIN)	MOIST	ELEV	CI TODCOIL		
											-		Brn SILT & FC	GRAVEL, COBBLES, BOULD	FRS
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5						<u> </u>					-	610"			
			<u> </u>			<u> </u>			_		1	6'6"	fractured BED	ROCK	UGER REFUSAL
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ss	= SPLIT	TUBE	SAMF	PLER		H.S.A. =	= HOLL	_OW ST	TEM AL	JGER				M = MEDIUM	
PR	OPORTIC	NS U	SED:	TRA	CE = (	0 - 10%	LITTLE	= 10 -	20%	SOME =	= 20 - 35%	AND =35 - 8	50%	F = FINE	

	90	DO	NOV	NG, AN F	RD.		CLIEN	IT:	First	Taxin	ng District	Water De	epartment	SHEET <u>1</u> HOLE NO.	OF <u>1</u> B-
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	C.	T (20	3) 26	62-93	328		PROJI	ECT NA	ME					BORING LOCATIONS	
	N	Y (91	4) 94	46-48	350					1088	Valley Ro	bad		per Plan	
FOI	RD/mo	URILI	_ER				LOCA	TION		New	Canaan, (	CT			
INS	PECTOR			_							CASING		COPERAD	OFFSET	
								TYPF			HSA	SS	CORE BAR	DATE START	8/2
GR	OUND W	ATER	OBSE	ERVA	TIONS	3	1	SIZE	.D.		4 1/4"	1 3/8"		DATE FINISH	8/2
AT_	none obs	erved	AF	TER_	<u>0</u> HC	OURS		HAMM	IER WI	г.		140#	BIT	SURFACE ELEV.	0/2
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			5	SAM	PLE					T		1			
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GRI AT_ AT_ 0	OUND W/ none obs FT AF 		OBSE HOI			S DURS							B-4 6* TOPSOIL Bm SILT, sm F BOULDER at !	F sand, cobbles	
GR AT_ AT_ 0	OUND W/ none obs FT AF 											40/07	B-4 6* TOPSOIL Bm SILT, sm F BOULDER at 1 COBBLES at 1	F sand, cobbles 5'	
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	90		NOV	'AN F	RD.		CLIEN	11:	First	laxin	g District	Water Do	epartment	SHEET_1_C	DF_1
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	N`	Y (91	4) 94	46-48	350					1088	Valley Ro	bad		per Plan	
FO	REMAN -	DRILI	LER				LOCA	TION		New	Canaan, (	CT			
	BD/ms						<b>_</b>								
inc	PECIUR							TVDE			CASING	SAMPLER	CORE BAR	OFFSET	
GR		ATER	OBS		TION		1	SIZE				1 2/0"		DATE START	8/
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D	PER		1.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	1		DEPTH	(FOR	CE ON	TUBE)	PER	CONSIST	DEPTH		IN ROCK, ETC.	
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#### SECTION 01740 SITE PROTECTION AND RESTORATION

#### PART 1 - GENERAL

#### 1.01 <u>SCOPE</u>

- A. The work under this Section shall consist of all work and operations, including, but not limited to equipment, supplies, material, personnel, and incidentals to restore areas in and around the project site to pre-construction conditions.
- B. The intent of the Work of this Section is that areas which are disturbed as a result of the overall Work of this Contract, whether intentionally or unintentionally, planned, or unplanned, are restored to at or better than their conditions prior to the start of work. The Scope of Work under this Section shall also include both significant and incidental work necessary to repair damage to the site beyond those areas shown as disturbed on the Project Drawings.
- C. Areas to be restored shall include, but not be limited to, the grassed and wooded areas within the limit of work, locations of trailers (if any), laydown and storage areas, construction access ways, etc. Facilities to be restored include the grassed areas used as temporary staging, laydown and stockpile areas, other staging/laydown areas, trees, and utilities. Additionally, restoration shall include public roadways, sidewalk, or private property areas, if disturbed by the Contractor's (or their Subcontractor's) activities.
- D. It is the intent of the Contract that the Contractor avoid and minimize indirect construction impact to the maximum extent possible. To this end, the site and surrounding areas should be protected, as needed, and as provided for under separate Sections of the Contract. The Contractor should also develop a plan to protect the site and inform and educate their forces regarding protective measures to be implemented. This Section covers the restoration of damage caused by unavoidable or inadvertent actions by the Contractor's forces, including all sub-contractors, material deliverers, and others under the Contractor's employ or authority. It is the intent of the Contract that the work of this Section be minimized to the extent possible by the Contractor's actions to avoid damage to the site and area.

#### 1.02 DOCUMENTATION OF EXISTING CONDITIONS

- A. Prior to the start of work, the Contractor shall be responsible for documenting the pre-construction conditions of these and other areas which might be disturbed by the Work of the Contract as described in Section 01436. This documentation, in the form of photographs, video tapes, and written documentation shall be provided to the District if requested. This documentation shall be used to determine the extent to which post-construction site restoration shall be needed.
- B. <u>Project Location:</u> Access to the general and immediate project site location is via Valley Road and Deep Valley Roads in New Canaan, CT which are both paved public roadways. Utilities may exist under these roadways and the temporary access roads to the work area.
- C. <u>Staging, Laydown and Stockpile Area:</u> Access, laydown, and stockpile areas are indicated on sheet G8 of the Contract Plans.

#### 1.03 PROTECTION OF EXISTING FEATURES

The Contractor shall take such steps and measures as are necessary to protect the project site and adjacent areas and public roadways from damage by construction activities and thereby minimize the extent of work to be done under this Section. Site protection shall be paid for under the Scope of other Sections.

#### 1.04 <u>RELATED SECTIONS</u>

- A. District Standard Specifications Applicable Items
- B. Section 01436 Pre and Post Construction Surveys
- C. Section 01500 Temporary Facilities and Controls
- D. Section 01565 Sedimentation and Erosion Controls
- E. Section 02200 Earthwork

#### 1.05 <u>SUBMITTALS</u>

The Contractor shall submit the following documents. Refer to Section 01300 - Submittals for additional information.

A. At least 10 days prior to the start of restoration work, the Contractor shall submit proposed materials and methods for areas of the Site and vicinity requiring restoration, if not already provided under a submittal for another Section. Areas requiring restoration will be mutually agreed upon by the District and Contractor prior to execution of restoration work.

#### PART 2 – PRODUCTS

Products used in Site Restoration shall meet the requirements of the applicable Section of the Contract Documents. If work similar to the nature of the necessary site restoration is not specified elsewhere in the District Standard Specifications or Contract Documents, the applicable section of the State of Connecticut Department of Transportation Standard Specifications for Roads, Bridges, and Incidental Construction, shall control. Materials for restoration of utilities shall meet with the standards of the Owner or the utility to be restored.

#### PART 3 – EXECUTION

#### 3.01 <u>GENERAL</u>

The work required and services for site restoration shall be done in a safe, professional manner and shall conform to any pertinent local or state law, regulation, or code. Good housekeeping consistent with safety shall be maintained. The Contractor shall be responsible for all necessary permits and approvals.

#### 3.02 <u>PRE-CONSTRUCTION SITE DOCUMENTATION</u>

Prior to the start of work at the site, the Contractor shall coordinate with the District and its Engineering Consultant to perform a pre-construction site walk for the purposes of documenting conditions prior to disturbance by the Contractor's forces and equipment. A representative from the Owner and/or its Engineering Consultant shall accompany the Contractor during the site walk, but it shall be the Contractor's sole responsibility to properly document existing conditions in all areas which might be subject to disturbance. The Contractor shall utilize photographs, video, written descriptions, sketches, and any other means to document pre-construction conditions. If requested, the Contractor shall supply the Owner with one copy each of the documentation, including both hard copies and digital files, as appropriate. The Owner alone shall be empowered to make decisions about the pre-construction condition of areas not covered by the Contractor's documentation.

#### 3.03 <u>RESTORATION METHODOLOGY</u>

Means of Site Restoration shall meet the requirements of the applicable Section of the Contract Documents or District Standard Specifications. If work similar to the nature of the necessary site restoration is not specified elsewhere in the Contract Documents, the applicable section of the State of Connecticut Department of Transportation Standard Specifications for Roads, Bridges, and Incidental Construction shall control. Proper sediment, erosion, and water control shall be provided, as needed, at no additional cost.

#### 3.04 <u>RESTORATION OF ROADS</u>

- A. The Contractor shall be required to repair any damage to roadways caused during the course of construction, in order to return the roads to pre-construction condition or better. Cost of this work shall be factored into the cost presented for this Section on the Bid Form.
- B. Restoration of paved areas shall be done with similar materials and paving characteristics.
- C. The District shall determine the appropriateness of proposed restorations (e.g., spot patching, full depth repaving, etc.)

#### 3.05 RESTORATION OF STAGING, LAYDOWN AND STOCKPILE AREAS

The Contractor shall be prepared to repair any damage to the areas which will be utilized as the main staging, laydown/storage, and stockpile areas. The areas shall be restored to their pre-construction conditions or better. Restoration of each area shall include (but not be limited to) clean up and removal of any/all materials, trash and debris resulting from its use during the work, as well as grading of the site to smooth out any disturbances made during the work.

#### 3.06 <u>RESTORATION OF VEGETATED AREAS</u>

A. The Contractor shall be responsible for restoring all vegetated areas beyond the indicated limits of work disturbed during the work of this Contract. Restoration shall include, but not be limited to, loam placement, regrading, seeding, re-sodding, mulching, and maintenance. The intent is to restore damaged areas to pre-construction condition or better. Loaming, seeding, and revegetation of areas which are shown on the plans as being filled, excavated, or graded shall be paid for under a separate Section of the Contract and work shall be in conformance with the District's standard specifications. Loaming, seeding, and revegetation of other areas, including areas disturbed by construction traffic, trailer placement, material stockpiling, etc. shall be paid for under the pay item for this Section.

- B. The Contractor shall be responsible for maintenance and care of all restored vegetated areas until establishment.
- 3.07 <u>TREES</u>
  - A. The Contractor shall be responsible for pruning and other actions necessary to repair construction-related damage to trees which are shown to remain in place or are outside of the construction areas.
  - B. The Contractor shall hire a certified arborist to perform restoration work on large trees, if judged necessary by the District.

#### PART 4 - MEASUREMENT AND PAYMENT

Refer to Section 01950 – Measurement and Payment for the measurement and payment items related to this Section.

#### \* \* \* END OF SECTION \* \* \*

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#### SECTION 01900 MOBILIZATION/DEMOBILIZATION

#### PART 1 - GENERAL

#### 1.01 <u>SCOPE</u>

- A. The work under this Section shall consist of the Contractor's preparatory work and operations, including, but not limited to transporting equipment, supplies, personnel, and incidentals to and from the work site, and <u>all</u> other operations which must be performed or for costs which must be incurred prior to commencement of the work.
- B. Work under this Section shall also include <u>all</u> work, services, equipment and other incidental items, whether specifically mentioned herein or not, to perform similar tasks at the work site at the conclusion of the work, in order to restore the site to its intended condition and remove all items which are not a permanent part of the work from the site, and to leave the site in a clean and orderly manner as directed by the Resident Engineer.
- C. The work of this Section shall also include any potential work, labor, equipment, and other expenses necessary for emergency protection of, demobilization from, and remobilization to the project site in the event of heavy rains, increased flows, and/or high water levels which cause the inundation of the job site or other weather-related conditions which temporarily restrict access to the work area.
- D. The Work of this Section shall include all work, services, equipment materials, supplies, personnel, and other incidental items necessary for the adequate and appropriate documentation of the existing structures and facilities at the site and the condition of said structures and facilities prior to the start of Construction at the site. This Work is intended to establish and document site conditions and provide a basis for restoration requirements.
- E. The Work of this Section shall include the provision, installation, inspection, maintenance, and removal of all temporary facilities and controls necessary for the Contractor to successfully complete the Work of this Contract in accordance with the Plans, Specifications, Permits, and all applicable local, state, and Federal laws and regulations. Temporary facilities shall include all work, services, equipment materials, supplies, personnel, and other incidental items necessary for the protection of existing structures and features at the site.
- F. The Work of this Section shall include all work and operations, including, but not limited to equipment, supplies, material, personnel, and incidentals for site preparation as well as the dismantling, relocation, demolition, removal, and lawful off-site disposal of certain existing materials and structures at the Grupes Reservoir Dam.
- G. The Work of this Section shall include all work and operations, including, but not limited to equipment, supplies, material, personnel, and incidentals to restore disturbed areas in and around the project site to pre-construction conditions.
- H. The Work of this Section shall include all work and fees required for the Contractor to prepare permit applications and obtain approvals for permits (where not specified in other Sections and/or paid for under other Bid Items). Such permits may include but are not limited to a Town

Building Permit for the Gatehouse and/or permits associated with new Electrical work at the Site.

#### 1.02 <u>DEMOBILIZATION / REMOBILIZATION DUE TO INCLEMENT WEATHER</u>

The Contractor is hereby notified that the Work of this Contract will take place in, on, and around Grupes Reservoir Dam. Portions of this Work will require personnel and equipment to be located on or adjacent to the Dam, including the upstream and downstream faces of the dam, within the dewatered reservoir and/or gatehouse, and near other areas typically subject to water flow. Certain weather conditions (such as an extended period of heavy rainfall and/or a weather event such as a hurricane) could potentially inhibit proposed work.

**Responses to such events are the Contractor's responsibility and no extra payment shall be made unless otherwise specified herein.** The Contractor shall make provision for contingencies to deal with inclement weather. In the event of rising waters and increasing flow, the Contractor may be required to act rapidly to protect the structure and the work, including removal of personnel and equipment from potentially affected areas. The Contractor may have to demobilize from the potentially affected areas on a temporary basis. Prior to leaving the area, the Contractor shall take such steps as are necessary to protect completed work and work in progress and to remove all equipment and materials from potentially inundated areas. The Contractor shall be responsible for any loss or damage to his work, equipment, or material. After water levels/flows have receded, the Contractor shall remobilize to the site at no additional cost to the Owner, unless otherwise specified herein. Remobilization will include all effort required to restart the Work.

To reduce the chance of high water levels / flows affecting the Work, the Contractor is urged to pay particular attention to weather forecasts for the area and to schedule work in vulnerable areas during periods of drawdown or at times of the year which are anticipated to be relatively dry.

#### 1.03 EXISTING CONDITIONS

Staging areas shall be decided in agreement with the Owner. The Contractor shall be responsible for marking and maintaining all existing structures and utilities within the staging area(s) and the work area before, during and after the course of work. Contractor responsibilities shall include notifying Call Before You Dig (CBYD) and all appropriate Town departments prior to commencing work.

The Contractor shall be prepared to provide working platforms/ramps, cribbing, shoring, matting, and all other specialized support equipment required to ensure safe access of all personnel, equipment, and materials necessary for completion of the work of this Contract in accordance with the Specifications and Contract Drawings.

#### 1.04 <u>RELATED WORK</u>

- A. District Standard Specifications Item No. 975
- B. Section 01060 Regulatory Requirements
- C. Section 01500 Temporary Facilities & Controls
- D. Section 01740 Site Restoration
# PART 2 – PRODUCTS

This Section Not Used

# PART 3 – EXECUTION

# 3.01 <u>GENERAL</u>

The work required and services for mobilization/demobilization shall be done in a safe, professional manner and shall conform to any pertinent local or state law, regulation, or code. Good housekeeping consistent with safety shall be maintained.

#### 3.02 <u>PRE-CONSTRUCTION SITE MEETING</u>

A meeting with the District, Engineer, and the Contractor will occur prior to beginning any dam rehabilitation work at the site. During this meeting, the Contractor will become familiar with the site, including working conditions, existing access road conditions, and access restrictions. During this meeting, the final location of laydown and spoil disposal areas will be discussed, and confirmation that the appropriate notifications and clearances (i.e., CALL BEFORE YOU DIG and the District's internal clearance as applicable) have been executed.

# PART 4 - MEASUREMENT AND PAYMENT

Refer to Section 01950 – Measurement and Payment for the measurement and payment items related to this Section.

# \* \* \* END OF SECTION \* \* \*

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# SECTION 01950 MEASUREMENT AND PAYMENT

#### PART 1 - GENERAL

#### 1.01 PAY ITEMS AND UNITS

The payment items for the Work of this contract shall be as shown on the Bid Form. Pay items shall have the corresponding unit of measurement for the Work of that item, as shown on the Bid Form. Payment for all pay items shall be at the corresponding price shown on the Bid Form.

#### 1.02 <u>GENERAL</u>

The Bid Form has an entry for each item on which payment will be made (i.e., Schedule of Values). No other allowance of any kind will be made unless specifically provided/stipulated in the Contract.

Each unit and lump-sum price stated on the Bid Form shall constitute full compensation as specified herein for each item of work complete in accordance with the Contract Drawings and Specifications. The unit and lump sum prices shall be inclusive of the full scope of the work for each item, including all labor, tools, materials, transportation, equipment, incidentals, mobilization/demobilization, and any other costs necessary to complete the work of the bid item.

The Specifications are arranged in separate divisions which are further broken down into sections. The price bid for various items includes all work in a particular division shall include all sections of that particular division.

#### 1.03 <u>GUARANTEE AND WARRANTY</u>

The Contractor guarantees all equipment against defective materials and workmanship for a period of **one year from the date of Final Acceptance**, unless otherwise specified, and shall provide in his purchase orders with the suppliers that they agree to guarantee all equipment against defective materials and workmanship for a period of **one year from the date of Final Acceptance** or such longer period as may be specified. During the maintenance and guarantee period, the suppliers shall be responsible to the Contractor to promptly repair, replace, restore, or rebuild, as the City may determine, any furnished equipment in which defects of materials or workmanship may appear or to which damage may occur because of such defects. The Contractor shall also submit to the Owner a certified copy of the Supplier's Guarantee for the equipment furnished against defective materials and workmanship prior to receiving any payment, which Guarantee shall also include the City as a guaranteed party.

#### 1.04 <u>LUMP SUM QUANTITIES</u>

A. No measurement shall be made of work, materials, or other quantities involved in provision or construction of Pay Items listed on the Bid Form as being Lump Sum quantities. Payment for the scope of the work specified for each Lump Sum Pay Item shall include all labor, tools, materials, equipment, fuel, supplies, overhead, profit, and incidentals.

# 1.05 <u>LUMP SUM CONTRACT ITEMS</u>

The following lump sum contract items shall be included in the Contractor's total bid for this Contract.

- A. Pay Item No. 1 Payment and Performance Bond
  - 1. No measurement shall be made for Pay Item No. 1 which has been provided on the Bid Form as a Lump Sum. The scope of the Pay Item No. 1 is described in Division 0 of the Project Specifications and Section 103 of the District Standard Specifications.
- B. Pay Item No. 2 Mobilization / Demobilization
  - 1. No measurement shall be made for Pay Item No. 2 which has been provided on the Bid Form as a Lump Sum. The scope of the Pay Item No. 2 is described in Section 975 of the District Standard Specifications, as well as Section 01900 of the supplemental technical specifications.
  - 2. Pay Item No. 2 will include full compensation for Mobilization and Demobilization costs associated with the Work of the Contract. Mobilization/demobilization costs for all work under the Contract not specifically addressed herein shall be considered incidental, and the costs for such shall be included as part of the work of that Section (and included in the respective Bid Form Lump Sum price items) and/or as part of the work of this Contract. The bid price for Pay Item No. 2 shall not exceed ten percent (10%) of the total contract bid price.
  - 3. Partial payments for Pay Item No. 2 shall be provided as follows: Sixty percent (60%) of the lump sum bid price upon completion of mobilization. Following the satisfactory completion of work, forty percent (40%) of the lump sum bid price will be paid upon completion of demobilization as approved by the District.
  - 4. All costs associated with applying for and obtaining required bonds, insurances, and permits shall be included in the lump sum cost for Mobilization and Demobilization, unless such permits or bonds are specifically called out as part of other Items.
  - 5. Where the Specifications are silent on Payment for work specified under an individual specification Section, it is understood that Payment will be made as part of the lump sum price for Pay Item No. 2
- C. Pay Item No. 3 Pre- and Post-Construction Surveys
  - 1. No measurement shall be made for Pay Item No. 3 which has been provided on the Bid Form as a Lump Sum. The scope of the Pay Item No. 3 is described in Section 01436 of the supplemental technical specifications.
  - 2. Pay Item No. 3 will include full compensation for pre- and post-construction survey costs associated with the Work of the Contract.
  - 3. Partial payments for Pay Item No. 3 shall be provided as follows: Fifty percent (50%) of the lump sum bid price upon completion and acceptance of the pre-construction survey. Following the satisfactory completion of the post-construction survey, fifty percent (50%) of the lump sum bid price will be paid upon acceptance by the District and Engineer.

# D. Pay Item No. 4 – Temporary Facilities, Site Prep, and Clear/Grub/Strip

- 1. No measurement shall be made for Pay Item No. 4 which has been provided on the Bid Form as a Lump Sum. Pay Item No. 4 shall include all measures utilized to furnish, install, maintain, and remove any and all Temporary Facilities and Controls from the Project Site.
- 2. The work and materials shall be in accordance with Sections 201, 969, and 971 of the District Standard Specifications, as well as Section 01500 of the supplemental technical specifications.
- 3. Payment for the scope of the work specified herein, including all labor, materials, equipment and incidentals and mobilization/demobilization costs to provide, install, maintain, and remove temporary facilities and controls associated with the work of this Contract shall be paid for at the applicable Lump Sum price for Item No. 4 on the Bid Form. Partial Payment for this item shall be provided as follows: Sixty percent (60%) of the lump sum bid price upon completion of installation and approval by the Resident Engineer. Following the satisfactory completion of work, forty percent (40%) of the lump sum bid price will be paid upon removal and cleanup of the Temporary Facilities and Controls.

# E. Pay Item No. 5: Sedimentation and Erosion Control

- 1. No measurement shall be made for Pay Item No. 5 which has been provided on the Bid Form as a Lump Sum. Pay Item No. 5 shall include all measures utilized to install, maintain, and remove all sedimentation and erosion controls at the Project Site. Perimeter Sedimentation & Erosion Controls may include but are not limited to silt fence, compost socks, turbidity curtains, stabilized construction entrances and other Best Management Practices including temporary seeding, erosion control matting, and periodic/regular maintenance of the sediment and erosion control systems.
- 2. The scope of this item also includes preparation of a Stormwater Pollution Control Plan (SWPCP) and any other work or fees required by the Contractor to obtain permit approval under the Connecticut DEEP Construction General Permit (CGP), as described in Section 01060. Monitoring and reporting required by the SWPCP shall also be included in the scope of this item.
- 3. The work and materials shall be in accordance with Section 210 of the District Standard Specifications, as well as Section 01560 of the supplemental technical specifications.
- 4. Payment for the scope of the work specified herein, including all labor, materials, equipment and incidentals and mobilization/demobilization costs to provide, install, maintain, and remove Perimeter Sedimentation & Erosion Controls shall be paid for at the applicable unit price for Item No. 5 stated on the Bid Form. Partial Payments for this item shall be provided as follows: Twenty percent (20%) of the lump sum bid price upon approval of the CGP and SWPCP. Fifty percent (50%) of the lump sum bid price upon completion of installation and approval of sedimentation controls by the Engineer and permitting agencies/representatives having jurisdiction. Following the satisfactory completion of work, thirty percent (30%) of the lump sum bid price will be paid upon removal and cleanup of Perimeter Sedimentation & Erosion Controls and closeout of the SWPCP documentation.

# F. Pay Item No. 6: Temporary Water Control and Cofferdams

- 1. No measurement shall be made for Pay Item No. 6 which has been provided on the Bid Form as a Lump Sum. The scope of Pay Item No. 6 is described in Section 01565 of the supplemental technical specifications.
- 2. Payment for the scope of the work specified herein, including all labor, materials, equipment and incidentals and mobilization/demobilization costs to provide Temporary Water Control associated with the work of this Contract, including both temporary surface water control and temporary construction dewatering and groundwater control shall be paid for at the applicable unit price for Item No. 6 stated on the Bid Form. Partial payments for this item shall be billable in four (4) equal payments of twenty-five percent (25%) of the lump sum bid price over the duration of the Project.
- G. Pay Item No.7: Dam Instrumentation Staff Gauge
  - 1. No measurement shall be made for Pay Item No. 7 which has been provided on the Bid Form as a Lump Sum. The scope of Pay Item No. 7 is described in Section 02015 of the supplemental technical specifications.
  - 2. The work and materials shall be in accordance with Section 02015 of the supplemental technical specifications.
  - 3. Payment for the scope of work specified herein, including all labor, materials, and incidentals, associated with Dam Instrumentation Staff Gage, including the gage, number plates, and fasteners, will be made at the applicable lump sum price for Item No. 7 stated on the Form for Bid, upon successful installation and acceptance of the Staff Gauge by the District and Engineer.

#### H. Pay Item No. 8: Demolition and Disposal of Structures and Existing Water Mains/Piping

- 1. No measurement shall be made for Pay Item No. 8 which has been provided on the Bid Form as a Lump Sum. The scope of Pay Item No. 8 is described in Section 02065 of the supplemental technical specifications.
- 2. The work and materials shall be in accordance with Section 02065 of the supplemental technical specifications.
- 3. Payment for all labor, materials, equipment, and incidentals associated with Removal and Legal Disposal of Demolition and Disposal of Structures and Existing Water Mains/Piping shall be made at the lump sum price for Item No.8 of the Form for Bid. Partial payments for this item shall be billable in four (4) equal payments of twenty-five percent (25%) of the lump sum bid price over the duration of the Project.
- I. Pay Item No. 9: Earthwork
  - 1. No measurement shall be made for Pay Item No. 9 which has been provided on the Bid Form as a Lump Sum. The scope of Pay Item No. 9 is described in Sections 02200 and 02270 of the supplemental technical specifications.

- 2. The scope of this item also includes independent testing services associated with earthwork (e.g., laboratory testing and field density testing), as described in Sections 01451 and 02200.
- 3. The scope of this item shall also include costs associated with transport and lawful disposal of excess soil generated by earthwork, when such soils are deemed unsuitable for re-use. Costs for testing to characterize soils for proper disposal shall also be borne by the Contractor.
- 4. The work and materials shall be in accordance with Section 02200 and 02270 of the supplemental technical specifications and any applicable District Standard Specifications.
- 5. Payment for all labor, materials, equipment, and incidentals associated with Earthwork shall be made at the lump sum price for Item No. 9 of the Form for Bid. Partial payments for this item shall be billable in four (4) equal payments of twenty-five percent (25%) of the lump sum bid price over the duration of the Project.
- J. <u>Pay Item No. 10: Articulated Concrete Block for Auxiliary Spillway Crest and Channel</u> <u>Crossing</u>
  - 1. No measurement shall be made for Pay Item No. 10 which has been provided on the Bid Form as a Lump Sum. The scope of Pay Item No. 10 is described in Section 02385 of the supplemental technical specifications.
  - 2. The work and materials shall be in accordance with Section 02385 of the supplemental technical specifications.
  - 3. Payment for all labor, materials, equipment, and incidentals associated with installation of Articulated Concrete Block for Auxiliary Spillway Crest and Channel Crossing shall be made at the lump sum price for Item No. 10 of the Form for Bid, upon successful completion and acceptance of the work by the District and the Engineer.

# K. <u>Pay Item No. 11: Drilling, Consolidation Grouting, Water Testing, Installation, and Load</u> <u>Testing of Anchors.</u>

- 1. No measurement shall be made for Pay Item No. 11 which has been provided on the Bid Form as a Lump Sum. The scope of Pay Item No. 11 is described in Sections 02455 and 02457 of the supplemental technical specifications.
- 2. The work and materials shall be in accordance with Section 02455 and 02457 of the supplemental technical specifications.
- 3. This Item includes the drilling and consolidation grouting to be performed prior to the drilling and installation of anchors at the specified locations. This item also includes installation and testing of the Test Anchor noted on the Drawings and in Section 02457.
- 4. This Item includes one water test for the bond zone of each anchor. Additional water tests that may be required for holes that are re-drilled and re-grouted shall be paid for under Item No. 27.

- 5. Payment for all labor, materials, equipment, and incidentals associated with Anchor Drilling, Grouting, Water Testing, Installation, and Load Testing shall be made at the lump sum price for Item No. 11 of the Form for Bid. Partial Payments for this item shall be provided as follows: Thirty percent (30%) of the lump sum bid price upon completion of drilling and consolidation grouting, Twenty percent (20%) after the successful completion and acceptance of the load testing on the Test Anchor. Following the satisfactory completion and acceptance the Resident Engineer of water testing, anchor installation, and proof testing, the remaining 50% of the lump sum bid price will be paid.
- L. <u>Pay Item No. 12: Decommissioning of Right Abutment Intake</u>, Valves, and Backfilling of <u>Valve Chambers</u>
  - 1. No measurement shall be made for Pay Item No. 12 which has been provided on the Bid Form as a Lump Sum. The scope of Pay Item No. 12 is described in Section 02760 of the supplemental technical specifications.
  - 2. The work and materials shall be in accordance with Section 02760 of the supplemental technical specifications.
  - 3. Payment for all labor, materials, equipment, and incidentals associated with Decommissioning of Right Abutment Intake, Valves, and Backfilling of Valve Chambers shall be made at the lump sum price for Item No. 12 of the Form for Bid, upon successful completion and acceptance of the work by the District and the Engineer.

# M. Pay Item No. 13: Video Inspection and Cleaning of Outlet Pipes (Right Abutment and Low-Level Outlet)

- 1. No measurement shall be made for Pay Item No. 13 which has been provided on the Bid Form as a Lump Sum. The scope of Pay Item No. 13 is described in Section 02762 of the supplemental technical specifications.
- 2. The work and materials shall be in accordance with Section 02762 of the supplemental technical specifications.
- 3. Payment for all labor, materials, equipment, and incidentals associated with Video Inspection and Cleaning of Outlet Pipes (Right Abutment and Low-Level Outlet) shall be made at the lump sum price for Item No. 13 of the Form for Bid. Partial Payments for this item shall be provided as follows: Sixty percent (60%) of the lump sum bid price upon completion of cleaning and inspection of the Right Abutment Intake and Low-Level Outlet, after approval by the Resident Engineer. Following the satisfactory completion of the relining and video inspection of the low-level outlet, the remaining 40% of the lump sum bid price will be paid.

# N. Pay Item No. 14: Re-Line Low-Level Outlet Pipe

- 1. No measurement shall be made for Pay Item No. 14 which has been provided on the Bid Form as a Lump Sum. The scope of Pay Item No. 14 is described in Section 02765 of the supplemental technical specifications.
- 2. The work and materials shall be in accordance with Section 02765 of the supplemental technical specifications.

- 3. Payment for all labor, materials, equipment, and incidentals associated with Re-lining the Low-Level Outlet Pipe shall be made at the lump sum price for Item No. 14 of the Form for Bid, upon successful completion and acceptance of the work by the District and the Engineer.
- O. Pay Item Nos. 15.1 through 15.3: Cast-In-Place, Reinforced Concrete
  - 1. No measurement shall be made for Pay Item Nos. 15.1 through 15.3 which have been provided on the Bid Form as Lump Sums. The scope of Pay Item Nos. 15.1 through 15.3 are shown on the Contract Drawings and described in Section 03300 of the supplemental technical specifications.
  - 2. The work and materials shall be in accordance with Section 601 of the District Standard Specifications and Section 03300 of the supplemental technical specifications.
  - 3. The scope of this item also includes independent testing services associated with concrete testing (e.g., laboratory testing and field sample collection/transport), as described in Sections 01451 and 03300.
  - 4. Payment for all labor, materials, equipment, and incidentals associated with Cast-in-Place, Reinforced Concrete (and Accessories) at Top of Dam and Spillway shall be made at the lump sum price for Item No. 15.1 of the Form for Bid, upon successful completion and acceptance of the work by the District and the Engineer.
  - 5. Payment for all labor, materials, equipment, and incidentals associated with Cast-in-Place, Reinforced Concrete (and Accessories) for Retaining Walls shall be made at the lump sum price for Item No. 15.2 of the Form for Bid, upon successful completion and acceptance of the work by the District and the Engineer.
  - 6. Payment for all labor, materials, equipment, and incidentals associated with Cast-in-Place, Reinforced Concrete for Gatehouse Foundation and Floor Slab shall be made at the lump sum price for Item No. 15.3 of the Form for Bid, upon successful completion and acceptance of the work by the District and the Engineer.
  - 7. The Contractor may submit requests for partial payments for Items 15.1 through 15.3 based on the percentage of completed and accepted work under each Item.
- P. Pay Item No. 16: Gatehouse Scaffold Supports
  - 1. No measurement shall be made for Pay Item No. 16 which has been provided on the Bid Form as a Lump Sum. The scope of Pay Item No. 16 is described on Sheet GH2 and GH3 of the Contract Drawings and in Section 05500 of the supplemental technical specifications.
  - 2. The work and materials shall be in accordance with Section 05500 of the supplemental technical specifications.
  - 3. Payment for all design, labor, materials, equipment, and incidentals associated with Gatehouse Scaffold Supports shall be made at the lump sum price for Item No. 16 of the Form for Bid, upon successful completion and acceptance of the work by the District and the Engineer.

# Q. Pay Item No. 17: Safety and Decorative Railings

- 1. No measurement shall be made for Pay Item No. 17 which has been provided on the Bid Form as a Lump Sum. The scope of Pay Item No. 17 is described on the Contract Drawings and in Sections 05501 and 05730 of the supplemental technical specifications.
- 2. The work and materials shall be in accordance with Sections 05501 and 05730 of the supplemental technical specifications.
- 3. Payment for all labor, materials, equipment, and incidentals associated with Safety and Decorative Railings shall be made at the lump sum price for Item No. 17 of the Form for Bid, upon successful completion and acceptance of the work by the District and the Engineer.
- R. Pay Item No. 18: Chain Link Security Fencing and Gates
  - 1. No measurement shall be made for Pay Item No. 18 which has been provided on the Bid Form as a Lump Sum. The scope of Pay Item No. 18 is described on the Contract Drawings and in Section 1040 of the District Standard Specifications.
  - 2. The work and materials shall be in accordance with Section 1040 of the District Standard Specifications.
  - 3. Payment for all labor, materials, equipment, and incidentals associated with Chain Link Security Fencing and Gates shall be made at the lump sum price for Item No. 18 of the Form for Bid, upon successful completion and acceptance of the work by the District and the Engineer.
  - 4. The Contractor may submit requests for partial payments for Item No. 18 based on the percentage of completed and accepted work.

# S. Pay Item No. 19: Prefabricated Pedestrian Bridges and Accessories

- 1. No measurement shall be made for Pay Item No. 19 which has been provided on the Bid Form as a Lump Sum. The scope of Pay Item No. 19 is described on the Contract Drawings and in Section 13125 of the supplemental technical specifications.
- 2. The work and materials shall be in accordance with Section 13125 of the supplemental technical specifications.
- 3. Payment for all labor, materials, equipment, and incidentals associated with providing and installing two (2) pedestrian bridges, at the spillway and at the gatehouse, shall be made at the lump sum price for Item No. 19 of the Form for Bid, upon successful completion and acceptance of the work by the District and the Engineer.
- T. <u>Pay Item No. 20: Gatehouse Wet Well Controls and Access Stop Panels, Screens, Gates,</u> <u>Operators, Ladders, and Hatches.</u>
  - 1. No measurement shall be made for Pay Item No. 20 which has been provided on the Bid Form as a Lump Sum. The scope of Pay Item No. 20 is described on the Contract Drawings and in Sections 05500, 11131, and 11295 of the supplemental technical specifications.

- 2. The work and materials shall be in accordance with Sections 05500, 11131, and 11295 of the supplemental technical specifications.
- 3. Payment for all labor, materials, equipment, and incidentals associated with providing and installing Gatehouse Wet Well Controls and Access Stop Panels, Screens, Gates, Operators, Ladders, and Hatches, shall be made at the lump sum price for Item No. 20 of the Form for Bid, upon successful completion and acceptance of the work by the District and the Engineer.
- U. Pay Item No. 21: Gatehouse Superstructure Reconstruction.
  - 1. No measurement shall be made for Pay Item No. 21 which has been provided on the Bid Form as a Lump Sum. The scope of Pay Item No. 21 is described on the Contract Drawings and in the Supplemental Architectural Specifications (Attachment D) prepared by Stein Troost Architecture, LLC
  - 2. The work and materials shall be in accordance with the Contract Drawings and Supplemental Architectural Specifications
  - 3. Payment for all labor, materials, equipment, and incidentals associated with the Gatehouse Superstructure Reconstruction shall be made at the lump sum price for Item No. 21 of the Form for Bid, upon successful completion and acceptance of the work by the District and the Engineer.
  - 4. The Contractor may submit requests for partial payments for Item No. 21 based on the percentage of completed and accepted work.
- V. Pay Item No. 22: Electrical Construction Gatehouse Systems and Service to Gatehouse
  - 1. No measurement shall be made for Pay Item No. 22 which has been provided on the Bid Form as a Lump Sum. The scope of Pay Item No. 22 is described on the Contract Drawings and in the Supplemental Electrical Specifications (Attachment C) prepared by Consulting Engineering Services, Inc.
  - 2. The work and materials shall be in accordance with the Contract Drawings and Supplemental Electrical Specifications
  - 3. Payment for all labor, materials, equipment, and incidentals associated with the Electrical Construction Gatehouse Systems and Service to Gatehouse shall be made at the lump sum price for Item No. 22 of the Form for Bid, upon successful completion and acceptance of the work by the District and the Engineer.
  - 4. The Contractor may submit requests for partial payments for Item No. 22 based on the percentage of completed and accepted work.
- W. Pay Item No. 23: Water Main Replacement
  - 1. No measurement shall be made for Pay Item No. 23 which has been provided on the Bid Form as a Lump Sum. The scope of Pay Item No. 23 is described on the Contract Drawings and in Section 0700 of the District Standard Specifications.

- 2. The work and materials shall be in accordance with the Contract Drawings and Section 0700 of the District Standard Specifications.
- 3. Payment for all labor, materials, equipment, and incidentals associated with the Water Main Replacement shall be made at the lump sum price for Item No. 23 of the Form for Bid, upon successful completion and acceptance of the work by the District.
- 4. The Contractor may submit requests for partial payments for Item No. 23 based on the percentage of completed and accepted work.

## X. Pay Item No. 24: Site Restoration

- 1. No measurement shall be made for Pay Item No. 24 which has been provided on the Bid Form as a Lump Sum. The scope of Pay Item No. 24 is described in Section 01740 of the supplemental technical specifications and shall include all work necessary to restore and stabilize the site and any other areas affected by the Contractors operations to the satisfaction of the District.
- 2. The work and materials shall be in accordance with the Contract Drawings, Section 01740 of the supplemental technical specifications and any applicable sections of the District Standard Specifications.
- 3. Payment for all labor, materials, equipment, and incidentals associated with Site Restoration shall be made at the lump sum price for Item No. 24 of the Form for Bid, upon successful completion and acceptance of the work by the District and the Engineer.

#### 1.06 <u>UNIT PRICE ITEM QUANTITIES</u>

- A. Quantities provided in the Bid Form for unit pay item quantities represent the District's estimate based on available measurements and record drawings. Actual quantities may vary. The Contractor shall be paid on the basis of the actual, in place quantity for each bid item.
- B. Areas and volumes for concrete repair materials shall be computed as per the methodology described Quantities may be more or less than the estimated quantity shown on the Bid Form.
- C. The total price paid for each item listed below may be more or less than the total shown on the Bid Form based on the measured, in-place quantity and the unit price bid for each item on the Bid Form. The total price of the project, as listed on the Bid Form, will therefore be increased, or reduced based on the actual, in-place quantities.

#### 1.07 <u>UNIT PRICE CONTRACT ITEMS</u>

The following unit price items shall be included in the total bid for this Contract.

- A. Pay Item Nos. 25.1 through 25.3 Imported Fill Materials
  - 1. Measurement of furnishing, transport, placement, and compaction of Imported Common Fill (Item No 25.1), Imported Granular Fill (Item No 25.2) and Imported Granular Road Base (Item No. 25.3) from off-site sources shall be on a basis of the actual, in-place volume of the imported fill materials placed, in cubic yards.

- 2. No payment shall be made for quantities not approved by the District or Resident Engineer. Previously placed fill materials that become disturbed by the Contractors operations or the Contractor's failure to protect placed fill from the weather shall be replaced by the Contractor at no additional cost to the District.
- 3. Payment for Item Nos. 25.1 through 25.3 shall be made at the Contract unit price bid per cubic yard for each item. This price shall constitute full compensation for providing all labor, equipment, and materials necessary to perform the Work as specified herein.

# B. Pay Item No. 26: Rock and Boulder Excavation

- 1. Under Pay Item No. 26, the Contractor shall excavate, remove, and lawfully dispose of bedrock and boulders, in accordance with Section 02201 of the supplemental technical specifications.
- 2. Measurement of rock boulder excavation shall be on a basis of the actual measured volume of excavated bedrock or boulders greater than 1.0 cubic yard. Boulders shall be measured based on length, width, and height of the boulder, or by other methods mutually acceptable to the District and the Contractor.
- 3. Payment for Rock and Boulder Excavation shall be made at the Contract unit price bid per cubic yard for Item No. 26. This price shall constitute full compensation for providing all labor, equipment, and materials necessary to perform the Work as specified herein.

# C. Pay Item No. 27: Additional Drilling, Grouting, and Water Testing for Anchors - Allowance

- 1. Under Pay Item No. 27, the Contractor shall perform additional rounds of drilling, grouting, and water testing at anchor locations that do not meet the watertightness requirements of Section 02455.
- 2. Measurement for additional water testing for Strand Anchors shall be on the basis of the actual number of anchor locations re-drilled, re-grouted, and water tested, Each, beyond the initial activities at each hole, which are included in Item No. 11. The Contractor and Resident Engineer shall each keep separate records, but the Resident Engineer shall be the sole source of quantity calculations.
- 3. Payment for the scope of work specified in Section 02455 for Additional Drilling, Grouting, and Water Testing for Anchors, including all labor, materials, equipment and incidentals, and mobilization and demobilization costs with performing water testing, pressure grouting, and re-drilling of holes as required to satisfy the Specifications, shall be paid for at the unit price bid for Item No. 27. This price shall constitute full compensation for providing all labor, equipment, and materials necessary to perform the Work as specified herein.
- D. Pay Item No. 28: Patterned Stone Facing for Cast-In-Place Concrete
  - 1. Under Pay Item No. 28, the Contractor shall provide a simulated stone pattern for cast-inplace concrete, in accordance with the requirements of Section 03348.
  - 2. Measurement for patterned stone facing for cast-in-place concrete shall be measured by the square foot of actual surface area installed and accepted. Measurement shall be made by

taping, or by other methods mutually acceptable to the District and the Contractor. No separate measurement shall be made applying finish to the patterned concrete.

3. Payment for the scope of work specified in Section 03348 for Patterned Stone Facing for Cast-In-Place Concrete, including all labor, materials, equipment and incidentals, and mobilization and demobilization costs, shall be paid for at the unit price bid for Item No. 28.

## E. Pay Item No. 29: Masonry Restoration / Repointing

- 1. Under Pay Item No. 29, the Contractor shall restore and/or repoint the existing stone masonry of the dam, in accordance with the requirements of Section 04400.
- 2. Measurement for masonry restoration/repointing will be measured by the square foot of actual surface area of masonry restored and/or repointed. Individual areas of less than 1 ft<sup>2</sup> in area will be considered as 1 ft<sup>2</sup>. Areas greater than 1 ft<sup>2</sup> will be recorded as the actual measurement of the repaired area to the nearest 0.1 ft<sup>2</sup>. Measurement shall be made by taping, or by other methods mutually acceptable to the District and the Contractor. No separate measurement shall be made for mortar or backer materials.
- 3. Payment for the scope of work specified in Section 04400 for masonry restoration/repointing, including all labor, materials, equipment, site preparation, cleanup and incidentals, and mobilization and demobilization costs, shall be paid for at the unit price bid for Item No. 29.

# 1.08 INCIDENTAL WORK

The Contractor shall do all work and pay all costs of cutting, protecting, supporting, maintaining, relocating and restoring all surface, sub-surface, or overhead structures, and all other property, including pipes, conduits, ducts, tubes, channels and appurtenances, public or private, in the vicinity and at the site of the work (except such which by law, franchise, permit, contract, consent or agreement the owner thereof is required to protect, support, maintain, relocate or restore), repairing the same if damaged and restoring to their original condition all areas disturbed. The Contractor shall do all work and pay all costs of protecting, supporting, maintaining, relocating, replacing, and restoring all property and equipment owned by the District and/or adjacent public and private properties, roads, and structures. No measurement or payment shall be made for incidental work.

# 1.09 PROGRESS PAYMENTS AND RETAINAGE

- A. Progress payments will be made as per the Payment Provisions of the Contract.
- B. A retainage from each invoice shall be made by the District as per the Payment Provisions of the Contract.

# PART 2 – PRODUCTS (NOT USED)

# PART 3 - EXECUTION

#### 3.01 MEASUREMENT OF UNIT PRICE ITEMS

- A. Payment for quantities based on length, area, or volume shall be made ONLY to the lines and grades shown on the Contract Drawings, unless specifically approved by the District. No measurement for payment of work or materials beyond the design lines and grades shall be made without such additional work being pre-approved by the District.
- B. The Contractor and the Resident Engineer shall jointly make measurements. The Contractor and Resident Engineer shall together make the relative measurements and jointly record the appropriate quantity. In the event of a discrepancy or disagreement, the Contractor and the Resident Engineer shall immediately take action to reconcile the quantity measurement. Quantity measurements made in the absence of the Resident Engineer are subject to rejection.
- C. Linear and area measurements shall be made on a planar basis except in cases when slopes exceed 1 horizontal to 1 vertical, in which case measurement shall be made parallel to the feature being measured. Volume measurements shall be made with a tape to determine the area and general height (or depth) of the volume being measured. In the event that a shape is irregular, "average end" method shall be used to compute the volume.
- D. Following the completion of concrete removal to the final depths for each repair area, the Contractor, accompanied by the Resident Engineer shall take measurements of the dimensions (length, width, and/or depth as needed) of the prepared area. Measurements shall be made using a convenient and accurate method such as tape, level, transit, etc. Concrete repair areas and volumes shall be measured prior to the start of forming and pouring concrete repairs. The computation of a concrete repair volume, when required, shall be determined by geometrically computing using average end area measurement.
- E. In the event of an authorized field modification to the Work or an acknowledged changed condition, determination of actual dimensions shall be made by the Resident Engineer with assistance from the Contractor, as requested by the District. Calculations of quantities from field measurements shall be performed by the Resident Engineer using usual and customary methods. The Contractor may make independent measurements and estimates of quantities. In such an event, the Contractor shall provide the District with all information, data, documentations, and calculations used to compute pay item quantities. In the event of a discrepancy between the quantity computed by the Contractor and the Resident Engineer, the Contractor and the District shall meet in an effort to resolve the discrepancy. If no resolution is obtained, the dispute will be handled as per the terms of the Contract.

# PART 4 – (NOT USED)

#### \* \* \* END OF SECTION \* \* \*

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# SECTION 02015 STAFF GAUGE

#### PART 1 – GENERAL

#### 1.01 <u>SCOPE OF WORK</u>

- A. Work of this Section shall include the furnishing of all materials, labor, equipment, incidentals, and all else necessary for installing and protecting one (1) new staff gauge at the Gatehouse. The exact location on the Gatehouse shall be determined in the field by the District.
- B. The staff gauge shall be of durable, corrosion-resistant material with highly visible marks and numbers. The gage shall be installed so as to indicate water surface elevations using the NGVD '29 datum (or another datum specified by the District) The staff gage shall be incremented in feet and tenths of feet. The staff gage elevations shall be established and verified by the Contractor's Registered Land Surveyor (RLS).

#### 1.02 <u>SUBMITTALS</u>

The Contractor shall submit the following documents. Refer to Section 01300 - Submittals for additional information.

- A. Five (5) days prior to purchase, Contractor Shop Drawings and Manufacturer's Cut Sheets on the staff gauge components and hardware.
- B. Following installation, stamped documentation of instrumentation location and elevation from a Registered Land Surveyor (may be part of "as-built" plans).

#### 1.03 <u>STORAGE</u>

A. All staff gauge and related materials, after receipt at the site and prior to installation, shall be stored in an indoor, clean, dry, and secure storage space.

#### **PART 2 - PRODUCTS**

#### 2.01 <u>STAFF GAUGES</u>

- A. All staff gauge components, backing structure, and hardware shall be corrosion-resistant materials.
- B. Staff sections shall be a minimum of 3.5 inches wide (unnumbered) and graduated with black markings in feet and tenths of feet. Individual number plates shall be attached adjacent to the un-numbered graduated gauge. Number plates shall be 2" by 3" plates with black digits.

# **PART 3 - EXECUTION**

## 3.01 STAFF GAGE INSTALLATION

- A. The Contractor shall install the staff gauge at the location on the gatehouse as directed by the District. The Contractor shall consult with the District and its Resident Engineer prior to finalizing the location of the staff gage. The location shall be selected so as to facilitate visual readings from the left abutment of the Dam.
- B. The Contractor shall clean and prepare the surface of the concrete and/or masonry as needed prior to attaching the staff gage and numbers. The staff gage and numbers shall be mechanically attached flush against the wall using stainless steel anchor bolts or concrete screws. Verticality of the gage shall be checked and maintained and verified by the RLS.
- C. The staff gage in the upstream impoundment shall extend from elevation 274.0' to elevation 306.0' feet. The Contractor's Registered Land Surveyor shall establish and verify elevations.
- D. The staff gage shall be labeled with elevations at one-foot (1') increments showing the actual elevations as per the project datum. The staff gage foot-markers shall be set at even (integer) foot elevations.

# PART 4 - MEASUREMENT AND PAYMENT

Refer to Section 01950 – Measurement and Payment for the measurement and payment items related to this Section.

#### \* \* \* END OF SECTION \* \* \*

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# SECTION 02065 DISMANTLING AND DEMOLITION / REMOVAL OF EXISTING STRUCTURES

## PART 1 – GENERAL

#### 1.01 DESCRIPTION

- A. This Section describes the general parameters and requirements for as the dismantling, relocation, demolition, removal, and lawful off-site disposal of certain existing materials and structures at the Work Site.
- B. The Work of this Section shall include the demolition and legal off-site disposal of existing structures which are intended to be removed as part of the Work of the Contract.
- C. The Work of this Section shall include temporary removal, handling, and storage of existing structures which may be re-constructed at the same location or elsewhere as part of the final project configuration.
- D. The Work of this Section shall include the removal, handling, and storage for existing material which may be reused at the site as part of the final project configuration.
- E. The Contractor shall obtain all necessary permits, including local, state, and federal permits, coordinate all required inspections with appropriate agencies, and conduct all work in accordance with all local, state, and federal rules, regulations, and guidance.
- F. If necessary, the scope of this item shall also include all work, materials, labor, and other costs associated with the design, installation, and removal of any temporary earth support systems, rigging systems, containment systems, or other means and methods required during dismantling, demolition, and/or removal of existing structures.

#### 1.02 <u>SCOPE OF WORK</u>

- A. The general scope of work shall be to prepare the Grupes Reservoir Dam site for the dam safety rehabilitation project by removing certain existing structures and materials as noted on the Drawings. Structures to be demolished include (but are not limited to):
  - 1. Former Chlorination Building
  - 2. Gatehouse Superstructure
  - 3. Steel Catwalks/Bridges
  - 4. Right Abutment Stairs
  - 5. Stone Walls Along Eastern Shoreline
  - 6. Auxiliary Spillway Stream Crossing
  - 7. Existing Concrete Vaults, DI Pipes, and Fittings
- B. Other site features slated for decommissioning, demolition, or removal are as indicated on the Contract Drawings (Refer to Sheets C1 and GH1)

# 1.03 <u>GENERAL</u>

- A. Demolition work shall be performed in accordance with all applicable local, state, and Federal regulations. Based on current information, no hazardous materials are anticipated within structures to be demolished or dismantled.
- B. The removal and disposal of all miscellaneous debris found at the job site, including timber, trash, wood chips, mulch, and other materials, above and below grade shall be considered incidental to the other pay items in this or other Sections of the Work. Useable materials specifically requested to be salvaged by the District shall be relocated within the staging area or elsewhere on site by the Contractor, as requested by the District. All other material becomes property of the Contractor and must be lawfully disposed of off-site.
- C. Excavation in support of demolition shall be considered incidental to the work of this specification.

# 1.04 EXISTING CONDITIONS

A description of some of the major components

- A. The existing Chlorination Building is a brick masonry structure approximately 12 feet by 15 feet by 12 feet high. The building features a slate roof and is currently used for storage. The finish floor elevation is 281.5 feet.
- B. The existing gatehouse superstructure is a brick masonry structure approximately 12 feet by 12 feet with a maximum height of 13 feet above the well chamber. The building features a slate roof and houses three gate operators for the low, mid, and high-level gates.
- C. The existing steel catwalk is approximately 50 feet long and 1-foot-deep, spanning over the primary spillway. The catwalk features steel handrails and steel floor grating. It is anchored directly to the top of dam at each spillway abutment.
- D. The existing steel bridge is approximately 60 feet long and 1-foot-deep, spanning from the right spillway abutment to the gatehouse. The bridge features steel handrails and steel floor grating.
- E. The existing auxiliary spillway crossing consists of five 15-inch RCP pipes overlain by concrete slabs.

# 1.05 DESIGN CRITERIA

- A. Excavations, if required shall be performed in accordance with OSHA requirements. If support structures are used by the Contractor to support the sides of excavations, the selection, design, and installation of the support system(s) shall be the responsibility of the Contractor.
- B. Debris resulting from demolition activities shall be segregated and recycled to the greatest extent possible. Salvage value accrues to the Contractor, <u>except</u> in cases where material is specifically reserved by the District. Material that the District does not specify becomes property of the Contractor.

C. Material salvaged for the District or for later replacement/restoration at the site by the Contractor shall be handled with care so as to not damage the material, to the extent possible. Material salvaged for use by the District shall be transported and placed in a storage location on-site, as designated by the Resident Engineer, at no additional cost to the District. Material salvaged for later restoration / reconstruction at the site shall be transported and placed in a storage location on-site or elsewhere, as selected by the Contractor, at no additional cost to the District.

# 1.06 PROJECT CONDITIONS

- A. Explosives: Blasting and use of explosives is not permitted.
- B. Burning: Burning on site is not permitted.
- C. Protection: The Contractor shall prevent injury to persons and damage to abutting property. The Contractor shall further provide adequate shoring and bracing to prevent uncontrolled collapse and immediately repair damaged property to its condition before being damaged.
- D. The Contractor shall carefully examine all of the Contract Documents for requirements that affect the work of this Section. Certain construction, systems, or equipment identified in the Contract Documents or by the District in the field shall remain in-place for future service and shall be protected.
- E. The Contractor shall not allow debris to be carried into the downstream channel, impoundment, or any portion of the Silvermine River.
- F. The Contractor shall immediately repair, to the satisfaction of the Resident Engineer, any damage directly and indirectly caused by the Contractor's operations at no cost to the District.
- G. The Contractor shall remove and legally dispose of all clearing debris, demolition debris, and solid waste from the Site. No on-site disposal of stumps shall be allowed. On-site recycling or reuse of demolition debris, including brick, concrete, and asphalt, is not allowed, except where specifically authorized by the Specifications or by the Resident Engineer. The Contractor shall be aware that remaining foundations and slabs may be painted or coated with substances (paint, sealers, etc.) and therefore may not be suitable for off-site recycling, in accordance with Connecticut Solid Waste Regulations.

#### 1.07 <u>RELATED WORK SPECIFIED ELSEWHERE</u>

- A. The following is a list of related work items that shall be performed or furnished under other Sections of these Specifications as indicated.
  - 1. Pre- and Post-Construction Surveys: 01436
  - 2. Temporary Water Control: Section 01565
  - 3. Site Restoration: Section 01740
  - 4. Temporary Cofferdam: Section 02170
  - 5. Earthwork: Section 02200

- 6. Pipeline and Valve Chamber Abandonment: Section 02760
- 7. Concrete: Section 03300

## 1.08 <u>SUBMITTALS</u>

The Contractor shall submit the following documents. Refer to Section 01300 - Submittals for additional information.

- A. The Contractor shall submit a plan detailing procedure, equipment, sequence of operations, and schedule to perform the dismantling, relocation, demolition, removal, and disposal activities called for in this Work Item.
  - 1. The Contractor's Work Plan shall list all features/structures to be demolished as part of this Work Item, based on their understanding of the Contract Documents.
  - 2. The Work Plan shall include the name, contact information, and qualifications of any subcontractors assisting with or conducting the demolition. The submission shall also include procedures for the supporting of excavation sidewalls.
  - 3. The Contractor shall submit information on the facility to which demolition debris will be taken for disposal. The Contractor shall also designate the area in which salvaged material will be stored.
- B. If a temporary earth support system is utilized, submit to the District all plans, sections, details, and calculations describing the Contractor's proposed temporary earth support system. The design of the bracing and support system shall be certified by a Professional Engineer licensed in the State of Connecticut.
- C. Documentation of existing conditions shall be submitted under Section 01436. Documentation of removal, storage, and replacement work shall be submitted to the District.

#### PART 2 - PRODUCTS

This Section Not Used.

# PART 3 - EXECUTION

#### 3.01 <u>GENERAL</u>

- A. No removal or demolition work shall begin until the existing conditions documentation work has been completed and the documentation package accepted by the District.
- B. The Contractor shall determine means and methods for all demolition tasks specified as part of the Work, subject to the restrictions contained in this specification and subject to approval by the District and its Resident Engineer.

- C. The Contractor shall backfill areas of demolished structures and/or features to existing grades, or to the subgrade elevation required to execute subsequent work items. Backfill shall be in accordance with Section 02200.
- D. The Contractor will likely require a method of traversing from the gatehouse to the dam once the bridge has been removed. Provision for continued site access shall be provided at no additional cost to the District.
- E. Erect and maintain temporary barriers and security devices including warning signs and lights, and similar measures, for protection of the District, Contractor's employees, all others, and existing improvements to remain.
- F. Protect existing landscaping materials, structures, and utilities not indicated to be demolished. Take all steps necessary to prevent movement or settlement of adjacent structures and embankments.
- G. The Contractor shall coordinate the demolition of the gatehouse with the installation of the temporary cofferdam and water controls.

# 3.02 <u>CHLORINATION BUILDING</u>

- A. The Chlorination Building shall be removed to 4' below existing ground surface.
- B. The Contractor shall punch holes in the basement floor slab and backfill the structure to the previous ground surface with compacted common fill.

# 3.03 <u>GATEHOUSE</u>

- A. The existing gatehouse superstructure shall be demolished to approximate El. 298.7 or as directed by the District or Engineer.
- B. Gatehouse demolition shall include removal of all internal equipment (operators and hoists) as well as gates, supports, and gate components not required as part of the proposed water control measures.
- C. The existing stoplog and screen guides shall also be removed as part of the Gatehouse demolition.

#### 3.04 STEEL CATWALK AND BRIDGE

The Contractor shall demolish and remove the steel catwalks and bridge completely, including any anchors/plates at the ends of either structure.

#### 3.05 OTHER MISCELLANEOUS FEATURES

Coordinate demolition of site features not specifically described herein with the District and the Engineer.

# PART 4 - MEASUREMENT AND PAYMENT

Refer to Section 01950 – Measurement and Payment for the measurement and payment items related to this Section.

# \* \* \* END OF SECTION \* \* \*

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# SECTION 02110 CLEARING, GRUBBING, AND STRIPPING

# PART 1 - GENERAL

#### 1.01 DESCRIPTION

- A. The Contractor shall furnish all labor, material, tools, and equipment and perform all operations necessary to cut and clear trees, remove surficial debris, grub up primary roots, stumps, and surficial stones, clear the site, and strip topsoil prior to excavation work.
- B. The Work shall consist of clearing, grubbing, removal and lawful off-site disposal of all vegetation, roots, stumps, surficial debris, and topsoil from proposed areas of construction within the Limit of Work as shown on the Contract Drawings.
- C. The Contractor shall conduct work in a manner that preserves from injury or defacement of all vegetation and objects designated by the District or its Resident Engineer.
- D. Clearing, Grubbing, and Stripping shall be required on portions of the Grupes Reservoir Dam and along the service road along the east side of Grupes Reservoir. Additional clearing, grubbing, and stripping shall be required at the staging areas.
- E. The District may pre-mark certain trees within the project area which are NOT to be cut or otherwise disturbed. The Contractor shall coordinate with the Resident Engineer regarding this effort and then shall protect the marked trees from harm.

## 1.02 <u>SCOPE</u>

The general scope of all clearing, grubbing, and stripping shall be to execute all work necessary to prepare all areas on the site for further earthwork (excavation or embankment), demolition, or other construction. The Contractor shall clear, grub, and strip all areas where construction shall take place as shown on the Contract Plans, as well as any other areas necessary for the work of the Contract (with approval from the District or its Resident Engineer). The Contractor shall perform ALL necessary clearing, grubbing, and stripping at all locations on the site, irrespective of the basic descriptions provided below:

Clearing and Grubbing shall encompass all Work necessary to remove all trees, vegetation, stumps, and roots from the proposed work areas (as necessary), staging areas, and other locations as necessary to accomplish the work and as shown on the Contract Drawings. Trees and vegetation outside the area of disturbance shall NOT be cleared, grubbed, or otherwise disturbed.

Stripping shall encompass all Work necessary to remove organic-containing topsoil from the work areas, staging areas, and other locations as necessary to accomplish the work as shown on the Contract Drawings. <u>The typical</u> <u>minimum depth of stripping shall be six inches (6")</u>. This depth may be varied based on the extent of topsoil and root penetration. In particular, extra depth may be necessary on some portions of the embankment. Areas outside the area of disturbance shall NOT be stripped or otherwise disturbed.

Backfill of these areas, if required, shall be performed as specified in Section 02200.

#### 1.03 <u>REQUIREMENTS</u>

A. All Work shall comply with all codes, rules, regulations, laws, and ordinances of the Town of New Canaan, Connecticut, the State of Connecticut, and all other authorities having jurisdiction within the Work area.

# B. The Contractor shall be responsible for clearing the site with Call Before You Dig and with all relevant District and Town Departments which may maintain utility structures in and around the site.

- C. All Work shall commence after respective sedimentation and erosion control measures are in place to the satisfaction of the Resident Engineer in accordance with Section 01560 of these Specifications. The Contractor remains solely responsible for the suitability and adequacy of any of the sedimentation and control materials, methods, and procedures.
- D. The Contractor shall not burn trees, brush, stumps, and other ignitable materials.
- E. The Contractor shall obtain permission from the Resident Engineer prior to using storage areas within the Site boundaries for collection or stockpiling of surficial debris and/or topsoil. Stockpiles shall only be in areas approved by the Resident Engineer.
- F. Any clearing beyond the boundary limits shall not be permitted without express permission from the District.
- G. The Contractor shall make all arrangements necessary for the legal disposal of trees, stumps, surficial debris, topsoil, and other material collected during Site clearing, grubbing, and stripping. Debris materials shall be temporarily stockpiled at an approved on-site location and lawfully disposed of off-site at a location approved by the District. Timber cleared from the site may be salvaged by the Contractor for any other lawful off-site uses. Topsoil shall be segregated and reused onsite in grassed areas or as the final surface treatment of stockpile or staging areas, or as directed by the Resident Engineer.

#### 1.04 <u>RELATED SECTIONS</u>

- A. District Standard Specification Item No. 201
- B. Section 01436 Pre- and Post-Construction Surveys
- C. Section 01560 Temporary Erosion and Sedimentation Control
- D. Section 02200 Earthwork
- E. Section 02930 Loaming, Seeding, and Revegetation

#### 1.05 <u>SUBMITTALS</u>

At least 10 days prior to the work of this Section, submit to the District for review and comment a plan showing the boundaries of all areas to be cleared, grubbed, and stripped, and showing the locations of proposed stockpiles. Indicate in the submittal the sediment and erosion control measures which will be implemented on and around the stockpiles. Indicate means and methods of clearing and grubbing and of accessing areas to be cleared and grubbed. Indicate stockpile areas and means of placement which will minimize re-handling. Indicate sequencing, if any. Indicate off-site disposal locations along with any required permits which the Contractor or disposal facility is required to obtain.

# PART 2 - PRODUCTS

Not Used

# PART 3 - EXECUTION

## 3.01 <u>PREPARATION</u>

- A. The Contractor shall confirm with the Resident Engineer those areas to be cleared, grubbed, and stripped and the location for the debris stockpiles for materials which will be disposed of off-site.
- B. The Contractor shall coordinate with the District to identify and protect trees which will NOT be cleared from the site. These trees shall be prominently marked.
- C. The Contractor shall locate, identify, and protect sensitive areas (especially wetland areas, protected trees, forest areas, and any utilities) from damage during work.
- D. The Contractor shall protect benchmarks, survey control points, valves, and existing geotechnical instrumentation from damage or displacement.

#### 3.02 <u>CLEARING, GRUBBING AND STRIPPING</u>

- A. The Contractor shall clear, cut, or otherwise remove all trees and vegetation from the indicated areas. Identified trees and trees and vegetation outside the indicated areas shall be protected.
- B. The Contractor shall remove surficial debris, vegetation, stumps, roots, and obstructions including topsoil, which will affect excavation and embankment operations on the Site. This shall include grubbing of all stumps and major subsurface root systems where roots exceed a quarter of an inch in diameter.
- C. The Contractor shall place all surficial debris including stripped topsoil into on-site stockpiles for off-site disposal at an approved disposal location by the Contactor. Transportation and disposal will be performed at the Contractors convenience after approval of the material for disposal and location of disposal.
- D. The Contractor shall screen and/or otherwise treat stripped topsoil which is intended for use as loam. Topsoil to be reused as loam shall meet all requirements and testing for loam set forth in Section 02930 prior to re-use on-site. Excess soil materials from the clearing and stripping processes may be permanently stockpiled in designated on-site areas with the prior approval of the District.
- E. No burning shall be allowed. The Contractor may chip cleared trees to create wood chip mulch. This material can be used on site where warranted. The District may have use for some portion of the material and shall be allowed to remove quantities not used on-site by the Contractor. The remaining material shall be lawfully disposed of off-site. This work shall be considered incidental, and the cost shall be included in the price bid for this item.

F. No additional payment will be made for moving of stockpiles or re-handling of material. The stockpiles shall be sited, placed, and graded in such a way as to minimize re-handling necessary.

# PART 4 - MEASUREMENT AND PAYMENT

Refer to Section 01950 – Measurement and Payment for the measurement and payment items related to this Section.

#### \* \* \* END OF SECTION \* \* \*

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#### SECTION 02170 TEMPORARY COFFERDAM

## PART 1 - GENERAL

#### 1.01 <u>SCOPE</u>

- A. The section includes the installation, maintenance, and removal of a temporary cofferdam needed to prevent water intrusion into the work areas and allow work to proceed "in-the-dry." The work under this section includes the furnishing of all labor, equipment, supplies, materials, and utilities required for the design, operation, maintenance, supervision, and removal of the temporary cofferdam.
- B. The Contractor shall determine the need for a temporary cofferdam based on their proposed construction methods and sequence. Any temporary cofferdams used should work in concert with the Contractor's Water Control Plan. It should be noted that the District anticipates being able to affect a complete drawdown of Grupes Reservoir between November 1 and May 1.
- C. The temporary cofferdam shall be placed so as not to interfere with the other components of the work. All work shall be performed in accordance with the plans and specifications and to the satisfaction of the Owner and their Engineering Consultant.
- E. The temporary cofferdam shall remain in-service until all corresponding dam rehabilitation work is complete and accepted by the Owner.
- F. It is hereby noted that at part of their bid submittal, the Contractor shall include a description of the temporary cofferdam system they intend to use to control water throughout the duration of the work. The Contractor shall fully explain their approach. The Owner will review the description/approach in terms of compliance with the intent of this specification and Project permits.

#### 1.02 <u>RELATED WORK</u>

- A. The following is a list of related work items that shall be performed or furnished under other sections of these specifications as indicated:
  - 1. Regulatory Requirements See Section 01060
  - 2. Sedimentation and Erosion Control See Section 01560.
  - 3. Temporary Water Control See Section 01565
  - 4. Hydraulic and Hydrologic Data See Section 01566
  - 5. Earthwork See Section 02200

#### 1.03 <u>SUBMITTALS</u>

The Contractor shall submit the following documents. Refer to Section 01300 - Submittals for additional information.

- A. Not less than two (2) weeks prior to the scheduled installation of the temporary cofferdam, the Contractor shall submit their proposed method of installing, maintaining, and removing the temporary cofferdam and emergency procedures for review. The submittal shall include as a minimum the following items:
  - 1. The Contractor's proposed design, layout, sequence of installation, sealing, maintenance, supervision, and removal of the temporary cofferdams. Maintenance and supervision requirements during non-working hours (i.e., nights, holidays, and weekends) should be addressed. The work plan should also provide a detailed description of the sequence of the installation and removal, including any phasing (if any) as appropriate, of the upstream and downstream cofferdams.
  - 2. All materials to be used for the work of this section.
  - 3. The designer's, installer's and supervisor's qualifications. These individuals shall each have appropriate qualifications through experience or professional status.
  - 4. The Contract Drawings show the layout in plan and section view of the temporary cofferdam installation. The Contractor's design of the cofferdam shall be stamped by a qualified, registered Professional Engineer (P.E.). Commercially supplied proprietary cofferdam systems do not require P.E. certification so long as they are judged by the Engineering Consultant to meet the intent of the specifications.
  - 5. Proposed method of initial lowering of water inside temporary cofferdams and subsequent raising of water levels at the completion of the work, along with siltation control measures for any water that is discharged into the Reservoir.
  - 6. The Contractor's proposed emergency contingency plan for prevention or control of potential flooding of the work area during storm events. The contingency plan should address, but not be limited to: maximum reservoir level, wind and/or wave conditions under which the temporary cofferdam may be used, emergency signaling procedures, health and safety plan, emergency breaching and controlled flooding procedures, leakage/seepage/sand boil control measures.

# PART 2 - PRODUCTS

# 2.01 <u>COFFERDAM</u>

- A. The temporary cofferdam shall provide a barrier between the Reservoir and the work area. The ends shall tie back perpendicularly into the existing shoreline or Gatehouse sufficiently upstream of the work so as to allow full and clear access to the work areas.
- B. System shall be sized and designed in accordance with the foundation bearing capacities, based on anticipated water depth (hydraulic loading). System shall be able to accommodate Reservoir levels coincident with the top of the system.
- C. Cofferdam systems, such as water filled bladders, sandbags, and/or concrete block and membrane systems may be proposed for consideration by the Engineering Consultant. Loose soil or other material considered "fill" by the US Army Corps of Engineers will NOT be an acceptable material for the construction of cofferdams or diversion barriers.

- D. All temporary cofferdam components shall be clean of contaminants and any other materials that could adversely impact water quality.
- E. A commercially available temporary cofferdam system, such as the Portadam system provided by PORTADAM, Inc. of Williamstown, N.J., or approved equivalent may be used in lieu of a Contractor-designed system.

# PART 3 - EXECUTION

# 3.01 <u>GENERAL</u>

- A. The Contractor shall be responsible for maintaining a safe, clean, and accessible work site at all times. The Contractor shall have full responsibility for the complete and proper diversion of water from the work site at all stages of the project. The Contractor shall, at no additional cost to the Owner, repair any damage to any equipment, material or work caused by seepage, flood, overtopping, or other failure of the temporary cofferdam systems.
- B. The Contractor shall take all reasonable and prudent precautions during construction to provide and maintain the temporary cofferdams and other related equipment. The temporary cofferdam(s) shall be maintained and supervised by the Contractor's personnel qualified to do such work.
- C. All OSHA requirements and all applicable State and local environmental requirements shall be satisfied.
- D. The Contractors work shall not alter the existing Reservoir or downstream channel in the course of completing the work and shall prevent or contain the release of any sediments and debris therein. Where the Contractor finds it necessary to remove accumulated sediments and/or debris, the price paid shall be considered incidental and be covered in the applicable bid items of this Contract.
- E. In the case of overtopping of the cofferdam by waves, settlement, or high waters, means shall be provided for controlled flooding of the work area.
- F. All pumping and water discharge shall be in accordance with Sections 01060 and 01565.
- G. Temporary cofferdam components which settle, tilt, or move laterally shall be righted, reset, or enlarged as necessary at no additional expense to the Owner.
- H. The Contractor shall take all such precautions necessary to protect the site and the Works of this Contract, either completed or incomplete, from flood waters and flows which would either damage the Work or the site or cause delay of the Work.
- I. In the event of the Reservoir water levels rising higher than the limits of the cofferdam during the performance of the Work, the Contractor shall undertake measures to protect existing structures and new work.
- J. In the event of anticipated flooding, the Contractor shall remove all equipment, erosionsusceptible material items or materials subject to damage from water, and items or materials

that could adversely impact water quality from areas liable to be inundated or otherwise impacted by flooding. The Contractor shall secure the site and make all efforts to protect completed and incomplete work.

#### 3.02 DESIGN REQUIREMENTS

- A. The temporary cofferdam shall be designed for all expected site-specific conditions, including, but not limited to: wind, waves, variations in reservoir level, bottom conditions, and site bathymetry/topography.
- B. The Contractor shall make their own evaluation of site conditions, particularly the Reservoir bottom and contours along the length of the cofferdam and verify the size/height of the cofferdam system required to meet the intent of these specifications. Other temporary cofferdam structures may be presented by the Contractor subject to the approval of the Owner and their Engineering Consultant.
- C. In the event the cofferdam is expected to be in place when ice will be present, the Contractor shall propose and operate an active system (with appropriate backup) to prevent ice formation against the cofferdams (e.g., bubblers, etc.).
- D. In the event of the Reservoir water level rising higher than the limits of the cofferdam during the performance of the work, the Contractor shall undertake measures to protect existing structures and new work.

#### 3.03 <u>REMOVAL</u>

- A. The Owner shall be informed at least 48 hours prior to removal or relocation of any portion of the temporary cofferdam system. The work inside the temporary cofferdam must be observed and accepted by the Owner prior to removal.
- B. All parts of the temporary cofferdams shall be removed from the site at the end of the work.

#### 3.04 WATER MANAGEMENT

A. The Contractor shall be responsible for the management of water within the areas encircled by the cofferdams and shall be responsible for all necessary bypass flows. Management of surface water and groundwater (seepage, etc.) shall be accomplished and paid for under separate Sections of the Contract.

#### PART 4 - MEASUREMENT AND PAYMENT

Refer to Section 01950 – Measurement and Payment for the measurement and payment items related to this Section.

#### \* \* \* END OF SECTION \* \* \*

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# SECTION 02200 EARTHWORK

#### PART 1 - GENERAL

#### 1.01 DESCRIPTION

- A. The work of this section applies to all operations involving earthwork and/or soil material. Refer to Section 02270 - Stone, Rock, and Riprap for stone/rock material information. This specification generally governs the execution of excavation, fill placement, and all other earthwork tasks. This specification also generally governs acceptable soil material properties. The provisions of this specification shall apply to all such work and materials unless specifically superseded in another specification.
- B. When earthwork is included as a fundamental or incidental part of the work of a pay item, the Contractor shall provide all equipment, materials, labor, and incidentals and do all work necessary to complete the earthwork shown on the drawings.
- C. Earthwork tasks governed by this Section include, but are not limited to, the following:
  - 1. Excavation of soil, temporary on-site stockpiling, lawful off-site disposal of unsuitable and excess materials.
  - 2. Grading and compaction of sub-grades.
  - 3. Supplying of appropriate backfill and fill materials, including stone/rock.
  - 4. Handling and placement of fill materials, in lifts, appropriate grading and compacting to specified densities at specified moistures, of fill materials.
  - 5. Intermediate and temporary grading.
  - 6. Final grading as per design plans and sections.
  - 7. Executing all incidental excavation, filling, and grading for the placement of material for structures and general site preparation. This work includes, but is not limited to, pipe trenching and backfilling, foundation preparation, backfilling of underground and retaining structures, site drainage, etc.
  - 8. Design and Construction of excavation support systems (if used).
  - 9. Testing of Off-Site Fill for chemical contamination.
  - 10. Exploratory test pits, if necessary
  - 11. Independent Geotechnical Laboratory Testing of fill, whether reused from on-site excavations of imported from off-site sources, for grain size distribution and moisture-density relationship.
- D. Provisions for excavation dewatering is included Section 01565 Temporary Water Control.
- E. The Contractor shall coordinate with the Resident Engineer in regard to field quality control for all earthwork under all pay items, as needed.

F. Stripping of topsoil shall be performed and paid for under a separate Section of the Work. Excavation quantities shall be calculated from the ground surface after topsoil material has been stripped.

# 1.02 <u>SCOPE OF WORK</u>

The general scope of work shall be to perform all earthwork, including excavation, trenching, filling, compaction, and grading, required for the Grupes Dam Rehabilitation Project. Any earthwork not specifically covered under this, or other sections of the Contract Documents shall be considered incidental and shall be accomplished at no additional cost to the District. Earthwork includes, but is not limited to the following items:

A. <u>Common Excavation after Stripping</u>: Excavation of earthen material both by machine and hand after topsoil has been stripped. The work shall also include the provision of all necessary excavation support and other required items to provide for safe access into the excavation and provide for the location and protection, as needed, of existing utilities and structures in, under, and near the excavation. The work of this item shall also include handling and temporary stockpiling of material. No additional payment will be made for any re-handling of the excavated material once it has been removed from its original position until it becomes Common Borrow or is designated as Spoil for Off-Site Disposal.

Excavation work under Common Excavation shall include all materials unless specifically covered by another item in the contract. Common excavation does not include excavation of bedrock (ledge) or large boulders.

Excavations shall be made in those areas indicated on the Contract Drawings or as directed by the Resident Engineer.

- B. <u>Placement of Previously Excavated On-Site Common Fill</u>: Handling, placement, compaction, and grading of on-site common soil material, which has been previously excavated by the Contractor at the project site under the work of this Contract. The on-site soil material, if judged suitable by the Resident Engineer, may be used for embankment fill, or used as directed by the Resident Engineer.
- C. <u>Furnishing and Placement of Off-site Common Fill</u>: Provision of materials, transport, handling, placement, compaction, and grading of off-site embankment fill meeting the material specifications. Common fill from off-site sources shall be used, as directed by the Resident Engineer, as excavation backfill and for raising the embankment when on-site material is found to be inappropriate or insufficient.
- D. <u>Legal Off-Site Disposal of Common Spoil</u>: Handling, dewatering, transportation, and lawful off-site disposal of excess soil material, common, organic, or otherwise, excavated from under Upland areas and which is judged not needed or not appropriate for use at the project site. Soil material not classified as polluted or contaminated (i.e., not requiring a special disposal facility) will be disposed of under this pay item.
- E. <u>Furnishing and Placement of Stone, Rockfill, and Riprap</u>: Provision of materials, transport, handling, placement, compaction, and grading of off-site crushed stone and/or riprap meeting the material specifications in Section 02270.

F. <u>Test Pits</u>: Test pits, if deemed necessary, shall be performed in within the project limits for the purpose of identifying soil, bedrock and subsurface utility conditions when directed by the District or Resident Engineer. Test pits shall include all excavation of earthfill material from within the project site both by machine and hand for examination and logging of the excavation by the District, its Resident Engineer, and/or its Consultant. The work of this item shall include proper refill and compaction.

# 1.03 <u>RELATED WORK</u>

- A. The following is a list of related work items that shall be performed or furnished under other Sections of these Specifications as indicated:
  - 1. District Standard Specifications
  - 2. Temporary Erosion and Sediment Control Section 01560
  - 3. Temporary Water Control Section 01565
  - 4. Subsurface Investigation Technical Data Section 01567
  - 5. Clearing, Grubbing, and Stripping Section 02110
  - 6. Rock and Boulder Excavation Section 02201
  - 7. Stone, Rockfill, and Riprap Section 02270
  - 8. Loaming, Seeding and Revegetation Section 02930

#### 1.04 FIELD MEASUREMENTS

- A. Verify survey benchmarks and intended elevations for the work prior to commencement of work.
- B. Verify final grades for conformance to design plans.
- C. Make measurements for determination of pay quantities in cooperation with the Resident Engineer as per Section 01950 Measurement and Payment.

#### 1.05 <u>REFERENCES</u>

- A. ASTM C33 Standard Specification for Concrete Aggregates.
- B. ASTM D422 63(2007) Standard Test Method for Particle-Size Analysis of Soils.
- C. ASTM D698 Standard Proctor Density Test for soil material.
- D. ASTM D1556 07 Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method.
- E. ASTM D6938 08a Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth).
- F. OSHA Regulations, 29 CFR Part 1926 Excavations, current revisions.

#### 1.06 <u>SUBMITTALS</u>

The Contractor shall submit the following documents. Refer to Section 01300 - Submittals for additional information.

- A. Submit for review, at least five (5) days prior to the delivery to the site of any non-woven geotextile fabric for use under construction entrances, temporary access roadways or elsewhere, a description of the material, the source of the material, manufacturer's specifications, and samples of the material.
- B. Submit for review, at least eight (8) days prior to the commencement of work, the methods of construction including equipment to be used, excavation support methods and details, dewatering provisions to be used, and proposed locations of haul roads and staging areas within the work limits.
- C. If temporary earth excavation support system(s) are to be used, , the Contractor shall submit to the District, at least eight (8) days prior to the commencement of work all plans, sections, details, and calculations describing the Contractor's proposed temporary earth support system(s). The design of the bracing and support system shall be certified by a Professional Engineer licensed in the State of Connecticut. <u>Despite review and comment by the District or its Consultant, the Contractor shall remain solely responsible for the adequacy and safety of materials and methods used in construction.</u>
- D. Submit for review, at least ten (10) days prior to use, representative samples of all fill materials to be used, along with laboratory test results for grain size distribution (sieve) and moisture-density (Proctor) test results. Testing shall be performed by the Contractor's Independent Materials Testing Laboratory. Test results shall be submitted for all fill to be used, whether imported from off-site or re-used from on-site excavations.
  - a. The Contractor may elect to perform gradation testing in advance of Proctor tests. If this is done, the Contractor shall allow sufficient time for review of separate gradation and Proctor test results prior to use on-site.
  - b. If, in the opinion of the Resident Engineer, the nature of the on- or off-site fill changes during the course of the Work, the Contractor shall resubmit a representative sample and the results of new gradation and Proctor testing prior to further material usage in the Work. These additional tests shall be at no additional cost to the District.
- E. At least ten (10) days prior to use, the Contractor shall submit the identity and location of each source of imported off-site fill material. The submittal for each source shall include results of environmental testing performed on a representative sample of the material. Testing shall be required for each 500 CY of each type of material from each source of material. Environmental testing shall include, but is not necessarily limited to, the following: Total Petroleum Hydrocarbons (TPH) by Connecticut ETPH; Volatile Organic Compounds (VOCs) by EPA Method 8260; Polynuclear Aromatic Hydrocarbons (PAH) by EPA Method 8270; PCBs by EPA Method 8082; and metals (RCRA 8) by EPA Methods 6010/7471A. Such testing shall be considered incidental to the earthwork items and performed at no additional cost to the District.

F. Within two weeks of the Notice to Proceed, but no later than five (5) days prior to transporting spoils and/or asphalt pavement off-site, the Contractor shall submit to the District for review, the name, contact information, and location of the proposed disposal location(s) for common spoils and asphalt pavement.

# 1.07 **PROJECT CONDITIONS**

- A. The Contractor shall be responsible for any damage to existing roadways, buildings, structures, trees and vegetation, utilities, and other structures caused by construction activities and shall repair any damage to the satisfaction of the District under the pay item for Site Restoration. As may be necessary, routes used as haul roads shall be returned to their original condition, or better, before final acceptance of the project.
- B. The Contractor's attention is called to the fact that the project is a dam site. A higher standard of earthwork construction practices and quality is required for work on and around a dam. Typical construction practices may require modification or adjustment to meet dam construction standards. In addition, additional care is required since the consequences of construction mishaps could extend beyond the project site were a dam failure to result.
- C. The Contractor's attention is called to the fact that the project is adjacent to a Reservoir. Water therefore may be a concern in certain excavations.
- D. The Contractor's attention is called to the fact that the anticipated earthwork is in areas adjacent to existing structures or utilities, which must be maintained and remained undamaged during the Work. The Contractor shall provide all such Work as is required to protect existing structures and utilities during excavations and placement and compaction of fill. Special methods may be required in some locations.
- E. Construction traffic associated with earthwork executed under this Section will require coordination with the Contractor's traffic control plan to provide for access (when required) and safety for the public.

# 1.08 <u>COORDINATION</u>

A. Contractor shall be responsible for obtaining representative samples of soil materials proposed to be used (both from on-site and off-site sources) and transporting them to the site and to an independent testing lab for environmental and geotechnical testing. Materials shall be delivered to the Resident Engineer sufficiently in advance of time planned for incorporating them into the work in accordance with these Specifications. Use of proposed materials by the Contractor prior to the Contractor's testing and review by the Resident Engineer shall not be allowed.

#### 1.09 <u>PERMITS AND CODES</u>

- A. All work shall conform to the Drawings and Specifications and shall comply with applicable codes and regulations.
- B. Comply with all rules, regulations, laws and ordinances of the State of Connecticut, Town of New Canaan, and of all other federal, state, and local authorities having jurisdiction. All labor, materials, equipment, and services necessary to make the work comply with such requirements shall be provided without additional cost to the District.

- C. Excavation safety and support in accordance and compliance with all applicable OSHA and other regulations shall be the sole responsibility of the Contractor.
- D. The Contractor shall be responsible for clearing the site with Call Before You Dig and with all relevant District and Town Departments, which may maintain utility structures in and around the site.

# 1.10 PROTECTION OF EXISTING PROPERTY

- A. The work shall be executed in such manner as to prevent any damage to District or Town facilities at the site and adjacent property and any other property and existing improvements, such as but not limited to the downstream masonry wall of the dam, public streets, utility lines, overhead wires, other structures, monuments, benchmarks, and other public or private property. Contractor shall protect existing improvements from damage caused by settlement, lateral movements, undermining, washout, and other hazards created by earthwork operations.
- B. In case of any damage or injury caused in the performance of the work, the Contractor shall, at his own expense, make good such damage or injury to the satisfaction of, and without cost to, the District, except as provided for under the Site Restoration Section. Existing roads, driveways, sidewalks, and curbs damaged during the project work shall be repaired or replaced to their original condition at the commencement of operations. The Contractor shall replace, at his own cost, existing benchmarks, monuments, and other reference points, which are disturbed or destroyed. Repairs to any damage to the core wall or retaining walls shall be made to the satisfaction of the District or Resident Engineer.
- C. Buried structures, utility lines, etc., including those, which project less than eighteen inches (18") above grade, which are subject to damage from construction equipment shall be clearly marked by the Contractor to indicate the hazard. Markers shall indicate limits of danger areas, by means, which will be clearly visible to operators of trucks and other construction equipment and shall be maintained at all times until completion of project.

#### 1.11 DRAINAGE

- A. The Contractor shall provide, at his own expense, adequate drainage facilities to complete all work items in an acceptable manner. Drainage shall be done in a manner so that runoff will not adversely affect construction product, construction procedures, nor cause excessive disturbance of underlying natural ground or exacerbate erosion and sedimentation and shall be performed in accordance with the criteria set forth in the applicable sections of these Specifications.
- B. The Contractor is advised that groundwater levels within the work area may be high, and that surface water and groundwater control will be required. Lateral and/or upward seepage through existing and proposed slope faces and subgrades is to be expected. The Contractor shall provide, at his own expense, adequate drainage and/or dewatering methods and facilities such that groundwater seepage will not adversely affect the construction product, procedures, nor cause excessive disturbance of underlying natural ground. These methods shall include but not necessarily be limited to the minimum dewatering requirements given in Specification Section 01565.
- C. The Contractor shall grade and ditch the staging areas and access roads, as necessary, to direct and control surface runoff in working areas, subject to approval of the Resident Engineer.
- D. Water from excavations shall be disposed of in such a manner as will not cause injury to public health, nor Grupes Reservoir and any other surface water body quality, nor to public or private property, nor to existing work, nor to the work completed or in progress, nor to the surface of roads, walks and streets, nor cause any undue interference with the use of the same by the public, except in the designated work areas.

## 1.12 FROST PROTECTION AND SNOW REMOVAL

- A. The Contractor shall, at his own expense, keep the operations under this Contract clear and free of accumulations of snow within the limit of work and on access roads as required to carry out the work.
- B. The Contractor shall protect excavations and the subgrade beneath existing and new structures and pipes from frost penetration when freezing temperatures are expected.
- C. The Contractor shall NOT place fill over frozen soils and shall NOT place frozen fill. The frozen soils shall be removed to the satisfaction of the Resident Engineer prior to fill placement. No payment shall be made for removal of frozen soil or for replacement with suitable fill.

## 1.13 <u>LAYOUT AND GRADES</u>

- A. Lay out all lines and grade work at the site in accordance with drawings and specifications. Establish and maintain permanent benchmarks. Maintain all established bounds and benchmarks and replace, as directed, any that are destroyed or disturbed.
- B. The word "subgrade" as used herein means the required surface of existing ground, final prepared ground after excavation, or compacted fill.

#### 1.14 OBSERVATION BY RESIDENT ENGINEER/CONSULTANT

- A. The District will employ a Resident Engineer and/or Consultant to perform full or part-time onsite observation and testing during the earthwork operations. The services of the Resident Engineer and/ or Consultant will include, but not be limited to, the following:
  - 1. Observation during excavation and dewatering.
  - 2. Observation during subgrade preparation, backfilling, and compaction operations.
  - 3. Laboratory testing and analysis of fill materials specified or proposed for use, as required for verification of Contractor submitted analyses.
  - 4. Preparation of test pit logs or documentation of excavation. The Resident Engineer or the Consultant may ask the Contractor to excavated test pits to facilitate the observation and document of sub-surface conditions.
  - 5. Visual or other examination of excavated material to judge suitability for reuse as onsite backfill material.

- 6. Observation and documentation of performance of compaction methodology and effort. During the course of construction, the Resident Engineer or the Consultant will advise the District and Contractor in writing, if at any time the work does not, in the opinion of the Resident Engineer or Consultant, conform to the plans and specifications.
- 7. Observation of construction and performance of field density testing (i.e., water content, and compaction tests) at a frequency and at locations that he/she shall select. The results of these tests will be reported to the Contractor on a timely basis so that the Contractor can take such action as is required to remedy any indicated deficiencies. During the course of construction, the Resident Engineer or the Consultant will advise the District and Contractor in writing, if at any time the work does not, in the opinion of the Resident Engineer or the Consultant, conform to the plans and specifications.
- B. The presence of the Resident Engineer, other representatives of the District, or the Consultant does not include supervision or direction of the actual work by the Contractor, his/her employees, or agents. Neither the presence of the Resident Engineer, other representatives of the District, or the Consultant nor any observations and testing performed by him/her, or any notice or failure to give notice, shall excuse the Contractor from defects discovered in his/her work.

# 1.15 **QUALITY ASSURANCE**

- A. The Contractor's Independent Testing Laboratory qualifications shall be submitted under Section 01451.
- B. Key personnel must be qualified and experienced in soil and rock quality assurance.

# PART 2 - PRODUCTS

## 2.01 FILL MATERIALS

# All off-site material brought to the site shall be non-soluble and free of contaminants. The Contractor shall identify the source of the material and provide results of environmental testing performed on a representative sample of the material from each source.

The District may request at no additional cost to the District, that the Contractor engage the services of a Licensed Environmental Professional (LEP) to certify that proposed off-site fill is suitable for use under the applicable provisions of Section 22a-133 of the Regulations of Connecticut State Agencies (RCSA), and all other relevant laws and regulations.

Off-site recycled aggregate product (RAP) containing asphalt, concrete or other former building materials shall not be used in any fill material used on the project.

A. <u>On-Site Common Fill Material</u>

On-site Common Fill material shall consist of material previously excavated by the Contractor from the project site. Excavated material will be examined by the Resident Engineer to judge its suitability for re-use on the project site as backfill material. Excavated material shall be judged suitable if it generally meets the standards for Common Fill, being a non-friable, non-soluble, well-graded soil, free of rubbish, ice, snow, tree stumps, roots and organic matter, with no less

than 15 percent (15%) and no more than thirty percent (30%) passing the No. 200 sieve and a water content between plus or minus two percent ( $\pm 2\%$ ) of its optimum moisture content. There shall be no stones greater than 3 inches in size. There shall also be no observable indications of contamination.

The Resident Engineer shall be the sole judge of the suitability of excavated material for use as on-site backfill. Some or none of the excavated material may be judged to be suitable. Peat or other organics are NOT acceptable for common fill. Excavated bedrock or boulders are NOT acceptable for common fill. The Contractor may, at his own expense, choose to modify the excavated material (by screening, crushing, mixing, etc.) to attempt to make the material more suitable for re-use. Some additional handling of suitable material (drying, mixing, and culling of oversized stones) may be necessary and shall be done at no additional cost to the District.

Material judged to be unsuitable or extra material shall be separated from the rest. Material unsuitable for use in the embankment may be used elsewhere on site in less critical areas, at the judgment of the Resident Engineer or may be removed from the site by the Contractor as directed by the Resident Engineer.

## B. Off-Site Common Fill Material

Off-site material imported for use as Common Fill shall have the same general characteristics as stated above under On-Site Common Fill Material; however, shall be graded within the following limits:

Sieve Size	Percent Finer by Weight Granular Fill	
3-inch	100	
No. 10	30-95	
No. 40	20-70	
No. 200	15-30	

Off-site Common Fill shall be well graded with a uniformity coefficient (Cu) of 6 or above and shall not be gap graded. Atterberg limits must plot above the "A" of the standard plasticity chart and the liquid limit shall not exceed 50.

- C. <u>Crushed Stone</u> Crushed Stone material shall be as specified under Section 02270 Stone, Rockfill, and Riprap.
- D. <u>Stone Dust</u> Stone Dust material for the right abutment footpath shall conform to the gradation requirements for "Dust" as specified under M.01.01 of the State of Connecticut Department of Transportation Standard Specifications for Roads, Bridges, and Incidental Construction latest revision.
- E. <u>Gravel Road Base</u> Gravel Road Base shall consist of sound, tough, durable particles of bank or crushed gravel. All materials shall be free from thin or elongated pieces, lumps of clay, loam, or vegetable matter. Gravel Road Base shall conform to the gradation requirements as specified under M.02.06 Gradation "C" of the State of Connecticut Department of Transportation Standard Specifications for Roads, Bridges, and Incidental Construction latest revision. Materials that break up when alternately frozen and thawed or wetted and dried shall not be used. Gravel Road Base shall conform to the following grading requirements:

Sieve Size	Percent Finer by Weight
1 <sup>1</sup> / <sub>2</sub> Inch	100
<sup>3</sup> / <sub>4</sub> inch	45-80
1/4 inch	25-60
No. 10	15-45
No. 40	5-25
No. 100	0-10
No. 200	0-5

- F. <u>Gravel Fill</u> Gravel Fill material for use as backfill against or below structures or as otherwise directed shall be as specified in Section 213 of the District Standard Specifications.
- G. <u>Loam</u> Loam shall be as specified in Section 02930.
- H. Other Soil Materials

Other soil materials proposed for use at the site shall meet either District Standard Specifications, Connecticut Department of Transportation specifications, or New York State DOT specifications, latest editions. The Resident Engineer with input from the Consultant shall have sole authority to authorize the use of alternative soil materials. No additional payment shall be made for substituted materials.

# 2.02 SPOIL MATERIALS

A. Testing: All material to be disposed of off-site shall be subjected to environmental testing performed on a representative sample of the material from each source. <u>Testing shall be required for each 500 cubic yards of material to be removed from the site from each general area of the site. More frequent testing may be required by the approved disposal location(s). Environmental testing shall include the following: Volatile organic compounds, by EPA Method 8260, Semi-volatile organic compounds by EPA Method 8270, Polychlorinated biphenyls by EPA Method 8082, Total petroleum hydrocarbons by the CT ETPH method, and Total metals (arsenic, barium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, and zinc).</u>

Testing frequency shall be increased in the event that such an increase is judged necessary based on testing results. Such testing shall be considered incidental to the earthwork items and performed at no additional cost to the District.

# 2.03 <u>GEOTEXTILE FABRIC</u>

- A. Non-woven geotextile fabric for use under construction entrances, temporary access roadways or as directed by the Resident Engineer shall be Mirafi 140N or approved equivalent.
- B. Woven geotextile fabric for use under riprap shall be as specified under Section 02270 Stone, Rockfill, and Riprap.

## PART 3 - EXECUTION

#### 3.01 EXAMINATION AND PREPARATION

Grades, both existing and finished, are indicated on the Contract Drawings. The District is not responsible for existing grades shown on the Drawings. The Contractor shall check all areas wherein grades are shown to satisfy himself as to actual conditions. The Contractor shall be responsible for establishing all control points and marks necessary for the work. Precautions shall be taken to preserve the materials outside the lines of the limit of work in the most undisturbed condition possible. The Contractor shall:

- A. Identify and check all required lines, levels, contours, and datum.
- B. Notify the Resident Engineer, District and Consultant in writing of unanticipated subsurface conditions and discontinue affected work in area until notified to resume.
- C. Protect plant life, grassed areas and other features remaining as a portion of final landscaping.
- D. Verify fill materials to be reused are acceptable.
- E. Notify appropriate utility company to remove or relocate utilities, if necessary.
- F. Maintain and protect existing utilities remaining which pass through the work area.

#### 3.02 <u>TEST PITS</u>

- A. Where necessary, test pits shall be performed by the Contractor as directed by the District or the Consultant to evaluate subsurface conditions within the project area. The Contractor shall assist the Resident Engineer and/or Consultant to all extent practicable in his duties to log the excavation, at no additional cost.
- B. Test pit locations and size will be determined by District or Consultant.
- C. Test pits may be up to 12 feet deep, 6 feet wide at the bottom and with a length sufficient to provide stability for the excavation. The actual size of each test pit will be determined on an individual case basis by the Resident Engineer and/or Consultant.
- D. Test pits shall be properly backfilled in controlled compacted lifts in accordance with this Section. Backfilled surfaces shall be stabilized in accordance with approved erosion and sedimentation control plans.

#### 3.03 PROTECTION OF ADJACENT FACILITIES AND PROPERTIES

- A. Protect all adjacent facilities, which may be damaged by excavation work. All construction induced damage shall be repaired by the Contractor at no additional expense to the District.
- B. The work area shall be graded, shaped, and otherwise drained in such a manner as to minimize soil erosion, siltation of drainage channels, damage to existing vegetation and property outside the limits of the work area.

# 3.04 DISTURBANCE OF EXCAVATED AND FILLED AREAS DURING CONSTRUCTION

- A. The Contractor shall take the necessary steps to avoid disturbance of subgrade during excavation and filling operations. Methods of excavation and filling operations shall be revised as necessary to avoid disturbance of the subgrade, including restricting the use of certain types of construction equipment and their movement over sensitive or unstable materials, dewatering and other acceptable control measures. The Contractor is advised that this will be of particular concern for slope cutting and reconstruction, where extensive zones of the seepage are likely to occur. The Contractor shall cooperate with the Resident Engineer and Consultant to modify procedures and protect bearing soils.
- B. Do not plow, scrap, or dig the earth by machinery so near to the finished subgrade as to result in the disturbance of material below the subgrade except as otherwise specified. If necessary, remove the last of the material to be excavated with pick and shovel just before placing a pipe or other structure.

## 3.05 <u>EXCAVATION</u>

- A. Perform all work of any nature and description required to accomplish the work as shown on the Drawings as specified. The work shall include, although not be limited to earth excavation; on-site stockpiling of materials; and removal of unsuitable materials to legally designated off-site disposal locations provided by the Contractor.
- B. Excavations, unless otherwise required by the Resident Engineer, shall be carried only to the elevations and limits shown on the Drawings. If unauthorized excavation is carried out below required subgrade and/or beyond minimum lateral limits shown on Drawings, it shall be backfilled as specified by the Consultant, at the Contractor's expense. Excavations shall be kept in good condition at all times, and all voids, which may endanger existing structures shall be filled to satisfaction of the Resident Engineer.
- C. Provisions for excavation of boulders and/or bedrock, if necessary, are provided in Section 02201.
- D. The Contractor shall lawfully and satisfactorily dispose of, at his own expense, surplus excavated materials. As necessary, the Contractor will be required to adequately reduce the water content of the spoil material prior to reuse as borrow or off-site disposal. The dewatering technique may include creation of temporary containment areas within the work area or other method approved by the Resident Engineer. The Resident Engineer shall designate surplus excavated materials as materials from the excavations that are unacceptable for use as fill or that are in excess of the fill materials required. These materials, if any, which cannot be placed at once in permanent positions, may be deposited in storage piles at locations designated by the Resident Engineer. Re-excavation and re-handling from such storage piles shall be included in material unit prices. Separate stockpiles shall be established for material to be reused and material to be disposed of off-site. Stockpiles shall be labeled with temporary signage.
- E. Excavated material, which meets the criteria put forth in the specifications, shall be reused at the site after the Contractor performed gradation and moisture-density testing has been completed. The Contractor is encouraged to reuse excavated material.
- F. All excavations shall be performed in accordance with OSHA requirements.

- G. The Resident Engineer shall assess the limits of excavation. The Resident Engineer may, at his discretion, reduce or extend the limits and/or depth of excavations, as judged necessary. It is the intent of this work to remove and replace all material encountered in excavations, which may have been subject to internal erosion and loss of structure.
- H. All appropriate care shall be taken to avoid damage to existing structures, such as, but not limited to, masonry portions of the dam and existing utilities to remain. Hand excavation around these and other structures may be necessary and will be performed as required at no additional cost to the District.
- I. Subgrade Preparation
  - 1. Following excavation, proofroll the exposed subgrade below structures, pavements, and pipelines. Proofrolling shall be performed with a minimum of four (4) completed coverages of the full area with a vibratory drum roller with a minimum of a 5,000-pound static drum weight and providing at least 10,000 lbs of dynamic force. Proofrolling in confined areas may be accomplished with hand operated vibratory equipment approved by the Resident Engineer. Proofrolling shall be conducted in the presence of the Resident Engineer. Subgrade soils, which become soft, loose, "quick", or otherwise unsatisfactory for support of the structure or pavement as a result of inadequate excavation, dewatering, proofrolling, or other construction methods shall be removed and replaced with compacted fill or other material satisfactory to the Consultant at the Contractor's expense.
  - 2. The subgrade shall be fine graded and recompacted as needed to meet required grades and cross-slopes.
  - 3. If the excavation extends beyond the limits shown on the Contract Drawings, specified, or directed by the Engineer, it shall be refilled at no additional cost to the District with either concrete or suitable compacted fill as determined by the District or Resident Engineer or Consultant.
  - 4. If the Contractor does not care for water properly, through failure to postpone final excavation immediately above the subgrade until shortly before placing of the new work thereon, or other failure or neglect to conduct the excavation work properly so that the surface of the subgrade is in proper condition when he/she is ready for construction, the Contractor shall remove the unsuitable material and replace it with concrete, compacted fill, or other approved material at no additional cost to the District so that the condition of the subgrade meets with the approval of the Resident Engineer or Consultant before any work is placed thereon.
  - 5. The Contractor shall perform excavation dewatering to maintain groundwater levels a minimum of one foot (1') below bottom of excavations and/or subgrades The Contractor shall sequence excavation dewatering as required to preserve the integrity of the subgrade. Refer to Section 01565 for more information.

## 3.06 EXCAVATION SUPPORT AND PROTECTION

- A. As necessary, provide shoring, sheeting, and/or bracing of excavations in accordance with approved submittal as required to assure complete safety against collapse of earth at side of excavations. The installation, performance and subsequent removal of any excavation support system shall not result in damage or compromise the performance or integrity of the dam.
- B. Comply with local safety regulations and/or, in the absence thereof, with the provisions of the Occupational Safety and Health Act (OSHA) for trenching and excavation.
- C. Remove sheeting and shoring, etc., as backfilling operations progress, taking all necessary precautions to prevent collapse of excavation sides. Sheeting and/or soldier piles driven in an existing dam embankment shall NOT be removed or disturbed. Cut sheeting or soldier piles even with grade. All wooden lagging shall be removed.
- D. The Contractor shall be fully responsible for furnishing, installing, maintaining, reinforcing and removal of all sheeting and bracing and shall be fully responsible for all damages, losses and claims involving the use or non-use of sheeting and bracing despite any orders given or any orders failed to be given by the Resident Engineer or Consultant. The Contractor shall hold harmless the District and its Consultant from all damages, losses and claims involving the use or non-use of sheeting.
- E. The Contractor shall furnish, put in place, and maintain sheeting and bracing to support the vertical side of excavations, to prevent any movement which could in any way diminish the width of the excavation below that necessary for proper construction, and to protect adjacent structures from disturbance, undermining or other damage.
- F. If the Resident Engineer or Consultant is of the opinion that at any point, sufficient or proper supports have not been provided, he/she may order additional supports put in at the expense of the Contractor, and compliance with such order shall not relieve or release the Contractor from his responsibility for the sufficiency of such supports. Care shall be taken to prevent voids outside of the sheeting, but if voids are formed, they shall be immediately filled and rammed.
- G. The Contractor is responsible for understanding the subsurface and soil, rock, and groundwater conditions in areas where excavation support is required. The Contractor shall examine available subsurface data and make additional explorations as needed and as approved by the District.
- H. Design the temporary excavation system in a manner permitting safe and expeditious construction of permanent structures, minimizing movement or settlement of the ground, and preventing damage to adjacent structures and utilities. Particular care shall be paid to not interfering with or damaging existing pipes. Repair or replacement of structures, utilities, or other facilities damaged by the excavation support system shall be the responsibility of the Contractor at his own expense.
- I. The Contractor shall monitor the excavation support system for deflection, movement, or excess seepage and shall take such steps as are necessary to correct any problems observed.

# 3.07 FILL PLACEMENT AND COMPACTION

- A. Particular care shall be taken in compacting material adjacent to existing structures. Compaction of subgrades and fill material within one foot of existing structures may require the use of hand vibratory compactors, as required by the Resident Engineer or Consultant, or as judged necessary by the Contractor.
- B. All subgrades shall be proofrolled prior to placement of fill. Proof-roll the subgrade by means of a vibratory drum roller having a static weight of not less than 5,000 lbs. Proofrolling may be omitted at the direction of the Resident Engineer. Soft areas shall be excavated and replaced with appropriate compacted fill.
- C. Fill shall not be placed over existing pavement or wet, frozen, or spongy subgrade soils or pervious embankment surfaces. In the event these conditions occur, the Contractor shall excavate and remove the unsuitable material prior to placing more fill.
- D. The Contractor shall dewater to maintain groundwater levels a minimum of one foot (1') below bottom of excavations and/or subgrades. All fill is to be placed "in-the-dry," except as allowed for certain rock material or directed by the Consultant.
- E. The Contractor shall excavate benches into the subgrade of existing slopes steeper than 6H:1V prior to placing horizontal fill layers.
- F. Place and compact all granular fill materials in continuous horizontal layers not exceeding eightinch (8") loose (pre-compaction) lift thickness when compacted with acceptable hand-operated vibratory equipment. The maximum loose lift thickness for granular fill may be increased to twelve inches (12") if large vibratory compaction equipment (at least 5,000-pound static weight) is used.
- G. Do not place frozen material.
- H. Place and compact crushed stone below structures in horizontal layers not exceeding eight inches (8") when hand operated vibratory equipment is used and not exceeding twelve inches (12") when large vibratory compaction equipment (i.e., at least 5,000-pound static weight) is used.
- I. All granular fill materials shall be placed in a firm and stable configuration with a minimum ninety-eight percent (98%) of the maximum dry density as determined by ASTM Test D-698 (Standard Proctor Test), and a water content between plus or minus two percent ( $\pm 2\%$ ) of optimum moisture content. If wet fill cannot be adequately compacted, remove and replace with drier fill.
- J. Fill that is too wet for proper compaction, as determined by testing or the Resident Engineer's or Consultant's judgment, shall be disced, harrowed, or otherwise dried to a proper moisture content for compaction to the required density, specified herein. If the fill material cannot be dried within forty-eight (48) hours of placement, it shall be removed and replaced with drier fill at the Contractor's expense.
- K. Fill that is too dry for proper compaction, as determined by testing or the Resident Engineer's or Consultant's judgment, shall receive water uniformly applied over the surface of the loose layer. Sufficient water shall be added to allow compaction to the required density.

- L. Compaction of fill material shall be performed to meet the above stated density criteria, but with a minimum six (6) passes of an approved compactor weighing at least 5,000 lbs (static) and providing at least 10,000 lbs of dynamic force. Hand operated vibratory compactors shall be used in confined areas. Make additional passes as necessary to achieve the specified degree of compaction.
- M. When compacting over or adjacent to utilities, place, and compact fill in loose layers not more than six inches (6") thick. Compact with a hand-operated vibratory compactor to the satisfaction of the Resident Engineer or Consultant.
- N. Fill, which becomes disturbed after compaction because of the Contractor's operations, shall be removed and replaced or re-compacted to the specified degree of compaction at the Contractor's expense.
- O. Placement and compaction of soil material on the embankments shall be in a direction parallel to the top of the embankment, when possible.
- P. In cases where prior excavation has not been made, the Contractor shall strip all organic topsoil from along the length and breadth of all areas, which are to have fill material placed on top. This work shall be paid for under other Sections of the Contract.
- Q. Grade the surface of embankment and fill as shown on the Contract Drawings. All surfaces shall be appropriately graded to drain and provided with a firm and stable surface, which is resistant to erosion.
- R. The Contractor shall scarify the surface between all lifts of dam embankment material if it appears, in the opinion of the Resident Engineer that a smooth plane susceptible to preferential seepage may develop between lifts.
- S. The Contractor shall strip all organic topsoil from along the length and breadth of all areas, which are to have fill materials placed on top.

# 3.08 FIELD QUALITY CONTROL

- A. The Contractor is required to provide field quality control of earthwork per Section 01451.
- B. The Resident Engineer or Consultant will observe the placement of all granular fill and crushed stone materials. The Resident Engineer or Consultant be the sole judge as to whether the materials used, and compaction effort provided are appropriate to meet the intent of the specifications.
- C. The Resident Engineer or Consultant will judge achievement of the compaction standards by visual observation of compaction effort and the use of in-place density tests including, but not limited to, in-place compaction (density and moisture) testing performed in accordance with ASTM D1556 (sand cone) or ASTM D6938 (nuclear density meter). The frequency of testing shall be at the Resident Engineer's sole discretion with a minimum of one test for each lift of material placed in a discrete area, at a minimum frequency of one (1) test for every 4,000 square feet of fill and/or one (1) test for every area of less than 4,000 square feet placed in one (1) day.
- D. If compaction is judged by the Resident Engineer to be inadequate, the Contractor shall provide additional compaction or otherwise correct the problem at no additional cost to the District.

- E. The Contractor shall be responsible for providing to the Resident Engineer and District the results of <u>independent</u> analysis of proposed on-site and off-site fill materials as specified in Article 1.06. Test results are to be submitted and reviewed by the Resident Engineer prior to the placement of fill. New Proctor curves shall be developed whenever the properties of a certain material are judged by the Resident Engineer to have substantially changed.
- F. The Contractor shall be responsible for coordinating with the Resident Engineer. No fill shall be placed if the Resident Engineer is not available to observe the Work. Fill placed in the absence of the Resident Engineer may be required to be excavated and replaced at the Contractor's expense.
- G. The Contractor shall provide the Resident Engineer, Consultant, or other Owner's Representative free and safe access to work at all times. Provide for observation of bottom of excavation and of bearing surfaces.

# 3.09 <u>SPOIL DISPOSAL</u>

- A. Disposal of excess or unsuitable soil shall be the responsibility of the Contractor. The Contractor shall be responsible for all handling and transport, including but not limited to, sampling, testing, analyzing, characterizing, dewatering, treatment, and hauling, necessary to legally dispose of spoil material.
- B. The Contractor is responsible at his sole expense for any dewatering, treatment, sampling, testing (analytical or otherwise), characterization analysis which may be required by the spoil disposal facility. This includes the services of a Licensed Environmental Professional (LEP), as necessary to characterize the material as either natural soil, polluted soil, or contaminated soil.
- C. Spoil material may consist of common excavated material, common excavated material with organics and roots, peat, topsoil, sediment, cobbles, rock, or other material which is unsuitable or has been excavated in excess of that quantity needed for embankment at the site.
- D. The Contractor shall be responsible as part of the work of spoil disposal for controlling the water content of the spoil (i.e., dewatering) such that it is suitable for transport. The Contractor shall not create sanitary problems during the transport of spoil material and shall be responsible for cleaning areas where liquids or solids have leaked.
- E. The Contractor shall truck the spoil to the approved spoil disposal area. The Contractor shall be responsible for complying with all rules and regulations regarding the transport of materials on public roads, including but not limited to the use of "tight trucks."
- F. The Contractor shall be responsible to ensure that free liquid is properly transported. "Wet soils" shall not be loaded for transport. The Contractor shall dewater "wet soils," and properly dispose of free liquids in accordance with local, state, and federal regulations. The Contractor shall dispose of any free liquids that may result during transportation at no additional cost to the Owner and without adverse impacts to nearby water bodies.
- G. Disposal of excess or unsuitable soils and/or spoil materials, including organic soils, shall be offsite and in conformance with local, state, and federal regulations for proper management, transportation, and disposal of these materials at a suitable disposal facility with appropriate documentation to transport and the permits, licenses, and insurance to receive such materials.

H. The Contractor shall provide appropriate Bills of Lading or Material Transport Documentation for ALL spoil material which leaves the site. This documentation shall meet all local, state, and federal regulations and shall, at minimum, record the amount of material, date of transport, and the location of disposal of the material. All transport documentation shall be reviewed and certified by the District.

#### 3.10 EARTHWORK UNDER OTHER SECTIONS

A. Unless specifically contradicted, all earthwork executed under other Sections of the Contract shall be governed by the methods specifications detailed in this Section.

#### 3.11 <u>STOCKPILING</u>

- A. Stockpile materials on site in such a manner so as to maintain the segregation of different types of material. Locations of material stockpiles shall be coordinated with the District, Resident Engineer, and requirements of Section 01560.
- B. The Contractor shall provide, at no additional cost, temporary signage which identifies the type of soil or rock material in each stockpile.
- C. No additional payment will be made for moving of stockpiles or re-handling of material. The stockpiles shall be sited, placed, and graded in such a way as to minimize re-handling necessary.

#### PART 4 - MEASUREMENT AND PAYMENT

Refer to Section 01950 – Measurement and Payment for the measurement and payment items related to this Section.

#### \* \* \* END OF SECTION \* \* \*

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## SECTION 02201 ROCK AND BOULDER EXCAVATION

#### PART 1 - GENERAL

#### 1.01 SCOPE OF WORK

- A. Furnish all labor, materials, equipment, and incidentals required and perform excavation of rock and boulders utilizing non-explosive methods such that damage is prevented to dam and adjacent utilities, pipes, structures, property, and the work and such that resulting ground vibrations are consistently maintained below the maximum levels specified in this Section. Non-explosive methods include rock splitting, ripping, or hoe-ramming.
- B. Obtain necessary written approvals and permissions and pay for permits and licenses required to complete the work of this Section.
- C. The proposed auxiliary spillway improvements shown on Sheet C9 of the Contract Drawings are anticipated to be primarily rock excavation. Removal of materials in this area shall be at the direction of the District and, depending on the nature of the subsurface materials encountered, may include bedrock removal.
- D. Excavations elsewhere that encounter boulders as defined herein, shall also be removed under the provisions of this Section. The Contractor will not be compensated for rock removal beyond that authorized by the Resident Engineer, nor shall the Contractor be compensated for rock removal required to accommodate other areas. The Contractor shall be responsible for backfilling over-excavated rock areas with the structural concrete to the satisfaction of the Resident Engineer, at no additional cost.

#### 1.02 <u>RELATED SECTIONS</u>

- A. The following is a list of related work items that shall be performed or furnished under other sections of these specifications as indicated:
  - 1. Temporary Erosion and Sedimentation Controls Section 01560.
  - 2. Earthwork Section 02200.

#### 1.03 <u>SUBMITTALS</u>

The Contractor shall submit the following documents. Refer to Section 01300 - Submittals for additional information.

- A. Submit at least one week prior to commencement of the Work, a description of the means and methods for non-explosive methods of rock and boulder excavation including size and energy of any impact equipment.
- B. Submit all pre-construction surveys (under Section 01436) at least one week prior to any rock removal work.

#### 1.04 <u>DEFINITIONS</u>

- A. Rock: Any large mass of stone, bedrock, or ledgerock.
- B. Boulder: Individual rock fragment exceeding one cubic yard (1 CY) in volume.
- C. Rock Excavation: The removal of solid rock or rock fragments greater than one cubic yard (1 CY) in volume which cannot be removed by conventional mechanical excavation equipment such as a Caterpillar 330 Tracked Excavator or equivalent or which requires mechanical impact equipment such as hoe-rams, chemical expanders, or other special procedures.
- D. Boulder Excavation: The removal of boulders exceeding one cubic yard (1 CY) in volume which can be excavated without resorting drilling and blasting, mechanical impact equipment such as hoe-rams, chemical expanders, or other special procedures.
- E. The Resident Engineer will be the sole judge as to what constitutes rock or boulder excavation.

## 1.05 <u>QUALITY ASSURANCE</u>

- A. Vibration monitoring shall be performed continuously to monitor peak particle velocities at dam structures within 50 feet during rock removal activities using seismographs operated by the District's Consultant, at locations chosen by the Resident Engineer.
- B. Vibration Limit Criteria

The Contractor shall limit rock excavation operations to prevent damage to the portions of the dam to remain in place, adjacent structures, utilities, or other features near the site. In no case shall the Peak Particle Velocity (PPV) at ground surface at the nearest dam structural component (such as stone masonry or concrete wall, outlet pipe, spillway, or training wall) exceed one half inch per second (0.5 ips) for all frequencies.

- C. Rock excavation shall not be permitted within 100-feet of locations where concrete has been placed in the preceding 24 hours. Rock excavation shall not be permitted within 100-feet of concrete structures until the concrete has attained at least 33 percent of its 28-day strength.
- D. The Contractor shall be completely responsible for all damages resulting from the rock excavation operations and shall, as a minimum, take whatever measures are necessary to maintain peak particle velocities within the specified limits. Modifications to excavation methods required to meet these requirements shall be undertaken at no additional cost to the District.

#### 1.06 <u>INDEMNITY</u>

A. Notwithstanding full compliance with these specifications, review of all submittals and successful limitation to the peak particle velocity specified in this Section, the Contractor shall be solely responsible for any damage, direct or indirect, arising from the rock removal operations and shall hold the District, Resident Engineer and their Consultants harmless from any costs, liens, charges, claims or suits, including the costs of defense, arising from such damage, real or alleged. The District, Resident Engineer and their Consultants shall be additionally-named insureds on any insurance policy covering rock removal operations carried by the Contractor and this requirement shall also be enforced on any subcontractor.

## 1.07 PROTECTION OF EXISTING PROPERTY

- A. The work shall be executed in such manner as to prevent any damage to the dam, the new work and all other District facilities at the site and adjacent property and any other property and existing improvements, such as but not limited to the street, service utility lines, structures, benchmarks, and other public or private property. Facilities and utilities shall remain in continual service throughout the duration of the project.
- B. In case of any damage or injury caused in the performance of the Work, the Contractor shall, at his own expense, make good such damage or injury to the satisfaction of, and without cost to, the District. The existing dams, pavement, structures, or utilities damaged during the project work shall be repaired or replaced to their original condition at the completion of operations. The Contractor shall replace, at his own cost, existing benchmarks, and other reference points which are disturbed or destroyed.

# PART 2 – PRODUCTS

This Section Not Used

# PART 3 - EXECUTION

- 3.01 <u>GENERAL</u>
  - A. When bedrock is encountered, it shall be uncovered, but not excavated, until the Resident Engineer or the District's Consultant have reviewed the area and given approval to perform rock removal. The bedrock surface shall be cleaned of soil and loose stones/boulders prior to any topographic survey of bedrock surface.
  - B. Soil surrounding boulders shall be excavated to a sufficient degree so as to allow dimensional measurements to be made by the Contractor and Resident Engineer.
  - C. Rock excavation shall be completed by non-explosive techniques in a manner, in accordance with the approved rock removal plan and shall not cause damage to the remaining portions of the dam, existing structures and utilities to remain, or new construction.
  - D. Grades, both existing and finished, are indicated on the Contract Drawings. The Contractor shall check all areas wherein grades are shown to satisfy himself as to actual conditions. The Contractor shall be responsible for establishing all control points and marks necessary for the work. Precautions shall be taken to preserve the materials outside the lines of the limit of work in an undisturbed condition.

## 3.02 <u>PREPARATION</u>

A. Perform a pre-construction survey in accordance with Section 01436. The pre-construction survey shall consist of a close visual inspection, fully supported by photographs or video recordings, performed by, or under the supervision of, a licensed professional engineer or geologist experienced in such surveys.

## 3.03 ROCK EXCAVATION

Rock removal may be performed by jack hammering, hoe-ramming, expansive chemical splitting, or other similar process as approved by the Engineer.

## 3.04 BOULDER EXCAVATION

Boulders as defined herein may be reduced in size by rock excavation methods to simplify their removal. Such actions to facilitate removal of said boulders shall be at no additional cost to the District.

#### 3.05 DISPOSAL OF ROCK AND BOULDERS

- A. Rock and boulders may be crushed and screened for reuse in the work, provided that the resultant materials meet the material requirements of Section 02200 or 02270. Such processing shall be at no additional cost to the District.
- B. Disposal of unused, excavated rock and boulders shall be in accordance with Section 02200.

# PART 4 - MEASUREMENT AND PAYMENT

Refer to Section 01950 – Measurement and Payment for the measurement and payment items related to this Section.

# \* \* \* END OF SECTION \* \* \*

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## SECTION 02270 STONE, ROCK, AND RIPRAP

## PART 1 - GENERAL

#### 1.01 DESCRIPTION

- A. The Contractor shall furnish all equipment, materials and labor and do all work necessary to place stone materials, including Crushed Stone bedding material, riprap, and underlying geotextile filter fabric.
- B. Crushed stone bedding material, stone, rock, and Riprap shall be sized as indicated on the Contract Drawings or as indicated in the Specification. The Contractor shall be responsible for all furnishing, processing, transportation, and placement necessary to achieve stone with quality and gradations meeting the specifications. Where indicated, filter fabric shall be provided and placed under all stone bedding material, as shown on the Contract Drawings, or as indicated in the Specification.
- C. Placement, intermediate grading, and final grading of areas of stone, rock, and riprap placement shall be included in the Work of this Section at no additional cost to the District. Such work may involve handling and placement of individual stones to achieve a stable slope to the lines and grades shown on the Contract Drawings. Such work shall be at no additional cost to the District.
- D. Adherence to the lines, grades, and slopes shown on the Contract Drawings is critical to meet permit requirements. Stone, rock, and riprap material placed by the Contractor shall not exceed the limits shown on the Plans.
- E. Stone, rock, revetment stone, and riprap placed as incidental work shall conform to the requirements of this Section, except as specified elsewhere.

#### 1.02 <u>SCOPE</u>

- A. Work involving stone, rock, stone, and riprap shall include, but not be limited to the following:
  - 1. Provision of Crushed Stone for Stabilized Construction Entrances and other Temporary Sediment and Erosion Control measures.
  - 2. Furnishing and placing of woven geotextile filter fabric under and around crushed stone bedding layer, riprap, and elsewhere as shown on the Contract Drawings.
  - 3. Furnishing and placing Crushed Stone for use as a bedding material for riprap placed on the new East embankment of Grupes Dam and elsewhere on-site.
  - 4. Furnishing and placing Crushed Stone for use as a subbase for the gravity retaining wall on the left shoreline and elsewhere on-site.
  - 5. Furnishing and stockpiling of Stone Riprap from off-site sources for use on the upstream embankment slopes of Grupes Dam for slope protection.
  - 6. Placing and grading of Riprap from stockpiles at the site.
  - 7. Furnishing and placing of "Chinking" stone for treatment/grading of final riprap surfaces, as necessary.

## 1.03 <u>RELATED WORK</u>

- A. The following is a list of related work items that shall be performed or furnished under other Sections of these Specifications as indicated:
  - 1. Temporary Erosion and Sedimentation Controls Section 01560
  - 2. Temporary Water Control Section 01565
  - 3. Earthwork Section 02200

## 1.04 <u>SUBMITTALS</u>

The Contractor shall submit the following documents. Refer to Section 01300 - Submittals for additional information.

- A. Two (2) weeks prior to the delivery of any stone material to the site, the Contractor shall submit the name and location of the proposed quarry(s) to be used to supply the stone products. The Contractor shall provide the District with information regarding the type and physical characteristics of the stone, as required below. The Contractor shall also provide copies of any certifications or approvals of the quarry's products from other agencies.
- B. Two (2) weeks prior to the delivery of any crushed stone material or riprap to the site, the Contractor shall submit a description of the material, the source of the material, a gradation analysis, and density/specific gravity test results.

If gradation test results of riprap are unavailable, or as otherwise requested by the District or Engineer, material samples shall be delivered to the Site by the Contractor for review by the Engineer. Alternatively, the Contractor may arrange for the Engineer to inspect stockpiles of proposed riprap at the source quarry or other off-site stockyard.

C. Five (5) days prior to the delivery of any woven geotextile filter fabric to the site, the Contractor shall submit a description of the material, the source of the material, manufacturer's specifications, and samples of the material as required by the Engineer or District.

# PART 2 - PRODUCTS

# 2.01 <u>STONE RIPRAP</u>

- A. Riprap shall consist of hard, durable, and sound angular stone which is resistant to weathering. Rounded stones, boulders, elongated, thin or flat pieces whose breadth or thickness is less than one-third its length will not be allowed. Soft, Sedimentary rock types such as shale, sandstone, or similar soft stone shall not be allowed. The stone shall be free of cracks, ice, snow, overburden, spoil, silt, clay, loam, organics, and other deleterious matter. Stone material shall not be susceptible to excessive dissolution by water, in part or in whole.
- B. Riprap stone shall have a minimum dry unit weight of 165 pounds per cubic foot.

- C. Riprap layer thickness shall be defined as the typical (or average) layer thickness as measured perpendicular to ground surface or slope.
- D. Riprap placed in areas with a layer thickness greater than or equal to two feet shall have a maximum individual stone dimension of 18 inches. The D50 of the riprap stones shall be between 9 and 12 inches.
- E. Riprap material shall be well graded as a material without gaps in the gradation curve. The uniformity ratio (D85/D15) should be no less than 3.0.
- F. All riprap stone furnished and placed at the site shall of the same parent rock from the same quarry. It is the intent of the work of this Contract that the source material for stone riprap be local to the area to the extent possible and that the stone riprap material be comprised of local rock. This would preferably be a granitic or gneissic rock typical of the region.
- H. Control of gradation will be by visual inspection. The Contractor shall provide, prior to riprap placement, a representative sample of off-site riprap stone for inspection by the District. Any difference of opinion between the Resident Engineer and the Contractor shall be resolved by dumping and checking the gradation of two random truckloads of stone. Mechanical equipment, a sorting site, and labor needed to assist in checking gradation shall be provided by the Contractor at no additional cost, if needed. <u>Further checking at the quarry site to establish the weight distribution of the riprap material being supplied may be required by the Resident Engineer. The Contractor shall provide such checking at no additional cost.</u>
- I, If requested by the District, or as part of the Contractor's submittal, the Contractor shall facilitate and participate in a field visit to the quarry which is the proposed source of the stone material, so that the District and Engineer can visually approve the proposed gradation.

# 2.02 <u>CRUSHED STONE MATERIAL</u>

- A. Crushed stone material used as specified in the Contract Documents shall consist of aggregate that is inert material from hard, **non-soluble**, durable stone and coarse sand, free from loam, clay, surface coatings, sod, and deleterious or organic materials. Crushed stone materials shall conform to the same suitability requirements, where applicable, as those specified for Stone Riprap in Paragraph 2.01 of this section.
- B. The thickness of the crushed stone bedding material layer below riprap and under retaining walls shall be as indicated on the Contract Drawings, but in no case shall the layer thickness be less than 6 inches.
- C. <u>No. 3 Crushed Stone</u>: Crushed stone material for stabilized construction entrances or other applications as directed by the Resident Engineer shall meet the requirements of ConnDOT M01.01 No. 3, which has the following gradation requirements:

Sieve Size	Percent Finer by Weight
2 inch	100
1½ inch	90-100
1 inch	20-55
3/4 inch	0-15
3/8 inch	0-5

D. <u>1<sup>1</sup>/<sub>2</sub>-inch Crushed Stone</u>: Crushed stone material for bedding material for riprap shall meet the requirements of ConnDOT M01.01 No. 4, which has the following gradation requirements:

Sieve Size	Percent Finer by Weight	
2 inch	100	
1½ inch	90-100	
1 inch	20-55	
3/4 inch	0-15	
3/8 inch	0-5	

E. <u>3/4-inch Crushed Stone</u>: Crushed stone bedding for the gravity retaining walls and for other applications as specified in the Contract Documents, shall meet the requirements of ConnDOT M01.01 No. 67, which has the following gradation requirements:

Sieve Size	Percent Finer by Weight
1-inch	100
3/4 inch	90-100
3/8 inch	20-55
No. 4	0-10
No. 8	0-5

## 2.03 <u>GEOTEXTILE FILTER FABRIC</u>

A. Woven filter fabric for use under riprap at Grupes Reservoir Dam shall be Mirafi Woven Filter Weave (FW) 700 or approved equivalent.

# PART 3 EXECUTION

# 3.01 EXAMINATION AND PREPARATION

A. Grades, both existing and finished, are indicated on the Contract Drawings. The Contractor shall check all areas wherein grades are shown to satisfy himself as to actual conditions. The Contractor shall be responsible for establishing all control points and marks necessary for the work. Precautions shall be taken to preserve the materials outside the lines of the limit of work in the most undisturbed condition possible. The Contractor shall:

- 1. Identify and check all required lines, levels, contours, and datum.
- 2. Notify the District in writing of unanticipated subsurface conditions and discontinue affected work in area until notified to resume.
- 3. Verify materials to be reused are acceptable to the Resident Engineer.

# 3.02 GENERAL RIPRAP PLACEMENT

- A. The prepared subgrade in riprap placement areas shall be cleared of all stones greater than 6 inches in diameter, along with any other items that may damage the geotextile (if used). The prepared surface shall be observed and approved by the Resident Engineer prior to installation of the geotextile or placement of the Crushed Stone bedding layer.
- B. All new areas of riprap shall be underlain by crushed stone bedding material and filter fabric unless the subgrade is comprised of sound bedrock. Riprap placed directly on concrete or bedrock shall not require a crushed stone bedding layer nor a geotextile layer, however, adjacent filter fabric should be lapped in such a manner so as to prevent loss of sub-grade or movement of soil along concrete or bedrock surfaces.
- C. The woven geotextile shall be placed on the prepared soil subgrade by unrolling directly from the rolls in a direction approximately parallel to the slope. Folds and wrinkles in the geotextile should be avoided. Adjacent rolls or sections of geotextile shall be overlapped a minimum of 3 feet, with the geotextile covering ground of higher elevation overlapping that which covers ground of lower elevation. The geotextile shall be fixed in place so that slippage does not occur as work continues. If neither a crushed stone bedding layer nor a geotextile is shown below the riprap layer, the Contractor shall place geotextile fabric as if it had been shown on the plans.
- D. Storage and handling of geotextile filter fabric shall be as per the manufacturer's recommendations for protection from sunlight, ultraviolet rays, heat, dirt debris, etc. which could affect its properties. Uncovered geotextile shall not be left exposed to sunlight, either on the roll or in place. Torn, punctured or otherwise damaged fabric shall not be used. Mishandled or damaged material shall be removed from the site and replaced at no additional cost to the District.
- E. Crushed Stone bedding material shall be placed immediately after the placement of the geotextile filter fabric. The crushed stone bedding layer shall be placed on the prepared soil subgrade and compacted in layers not exceeding 6 inches. Compaction shall be firm and stable configuration as determined by the Resident Engineer. The Contractor shall grade and shape the final surface to conform to the Contract Drawings and provide a uniform and acceptable surface for placement of the riprap.
- F. After Crushed Stone bedding layer and/or geotextile placement, the riprap shall be placed on the slope in uniform fashion to the required thickness. Riprap may be dumped from an excavator or loader bucket, but from no greater than two feet above the ground. Riprap shall be dumped directly onto its final location without rolling down the slope. Care shall be taken during placement so as not to damage or disturb the crushed stone bedding layer or underlying geotextile. Do not dump riprap directly from truck onto slope or other riprap placement area.
- G. Riprap shall be placed in such a manner as to produce a reasonably well graded distribution of the various stone sizes, with no localized areas of uniform size material. If directed by the Resident Engineer, individual stones with a spherical diameter larger than the nominal thickness of the riprap layer (24") shall be culled from the riprap stockpiles at no additional cost to the

Owner. Each of the largest stones are to touch adjacent large stones. The smaller size stones shall fill the spaces between the larger stones to obtain a minimum practical percent of void space. Dumping from trucks and spreading shall not be allowed. Post-placement manipulation of the riprap shall be performed, as required, such that individual stones are in contact with one another, without gaps or spaces between.

- H. Riprap shall be compacted and shaped by tamping and manipulation with the bucket of an excavator, or to the satisfaction of the District and its Resident Engineer.
- I. It may be necessary to handle and place individual riprap stones to place the material such that it achieves a stable slope conforming to the lines, grades, and slopes shown on the Contract Plans. The Contractor shall be responsible for all efforts necessary to place the riprap in such a manner, which produces a stable slope conforming to the lines, grades, and slopes shown on the Contract Plans. The Contractor shall not place material beyond the limits shown on the Contract Drawings without specific direction from the District.
- J. "Chink" the final riprap surface, manually, if necessary, to eliminate any significant gaps in the riprap surface to the satisfaction of the District and its Resident Engineer. "Chinking" shall involve the placement and setting of smaller stones in gaps between larger stones to provide uniform coverage across the riprap surface. "Chink" stones shall be less than 18 inches and greater than 6 inches in diameter. No additional payment shall be made for chinking materials or effort.
- K. Tolerances for placement of stone riprap shall be within plus or minus six inches  $(\pm 6")$  of the dimensions shown on the Contract Drawings.

# PART 4 - MEASUREMENT AND PAYMENT

Refer to Section 01950 – Measurement and Payment for the measurement and payment items related to this Section.

#### \* \* \* END OF SECTION \* \* \*

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#### SECTION 02385 ARTICULATED CONCRETE BLOCK

#### PART 1 - GENERAL

#### 1.01 SCOPE OF WORK

Provide all supervision, facilities, labor, materials, tools, equipment, appliances, transportation, supervision, and related work necessary to complete all operations in connection with the installation of open-celled articulated concrete block erosion protection in accordance with the lines, grades, design, and dimensions shown on the Contract Drawings and as specified herein.

#### 1.02 <u>RELATED SECTIONS</u>

Carefully examine all of the Contract Documents for requirements which affect the work in this section. Other specification sections which relate to the work of this section include, but are not limited to, the following:

- A. Section 02200 Earthwork
- B. Section 02201 Rock and Boulder Excavation
- C. Section 02270 Stone, Rock, and Riprap

#### 1.03 <u>SUBMITTALS</u>

The Contractor shall submit the following documents. Refer to Section 01300 - Submittals for additional information.

- A. The Contractor shall furnish to the Owner's Consultant all manufacturer's specifications, literature, shop drawings for the fabrication of the mats, and any recommendations, if applicable, that are specifically related to this project, 14 days prior to assembly of the cellular mats.
- B. The Contractor shall furnish manufacturer's certificates of compliance for cellular concrete blocks/mats, revetment cable, and any revetment cable fittings and connectors to the Owner's Consultant prior to the start of mat fabrication.

#### **PART 2 - PRODUCTS**

#### 2.01 <u>GENERAL</u>

A. The Contractor is not required to install Articulated Concrete Blocks in pre-assembled mats. If pre-manufactured mats are used, they must consist of an assembly of concrete blocks, with specific hydraulic capacities, bound into mats by the use of revetment cables. Cellular concrete mats may be assembled on-site by hand-placing individual blocks with subsequent insertion of cables.

- B. Individual blocks in the articulated mats shall be staggered and interlocked for enhanced stability. The mats shall be constructed of open cell blocks. Open cell blocks shall have two (2) vertical openings of rectangular cross section with sufficient wall thickness to resist breakage during shipping and installation. Parallel strands of cable shall extend through two (2) ducts in each block in a manner which provides for longitudinal binding of the blocks within the mats. Each row of blocks shall be laterally offset by one-half block width from the adjacent row so that any given block is cabled to four other blocks (two in the row above and two in the row below).
- C. The gross area of each individual block in direct contact with the subgrade to be subgrade shall be no less than one square foot. Each block shall incorporate interlocking surfaces that prevent lateral displacement of the blocks within the mats when they are lifted by the longitudinal revetment cables. The interlocking surfaces must not protrude beyond the perimeter of the blocks to such an extent that they reduce the flexibility or articulation capability of the cellular mats or become damaged or broken when the mats are lifted during shipment or placement. Once the mats are in place, the interlocking surfaces shall prevent the lateral displacement of the blocks even if the cables should become damaged or removed. The mats must be able to flex a minimum of 18° between any given row or column of blocks in the uplift direction and a minimum of 45° in the downward direction.
- D. If used, the cables inserted into the mats shall form lifting loops at one end of the mat with the corresponding cable ends spliced together to form a lifting loop at the other end of the mat. The cables shall be inserted after sufficient time has been allowed for the concrete to complete the curing process.
- E. The cellular concrete mats shall be placed on a filter fabric as specified herein. Under no circumstances shall the filter fabric be affixed (i.e., chemically bonded to the blocks) to the mattress in a manner in which would jeopardize the functionality of the filter fabric. Specifically, the filter fabric shall be independent of the block system.

# 2.02 <u>ACCEPTANCE</u>

Articulated concrete block mats will only be accepted when accompanied by documented hydraulic performance characteristics that are derived from tests under controlled flow conditions. Testing guidelines should conform to U.S. Federal Highway Administration and U.S. Bureau of Reclamation Testing Protocol as documented in "Minimizing Embankment Damage During Erosion Flow," Report No. FHWA-RD-88-181 and all hydraulic performance testing shall be performed in a 2H:1V flume.

# 2.03 ARTICULATED CONCRETE BLOCKS

# A. <u>General</u>

- 1. This specification covers concrete blocks for erosion control mats used in storm channel crossings, revetments, etc. and for soil stabilization.
- 2. Concrete units covered by this specification are made from lightweight or normal weight aggregates, or both.

## B. <u>Materials</u>

- 1. Cementitious Materials Materials shall conform to the following applicable ASTM specifications:
  - a. Portland Cements Specification C 150
  - b. Blended Cements Specification C 595
  - c. Hydrated Lime Types Specification C 207
  - d. Pozzolans Specification C 618, for Fly Ash and Raw or Calcined Natural Pozzolans for use in Portland Cement Concrete.
- 2. Aggregates shall conform to the following ASTM specifications, except that grading requirements shall not necessarily apply:
  - a. Normal Weight Specification C 33, for Concrete Aggregates.

# C. <u>Casting</u>

1. The concrete units shall be produced by a dry cast method. The dry cast units obtain strength in a shorter duration as well as an increase in the durability and overall quality of product.

# D. <u>Physical Requirements</u>

1. At the time of delivery to the work site, the units shall conform to the physical requirements listed below.

Compressive Strength Net Area		Water Absorption		
Minimum psi		Maximum lb./ft <sup>3</sup>		
Avg. of 3 units	Individual Unit	Avg. of 3 units	Individual Unit	
4,000	3,500	10	12	

- 2. Additionally, the manufacturer shall meet all requirements pertaining to a concrete unit's durability pertaining to a freeze-thaw environment.
- 3. Units shall be sampled and tested in accordance with ASTM D 6684-01, Standard Specification for Materials and Manufacture of Articulating Concrete Block (ACB) Revetment Systems.

# E. <u>Visual Inspection</u>

- 1. All units shall be sound and free of defects that would interfere with either the proper placement of the unit or impair the performance of the system. Surface cracks incidental to the usual methods of manufacture, or surface chipping resulting from customary methods of handling in shipment and delivery, shall not be deemed grounds for rejection.
- 2. Cracks exceeding 0.25 inches in width and/or 1.0 inch in depth shall be deemed grounds for rejection.

- 3. Chipping resulting in a weight loss exceeding 10% of the average weight of a concrete unit shall be deemed grounds for rejection.
- 4. Blocks rejected prior to delivery from the point of manufacture shall be replaced at the manufacturer's expense. Blocks rejected at the job site shall be repaired with 4,000 psi structural grout or replaced at the expense of the Contractor.

## F. <u>Manufacturer</u>

1. The individual blocks comprising the mat shall have the nominal characteristics, such as the open area, which are presented below.

Туре	Min. Weight∖ Lbs.	Min. Weight Lbs./Sq.ft	Min. Height Inches	Open Area %
Open	58	32	4.0	20

2. Articulated concrete blocks shall be ARMORFLEX® Class 40T as manufactured by ARMORTEC, or approved equivalent.

## 2.04 <u>REVETMENT CABLE AND FITTINGS</u>

- A. Revetment cable shall be constructed of preformed galvanized aircraft cable. The cables shall be made from individual wires and strands that have been formed during the manufacture into the shape they have in finished cable.
- B. Cable shall consist of a core construction comprised of six (6) or seven (7) wires wrapped within seven (7) or nineteen (19) wire strands. The revetment cable shall have the following physical properties:

Nominal	Approx. Avg.	Lbs./100 ft	
Cable Diam.	Strength (Lbs.)	Min.	Max.
3/8"	13,300	23.6	24.3

- C. The revetment cable shall exhibit resistance to mild concentrations of acids, alkalis, and solvents. Fittings such as sleeves and stops shall be aluminum, and the washers shall be galvanized steel.
- D. Selection of cable and fittings shall be made in a manner that ensures a safe design factor for mats being lifted from both ends, thereby forming a catenary. Consideration shall be taken for the bending of the cables around hooks or pins during lifting. Revetment cable splicing fittings shall be selected so that the resultant splice shall provide a minimum of 75% of the minimum rated cable strength.

#### 2.05 <u>GEOTEXTILE FABRIC</u>

Refer to Section 02270 for requirements of Geotextile Fabric below Articulated Concrete Blocks.

## 2.06 <u>CRUSHED STONE BASE BELOW BLOCKS</u>

Crushed Stone Base below Articulated Concrete Blocks shall meet the requirements of 1 <sup>1</sup>/<sub>2</sub>-inch Crushed Stone as specified in Section 02270.

## 2.07 PRE-ASSEMBLED ARTICULATED CONCRETE BLOCK MATS

- A. The cellular concrete blocks, cables and fittings shall be fabricated at the manufacturer or another approved location into mats in accordance with the Contractor's approved submittal.
- B. The cellular concrete mats shall have the ability for fabrication in various lengths, widths, and in combinations of length and/or widths. Special mats are a combination of two opposing dimensions either in the longitudinal or transverse direction of the mats. The special mats are available in various dimensions that allow for a custom fit to a site-specific project.

## **PART 3 - EXECUTION**

#### 3.01 <u>SUBGRADE PREPARATION</u>

- A. Areas upon which the Articulated Concrete Block system are to be placed shall be constructed to the lines and grades shown on the Contract Drawings and to the tolerances specified in the Contract Documents.
- B. <u>Excavation</u>: Remove loam, subsoil, fill and/or natural soils down to inorganic subgrade elevation necessary to install the specified articulated block Erosion protection system. Refer to the Contract Drawings for a cross-section detail depicting requirements in both grassed and paved areas.
- C. <u>Grading</u>
  - 1. Subgrades shall be graded and proof-compacted to a smooth plane surface. All slope deformities, roots, stones, and other deleterious matter which project normal to the subgrade must be re-graded or removed. No holes, "pockmarks", footprints, or other voids greater than 1.0 inch in depth normal to the subgrade shall be permitted. No grooves or depressions greater than 0.5 inches in depth normal to the subgrade with a dimension exceeding 1.0 foot in any direction shall be permitted. Where such areas are evident, they shall be brought to grade by placing compacted homogeneous material. Prior proof-compact subgrade a minimum of 4 passes using a smooth-drum vibratory roller (minimum dynamic force at drum 10,000 pounds) prior to placement of geotextile fabric. Over excavate, backfill, and compact any loose or otherwise unstable areas.
  - 2. Excavation and preparation for anchor trenches, flanking trenches, or aprons shall be done in accordance with the lines, grades and dimensions shown in the Contract Drawings. The anchor trench hinge-point at the top of the slope shall be uniformly graded so that no dips or bumps greater than 0.5 inches over or under the local grade occur. The width of the anchor trench hinge-point

shall also be graded uniformly to assure intimate contact between all cellular concrete blocks and the underlying grade at the hinge-point.

3. No fabric, stone or blocks shall be placed thereon until subgrades have been approved by the Owner's Consultant.

# 3.02 PLACEMENT OF GEOTEXTILE FILTER FABRIC

- A. Filter Fabric, as specified herein, shall be placed within the limits shown on the Contract Drawings.
- B. The geotextile shall be placed directly on the prepared subgrade, in intimate contact with the subgrade, followed by a 6-inch-thick drainage layer consisting of 1-1/2-inch angular crushed rock. The geotextile shall be free of folds or wrinkles. The geotextile shall not be walked on or disturbed when the result is a loss of intimate contact between the geotextile and the articulated block or the geotextile and the subgrade. The geotextile filter fabric shall be placed so that the upstream strip of fabric overlaps the downstream strip. The longitudinal and transverse joints shall be overlapped at least two (2) feet. The geotextile shall extend at least one foot beyond the top and bottom revetment termination points. If cellular concrete blocks are assembled and placed as large mattresses, the top lap edge of the geotextile should not occur in the same location as a space between cellular concrete mats unless the space is concrete filled.

# 3.03 PLACEMENT OF ARTICULATED CONCRETE BLOCKS/MATS

- A. Articulated concrete block/mats, as specified in Part 2 of these Specifications, shall be constructed within the specified lines and grades shown on the Contract Drawings.
  - 1. Field installation procedures shall comply with the procedures utilized during the hydraulic testing procedures of the recommended system. All system restraints and ancillary components (such as synthetic drainage mediums) shall be employed as they were during testing. For example, if the hydraulic testing installations utilize a drainage layer, then the field installation must utilize a drainage layer; an installation without the drainage layer would not be permitted.
- B. <u>Placement.</u>

The cellular concrete blocks shall be placed on the specified geotextile fabric, in such a manner as to produce a smooth plane surface in intimate contact with the concrete unit. No individual block within the plane of placed cellular concrete blocks shall protrude more than one-half inch or as otherwise specified by the Owner's Consultant. To ensure that the cellular concrete blocks are flush and develop intimate contact with the subgrade, the blocks shall be "seated" with a light roller or other means consistent with the manufacturer's literature.

1. If assembled and placed as large mattresses, the cellular concrete mats shall be attached to a spreader bar or other approved device to aid in the lifting and placing of the mats in their proper position by the use of a crane or other approved equipment. The equipment used should have adequate capacity to place the mats without bumping, dragging, tearing, or otherwise damaging the

underlying crushed stone or fabric. The mats shall be placed side-by-side and/or end-to-end, so that the mats abut each other. Mat seams or openings between mats greater than two (2) inches shall be filled with 4000 psi grout. Whether placed by hand or in large mattresses, distinct changes in grade that results in a discontinuous revetment surface in the direction of flow shall require a grout seam at the grade change location so as to produce a continuous surface.

- 2. Anchor trenches and flanking trenches shall be backfilled and compacted flush with the top of the blocks. The integrity of a soil trench backfill must be maintained so as to ensure a surface that is flush with the top surface of the cellular concrete blocks for its entire service life. Trenches shall be backfilled in accordance with section 02200. Backfilling and compaction of trenches shall be completed in a timely fashion.
- C. Thereafter the cells or openings in the cellular concrete blocks shall be backfilled with  $\frac{3}{4}$ -inch crushed stone and compacted in a timely manner to assure there are no voids and so that compacted material extends from the filter fabric to within  $\frac{3}{4}$  inches of the surface of the cellular concrete block.
- D. The Contractor shall consult with the manufacturer of the cellular concrete blocks/mats who shall provide construction advice during the initial installation phases of the project as required.

# PART 4 - MEASUREMENT AND PAYMENT

Refer to Section 01950 – Measurement and Payment for the measurement and payment items related to this Section.

# \*\*\*END OF SECTION\*\*\*

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## SECTION 02455 GROUTING AND ANCHOR INSTALLATION

## PART 1 - GENERAL

## 1.01 <u>SCOPE OF WORK</u>

- A. The intent of the Work of this Section is to make repairs and improvements to the masonry structure, curtail seepage through the masonry and foundation, increase resistance to overturning, and provide a more durable structure.
- B. The Contractor shall furnish all labor, materials, tools, supervision, transportation, installation equipment, and incidentals necessary to complete the consolidation grouting and anchor installation specified herein and shown on the Contract Drawings. The work shall include but not be limited to:
  - 1. Selecting and detailing proposed anchors, anchorages, and supplemental reinforcement at the anchor heads.
  - 2. Drilling and consolidation grouting at the locations as shown on the Contract drawings.
  - 3. Drilling, water testing, re-grouting, and re-drilling for post-tensioned anchors.
  - 4. Installation, grouting of the bond zone, anchorage installation, stressing, confirmation testing, and lock-off for post-tensioned anchors.
  - 5. Final grouting of the free length of anchors after testing and acceptance.

The Work of this Section shall be performed under the observation of the Resident Engineer or Consultant.

- C. Execution of the Work of this Section shall comply with the performance standards described herein. Of primary importance is that the integrity of Grupes Dam is not compromised by the drilling or grouting methods employed by the Contractor. The masonry portion of Grupes Dam is more than 120 years old. No drilling or grouting techniques which have the potential to cause damage to the dam shall be permitted. The Contractor shall be responsible for the repair of any damage caused during the advancing of the drill holes, anchor installations, and/or tremie/pressure grouting, or any other work of this Section.
- D. Locations of existing internal features at Grupes Reservoir Dam are indicated on the Contract Drawings. Locations of these features are based on a combination of field survey and record drawings. Prior to starting the work of this Section, the Contractor shall perform a field survey to satisfy himself/herself as to the actual location of these features. The Contractor shall be responsible for establishing any control points and marks necessary for the Work. The Contractor must take necessary precautions while executing his Work to preserve and protect the dam including its internal features.
- E. The Contractor, Consultant and the Resident Engineer will monitor and judge the effects of the Contractor's drilling, anchor installation, and grouting work on the integrity of the dam. The Contractor shall be responsible for taking all such precautions as necessary to prevent operations from causing damage to the dam structure and appurtenances. If, in the opinion of

the District, the Resident Engineer, or the Consultant, the methods employed by the Contractor are causing damage to the Dam or its appurtenant structures, the District and the District's Resident Engineer shall have the authority to order and immediate stop the operations. In this event, the Contractor shall evaluate the situation and then propose and implement such changes to the methodologies as are needed to permit the continuance of the Work without additional damage. No additional payment shall be made for the time, effort, and materials required for the Contractor to evaluate and correct problems with the Contractor's methods. No alteration shall be made to the Contractor's unit prices for changes made to methods to protect the integrity of the dam.

- F. The Contractor shall be responsible for installing strand anchors that will develop the loadcarrying capacity indicated on the Contract Drawings and specified in the Specifications. Unless otherwise directed, the Contractor shall select the strand anchor type, drilling method, grouting method, grouting pressures, and, subject to the minimum values in the contract documents (as demonstrated by anchor test requirements), determine the bond length, freestressing (unbonded) length, anchor diameter, and anchor head/anchorage configuration.
- G. The drill holes, consolidation grouting, and anchor installation shall be executed from the top of the existing masonry/concrete dam structure as stated herein and as shown on the Contract Drawings. Drill holes for anchor installation shall be advanced through the full height of the masonry dam and into the underlying bedrock as shown on the Contract Drawings. The Work of this Section shall also include determining and documenting the depth of the masonry/bedrock foundation interface at each drill hole (both consolidation grouting and anchor) location.
- H. The Contractor shall be required to submit drilling, consolidation grouting, and anchor installation plans, as described below, to the Consultant and Resident Engineer for review and comment. The plan shall describe the Contractor's proposed drilling, anchor installation, and grouting methodology. The Contractor shall adhere to the reviewed drilling, grouting, and anchor installation submittals, unless a change is specifically requested by the Consultant and agreed to by the Consultant and the Resident Engineer.
- I. The Contractor shall be required to achieve the verticality tolerances specified herein. The Contractor will be required to provide detailed submittals to demonstrate the ability to achieve and monitor the drilling tolerances as well as to correct hole alignment during drilling.
- J. The Work of this Section shall be performed only by a qualified Specialty Geotechnical Subcontractor and competent supervisors and workers acceptable to the District and Consultant, as set forth herein. The Specialty Geotechnical Subcontractor's minimum qualification requirements are specified in Paragraph 1.04 below.

# 1.02 <u>DEFINITIONS</u>

- Admixture: Substance added to the grout to control bleed and/or shrinkage, improve flowability, reduce water content, or retard setting time.
- Alignment Load (AL): A nominal minimum load applied to an anchor during testing to keep the testing equipment correctly positioned.

- Anchor: A system, used to transfer tensile loads to the foundation, which includes the prestressing steel, anchorage, corrosion protection, sheathings, spacers, centralizers, and grout.
- Anchor Head: The means by which the prestressing force is permanently transmitted from the prestressing steel to the bearing plate. The anchor head includes wedges and a wedge plate for strand tendons.
- Anchorage: The combined system of anchor head, bearing plate, trumpet, and corrosion protection that is capable of transmitting the prestressing force from the prestressing steel to the surface of the ground or the supported structure.
- Anchorage Cover: A cover to protect the anchorage from corrosion and physical damage.
- Anchor Grout: Portland cement grout that is injected into the anchor hole prior to or after the installation of the anchor tendon to provide for the force transfer to the bedrock along the bond length of the tendon.
- Apparent Free Tendon Length: The length of tendon which is apparently not bonded to the surrounding grout or ground, as calculated from the elastic load extension data during testing.
- **Bearing Plate**: A steel plate under the anchor head that distributes the prestressing force to the anchored structure.
- **Bond Length**: The length of the tendon that is bonded to the primary grout and capable of transmitting the applied tensile load to the surrounding soil or rock.
- **Bondbreaker**: A sleeve placed over the anchor tendon in the free stressing length to ensure unobstructed elongation of the tendon during stressing.
- **Centralizer:** A device to support and position the tendon in the drill hole so that a minimum grout cover is provided.
- **Consolidation Grout:** Portland cement grout that is injected into the drill hole locations to either reduce the permeability of the bedrock or the masonry surrounding the hole.
- Corrosion Inhibiting Compound: Material used to protect against corrosion and/or lubricate the prestressing steel.
- Creep Movement: The movement that occurs during the creep test of an anchor under a constant load.
- Creep Test: A test to determine the movement of the ground anchor at a constant load.
- **Design Load (DL):** Anticipated final maximum effective load in the anchor after allowance for timedependent losses or gains. The design load includes appropriate load factors to ensure that the overall structure has adequate capacity for its intended use.
- **Detensionable Anchor Head**: An anchor head that is restressable and, in addition, permits the tendon to be completely detensioned in a controlled way at any time during the life of the structure.
- Elastic Movement: The recoverable movement measured during an anchor test.
- Encapsulation: A corrugated or deformed tube protecting the prestressing steel against corrosion in the tendon bond length.
- **Final Grout:** Portland Cement Grout installed via tremie methods within the annulus between the anchor and the drill hole over the free length of the tendon.

- **FPU:** Specified minimum tensile strength of the tendon as defined in the pertinent ASTM Specification.
- Free Stressing (Unbonded) Length: The designed length of the tendon that is not bonded to the surrounding ground or grout during stressing.
- **Fully Bonded Anchor:** Anchor in which the free stressing length without bondbreaker is grouted after stressing and so bonded to the surrounding structure or ground.
- Lift-Off: The load (lift-off load) in the tendon which can be checked at any specified time with the use of a hydraulic jack, by lifting the anchor head off the bearing plate.
- Lock-Off Load: The prestressing force in an anchor immediately after transferring the load from the jack to the stressing anchorage.
- **Permanent Anchor:** Any prestressed ground anchor that is intended to remain and function as part of a permanent structure. A permanent anchor has to fulfill its function for an extended period of time and thus requires special design, corrosion protection, and supervision during installation.
- **Performance Test**: Incremental cyclic test loading of a prestressed anchor in which the total movement of the anchor is recorded at each increment.
- **Pilot Hole:** The initial drill hole used to establish the anchor hole's verticality.
- Primary Grout: Primary grout is also known as anchor grout.
- **Proof Test:** Incremental loading of a prestressed anchor recording the total movement of the anchor at each increment.
- **Pulling Head:** Temporary anchoring device behind the hydraulic jack during stressing.
- **Relaxation:** The decrease of stress or load with time while the tendon is held under constant strain.
- **Residual Movement:** The non-elastic (i.e., non-recoverable) movement of an anchor measured during load testing.
- **Restressable Anchor Head:** An anchor head that permits the anchor load, throughout the life of the structure, to be measured by lift-off checking and adjusted by shimming/unshimming.
- Safety Factor: The ratio of the ultimate capacity to the working load used for the design of any component or interface.
- Sheath: A smooth or corrugated pipe or tube protecting the prestressing steel in the free stressing length against corrosion.
- **Spacer:** A device to separate elements of a multiple-element tendon to ensure full bond development of each prestressing steel element.
- Stressing Anchorage: See Anchorage.
- **Tendon:** The complete anchor assembly (excluding grout) consisting of prestressing steel, corrosion protection, sheathings, and coating when required, as well as spacers and centralizers.
- Test Load (TL): The maximum load to which the anchor is subjected during testing.
- **Trumpet:** Device to provide corrosion protection in the transition length from the anchorage to the free stressing length.
- Unbonded Anchor: Anchor in which the free stressing length remains permanently unbonded.

- Wedge: The device that transfers the prestressing force in the strand to the wedge plate.
- Wedge Plate: The device that holds the wedges of multistrand tendons and transfers the anchor force to the bearing plate.
- Working Load: Equivalent term for Design Load.

# 1.03 <u>RELATED WORK</u>

- A. Field Engineering Section 01050
- B. Submittals Section 01300
- C. Pre- and Post-Construction Surveys Section 01436
- D. Independent Testing Services Section 01451
- E. Subsurface Explorations Technical Data Section 01567
- F. Load Tests for Strand Anchors Section 02457

# 1.04 SPECIALTY GEOTECHNICAL SUBCONTRACTOR QUALIFICATIONS

- A. The Specialty Geotechnical Subcontractor performing the grouting and anchor work described in this Specification must have successfully completed at least five (5) dam anchoring projects of similar size and/or complexity within the last ten (10) years. The Specialty Geotechnical Subcontractor shall furnish references from at least five similar projects completed within the last ten (10) years. At least three projects must have involved grouting masonry dams and have successfully installed and stressed anchors in dams (preferably masonry) with equal or higher capacity than the anchors specified herein.
- B. The Specialty Geotechnical Subcontractor shall engage a qualified engineer, to prepare submittals and supervise the work. The Specialty Geotechnical Subcontractor's Engineer shall be a professional engineer licensed in the State of Connecticut with at least ten (10) years of experience in the design, and construction of permanent high-capacity strand anchors. The Subcontractor may not use consultants or manufacturer's representatives in order to meet the requirements of this section.
- C. The Specialty Geotechnical Subcontractor's shall assign a Superintendent and driller(s) with the following minimum qualifications.
  - 1. The Superintendent shall have at least five (5) years of experience with at least three dam anchoring projects.
  - 2. The drillers shall have at least three (3) years of experience as a driller (not including time spent as a driller's helper) on at least two dam anchoring projects.
  - 3. The Superintendent and drillers shall have successfully completed at least three (3) drilling projects where the drilling method proposed by the Specialty Geotechnical Subcontractor for the Grupes Dam project, were utilized.
  - 4. The Superintendent and driller(s) shall have successfully installed double corrosionprotected anchors, at a minimum of two (2) other project sites.

- D. The Specialty Geotechnical Subcontractor shall furnish resumes for their Engineer, Superintendent, and each driller proposed to perform work at the site.
- E. Inadequate proof of the qualifications, as judged by the District and Consultant, shall be cause for withholding contract award or for rejection of the bid. The District may suspend the grouting and anchor work if the Contractor substitutes unqualified personnel for approved personnel during construction. If work is suspended due to the substitution of unqualified personnel, the Contractor shall be fully liable for additional costs resulting from the suspension of work and no adjustment in contract time resulting from the suspension of work will be allowed.

# 1.05 DESIGN CRITERIA

- A. Unless otherwise directed, the Contractor shall select the type of tendon to be used. The tendon shall be sized so the design load does not exceed 60 percent of the specified minimum ultimate tensile strength (SMTS) of the prestressing steel strands. The lock-off load for the tendon shall be chosen based on anticipated time or activity dependent load changes but shall not exceed 67 percent of the SMTS of the prestressing steel strands. The prestressing steel strands shall be sized so the maximum test load does not exceed 80 percent of the SMTS of the prestressing steel.
- B. The production strand anchors shall be designed with the bonded zone in the bedrock below the dam as shown on the Contract Drawings. The design bond stress for the bedrock/grout interface for the design of the strand anchors shall not exceed 150 psi (i.e., maximum ultimate bond stress 300 psi). The minimum factor of safety for determining the required bond length for the strand anchors shall be 2.0 and shall be confirmed via anchor load testing as described in Section 02457 Load Test for Strand Anchors.
- C. The Contractor shall be responsible for providing the bond length necessary to develop the design load indicated on the Contract Drawings in accordance with these Specifications. The minimum bond length of any production strand anchor shall not be less than 23 feet.
- D. The free stressing length (unbonded length) for strand anchors shall not be less than 10 ft.
- E. Strand anchors shall be double corrosion protected, and the free length of the anchors shall be grouted after the tendons have been locked off and accepted.

# 1.06 <u>SUBMITTALS</u>

- A. Submit to the District, in accordance Section 01300 the shop drawings, product data and additional information as specified herein.
- B. Submit to the District, in accordance with Paragraph 1.04 of this Specification, the qualifications of the Specialty Geotechnical Subcontractor performing masonry grouting and the strand anchor installations. Submit a list containing at least five (5) similar projects completed within the last ten (10) years. For each project, the Contractor shall include with this submittal, at a minimum:
  - 1. Name of client contact, address, and telephone number;
  - 2. Location of project;

- 3. Contract value; and
- 4. Scheduled completion date and actual completion date for the project.
- C. Resumes of the Contractor's staff (including any Subcontractors) shall be submitted to the District for review as part of the Contractor bid. Only those individuals designated as meeting the qualification requirements shall be used for the project. The Contractor cannot substitute for any of these individuals without written approval of the District or Consultant. The Consultant shall approve or reject the Contractor's qualifications and staff within fifteen (15) working days after receipt of the submission. Work shall not be started on any anchors, nor materials ordered until the Contractor's qualifications have been approved by the District.
- D. At least 30 days prior to drilling, the Contractor shall submit a survey plan of Grupes Dam performed by a registered land surveyor. The survey plan shall show the location of the proposed grout holes and anchor locations relative to the existing conditions including any internal features such as valve chambers or outlet pipes. The survey plan should be coordinated with Contract Drawings including the project horizontal and vertical datums. The Contractor shall highlight any potential conflict between the proposed anchor locations with the internal features of the dam. As part of the review of the survey submittal, the District and Consultant will provide guidance to the Contractor regarding possible drill hole relocation if any of the proposed locations are found to conflict with the actual locations of the internal features of the dam.
- E. The Contractor shall prepare and submit to the Consultant for review Shop Drawings and a design submission describing the drilling and grouting methods and materials along with information on the strand anchor system intended for use. The Shop Drawings and design submission shall be submitted thirty (30) working days prior to the commencement of the grouting and anchor work.

All Shop Drawings and design calculations for the proposed grouting and strand anchors shall be sealed by a professional engineer registered in the State of Connecticut. Design calculations shall be provided for the sizing of the strand anchors including the anchorage in accordance with the design criteria shown on the Contract Drawings and specified herein. The final anchor design calculation package must be updated with the results of the load testing of the test strand anchor as shown on the Contract Drawings and specified in Section 02457 of the Specification.

The Shop Drawings and design submission shall provide a description of the work to be performed for the grouting and strand anchor installations, and materials to be used as specified herein.

F. <u>Drilling Submittal:</u>

The drilling submittal shall include as a minimum, the following information:

1. A description of the proposed installation methodology and procedures including the means and methods for drilling through masonry, concrete, and bedrock at the dam. The description shall include information on the type of drilling equipment to be utilized, proposed hole diameters, whether the hole will be cased or uncased, and how any casing will be advanced and removed.
- 2. Location, layout, and description of the temporary water supply including materials to be used and any permits required to secure the use of the reservoir water.
- 3. Descriptions of drilling and lifting equipment to be utilized on the job.
- 4. A description of the methods and equipment for measuring and maintaining verticality of the drill hole within the specified tolerances.
- 5. A description of the methods and equipment for correcting any drill holes found to be outside of the specified tolerances. Such plans may include a description of how the hole will be grouted, redrilled, over-cored, and/or changes/modifications in the drilling techniques/equipment that will be used to correct the verticality of the hole.
- 6. Contingency plans to be utilized if drilling methods are observed to be causing distress to the dam. Such plans shall include a list of and priorities of modifications to drilling methods which will serve to mitigate the impact of drilling on the dam. This may include alternative (low vibration) methods of advancing the holes.
- 7. Contingency plans to be utilized if a grouting hole or anchor hole is drilled through or contacts an internal feature at Grupes Dam Internal features include but are not limited to valve chambers and outlet pipes. A description of the equipment to be maintained onsite during drilling to abandon a drill hole (i.e., packers, grout, additional casing, etc.) shall also be provided in the contingency plan.
- 8. A description of the methods and equipment for determining and documenting the depth of the masonry/bedrock foundation interface.
- 10. A construction sequence for moving from location to location and a sequence for operations within each drill hole (including anchor installation and tremie/pressure grouting).
- 11. A construction schedule showing anticipated start and stop dates.
- 12. A description of the means and methods of controlling drilling by-products (including water, concrete and drill cuttings) within the Limit of Work to prevent environmental impacts to Grupes Reservoir, Silvermine Brook, the air, and surrounding environment.
- 13. If proposed and accepted by the District, a work plan which includes a description of the means and methods to be used to pump water from Grupes Reservoir for use in the drilling and the anchor installation process. The work plan must adequately describe the procedures to be used to protect Grupes Reservoir and the Silvermine Brook.
- 14. A shop drawing showing the proposed grouting and anchor locations coordinated with the Contractor's survey of any of the internal features at the dam.

# G. <u>Grouting Submittal</u>

The grouting submittal shall include as a minimum, the following information:

1. Submit descriptions of consolidation grouting equipment, methods, and materials as well as the methods, equipment, and procedures for the associated water testing to be performed within the bond zone at the anchor locations.

- 2. Submit proposed grout mix(es) for consolidation grouting (and anchor grouting, if not included in the anchor submittal). Include information on the proposed constituents and any admixtures/additives.
- 3. Name and qualifications of independent testing agency to be employed for quality control testing of the grout (consolidation and anchors).
- 4. Location, layout, and description of the temporary water supply including materials to be used and any permits required to secure the use of the reservoir water.
- 5. A description of the means and methods of controlling grout within the Limit of Work to prevent environmental impacts to Grupes Reservoir and/or Silvermine Brook, the air, and surrounding environment.

# H. <u>Strand Anchor Submittal</u>

The strand anchor submittal shall include as a minimum, the following information:

- 1. Name, location, and contact information for anchor strand suppliers.
- 2. Manufacturer's and/or mill certifications and test results for anchor strand.
- 3. Detailed information of corrosion protection system materials (e.g., factory grout, PVC sheathing, epoxy, etc.)
- 4. Shop Drawings and Details for the Strand Anchors showing, at a minimum:
  - a. Strand anchor number;
  - b. Strand anchor design load, minimum tensile load, minimum lock off load;
  - c. Type and size of tendon;
  - d. Minimum total anchor length;
  - e. Minimum bond length;
  - f. Minimum tendon bond length; and
  - g. Minimum unbonded length.
  - h. Anchor tendon and corrosion protection system
  - i. Spacers and their location;
  - j. Centralizers and their location;
  - k. Unbonded length corrosion protection system;
  - k. Bond length corrosion protection system;
  - 1. Anchor head assembly, trumpet, and any additional reinforcement required below the anchor head, and
  - m. Anchorage corrosion protection system
- 5. A description of the methods, materials, and equipment for grouting the bond zone of the anchor (anchor grout) prior to stressing as well as final grouting the free zone after the anchor has been locked off and accepted.

- 6. Certificates of Compliance for the following materials, if used. The certificate shall state that the material or assemblies to be provided will fully comply with the requirements of the contract.
  - a. Prestressing steel strands;
  - b. Portland cement;
  - c. Prestressing hardware;
  - d. Bearing plates; and
  - e. Corrosion protection system

# I. The Test Anchor design submissions should be prepared in conjunction with the required submittals described in Section 02457 – Load Tests for Stand Anchors.

- J. The Consultant shall review the Contractor's Shop Drawings and design submission within thirty (30) working days after receipt of the submission. Review of the design submittal does not relieve the Contractor of his responsibility for the successful completion of the work.
- K. The Contractor shall submit to the Consultant for review and approval or rejection mill test reports for the prestressing steel strands and the bearing plate steel. The Consultant may require the Contractor to provide samples of any anchor material intended for use on the project. The Consultant shall review the prestressing steel and bearing plate steel within five (5) working days after receipt of the test reports. The prestressing steel strands and bearing plates shall not be incorporated in the work without the Consultant's review.
- L. The Contractor shall submit to the Consultant and Resident Engineer within twenty (20) calendar days after completion of the anchor work a report containing:
  - 1. Grouting records indicating the cement type, quantity injected, grout pressures and grout strength test data;
  - 2. As-built drawings showing the location and orientation of each strand anchor, hole diameter, strand anchor type and size, anchor capacity, tendon type, total anchor length, bond length, unbonded length, and top of bedrock elevation, and the deviation from vertical for each strand anchor, and the locations of all instruments installed.

#### 1.07 <u>REFERENCES</u>

- A. Contract Drawings
- B. Ground Anchor Inspector's Manual, from "In-Situ Soil Improvement Techniques", American Association of State Highway and Transportation Officials - Associated Contractors of America - American Road and Transportation Builders Association (AASHTO-AGC-ARTBA), Task Force 27 Report, 1990.
- C. Latest version of American Society for Testing and Materials (ASTM) standards:
  - 1. ASTM A53 Standard Specification for Steel Pipe
  - 2. ASTM A500 Standard Specification for Cold-formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes

- 3. ASTM A536 Standard Specification for Ductile Iron Castings
- 4. ASTM A775 Standard Specification for Epoxy-Coated Reinforcing Steel Bars
- 5. ASTM A779 Standard Specification for Steel Strand, Seven Wire, Uncoated, Compacted, Stress-relieved for Prestressed Concrete
- 6. ASTM A882 Standard Specification for Epoxy-Coated Seven-Wire Prestressing Steel Strand
- ASTM A981 Standard Test Method for Evaluating Bond Strength for 15.2 mm (0.6 in.) Diameter Prestressing Steel Strand, Grade 270, Uncoated, used in Prestressed Ground Anchors
- 8. ASTM C109 Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2 inch or 50 mm Cube Specimens)
- 9. ASTM C143 Standard Test Method for Slump of Hydraulic Cement Concrete
- 10. ASTM D1248 Standard Specification for Polyethylene Plastic Molding and Extrusion Materials
- 11. ASTM D1784 Standard Specification for Rigid Poly Vinyl Chloride (PVC) Compounds and Chlorinated Poly Vinyl Chloride (CPVC) Compounds
- 12. ASTM D1785 Standard Specification for Poly Vinyl Chloride (PVC) Plastic Pipe, Schedule 40, 80 and 120
- 13. ASTM D2241 Standard Specification for Poly Vinyl Chloride (PVC) Pressure-Rated Pipe (SDR Series)
- 14. ASTM D4101 Standard Specification for Propylene Plastic Injection and Extrusion Materials
- 15. ASTM G57 Standard Method for Field Measurements of Soil Resistivity under the Wenner Four Electrode Method
- D. Latest version of American Association of State Highway and Transportation Officials (AASHTO) standards:
  - 1. AASHTO M85 Portland Cement
  - 2. AASHTO M183 Structural Steel
  - 3. AASHTO M203 Uncoated Seven-wire Stress-relieved Steel Strand
  - 4. AASHTO M222 High-strength Low-alloy Structural Steel with 50,000 psi Minimum Yield Point to 4 Inches Thick
  - 5. AASHTO M252 Corrugated Polyethylene Drainage Tubing
  - 6. AASHTO M275 Uncoated High-strength Steel Bar
  - 7. AASHTO M284 Epoxy-coated Reinforcing Bars
  - 8. AASHTO T288 Determining Minimum Laboratory Soil Resistivity
  - 9. AASHTO T289 Determining pH of Soil for Use in Corrosion Testing
  - 10. AASHTO T290 Determining Water Soluble Sulfate Ion Content in Soil

- E. American Water Works Association (AWWA) C105, "Notes on Procedures for Soil Survey Tests and Observations and Their Interpretation to Determine Whether Polyethylene Encasement Should Be Used," Appendix A.
- F. Federal Highway Administration (FHWA), FHWA-IF-99-015, "Geotechnical Engineering Circular No. 4, Ground Anchors and Anchored Systems". June 1999.
- G. Latest version of Post Tensioning Institute (PTI) standards:
  - 1. PTI, "Post Tensioning Manual"
  - 2. PTI, "Specification for Unbonded Single Strand Tendons"
  - 3. PTI, "Recommendations for Prestressed Rock and Soil Anchors"

#### 1.08 QUALITY ASSURANCE / QUALITY CONTROL

- A. The work shall be performed under the observation of the Consultant and the Resident Engineer. The Consultant and Resident Engineer shall interpret the Specifications and will decide all questions in connection therewith, including potential impacts of drilling operations on the condition of the dam. The observation of the work shall not relieve the Contractor of any obligations to fulfill the terms of the contract as herein required, including, but not limited to the protection of the condition and integrity of the existing dam.
- B. The Contractor shall furnish the Consultant, the Resident Engineer or District, with every reasonable facility and assistance for keeping his own records and ascertaining whether or not the work as performed is in accordance with the requirements and intent of the plans and specifications. The Consultant and the Resident Engineer reserve the right to review and comment on the sequence in which the work shall be undertaken, suspended, or completed.
- C. Construction Quality Control and Testing shall be in accordance with District Standard Specifications Item No. 105 and Section 01451. The Contractor shall correct all deficiencies and nonconformities identified by the Resident Engineer or Consultant at no additional cost to the District.
- D. Vibration and deformation monitoring during anchor installation shall be performed by the District's Consultant.
- E. Grout testing shall be performed as specified in Article 3.20 of this Section.
- F. The Contractor shall keep project records as specified in Article 3.21 of this Section.
- G. All hoses and equipment that will be contact with the reservoir must be sterilized prior to being mobilized on-site. Backflow prevention devices must be installed to prevent backflow or back siphonage.
- H. No discharge of wastewater to the reservoir will be permitted. Treated wastewater shall only be discharged downstream of the dam. Wastewater shall be tested, as required, to ensure compliance with the wastewater discharge requirements as specified in Section 01565.

## 1.09 EXISTING CONDITIONS

- A. Information on subsurface conditions at the site is provided in Section 01567.
- B. Prior to beginning work, the Contractor shall satisfy himself/herself as to the actual grades, lines, elevations, dimensions, and locations of existing utilities, structures, and internal features at the site, in accordance with Item No. 105 of the District Standard Specifications.
- C. Prior to beginning work, the District shall provide utility location plans to the Contractor. The Contractor is responsible for contacting a utility location service to verify the location of underground utilities before starting the work.
- D. Additionally, the Contractor's attention is called to the presence of several internal features inside Grupes Reservoir dam, including two gate chambers and two outlet pipes as shown on the Contract Drawings.
- E. Prior to the start of Work of this Section, the Contractor shall have submitted the preconstruction site documentation package as required under Sections 01436 and 01740 of the Contract Specifications. At least three (3) days before the start of Work under this Section, The Contractor and the Resident Engineer shall together assess the condition of the Dam. Photographs shall be taken, and records made during this pre-construction survey and a consensus on the pre-existing conditions shall be reached between the Contractor, Resident Engineer, and District shall become the basis for assessing changes to the condition of the dam resulting from construction activities.

## 1.10 CONTRACTOR'S PLANT AND EQUIPMENT

- A. All plant, equipment, and methods to be used by the Contractor shall be subject to review and commentary by the Resident Engineer before the work is started.
- B. For work which is performed from the top of dam, all of the Contractor's plant and equipment must be positioned and/or secured in such a manner as to prevent it from falling off the dam. The Contractor shall be responsible for providing all materials, equipment, and labor necessary to place and remove equipment onto and off of the dam.

#### 1.11 LOCATIONS OF DRILL HOLES

A. The exact locations of drill holes for consolidation grouting and anchors will be established and laid out by the Contractor based on the Contract Drawings and the reviewed shop drawings. If a potential conflict with an internal feature of the dam is identified during the Contractor's verification of existing conditions, the Contractor shall inform the District and Consultant as soon as possible. The District and Consultant will provide the Contractor with alternate consolidation grouting or anchor location or request the Contractor to develop and submit a proposal to install the consolidation grouting or anchor through the internal feature of the dam, where deemed appropriate. The District, with input from the Consultant, will make the final decision as to how to proceed. B. Before drilling is performed, the Contractor shall locate joints between concrete, masonry, cracks or irregularities, underlying reinforcing steel, utilities or other features which might interfere with drilling or lead to damage to the dam or appurtenances during the course of drilling. Conflicts with the drill holes shall be addressed as described above.

# 1.12 FACILITIES TO BE FURNISHED BY THE CONTRACTOR

- A. The Contractor shall provide all equipment, labor, and materials as required so that the drill holes and anchors can be positioned as shown on the Contract Drawings. The means of access proposed by the Contractor shall be such that they do not detrimentally affect the existing condition of the Dam and surrounding appurtenances. The Contractor shall provide all material and take all steps necessary to protect the condition of the existing top of dam and concrete/masonry. Loading limits for public roads and bridges (used to reach the site) shall be adhered to. Equipment or materials shall be positioned so as to not detrimentally affect utilities, walls, and other structures adjacent to the dam.
- B. The Contractor shall provide all equipment, labor, and materials as required to properly execute the drill holes, grouting, water testing, and anchor installations compliance with the specifications provided herein. This shall include, but not be limited to, all casing, bits, and other drilling material, grout, pumps, hoses, anchors, couplings, and grout containment and recovery systems. The Contractor shall also provide proper wooden boxes for the storage of rock cores, when such cores are recovered.
- C. The Contractor shall provide all equipment, labor, and materials as required for providing the safe conduct of the work in accordance with all OSHA requirements applicable for this work.
- D. The cost of all these items shall be included in the unit bid prices, and no separate and/or additional payment will be made.

# 1.13 <u>LINES AND GRADES</u>

- A. Employ a registered land surveyor that is experienced with this type of work. The surveyor shall establish lines and levels and be responsible for the correct location of the grout and anchor locations. The Contractor's surveyor shall also be responsible for confirming the locations of the internal features in the dam near the anchor installations prior to drilling.
- B. Establish a baseline and datum elevation for review by the District and Consultant. Locate the proposed consolidation grouting/anchor location per the Contract Drawings and reviewed shop drawings. Review the consolidation grouting/anchor location relative to the existing conditions. Identify the District and Consultant if any conflicts are anticipated.
- C. The Contractor's surveyor shall also confirm the position of the drill holes during drilling and the location of the dam/bedrock interface as it relates to the final selection of the bond zone for each anchor.

# 1.14 NOTIFICATIONS TO BE MADE BY THE CONTRACTOR

A. The Contractor shall notify Call Before You Dig by telephone or online as required by law prior to any drilling or excavation. The Contractor shall make all other necessary efforts to identify utilities or other features which might interfere with the Work.

# PART 2 - PRODUCTS

## 2.01 <u>GENERAL</u>

- A. The Contractor shall not deliver materials to the site until the submittals have been reviewed by the Consultant and accepted by District as outlined in Part 1.06 of this Specification.
- B. The Contractor shall furnish all installation tools, materials, and miscellaneous instrumentation components.
- C. The designated storage location or locations shall be protected by the Contractor from theft, vandalism, passage of vehicles, and other potential sources of damage to materials delivered to the site.
- D. The Contractor shall protect the materials from the elements by appropriate means. Prestressing steel strands shall be stored and handled in accordance with the manufacturer's recommendations and in such a manner that no damage to the component parts occurs. All steel components shall be protected from the elements at all times. Cement and additives for grout shall be stored under cover and protected against moisture.

#### 2.02 <u>ADMIXTURES</u>

- A. Admixtures which control bleed, improve flowability, reduce water content, and retard set may be used in the grout subject to the review of the Consultant.
- B. Admixtures, if used, shall be compatible with the prestressing steels and mixed in accordance with the manufacturer's recommendations. Expansive admixtures may only be added to the grout used for filling sealed encapsulations, trumpets, and anchorage covers. Accelerators shall not be permitted.
- C. Any admixtures which are used at the Contractor's option must be approved by the Owner's Consultant in advance and must be of a type that will not contaminate Grupes Reservoir or Silvermine River.

#### 2.03 ANCHORAGE DEVICES

- A. Stressing anchorages shall be a combination of either a steel bearing plate with wedge plate or wedges. The steel bearing and wedge plate may also be combined into a single element. Anchorage devices shall be capable of developing 95 percent of the specified minimum ultimate tensile strength (SMTS) of the prestressing steel tendon. The anchorage devices shall conform to the static strength requirements of Section 3.1.6 (1) and Section 3.1.8 (1) and (2) of the PTI "Guide Specification for Post-Tensioning Materials."
- B. The bearing plate and sub bearing plate shall be fabricated from steel conforming to AASHTO M 183 or M 222 specifications, or equivalent. The Contractor shall design the bearing plate and sub-bearing plate considering the required design load as well as the selected drill hole diameter, instrumentation requirements, anchor pocket size and depth, and the chosen corrosion protection system.

- C. The Contractor shall design and provide additional reinforcement (as required) within the concrete below the anchorage for the proposed anchor head and bearing plate design and configuration.
- D. The trumpet shall be fabricated from a steel pipe. Steel pipe shall conform to the requirements of ASTM A53. Steel trumpets shall have a minimum wall thickness of 1/8 in for diameters up to 4 in and 1/4 in for larger diameters. Trumpets shall be positively sealed against the bearing plate and aligned with the tendon to prevent cracking during stressing.
- E. Anchorage covers shall be fabricated from steel or plastic with a minimum thickness of 1/8 in. The joint between the cover and the bearing plate shall be watertight.
- F. Wedges shall be designed to preclude premature failure of the prestressing steel strands due to notch or pinching effects under static and dynamic strength requirements of Section 3.1.6 (1) and Section 3.1.8 (1) and 3.1.8 (2) of the PTI "Post Tensioning Manual." Wedges shall not be reused.
- F. Wedges for epoxy coated strands (if used) shall be designed to be capable of biting through the epoxy coating and into the strand. Removal of the epoxy coating from the strands to allow the use of standard wedges shall not be permitted.

# 2.04 <u>BONDBREAKER</u>

- A. The bondbreaker shall be fabricated from a smooth plastic tube or pipe having the following properties:
  - 1. Resistant to chemical attack from aggressive environments, grout, or corrosion inhibiting compound;
  - 2. Resistant to aging by ultra-violet light;
  - 3. Fabricated from material nondetrimental to the tendon;
  - 4. Capable of withstanding abrasion, impact, and bending during handling and installation;
  - 5. Enable the tendon to elongate during testing and stressing; and
  - 6. Allow the tendon to remain unbonded after lock-off.

# 2.05 <u>CEMENT GROUT</u>

- A. Grout mixes shall be proposed by the Contractor subject to the approval of the Consultant based on the specific application required. Initial mixes and water-to-cement ratios for the consolidation and anchor grout are specified below.
- B. Twenty-eight-day compressive strength ( $f_c$ ) of the grout used in consolidation grouting work shall be a minimum of 3,000 pounds per square inch (psi). Twenty-eight-day compressive strength ( $f_c$ ) of the grout used to install the anchor shall be a minimum of 5,000 psi.

- C. <u>Composition</u>: When grouting in tight areas of bedrock, as determined by the Contractor in consultation with the Consultant, and when backfilling holes, a standard non-shrink Portland cement/bentonite grout mix shall be used.
- D. <u>Water:</u> Water used in the grout shall comply with the requirements of Section 2.14, below. The Contractor shall be responsible for verifying his source water is acceptable via laboratory testing for the presence of deleterious material and shall be responsible for providing any treatment, filtration, or alternative source, as needed at his or her own expense.
- E. <u>Cement</u>
  - 1. The cement shall conform to the requirements of ASTM C150 for Portland cement and shall be either Type I/II or Type II. Cement shall be fresh, sieved, and free of lumps.
  - 2. Cement shall not exhibit a flash set or cause an abnormal initial rise of temperature upon engaging with water, and it shall maintain its full plasticity and fluidity during the period required for placing grout.
- F. <u>Bentonite:</u> Bentonite to be used in grout mixes shall be commercial grade sodium bentonite (sodium montmorillonite). Bentonite shall be supplied and utilized in powdered form only.
- G. Sand

Sand for grout, if used, shall consist of hard, durable un-coated particles free of mica. The shape of the particles shall be generally rounded and shall not contain more than ten percent (10%) of flat or elongated particles having a maximum dimension in excess of four (4) times the minimum dimension. The sand shall be well graded from fine to coarse and the gradation shall conform to the following requirements:

Sieve Designation	Percent Finer by Weight
No. 10	100
No. 20	95-100
No. 40	80-100
No. 60	20-100
No. 100	20-50
No. 200	0-5

The Contractor shall provide representative sand samples and test data for approval by the Owner's Consultant at least three days prior to incorporating material into the work. All tests will be made by the Contractor at the Contractor's expense. The percentage of surface moisture in terms of the saturated surface-dried sand will be determined in accordance with ASTM Designation C70-47, or other method giving comparable results. Sand shall be stored in such a manner as to avoid the inclusion of any foreign materials in the grout. The storage piles shall be constructed so as to prevent segregation. All sand shall remain in free drainage storage for at least seventy-two (72) hours prior to use.

## I. <u>Cement/Bentonite Grout Mix</u>

The initial cement/bentonite grout mix and anticipated range in water-to-cement ratios to be used shall be as follows. All grout mixes shall be non-shrink:

Application	Initial Water/Cement Ratio (by weight)	Water/Cement Ratio Anticipated Range* (by weight)	Bentonite Content (% by weight of cement)
Consolidation Grouting	1.5	1.0 to 3.0	1.5 to 5
Anchor Grouting	0.5	0.45 to 0.55	1.5 to 5

\* The quantity of water added to the grout mix may be varied with approval by the Consultant, depending upon field conditions, to obtain different flow characteristics and grout penetration and control.

## 2.06 <u>CENTRALIZERS</u>

A. Centralizers shall be fabricated from plastic, steel or material which is non-detrimental to the prestressing steel. Wood shall not be used. The centralizer shall be able to support the tendon in the drill hole and position the tendon so a minimum of 1-inch of grout cover is provided and shall permit grout to freely flow around the tendon and up the drill hole.

## 2.07 CORROSION INHIBITING COMPOUND

A. The corrosion inhibiting compound placed in the free length, anchorage head, or the trumpet area shall be an organic compound (i.e., grease or wax) with appropriate polar moisture displacing, corrosion inhibiting additives and self-healing properties. The compound shall permanently stay viscous and be chemically stable and nonreactive with the prestressing steel, the sheathing material, and the anchor grout. Corrosion inhibiting compounds shall conform to the requirements of Section 4.6 of the PTI, "Recommendations for Prestressed Rock and Soil Anchors."

#### 2.08 <u>GROUT TUBES</u>

A. Grout tubes shall have an adequate inside diameter to enable the grout to be pumped to the bottom of the drill hole. Grout tubes shall be strong enough to withstand a minimum grouting pressure of 150 psi. Post-grout tubes shall be strong enough to withstand anticipated post-grouting pressures.

#### 2.09 <u>HEAT SHRINKABLE SLEEVES</u>

A. Heat shrinkable sleeves, if used, shall be fabricated from a radiation crosslinked polyolefin tube internally coated with an adhesive sealant. Prior to shrinking, the tube shall have a nominal wall thickness of 0.6 mm. The adhesive sealant inside the heat shrinkable tube shall have a nominal thickness of 0.5 mm.

#### 2.10 PRESTRESSING STEEL STRANDS

A. Strand anchor tendons shall be fabricated from multiple elements of one of the following prestressing steels:

- 1. Seven-wire, low-relaxation strands conforming to ASTM A416 (AASHTO M203)
- 2. Epoxy coated strand conforming to ASTM A882.
- B. Steel strands used for anchors shall be continuous with no splices.

# 2.11 <u>SHEATH</u>

- A. A sheath shall be used as part of the corrosion protection system for the unbonded length portion of the tendon. The sheath shall be fabricated from one of the following:
  - 1. A polyethylene tube pulled or pushed over the prestressing steel. The polyethylene shall be Type II, III or IV as defined by ASTM D 1248 (or approved equal). The tubing shall have a minimum wall thickness of 1.5 mm.
  - 2. A hot melt extruded polypropylene tube. The polypropylene shall be cell classification B55542-11 as defined by ASTM D 4101 (or approved equal). The tubing shall have a minimum wall thickness of 1.5 mm.
  - 3. A hot-melt extruded polyethylene tube. The polyethylene shall be high density Type III as defined by ASTM D1248 (or approved equal). The tubing shall have a minimum wall thickness of 1.5 mm.
  - 4. Plastic pipe or tube of PVC conforming to ASTM D 1784 Class 13464-B. The pipe or tube shall be Schedule 40 at a minimum.
  - 5. A corrugated tube conforming to the requirement of the tendon bond length encapsulation (Part 2.14).
- B. A smooth sheath may also function as a bondbreaker. Sheaths fabricated from a corrugated tube or a heat-shrinkable tube requires a separate bondbreaker applied over them.

# 2.12 <u>SPACERS</u>

- A. Spacers shall be used to separate elements of a multi-element tendon and shall permit grout to freely flow around the tendon and up the drill hole. Spacers shall be fabricated from plastic, steel or material which is nondetrimental to the prestressing steel. Wood shall not be used. A combination centralizer-spacer may be used.
- B. Spacers/Centralizers shall be provided at maximum intervals of 10 ft with the deepest spacers/centralizers located 1 ft from the end of the anchor and the upper spacers/centralizers for the bond zone located no more than 5 ft from the top of the tendon bond length. Spacers/Centralizers shall be used to separate the steel strands of strand tendons.

# 2.13 <u>TENDON BOND LENGTH ENCAPSULATIONS</u>

A. When the Contract Drawings require the tendon bond length to be encapsulated to provide additional corrosion protection, the encapsulation shall be fabricated from one of the following:

- 1. High density corrugated polyethylene tubing conforming to the requirements of AASHTO M252 and having a minimum wall thickness of 1.5 mm except pregrouted tendons which may have a minimum wall thickness of 1.0 mm.
- 2. Deformed steel tubing or pipes conforming to ASTM A52 or A500 with a minimum wall thickness of <sup>1</sup>/<sub>4</sub> in.
- 3. Corrugated, polyvinyl chloride tubes manufactured from rigid PVC compounds conforming to ASTM D1784, Class 13464-B.
- 4. Fusion-bonded epoxy conforming to the requirements of AASHTO M84.
- B. The tendon bond length encapsulation shall be:
  - 1. Capable of transferring stresses from the grout surrounding the tendon to the bond length grout;
  - 2. Able to accommodate movements during testing and after lock-off;
  - 3. Resistant to chemical attack from aggressive environments, grout, or grease;
  - 4. Resistant to aging by ultra-violet light;
  - 5. Fabricated from materials nondetrimental to the tendon;
  - 6. Capable of withstanding abrasion, impact and bending during handling and installation; and
  - 7. Capable of resisting internal grouting pressures developed during grouting.

# 2.14 <u>WATER</u>

A. Water used in the grout shall be clean and free from injurious amounts of sewerage, oil acid, alkali, salts, sediments, organic and other deleterious materials. Reservoir water shall not be used without approval from the District. Reservoir water will be considered suitable for use in mixing grout unless it does not meet the following minimum test parameters and acceptable ranges:

Acceptable Value/Range
4.5 to 8.5
< 77º
< 2,000 ppm.
< 1,500 ppm
< 5,000 ppm
< 10,000 ppm
< 3,000 ppm

The Contractor shall be responsible for verifying his source water is acceptable via laboratory testing for the presence of deleterious material and shall be responsible for providing any treatment, filtration, or alternative source, as needed at his or her own expense.

## 2.16 EQUIPMENT

## A. <u>Drilling Equipment</u>

All equipment, including casing, drill rods, core barrels, bits, etc., shall be standard heavyduty drilling equipment meeting industry standards as defined by DCDMA, NDA. or other applicable organization. All equipment shall be in good and serviceable condition when brought to the site and shall be free of contaminates.

Drilling equipment may include rotary coring systems or tri-cone roller bit systems. Rotary percussion and/or air/water circulation drilling systems, (e.g., duplex or down-the-hole hammers) shall not be used.

Drilling equipment shall utilize centralizers or rods intended to improve hole straightness and linearity. Additional equipment, such as directional drilling equipment, may be used to verify/correct drill hole alignment to meet the required tolerances.

Drilling equipment used to drill the anchor holes to their final diameter shall be capable of following a previously drilled pilot hole (if used).

#### B. <u>Grouting Equipment</u>

- 1. <u>Type</u>: All grouting equipment used shall be of a type, capacity, and mechanical condition suitable for performing the work, in accordance with the requirements specified in these Specifications, and to the satisfaction of the Consultant. The power, equipment and the layout thereof shall meet all applicable requirements of local, State, and Federal regulations and codes.
- 2. <u>Location</u>: The Contractor's grout mixing plant shall be located in an approved location. The plant may be located in the staging and lay-down areas identified in the Contract Drawings, or at other areas proposed by the Contractor and approved by the District.
- 3. <u>Arrangement and Operation</u>: The arrangement of the grouting equipment shall be such as to provide a continuous circulation of grout throughout the system and to permit accurate pressure control by operation of a valve on the grout return line, regardless of how small the grout take may be. The Contractor's equipment should have a means of measuring the volume of grout pumped into the hole. The equipment and lines shall be prevented from becoming fouled by the constant circulation of grout and by the periodic flushing-out of the system with water. Flushing shall be done with the grout intake valve closed, the water supply valve open and the pump running at 100 percent of its capacity.
- 4. Pumping of grout shall be limited to a maximum length of 500 feet from the grout plant to the connection to the grout hole. A standby grout pump and power supply shall be available upon short notice in the event of the failure of the primary pump. Grouting equipment shall include a mixer capable of continuous mechanical mixing which shall produce a fluid grout free of lumps and un-dispersed cement, and all other ancillary equipment necessary to do the work.

- 5. Standby water flushing equipment shall be maintained available by the Contractor. The standby water flushing equipment shall utilize a different power source than the grouting equipment, have sufficient capacity to flush out any partially grouted holes if necessary due to blockage or breakdown of grouting equipment, and shall be capable of developing a pressure of at least one hundred pounds per square inch - gage (100 psig). The Contractor shall flush out partially grouted holes whenever grouting is interrupted for two (2) hours or more due to equipment failures. Maximum pressure utilized shall be as directed by the Consultant but shall not exceed one pound per square inch (1 psi) per foot of depth. If the Contractor fails to flush out a partially grouted hole, the Resident Engineer shall direct the Contractor to abandon or re-drill the hole and no measurement (or payment) will be taken of the abandoned hole.
- 6. The Contractor shall maintain his grout pressures to prevent heaving and shall have a pressure gage in good operating condition accurate to one-half (0.5) psi, located at the top of the hole being grouted unless otherwise approved by the Consultant. The grout plant shall be maintained in good operating condition at all times and any grout hole that is lost or damaged due to mechanical failure of equipment or to any inadequacy of grout supply shall be replaced by another hole, drilled/cored by the Contractor at his expense.

# **PART 3 – EXECUTION**

## 3.01 ACCESS TO DAM

A. Access to the dam and its appurtenant structures is provided via a paved and unpaved access roadway system. Site access is as shown on the Contract Drawings. The Contractor shall visit the site to determine site access and working space before submitting a bid for the Work.

# 3.02 <u>SUPPLY WATER</u>

- A. The District shall designate the location from which the Contractor shall obtain potable water. The Contractor is responsible for supplying all material, equipment, and tools necessary to tap into the water source. The Contractor shall install a meter to measure the water consumption. The District will provide, at no charge to the Contractor, 10,000 gallons of potable water per day for use in the grouting and strand anchor installations.
- B. All hoses and equipment that will be contact with the reservoir must be sterilized prior to being mobilized on-site. Backflow prevention devices must be installed to prevent backflow or back siphonage.

#### 3.03 <u>GENERAL PROCEDURE AND SEQUENCE</u>

A. Location of drill holes shall be as shown on the Contract Drawings and reviewed shop drawings. With approval from the Consultant and the Resident Engineer, the Contractor shall adjust the exact location of the drill holes such that any edge of a drill hole is no closer than six (6) inches from any joint, internal feature, dam face, etc. The general center to center spacing of the drill holes shall not vary by more than six (6) inches along the center axis parallel along the dam from that shown on the Contract Drawings and not more than three (3)

inches in the upstream or downstream direction, unless specifically approved by the Consultant.

- B. The Contractor shall coordinate the drilling, grouting, and anchor installation work with the other work/construction/modifications taking place along the top of the dam. With respect to drilling, grouting, and anchor installation, the Contractor is expected to adhere to the following general sequence:
  - 1. Layout and verify the drill hole locations. Adjust spacing as needed and in cooperation with the District and Consultant to account for construction joint locations, internal features of the dam, other irregularities as well as the actual field conditions.
  - 2. Deformation monitoring points, crack gages, and seismographs shall be in-place prior to the start of any drilling for grouting or anchor installation.
  - 3. Construct and install test anchor(s) in accordance with the approved procedure, perform load tests on test anchor(s) as described in Section 02457. Adjust bond lengths and/or installation procedures for the "production" anchors as necessary based on the results of the testing.
  - 4. Drill NX diameter holes for grouting at all locations (consolidation and anchor). The Contractor shall follow a drilling sequence approved by the District and Consultant., The Contractor shall verify whether the hole meets required drilling tolerances for verticality.
  - 5. Advance the drill holes for grouting through the concrete and masonry dam and into the bedrock to the required final depth below the dam/bedrock interface. Anchor holes shall be drilled to the minimum depth shown on the Contract Drawings. Consolidation grouting holes without anchors shall be drilled to 10 feet below the dam/bedrock interface. The depth of the dam/bedrock interface shall be determined via core recovery or by borehole televiewer. Holes drilled into bedrock shall not be left open overnight without casing.
  - 6. Perform consolidation grouting for watertightness at all drill hole locations.
  - 7. Ream the drill holes at anchor locations to the final dimensions using accepted drilling methods. Confirm that final drill hole meets required tolerances and is in the correct location.
  - 8. Water test the bond zone of the final anchor drill hole as specified herein. Pressure grout and re-drill hole as many times is as required to meet the grout refusal criteria set in these Specifications. Redrilling, if required shall occur within 48 hours of the completion of the follow-up grouting.
  - 9. Install double corrosion-protected strand anchors as per specifications.
  - 10. Grout the bond zone of the anchor from the bottom up with approved Anchor Grout mix as specified herein.
  - 11. Install the anchorage at the top of the dam, pre-stress, load test, and lock-off the anchor.
  - 12. After anchors have been accepted, final grout the annulus between the anchors and borehole along the free length (between the bond zone and anchorage).

# 3.04 <u>TENDON STORAGE AND HANDLING</u>

- A. Tendons shall be handled and stored in such a manner as to avoid damage or corrosion. Damage to the prestressing steel, the corrosion protection, and/or the epoxy coating as a result of abrasions, cuts, nicks, welds, and weld splatter will be cause for rejection by the Engineer. The prestressing steel shall be protected if welding is to be performed in the vicinity. Grounding of welding leads to the prestressing steel is forbidden. Prestressing steel strands shall be protected from dirt, rust, or deleterious substances. A light coating of rust on the steel is acceptable. If heavy corrosion or pitting is noted, the Engineer shall reject the affected tendons.
- B. The Contractor shall use care in handling and storing the tendons at the site. Prior to inserting a tendon in the drill hole, the Contractor and the Engineer shall examine the tendon for damage to the encapsulation and the sheathing. If, in the opinion of the Resident Engineer and Consultant, the encapsulation is damaged, the Contractor shall repair the encapsulation in accordance with the tendon supplier's recommendations. If, in the opinion of the Engineer, the smooth sheathing has been damaged, the Contractor shall repair it with ultra-high molecular weight polyethylene tape. The tape should be spiral wound around the tendon to completely seal the damaged area. The pitch of the spiral shall ensure a double thickness at all points.
- C. Banding for fabricated tendons shall be padded to avoid damage to the tendon corrosion protection. Upon delivery, the fabricated anchors, or the prestressing steel for fabrication of the tendons on site and all hardware shall be stored and handled in such a manner to avoid mechanical damage, corrosion, and contamination with dirt or deleterious substances.
- D. Lifting of the pre-grouted tendons shall not cause excessive bending, which can debond the prestressing steel from the surrounding grout.
- E. Prestressing steel strands shall not be exposed to excessive heat (i.e., more than 230°C).

# 3.05 ANCHOR FABRICATION

- A. Anchors shall be either shop or field fabricated from materials conforming to Part 2 of the Specification and as shown in the approved Shop Drawings and schedules.
- B. Prestressing steel shall be cut with an abrasive saw or, with the approval of the prestressing steel supplier, an oxyacetylene torch.
- C. All of the tendon bond length, especially for strand, must be free of dirt, manufacturers' lubricants, corrosion-inhibitive coatings, or other deleterious substances that may significantly affect the grout-to-tendon bond or the service life of the tendon.
- D. Pregrouting of encapsulated tendons shall be done on an inclined, rigid frame or bed by injecting the grout from the low end of the tendon.

## 3.06 CORROSION PROTECTION

- A. <u>General:</u> Corrosion protection shall be Class I Encapsulation (Double Corrosion Protected) in accordance with PTI "Recommendations for Prestressed Rock and Soil Anchors" and as shown on the Contract Drawings. The corrosion protection systems shall be designed and constructed to provide reliable, permanent ground anchors.
- B. Anchorage Protection
  - 1. Anchorages shall have a cover filled with a corrosion inhibiting compound. All anchorage surfaces shall be protected with a bitumastic coating prior to covering with grout. All stressing anchorages shall be sunken below the surface of the dam surface and covered by a minimum of 9 inches of concrete.
  - 2. The trumpet shall be sealed to the bearing plate and shall overlap the unbonded length corrosion protection by at least 6 inches. The trumpet shall be long enough to accommodate movements of the structure and the tendon during testing and stressing. The trumpet shall be long enough to enable the tendon to make a transition from the diameter of the tendon along the unbonded length to the diameter of the tendon at the wedge plate without damaging the encapsulation.
  - 3. The trumpet shall be completely filled with a corrosion inhibiting compound. Compounds may be placed any time during construction. Compound-filled trumpets shall have a permanent seal between the trumpet and the unbonded length corrosion protection.
- C. Unbonded Length Protection
  - 1. Corrosion protection of the unbonded length shall be provided by a combination of sheaths, sheath filled with a corrosion inhibiting compound or grout, or a heat shrinkable tube internally coated with a mastic compound, depending on the tendon class. The corrosion inhibiting compound shall completely coat the tendon elements, fill the void between them and the sheath, and fill the interstices between the wires of 7-wire strands. Provisions shall be made to retain the compound within the sheath.
  - 2. The corrosion protective sheath surrounding the unbonded length of the tendon shall be long enough to extend into the trumpet but shall not come into contact with the stressing anchorage during testing. Any excessive protection length shall be trimmed off.
  - 3. For pregrouted encapsulations and all Class I tendons, a separate bondbreaker or common sheath shall be provided for supplemental corrosion protection or to prevent the tendon from bonding to any grout surrounding the unbonded length.
  - 4. The transition between the corrosion protection for the bonded and unbonded lengths shall be designed and fabricated to ensure continuous protection from corrosive attack.
- D. Tendon Bond Length Protection for Encapsulated Tendons
  - 1. A grout-filled, corrugated plastic encapsulation or a grout-filled, deformed steel tube shall be used. The prestressing steel can be grouted inside the encapsulation prior to inserting the tendon into the drill hole or after the tendon has been placed.

- 2. Centralizers or grouting techniques shall ensure a minimum of <sup>1</sup>/<sub>2</sub> inch of grout cover over the encapsulation.
- 3. Fusion-bonded epoxy may be used to provide a layer of protection for the steel tendon in addition to the cement grout.

# 3.07 <u>TEST ANCHORS</u>

- A. A minimum of one (1) Test Anchor shall be installed in the area on the east (left) abutment designated "TA-1" on the Contract Drawings. The Contractor may propose a different test anchor location with approval from the District and Consultant.
- B. The drill hole for the Test Anchor shall be constructed using the same equipment and methods that will be used to construct the production anchors. The diameter of the test anchor drill hole shall be the same diameter as the production anchors. Because soil overburden is present in the proposed test area location, temporary casing shall be used over the unbonded length of the Test Anchor.
- C. Water testing of the test anchor drill hole shall be performed in accordance with the requirements of this Section.
- D. The test anchor bond length shall be twenty-three (23) feet and shall be in sound bedrock. The test anchor shall be constructed from the same materials proposed for use in the production anchors. The test anchor shall be installed in such a manner that prevents any load to be distributed above the bonded zone.
- E. The Test Anchor shall be instrumented to determine the load distribution within the bonded zone.
- F. Grout testing shall be performed for the Test Anchor installation in accordance with the procedures outlined in Article 3.20 of this Section.
- G. The Test Anchor shall undergo Performance Testing in accordance with Section 02457. The Contractor is responsible for design and construction of the load testing system required to perform the load test. The load testing system shall be designed by a Professional Engineer registered in the State of Connecticut.
- H. Based on the results of the load testing performed on the Test Anchor, the Contractor may propose to adjust the installation procedures or configuration of the production stand anchors, including the hole diameter and bond length.

# 3.08 <u>DRILLING</u>

- A. Drill holes shall be made as necessary to allow for consolidation grouting at all indicated locations, as well as the eventual installation of anchors at designated holes. The number, location, and estimated drill lengths of the drill holes required are shown on the Contract Drawings and/or described herein.
- B. In all cases, drill holes where anchors will be installed shall be of such depth as required to provide a minimum anchor embedment into bedrock, beneath the dam (i.e., masonry /bedrock

interface). Final drill depths will be based on the subsurface conditions encountered at each hole, the results of the test anchor installation and testing, and by approval of the Consultant.

- C. The Contractor shall be responsible for the repair of all damage caused by drilling through the concrete and masonry and shall therefore select his/her means and methods accordingly. Acceptable low-vibration drilling methods include tri-cone rollerbit with water wash, or rotary coring and reaming to final dimensions.
- D. Detrimental effects to the dam may include, but are not limited to, excessive vibrations (as measured by seismograph), visual cracking of concrete, communication of drilling fluids or air with adjacent anchor holes, or displacement of stone masonry. If the District or Consultant judges that the Contractor's drilling operations are detrimental to the dam, the Contractor will be required to modify his drilling procedures immediately. If the drilling technique does not result in visually detectable damage to the dam; however, the vibration criteria is being exceeded, the Contractor may be directed to implement alternate, low-vibration drilling methods.
- E. Redrilling of grouted holes (for consolidation grouting or anchors) may be required if:
  - 1. Excessive grout takes are encountered during consolidation grouting.
  - 2. The grout refusal or watertightness criteria were not achieved for the bond zone for anchor holes; or
  - 3. The time interval between the completion of tremie grouting of the bond zone and the insertion of the strand anchor exceeds 2 hours.
- F. If required, redrilling of grouted anchor holes shall be performed with a tri-cone roller bit with wash water. The minimum time of grout set before any hole can be re-drilled shall be 18 hours unless otherwise directed by the Consultant. To increase the likelihood that the re-drilled hole will follow the path of the initial hole, maximum time of grout set before beginning re-drilling shall be no more than 48 hours unless otherwise directed by the Consultant.
- G. All drill holes must be open and unobstructed prior to the installation of anchors. Each hole shall be cleaned of all debris and dust by a method approved by the Consultant and the Resident Engineer. In the event that casing is used, the casing must be removed in advance of or during grouting. Casing must not interfere with anchor installation or grouting. All casing shall be removed prior to completion of the work, and it shall remain the property of the Contractor.
- I. Depending on the drilling method utilized by the contractor, a sump of appropriate depth shall be provided at the bottom of each anchor hole to collect debris and dust from drilling operations that are unable to be flushed from the drill hole. No payment or measurement of drilling required to construct the sump will be made.
- J. Refer to Paragraph 3.22 of this Section for requirements and information regarding drill hole abandonment.

## 3.09 DRILL HOLE DIAMETERS

- A. The minimum diameter of the drill hole at each location shall be based upon the requirements of the type of anchor to be installed within the hole and/or the needs of the grouting operations. The maximum diameter of all drill holes shall be limited so as to reduce the impact of drilling operations on the dam. Minimum and maximum drill hole diameters are specified hereinafter. The Contractor shall not deviate from these limits without written permission from the Consultant. Within these limits, the diameter of the drill hole shall be dictated by the drilling methods selected by the Contractor. Payment for the Work of this Item shall be independent of the diameter of the drill holes.
- B. Minimum and maximum final diameters shall apply in both the dam and foundation bedrock, but actual borehole diameters may vary between the dam and bedrock portions of the hole, depending on the drilling methods used.
- C. <u>Consolidation Grout Holes:</u> Drill holes for consolidation grouting shall have a minimum nominal diameter of 3 inches and a maximum nominal diameter of 6 inches.
- D. <u>Double Corrosion Protected Strand Anchor Holes:</u>

Drill holes at locations where double corrosion protected strand anchors are to be installed shall have the following minimum and maximum final diameters:

Minimum final diameter:	6 inches
Maximum final diameter:	9 inches

The actual final diameter of the drill holes shall be selected by the Contractor in conformance with the minimum and maximum final diameters shown above and shall account for the recommendations of anchor manufacturer to provide adequate space for anchor installation. In general, minimum final drill hole diameters for double corrosion protection anchors are similar to those shown, but the Contractor **MUST** verify the information with the anchor manufacturer.

# 3.10 DRILLING TOLERANCES

- A. Drill holes (both consolidation grouting and anchor holes) shall be vertically aligned. No portion of any drill hole to receive an anchor shall deviate from true vertical by more than 3 degrees.
- B. The position of each drill hole shall be measured during drilling at a minimum of 10-foot intervals. If the conditions warrant, the Contractor shall provide measurements of the position of the drill holes when requested by the by the District or Consultant, at no additional cost.
- C. The Contractor shall provide a record of the position and verticality over the entire length of each hole, prior to the installation of anchor tendons.
- D. The Contractor shall adjust the verticality of the drill holes as necessary based on results of their surveys/measurements. No separate payment will be made for the Contractor to abandon and re-drill a mis-aligned hole. Mis-aligned drill holes shall be regrouted and redrilled in

accordance with the Contractor's approved contingency plan to correct a drill hole that does not meet the verticality requirements.

## 3.11 LABELING, MARKING, PRESERVING, DELIVERING AND DISPOSAL OF CORES

A. All concrete, masonry, and rock cores shall be clearly, accurately, and permanently labeled or marked to show all pertinent information which may be helpful in identifying the sample or core and in determining the character of the subsurface materials as follows:

<u>Storage:</u> The Contractor shall provide wooden core boxes of a size suitable for the storage of all concrete and rock core material recovered from the Dam. These boxes shall be permanently marked to indicate the following:

- "Grupes Reservoir Dam"
- Anchor or Grout Hole Number and Box Number (e.g., 1 of X)
- Core Run Number/Sequence
- Depth interval of Core Run (and sequence in box)
- Date and Time of Coring
- B. The Contractor shall mark breaks in core samples that are a result of the drilling or extraction process (i.e., "Driller's Breaks" or "Mechanical Breaks").
- C. The Contractor shall store on-site all concrete and rock cores during the Work. The Contractor shall dispose of all core samples at the end of the project, unless the District or the Resident Engineer identify specific concrete or rock cores to be preserved. The Contractor shall deliver the preserved core samples to a location designated by the District within fifty (50) miles of the site.

#### 3.12 <u>CONSOLIDATION GROUTING</u>

- A. The grouting shall be conducted using the Contractor submitted grouting method(s), as approved by the Consultant.
- B. The need for additional rounds of consolidation grouting will be determined based on the whether the initial attempt results in excessive grout takes, and/or the results of water testing of the hole after re-drilling.
- C. <u>Grout Injection:</u> The consolidation grout injection shall proceed in a continuous manner until either refusal is reached or injection is stopped by the Owner's Consultant due to excessive takes (defined as twice the theoretical volume of the drill hole).
- D. <u>Grout Refusal Criteria</u>: Refusal is defined as a grout take of less than 0.1 cubic foot in three minutes at maximum grouting pressure for every grout stage.
- E. Prior to initiating and grouting work, the Contractor shall submit a plan for daily disposal of wasted and unused grout for the approval of the District. Grout that cannot be placed, for any reason, within two (2) hours after mixing shall be discarded.
- F. Consolidation grouting shall be injected from the bottom up in two stages. Separation of stages shall be accomplished through the use of a single packer. The initial grouting stage

shall be within the bedrock foundation of the dam. The packer shall be placed across or below (maximum 2 feet below) the dam/foundation interface. After inflation of the packer, the bedrock stage shall be grouted to refusal.

Once refusal is achieved in the bedrock stage and confirmed by the Consultant, the masonry portion of the dam shall be grouted in a second stage operation. The single packer shall be raised to within no more than two feet from the top of the dam. Grout shall then be injected into the hole to grout the masonry portion of the dam. It is not necessary to isolate the previously grouted bedrock zone during second stage grouting operations.

Grouting shall be continued until refusal or until directed to cease by the Consultant. After completion of the second grouting stage, the top portion of the hole shall be filled with grout by free discharge of grout into the hole.

## G. <u>Grouting Pressures</u>

It is of the essence that grouting pressures be controlled such that grouting operations do not cause damage to the dam or foundation. Excessive grouting pressures may displace or damage masonry. Grouting pressures as measured at the top of the dam should be limited to a maximum of 1 psi per foot of maximum depth for the grouting stage. For the bedrock grouting (initial) stage, the bottom of the hole will define the maximum depth. For the masonry grouting (second) stage, the location of the dam/foundation interface will define the maximum depth.

## 3.13 <u>WATER TESTING</u>

- A. Water testing shall be performed for the bond zone (in the bedrock) at anchor locations only.
- B. The water testing shall be performed in accordance with the contractor-submitted and approved procedure, at a minimum the test shall consist of the following:
  - 1. An inflatable packer shall be used to isolate the water testing to the portion of the hole below the dam (i.e., bond length within bedrock). The water test shall be performed by filling the hole with water, pressurized to 5 psi in excess of the hydrostatic head as measured at the top of the dam.
  - 2. If the leakage from the hole over a ten (10) minute period exceeds 0.01 gallons of water per foot of bond length per inch of hole diameter, then the hole should be pressure grouted, redrilled and retested. The grout mix for pressure grouting should be designed to limit take and optimize sealing.
  - 3. Re-drilling shall be done when the grout strength is less than the strength of the surrounding rock and/or concrete.
  - 4. Should the subsequent water test(s) fail, the entire process shall be repeated until results are attained which are within leakage allowances.
- C. If artesian or flowing water is encountered in the drilled hole, the hole should be grouted and re-drilled prior to water pressure testing. Pressure should be maintained on the grout until initial set has been obtained.

# 3.14 INSTALLATION OF ANCHORS

- A. Anchors shall be installed in accordance with the Contract Drawings, details, and the recommendations of the manufacturer or specialist anchor contractor.
- B. Anchors shall only be installed in holes that have been water tested and meet the specified water testing criteria. Before installation of the anchor, each hole shall be cleaned of all debris and dust by a method approved by the Owner's Consultant.
- C. All equipment used for installation of anchors shall be such that it will not damage the corrugated sheathing, factory grout, or other corrosion protection system.
- D. The Contractor shall provide a temporary or permanent system for holding the anchors in place vertically and horizontally during the installation process and until the grout has set. Centering systems shall be compatible with the corrosion protection systems of the anchor and shall not cause damage to that system.
- E. The anchor shall be inserted into the drill hole to the desired depth without difficulty. If the anchor cannot be completely inserted, the Contractor shall remove the anchor from the drill hole and clean or redrill the hole to permit insertion. Partially inserted anchors shall not be driven or forced into the hole. Anchors shall be lowered in a controlled manner to the specified location and adequately secured prior to tremie grouting.
- F. Each anchor tendon shall be inspected by field personnel during installation into the drill hole or casing. Damage to the corrosion protection system shall be repaired, or the tendon replaced if not repairable. Loose spacers or centralizers shall be reconnected to prevent shifting during insertion. Damaged fusion-bonded epoxy coatings shall be repaired in accordance with the manufacturer's recommendations. If the patch is not allowed to cure prior to inserting the anchor in the drill hole, the patched area shall be protected by tape or other suitable means.
- E. The rate of placement of the anchor into the hole shall be controlled such that the sheathing, coating, and grout tubes are not damaged during installation of the tendon. Anchor tendons shall not be subjected to sharp bends. The bottom end of the tendon may be fitted with a cap or bullnose to aid its insertion into the hole, casing, or sheathing.

# 3.15 TREMIE GROUTING

- A. After the anchor has been inserted to its design location, the hole should be tremie grouted from the bottom of the drill hole up to the top of the bond zone. The anchor grout shall be injected from the lowest point of the drill hole. The grout may be pumped through grout tubes. The quantity of the grout and the grout pressures shall be recorded. The grout pressures and grout takes shall be controlled to prevent excessive heave or fracturing.
- B. The grouting equipment shall produce a grout free of lumps and undispersed cement. A positive displacement grout pump shall be used. The pump shall be equipped with a pressure gauge to monitor grout pressures. The pressure gauge shall be capable of measuring pressures of at least 150 psi or twice the actual grout pressures used by the Contractor, whichever is greater. The grouting equipment shall be sized to enable the grout to be pumped in one continuous operation. The mixer should be capable of continuously agitating the grout.

- C. Tremie grouting can be performed before or after the strand anchor has been installed. The grout tube may remain in the hole on completion of grouting if the tube is filled with grout.
- D. After tremie grouting, the tendon shall not be loaded for a minimum of three (3) days.

# 3.16 ANCHORAGE INSTALLATION

- A. The Contractor is responsible for designing and providing reinforcement for the concrete below the proposed anchorage, if required. The Contractor shall satisfy him/herself to the condition of the existing concrete below the proposed anchorage prior to anchorage design.
- B. The anchor bearing plate and the anchor head shall be installed perpendicular to the anchor tendon, within plus/minus three (3) degrees and centered on the bearing plate, without bending or kinking of the prestressing steel elements. Wedge holes and wedges shall be free of rust, grout, and dirt.
- C. The stressing tail shall be cleaned and protected from damage until final testing and lock-off. After the anchor has been accepted by the Engineer, the stress tail shall be cut to its final length according to the tendon manufacturer's recommendations.
- D. The corrosion protection surrounding the unbonded length of the tendon shall extend up beyond the bottom seal of the trumpet. If the protection does not extend beyond the seal or sufficiently far enough into the trumpet, the Contractor shall extend the corrosion protection or lengthen the trumpet.
- E. The corrosion protection surrounding the unbonded length of the tendon shall not contact the bearing plate or the anchor head during testing and stressing. If the protection is too long, the Contractor shall trim the corrosion protection to prevent contact.
- F. For epoxy-coated strands, field removal of the epoxy at the anchorage shall not be permitted, as this not only voids the corrosion protection that the epoxy normally provides but can also severely damage the strand.
- G. Electrical isolation of the anchorage and trumpet is not necessary, provided that the unbonded and bond length of the tendon are electrically isolated from the ground.
- H. The anchorage shall be installed below the surface of the dam and shall be covered by a minimum of nine (9) inches of concrete. Measures should be taken to allow for future recovery of the anchor heads.

# 3.17 <u>TESTING AND ACCEPTANCE</u>

A. Testing and acceptance of production anchors shall be in accordance with Section 02457.

# 3.18 ANCHOR LOCK-OFF

A. After testing has been completed, the load in the tendon shall be such that after seating losses (i.e., wedge seating), the specified lock-off load has been applied to the anchor tendon.

- B. The magnitude of the lock-off load shall be specified by the Consultant and shall not exceed 70% F<sub>PU</sub>.
- C. The wedges shall be seated at a minimum load of 50%  $F_{PU}$ . If the lock-off load is less than 50%  $F_{PU}$ , shims shall be used under the wedge plate and the wedges seated at 50%  $F_{PU}$ . The shims shall then be removed to reduce the load in the tendon to the desired lock-off load.
- D. Once the anchor has been locked off and accepted, the Contractor shall final grout the annulus between the anchor and the drill hole over the free length of the tendon. The grout shall not contaminate the corrosion-inhibiting compound and any excess grout on the stressing head or at the top of the dam shall be removed immediately.

# 3.19 PROTECTION OF RESERVOIR AND WORK AND CLEANUP

- A. During and after grouting operations, the Contractor shall take such precautions as may be necessary to prevent grout from entering Grupes Reservoir or any adjacent wetland resource areas. The Contractor shall therefore exercise care in the transporting of materials to and from the grout mixing plant. All hoses and connections shall be thoroughly inspected each day to verify their integrity and shall be monitored for leakage during operations. Good housekeeping shall be continuously practiced. Discharge of drilling water, excess grout or washing of equipment in the reservoir shall specifically be prohibited.
- B. During grouting operations, the area around the grouting location, and the upstream and downstream faces of the dam shall be visually monitored for signs of grout leakage or outbreaks. If grout, cloudiness, or other indications of leakage are observed, injection pressure shall be immediately reduced. Pressure reduction shall continue until leakage indications cease. If leakage indications continue even after pressure reduction, then other steps shall be taken in consultation with the Consultant, including, but not limited to changing the grout mix, pointing the leak area, temporarily plugging the leak area, etc.
- C. Particular care shall be exercised when filling the top of holes and/or when installing the anchors, as these operations have the potential to cause spillage of grout out the top of the hole and into the reservoir, or wetland resources downstream of the dam. The Contractor shall therefore take all actions and precautions necessary to prevent this situation, such as providing a barrier or box to capture excess grout, pumping of excess grout to an acceptable location, etc.
- D. The Contractor shall, upon completion of his operations, clean up all waste resulting from his operations that is unsightly, would lead to contamination of the Reservoir, downstream channel, or related wetland resources under existing or future water conditions, or would interfere with the efficient continuation of the project as anticipated by the original design. No separate payment will be made for the work required for cleanup.

# 3.20 GROUT TESTING AND QUALITY CONTROL

A. All work under this section shall be performed under the observation of the Resident Engineer. The Contractor shall fully cooperate with the Resident Engineer in providing or assisting in determining location and depth of drill holes and grout quantities.

- B. The Contractor shall be responsible for retaining the services of an Independent Testing Laboratory in accordance with Section 01451 to provide quality control testing on grout used during the execution of the work. The cost of all such testing, including the preparation of samples, transport, testing and reporting shall be considered incidental to the Contractor's price bid for grouting and/or strand anchors, where applicable. No additional payment shall be made for testing or other quality control activities.
- C. The Contractor shall make or cause to have made a minimum of three (3) cylinders (either 3"x6" or 4"x8"), per mix, for each day of grouting. These samples shall be properly marked and stored. Samples shall be prepared during the middle of grouting operations.
- D. The Contractor shall test one grout sample for compressive strength 7 days and one at 28 days following preparation.
- E. Test specimens and compressive strength testing shall be in accordance with ASTM C-109.
- F. Laboratory strength results shall meet the minimums specified in Paragraph 2.05.B above.

# 3.21 <u>RECORDS</u>

- A. The Contractor shall keep complete records of each hole, and these records shall show the manner in which the drill hole operation proceeded, and the means and methods used to advance the hole. The Contractor shall record the depth to the masonry/bedrock interface at each hole and the final total depth of each hole. The Consultant and Resident Engineer shall keep an independent record at each hole. The Consultant and Resident Engineer's record shall become the sole basis for the determination of quantities for payment.
- B. Such records shall be furnished to the Resident Engineer and Consultant as the work progresses. One final copy of each shall be furnished on durable material that will permit reproductions to be made. The records and logs to be kept by the Contractor shall include at least the following data:
  - 1. Date and time.
  - 2. Resident Engineer, Consultant, Contractor, and Driller.
  - 3. Location of the top and tip of each anchor identified by the anchor number and in reference to the survey data.
  - 4. Ground elevation to hole to the nearest 0.1 feet (as referenced from plans).
  - 5. Drill hole vertically measurements to the nearest 0.1 degree at a minimum of 10-foot intervals during drilling. Type of equipment used for measurements.
  - 6. Depth to water within the hole including the time and amount and position of the casing (if any) during the observation.
  - 7. Drilling method, cased/uncased, diameter and type of casing and/or bit.
  - 8. Depths of advancement by each method, depth/elevation of concrete/bedrock interface, depth/elevation of the bonded zone, and the final tip depth/elevation.
  - 9. If a borehole televiewer is used to confirm the dam/bedrock interface, a borehole report containing the appropriate information pertaining to the equipment used, the

depth of the interface, and the relative stratigraphy in each drill hole shall be provided.

- 10. Down pressure, drilling fluid pressures, loss of fluid.
- 11 Time of advancement per foot of drilling.
- 12. Date and time of water testing, and results of water test
- 13. Length and type of anchor and locations of instruments.
- 14. Date and time of grouting.
- 15. Grouting depths and pressures.
- 16. Grout mixes used.
- 17. Grout takes and total volume utilized.
- 18. Anchorage dimensions
- 19. Lock-off load and lift-off test results

The Contractor shall also maintain a set of "As Built" plans in accordance with Section 01055 on which all changes and deviations from the design plans are clearly and legibly noted. Performance and proof test results shall be submitted in accordance with the requirements of Section 02457.

C. No separate payment will be made for record or report preparation or packing and delivery of samples and cores as specified, but the cost thereof shall be included in the prices bid for the various items scheduled. The cost for as-built drawing preparation will be included under Section 01055.

# 3.22 ABANDONED DRILL HOLES

# A. The Contractor must assume the risk of obstacles and difficult drilling and must either carry the drill hole through or past such obstacles where possible.

- B. The Contractor shall submit a procedure and equipment for abandonment of drill holes that contact internal features at the dam. The proposed drill hole abandonment shall result in a repair which maintains (or improves) the existing operation of the feature.
- C. During drilling, the Contractor shall keep materials and equipment for drill hole abandonment on-site (i.e., packers, grout, additional casing, etc.) for immediate hole abandonment if an internal feature is encountered during drilling. Repairs to damaged internal features shall be made as soon as possible. However, no repairs shall be made without notifying the District that contact with an internal structure has been made.
- D. The Contractor shall make provisions for the District to inspect an internal feature that was hit during drilling after contact has occurred and after the repair has been made.
- E. All costs for repairing internal features contacted during drilling, and verifying the condition of the repairs shall be borne by the Contractor.

- F If drill holes are abandoned in preference to drilling through or past the obstacles, or because of shattered or mis-aligned casing, no payment shall be made for the partially completed drill hole. The hole must be grouted (in accordance with the requirements of this section) and a new hole drilled in a location selected by the Contractor and Resident Engineer and approved by the District and Consultant.
- E. Should the hole be abandoned without permission of the Resident Engineer or should a drill hole be started or anchor installed for any reason without inspection of the Resident Engineer, or should the Contractor fail to keep the complete records or fail to furnish the Resident Engineer and Consultant with the records, no payment shall be made for drilling, grouting, or anchor installation within the abandoned or unauthorized hole.

# 3.23 <u>APPROVAL OF QUANTITIES BY THE RESIDENT ENGINEER</u>

A. Payment for all items of work performed under this Contract to the Contractor by the District shall be based upon the certified approval of all such quantities by the Resident Engineer and Consultant. The Resident Engineer and Consultant shall be solely responsible for determining the acceptability of all the work performed under this Section and the final quantities under each respective items for which payment will be allowed.

# PART 4 - MEASUREMENT AND PAYMENT

Refer to Section 01950 – Measurement and Payment for the measurement and payment items related to this Section.

# \*\*\* END OF SECTION\*\*\*

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## SECTION 02457 LOAD TESTS FOR STRAND ANCHORS

#### PART 1 - GENERAL

#### 1.01 <u>SCOPE OF WORK</u>

- A. The Contractor shall furnish all labor, materials, tools, supervision, transportation, installation equipment, and incidentals necessary to complete the work specified. The work shall include but not be limited to mobilization, stressing, load testing, and lock-off of anchors at the appropriate locations. The Work of this Section shall be performed under the observation of the Resident Engineer.
- B. Each strand anchor shall be tested. No load greater than ten (10) percent of the design load shall be applied to the strand anchor prior to testing. The maximum test load shall be no less than 1.33 times the design load and shall not exceed 80 percent of the specified minimum ultimate tensile strength (SMTS) of the prestressing steel of the tendon. The test load shall be simultaneously applied to the entire tendon. Stressing of single elements of multi-element tendons shall not be permitted.
- C. The work of this Section also includes all labor, materials, tools, supervision, transportation, installation equipment, and incidentals necessary to install and perform load testing on a Test Anchor installed on-site as described in the Specifications and at the location shown on the Contract Drawings. The work shall include but not be limited to mobilization, reaction frame construction, Test Anchor construction, stressing, load testing, demobilization of testing equipment for Test Anchors.

## 1.02 <u>RELATED WORK</u>

- A. Field Engineering Section 01050
- B. Submittals Section 01300
- C. Independent Testing Services Section 01451
- D. Strand Anchor Installation Section 02455

#### 1.03 <u>SUBMITTALS</u>

- A. Submit to the District, in accordance Section 01300 the shop drawings, product data and additional information as specified herein.
- B. The Contractor shall prepare and submit to the District for review and approval Shop Drawings and a design submission describing the load test setup or setups intended for use on both the Test Anchor and the Production Anchors. The Shop Drawings and design submission shall be submitted thirty (30) working days prior to the commencement of the strand anchor work, and shall include: Test Anchor location(s), dimensions, and materials; construction/installation procedures and equipment; test procedures; test setup including test anchor, reaction system layout (if required), load cell, hydraulic jack and any associated instrumentation. Provide reaction system design calculations prepared by a Professional Engineer licensed in the State of Connecticut.

- C. In conjunction with the test anchor submittal, the Contractor shall submit to the District for review and approval or rejection calibration data for each test jack, load cell, primary pressure gauge and reference pressure gauge to be used for testing both the Test Anchor(s) and Production Anchors. The Consultant shall approve or reject the calibration data within five (5) working days after receipt of the data. Testing cannot commence until the Consultant has approved the jack, load cell, primary pressure gauge and reference pressure gauge calibrations.
- D. The Contractor shall submit to the District within ten (10) calendar days after completion of the Test Anchor work a load test report containing:
  - 1. As-built drawings showing the location, dimensions, and orientation of the Test Anchor, anchor capacity, tendon type, total anchor length, bond length, unbonded length, and tendon bond length as installed, and locations of all instruments installed.
  - 2. Strand anchor test results and graphs for Performance, Proof, and Extended Creep Tests in accordance with the requirements of PTI, "Recommendations for Prestressed Rock and Soil Anchors."
  - 3. The load test report shall include a recommendation for the design bond stress to be used for the final design of the production anchors that will yield a factor of safety of at least 2.0.
- E. The District and the Consultant shall review the Contractor's design submissions within thirty (30) working days after receipt of the submissions. Review of the design submittals does not relieve the Contractor of his responsibility for the successful completion of the work.

# 1.04 <u>REFERENCES</u>

- A. Contract Drawings
- B. Latest version of American Society for Testing and Materials (ASTM) standards:
  - 1. ASTM A981 Standard Test Method for Evaluating Bond Strength for 15.2 mm (0.6 in.) Diameter Prestressing Steel Strand, Grade 270, Uncoated, used in Prestressed Ground Anchors
- C. Federal Highway Administration (FHWA), FHWA-IF-99-015, "Geotechnical Engineering Circular No. 4, Ground Anchors and Anchored Systems". June 1999.
- D. Latest version of Post Tensioning Institute (PTI) standards:
  - 1. PTI, "Post Tensioning Manual"
  - 2. PTI, "Specification for Unbonded Single Strand Tendons"
  - 3. PTI, "Recommendations for Prestressed Rock and Soil Anchors"

## **PART 2 - PRODUCTS**

#### 2.01 <u>GENERAL</u>

A. The Contractor shall furnish all tools, materials, temporary facilities, and miscellaneous instrumentation components required for the load testing described herein.

## 2.02 <u>TEST ANCHOR</u>

A. The Test Anchor shall meet the requirements for strand anchors as described in Section 02455 – Strand Anchor. The production anchors are to be sized for a design load using a design bond stress of no greater than 150 psi. The test load applied to the test anchor shall be performed to confirm at least a factor of safety of 2.0.

#### 2.03 <u>TEST INSTRUMENTATION</u>

A. Instrumentation used during the testing of both the Test Anchor and Production Anchors shall as specified herein and as specified in Sections 02455 – Strand Anchors, where applicable.

## 2.04 <u>TEST AND STRESSING EQUIPMENT</u>

- A. The testing equipment shall consist of:
  - 1. A dial gauge or vernier scale capable of measuring to the nearest one-thousandth of an inch (0.001 in) shall be used to measure the ground anchor movement. The movement-measuring device shall have a minimum travel equal to the theoretical elastic elongation of the total anchor length at the maximum test load and it shall have adequate travel so the ground anchor movement can be measured without resetting the device at an interim point.
  - 2. A hydraulic jack and pump shall be used to apply the test load. The jack and a calibrated primary pressure gauge shall be used to measure the applied load. The jack and primary pressure gauge shall be calibrated by an independent firm as a unit. The calibration shall have been performed within forty-five (45) working days of the date when the calibration submittals are provided to the Consultant. Testing cannot commence until the Consultant has approved the calibration. The primary pressure gauge shall be graduated in 100 psi increments or less. The ram travel shall be at least 6 in and preferably not be less than the theoretical elongation of the tendon at the maximum test load. If elongations greater than 6 in are required, re-stroking may be allowed.
  - 3. A calibrated reference pressure gauge shall also be kept at the site to periodically check the production (i.e., primary pressure) gauge. The reference gauge shall be calibrated with the test jack and primary pressure gauge. The reference pressure gauge shall be stored indoors and not subjected to rough treatment. If the load determined by the reference pressure gauge, the load determined by the primary pressure gauge and the load determined with the load cell are within ten (10) percent of each other, the primary pressure gauge may be assumed to be functioning properly.
  - 4. The Contractor shall provide an electrical resistance load cell and readout to be used as specified herein.

- 5. The stressing equipment shall be placed over the ground anchor tendon in such a manner that the jack, bearing plates, load cells and stressing anchorage are axially aligned with the tendon and the tendon is centered within the equipment.
- B. The stressing equipment, the sequence of stressing and the procedure to be used for each stressing operation shall be determined at the planning stage of the project. The equipment shall be used strictly in accordance with the manufacturer's operating instructions.
- C. Stressing equipment shall preferably be capable of stressing the whole tendon in one stroke to the specified Test Load and the equipment shall be capable of stressing the tendon to the maximum specified Test Load within 75 percent of the rated capacity. The pump shall be capable of applying each load increment in less than 60 seconds unless the length of the anchors does not allow for the application of the entire load within 60 seconds.
- D. The equipment shall permit the tendon to be stressed in increments so that the load in the tendon can be raised or lowered in accordance with the test specifications and allow the anchor to be lift-off tested to confirm the lock-off load.
- E. Stressing equipment shall be recently calibrated within an accuracy of plus or minus two (2) percent prior to use. The calibration certificate and graph shall be available on site at all times. The calibration shall be traceable to the National Institute of Standards and Technology (NIST).

# PART 3 – EXECUTION

## 3.01 <u>TEST ANCHOR</u>

- A. The Test Anchor(s) at the site shall be constructed in accordance with the Contract Drawings and Section 02455 of the Specifications.
- B. The Test Anchor shall be tested using the procedures for a Performance Test as described in Part 3.04 of this Section. The test load for the test anchor shall be in accordance with the Contract Drawings.
- C. After the completion of a successful Performance Test, an Extended Creep Test shall be performed on the Test Anchor in accordance with Part 3.06 of this Section.

#### 3.02 <u>TEST ANCHOR INSTRUMENTATION</u>

- A. Instrumentation shall be installed on the test anchor as specified herein and in Section 02455, Paragraph 3.06. The instrumentation requirements shall be in accordance with the provisions of Section 02015.
- B. A load cell and readout shall be provided as part of the test anchor setup. The load cell is not intended to remain a permanent part of the test anchor.

#### 3.03 LOAD TESTING SETUP

A. Dial gauges shall bear on the pulling head of the jack and their stems shall be coaxial with the tendon direction. The gauges shall be supported on an independent, fixed frame, such as a tripod, which will not move as a result of stressing or other construction activities during the

operation. The seating loss of the pull wedges must be considered in addition to the reading taken from the dial gauges.

- B. Prior to setting the dial gauges, the Alignment Load (AL) shall be accurately placed on the tendon. The magnitude of AL depends on the type and length of the tendon; however, the Alignment Load is typically no more than 5 percent of the Design Load (DL).
- C. Regripping of strands, which would cause overlapping wedge bites, or wedge bites on the tendon below the anchor head, shall be avoided.
- D. Stressing and testing of multiple element tendons with single element jacks is not permitted.
- E. Stressing shall not begin before the grout has reached adequate strength.
- F. The load test setup shall be protected from inclement weather that may adversely affect the performance of the installed anchor.

# 3.04 <u>PERFORMANCE TESTS</u>

- A. Two production anchors installed at the site shall be performance tested in accordance with the procedures described below. The remaining ground anchors shall be tested in accordance with the proof test procedure (see Part 3.05).
- B. The performance test shall be made by incrementally loading and unloading the anchor in accordance with the schedule provided in **Table 3.1**. The load shall be raised from one increment to another immediately after recording the anchor movement. The anchor movement shall be measured and recorded to the nearest 0.001 in with respect to an independent fixed reference point at the alignment load and at each increment of load. The load shall be monitored with a load cell and the primary pressure gauge. The reference pressure gauge shall be placed in series with the primary pressure gauge, the load determined by the reference pressure gauge, the load determined by the primary pressure gauge and reference pressure gauge shall be recalibrated at no expense to the District. At load increments other than the maximum test load, the load shall be held just long enough to obtain the movement reading.
- C. The maximum test load in a performance test shall be held for ten (10) minutes. A load cell shall be used to monitor small changes in load during constant load-hold periods.
- D. The jack shall be adjusted as necessary in order to maintain a constant load. The load-hold period shall start as soon as the maximum test load is applied and the anchor movement, with respect to a fixed reference, shall be measured and recorded at 1 minute, 2, 3, 4, 5, 6 and 10 minutes. If the ground anchor movement between one (1) minute and ten (10) minutes exceeds 0.04 in (1 mm), the maximum test load shall be held for an additional 50 minutes. If the load hold is extended, the ground anchor movement shall be recorded at 15 minutes, 20, 30, 40, 50 and 60 minutes.

Step	Loading	Applied Load	Record and Plot Total Movement (δ <sub>ti</sub> )	Record and Plot Residual Movement (δ <sub>ri</sub> )	Calculate Elastic Movement (δ <sub>ei</sub> )
1	Apply Alignment Load (AL)				
2 Cycle 1	G 1 1	0.25 DL	$\delta_{t1}$		
	Cycle I	AL		$\delta_{r1}$	$\delta_{t1}$ - $\delta_{r1} = \delta_{e1}$
		0.25 DL	$\delta_2$		$\delta_{t2} \cdot \delta_{r2} = \delta_{e2}$
3	3 Cycle 2	0.50 DL	δ <sub>t2</sub>		
		AL		$\delta_{r2}$	
		0.25 DL	δ3		
4		0.50 DL	δ <sub>3</sub>		2 2 2
4	Cycle 5	0.75 DL	$\delta_{t3}$		$O_{t3} - O_{r3} = O_{e3}$
		AL		$\delta_{r3}$	
		0.25 DL	δ4		
		0.50 DL	$\delta_4$		$\delta_{t4} \cdot \delta_{r4} = \delta_{e4}$
5	Cycle 4	0.75 DL	$\delta_4$		
		1.00 DL	$\delta_{t4}$		
		AL		$\delta_{r4}$	
		0.25 DL	δ5		
		0.50 DL	δ5		
6	Cruele 5	0.75 DL	$\delta_5$		2 2 2
0	Cycle 5	1.00 DL	$\delta_5$		$O_{t5} - O_{r5} = O_{e5}$
		1.20 DL	$\delta_{t5}$		
		AL		$\delta_{r5}$	
		0.25 DL	$\delta_6$		
		0.50 DL	$\delta_6$		
		0.75 DL	$\delta_6$		
		1.00 DL	$\delta_6$		
	1.20 DL	$\delta_6$			
7	Cycle 6	1 33 DI	$\delta_{t6}$ , (Zero reading		$\delta_{t6} - \delta_{r6} = \delta_{e6}$
	5	1.55 DE	for creep test)		
	Hold load for 10	minutes while recordin	g movement at specified		
		times. If the to	tal movement measure	d during the load hold	
	-	exceeds the specifier	tended for a total of 60	minutes	
				s minutes.	
Notes	Notes: AL = Alignment L and DL = Design L and St = total maximum for				
Notes. AL – Alignment Load, DL – Design Load, $o_i = total movement at a load other than maximum for cycle i = number identifying a specific load cycle$				ulan maximum 10f	
	cycle, i number identifying a specific fold cycle.				

# TABLE 3.1 – PERFORMANCE TEST SCHEDULE

#### 3.05 <u>PROOF TESTS</u>

- A. Proof tests shall be performed on all anchors not subjected to either a performance test or an extended creep test.
- B. The proof test shall be performed by incrementally loading the ground anchor in accordance with the schedule provided in **Table 3.2**. The load shall be raised from one increment to another immediately after recording the ground anchor movement. The ground anchor movement shall be measured and recorded to the nearest 0.001 in with respect to an independent fixed reference point at the alignment load and at each increment of load. The load shall be monitored with a load cell and the primary pressure gauge. If the load determined by the reference pressure gauge, the load determined by the primary pressure gauge and reference pressure gauge shall be recalibrated at no expense to the District. At load increments other than the maximum test load, the load shall be held just long enough to obtain the movement reading.

Step	Load
1	AL
2	0.25 DL
3	0.50 DL
4	0.75 DL
5	1.00 DL
6	1.20 DL
7	1.33 DL
8	Reduce to lock-off load
9*	AL
10*	Adjust to lock-off load

## TABLE 3.2 – PROOF TEST SCHEDULE

\*When the results of Performance Tests cannot be compared directly to those of Proof Tests, the anchor should be returned to AL after the 10-minute hold at Test Load and raised again to Lock-Off. This will permit the determination of permanent and elastic movements at the Test Load.

C. The maximum test load in a proof test shall be held for ten (10) minutes. The jack shall be adjusted as necessary in order to maintain a constant load. The load-hold period shall start as soon as the maximum test load is applied and the ground anchor movement with respect to a fixed reference shall be measured and recorded at 1 minute, 2, 3, 4, 5, 6 and 10 minutes. If the ground anchor movement between one (1) minute and ten (10) minutes exceeds 1 mm, the maximum test load shall be held for an additional 50 minutes. If the load hold is extended, the ground anchor movements shall be recorded at 15 minutes, 20, 30, 40, 50 and 60 minutes.

#### 3.06 EXTENDED CREEP TESTS

- A. If an extended creep test is unable to be performed on the Test Anchor, an extended creep test shall be performed on at least one (1) production anchor.
- B. The stressing equipment shall be capable of measuring and maintaining the hydraulic pressure within 50 psi.
- C. The extended creep test shall be made by incrementally loading and unloading the strand anchor in accordance with the performance test schedule provided in **Table 3.3**. At the end of each loading cycle, the load shall be held constant for the observation period indicated in the creep test schedule below. The times for reading and recording the ground anchor movement during each observation period shall be 1 minute, 2, 3, 4, 5, 6, 10, 15, 20, 25, 30, 45, 60, 75, 90, 100, 120, 150, 180, 210, 240, 270 and 300 minutes as appropriate for the load increment. Each load-hold period shall start as soon as the test load is applied. In a creep test, the primary pressure gauge and reference pressure gauge will be used to measure the applied load and the load cell will be used to monitor small changes in load during constant load-hold periods. The jack shall be adjusted as necessary in order to maintain a constant load.
- D. The Contractor shall plot the ground anchor movement and the residual movement measured in an extended creep test. The Contractor shall also plot the creep movement for each load hold as a function of the logarithm of time.

Load	Observation Period	Reading Intervals		
	(min.)	(min.)		
AL	-	-		
0.25 DL	10	1,2,3,4,5,6,10		
0.50 DL	30	1,2,3,4,5,6,10,15,20,25,30		
0.75 DL	30	1,2,3,4,5,6,10,15,20,25,30		
1.00 DL	45	1,2,3,4,5,6,10,		
		15,20,25,30,45		
1.20 DL	60	1,2,3,4,5,6,10,15,		
		20,25,30,45,60		
1.33 DL	300	1,2,3,4,5,6,10,15,20,25,30,45,60,75,90,		
		100,120,150,180,210,240,270,300		
Lock-off	-	-		

TABLE 3.3 – EXTENDED CREEP TEST SCHEDULE

## 3.07 ANCHOR LIFT-OFF TEST

- A. After transferring the load to the anchorage, and prior to removing the jack, a lift-off test shall be conducted to confirm the magnitude of the load in the anchor tendon. This load is determined by reapplying load to the tendon to lift off the wedge plate (or anchor nut) without unseating the wedges (or turning the anchor nut). This moment represents zero time for any long-term monitoring.
- B. The initial lift-off reading shall be within plus or minus five (5) percent of the designed lockoff Load. If this criterion is not met, then the tendon load shall be adjusted accordingly and the initial lift-off reading repeated.

## 3.08 ANCHOR ACCEPTANCE CRITERIA

- A. Creep
  - 1. A performance-tested or proof-tested anchor with a 10-minute load hold shall be acceptable if the anchor resists the maximum test load with less than 1 mm of movement between 1 minute and 10 minutes.

- 2. A performance-tested or proof-tested anchor with a 60-minute load hold shall be acceptable if the anchor resists the maximum test load with a creep rate that does not exceed 2 mm of movement between 6 minutes and 60 minutes.
- 3. An anchor subjected to extended creep testing is acceptable if the anchor resists the maximum test load with a creep rate that does not exceed 2 mm in the last log cycle of time (30 minutes and 300 minutes).
- 4. Creep criteria for epoxy coated strands (if used) shall be the same as the bare strand criteria listed above. However, if high creep movements in epoxy coated strands are observed, the following secondary criteria shall apply.
  - a. A lift-off reading shall be made immediately after anchor lock-off, and then at 24 hours after lock-off. The new lift-off load, within reading tolerances, shall correspond to the original lift-off load minus the predicted relaxation losses for the 24-hour period.
  - b. In case of further unsatisfactory creep behavior, lift-off readings may be taken up to 30 days later to verify an acceptable predicted long-term behavior of the anchor, based on criteria similar to the 24-hour lift-off parameters.

### B. Movement

1. An anchor tested by any means (Proof, Performance, Extended Creep) shall be acceptable if the total elastic movement at the maximum test load exceeds 80 percent of the theoretical elastic elongation of the unbonded length. *(i.e., The minimum apparent free length at the Test Load, as calculated on the basis of elastic movement, should be equivalent to not less than 80% of the designed free tendon length plus the jack length.)* 

### 3.09 PROCEDURES FOR ANCHORS FAILING ACCEPTANCE CRITERIA

- A. Anchors that do not satisfy the minimum apparent free length criteria shall be rejected and replaced at no additional cost to the District. In this event, no further acceptance criteria are applied.
- B. In the event that an anchor fails, the Contractor shall modify the design and/or construction procedures. These modifications may include, but are not limited to, modifying the installation methods, increasing the anchor length, installing supplemental anchors, or changing the anchor type. Any modification of design or construction procedures shall be at no change in the contract price. A description of any proposed modifications must be submitted to the Consultant in writing for approval. Proposed modifications shall not be implemented until the Contractor receives written approval from the District/Consultant.

## 3.10 ANCHOR LOCK-OFF

A. After testing has been completed, the load in the tendon shall be such that after seating losses (i.e., wedge seating), the specified lock-off load has been applied to the anchor tendon, in accordance with the Contract Drawings and Section 02455 of the Specifications.

# PART 4 - MEASUREMENT AND PAYMENT

Refer to Section 01950 – Measurement and Payment for the measurement and payment items related to this Section.

#### \*\*\* END OF SECTION\*\*\*

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### SECTION 02760 DECOMISSIONING OF INTAKE PIPES, VALVES, AND CHAMBERS

### PART 1 - GENERAL

#### 1.01 <u>SCOPE</u>

- A. The Contractor shall furnish all labor, materials, and equipment and shall perform all work required to decommission the former 30-inch primary intake valve and the Left Gate Chamber. It is envisioned that this work will consist of:
  - 1. Removal of the stem and gate within the 30-inch valve at the Left Gate Chamber to allow for slip lining (under a separate Work Item).
  - 2. Backfilling of the Left Gate Chamber with concrete.
- B. The Work shall also include the decommissioning of the 16-inch former emergency intake pipe and Right Gate Chamber. It is envisioned that this work will consist of:
  - 1. Capping and grouting/filling of the upstream portion of the intake pipe between the existing valve within the Right Gate Chamber and the reservoir.
  - 2. Capping and grouting/filling of the downstream portion of the intake pipe between the existing valve within the Right Gate Chamber and the downstream toe of the dam.
  - 3. Backfilling of the Right Gate Chamber with concrete.

#### 1.02 EXISTING CONDITIONS

- A. <u>Primary Intake</u>: The gatehouse at Grupes Reservoir Dam is the primary intake. The outlet pipe for the gate house is a 24-inch pipe that extends through an inactive 24-inch gate valve (to be removed under a separate Work Item) to the Left Gate Chamber, which houses a 30-inch gate valve. The stem of the gate valve was previously observed to be in poor condition. This chamber is approximately 3 ft. by 4 ft. by 25 ft. deep and is located at the right abutment of the principal spillway, near the top of the dam. The overall condition of the Left Gate Chamber had been previously observed to be fair to good and the side walls consist of three-foot square stones with masonry joints. Significant repointing along the interior walls appears to have been previously done.
- B. <u>Former Emergency Intake</u>: The 16-inch emergency intake is approximately 50 feet upstream of the Right Gate Chamber and has been abandoned. The Right Gate Chamber is approximately 3 ft. by 4 ft. by 24 ft. deep. The 24-inch gate valve in the chamber was previously observed to outlet to the well interior and has no evidence of an outlet pipe from chamber. The outlet is reportedly inoperable and appeared to be silted up (pipe to be cleaned under a separate Work Item). The Right Gate Chamber was previously observed to be in poor to fair condition with joint deterioration observed in stone masonry chamber above the reservoir level. Some signs of movement along with voids in joints up to two feet deep were also observed. The chamber was observed to fill with water when the reservoir level is up due to intake gate being open and/or wall joints open to the reservoir.

### 1.03 <u>RELATED WORK</u>

The following is a list of related work items that shall be performed or furnished under other sections of these specifications as indicated:

- A. District Standard Specifications Item No. 700 Water Mains and Appurtenances
- B. Section 01565 Temporary Water Control
- C. Section 02200 Earthwork
- D. Section 02762 Pipe Inspection and Cleaning
- E. Section 03300 Concrete

### 1.04 <u>SUBMITTALS</u>

A. Not less than ten (10) calendar days prior to the scheduled start of pipeline abandonment, the Contractor shall submit his proposed method of abandonment and details of products to be used to the District's Consultant for review.

### PART 2 – PRODUCTS

### 2.01 <u>CONCRETE BACKFILL</u>

Components of cement concrete placed as vault backfill shall generally meet the requirements of ConnDOT Standard Specifications, Section M.03 and shall be proportioned per ACI 211.1. Concrete backfill shall have a minimum compressive strength of 3500 psi, a maximum water/cement ratio of 0.45 with a maximum slump at point of placement of 4 inches and shall have an air entrainment of five percent ( $\pm 1\%$ ).

### 2.02 NON-SHRINK GROUT

- A. Non-Shrink grout shall be prepackaged, non-metallic, and non-gaseous. It shall be non-shrink when tested in accordance with ASTM-C1107 Grade B or C at a fluid consistency (flow cone) of 20 to 30 seconds. Thirty-minute-old grout shall flow through the flow cone after slight agitation, in temperatures of 4 degrees C (40 degrees F) to 32 degrees C (90 degrees F). Grout shall be bleed free and attain 7,500 pounds per square inch (51.7 mPa) compressive strength in 28 days at fluid consistency.
- B. Products such as SikaGrout 212, as manufactured by Sika Corporation of Lyndhurst, New Jersey, or Approved Equal meeting the performance specification shall be acceptable for use in pipeline abandonment.

### 2.03 <u>CONTROLLED LOW STRENGTH MATERIAL (CLSM)</u>

A. Controlled Low Strength Material (CLSM) (aka Flowable Fill) shall be a selfconsolidating, rigid setting material to be used in backfills, fills, structural fills and elsewhere as indicated on the plans, or as directed by the Engineer.

- B. The flow and set time characteristics of CLSM shall be designed to meet the specific job conditions. All CLSM material covered by this specification shall be designed to be hand excavatable at any time after placement.
- C. CLSM shall be composed of a mixture of Portland cement, aggregate, and water with the option of using fly ash, slag cement, air-entraining agents, and other approved admixtures.
- D. The minimum compressive strength of the CLSM material shall be 30 pounds per square inch (psi) and the maximum compressive strength of the CLSM shall be 150 pounds per square inch (psi) when tested in accordance with ASTM D4832 after 56 days.
- E. The CLSM mix design shall utilize a nominal maximum size of No. 8 aggregate.
- F. CLSM mixes shall have a minimum of 20% entrained air when tested in accordance with AASHTO T152.

### 2.03 <u>DUCTILE/CAST IRON PIPE ACCESSORIES</u>

Fittings and/or accessories for use in capping/plugging intake or outlet pipes shall be compatible with the existing pipe(s). Specific products or accessories shall be in accordance with District Standard Specifications and subject to review/approval by the District.

## PART 3 – EXECUTION

### 3.01 <u>GENERAL</u>

The work required and services for the pipe, valve, and chamber decommissioning shall be done in a safe, professional manner and shall conform to any pertinent federal, local, or state law, regulation, or code. Good housekeeping consistent with safe working conditions shall be maintained.

### 3.02 <u>PREPARATORY WORK</u>

The Reservoir shall be nearly completely drawn down for the work and all water control and sediment and erosion control measure shall be fully in place before beginning the work of this section. Emergency demobilization measures as submitted under Section 01900 shall specifically address protecting and plugging the upstream end of the pipe in the event of rapid increase in the water level in the reservoir.

### 3.03 <u>INITIAL SURVEY</u>

- A. Locate and mark the upstream end of the Emergency Intake pipe. Note location on "as-built" plans. Expose such portion of the pipes as will be necessary for the work. If necessary, remove any headwalls, screens, etc.
- B. Excavate at the downstream toe of the dam (at the Right Gate Chamber) to visually establish location of pipes and any connections to other pipes upstream of proposed cap location.
- C. After cutting the intake pipe near the upstream end as shown on the Drawings, video survey and clean the full length of the pipe. The Consultant and Resident Engineer must be present during this operation. Notify the Resident Engineer a minimum of 48 hours prior to the work. Video survey and cleaning shall be done as per Section 02762.

## 3.04 DISCONNECTION FOR OTHER UTILITIES

A. The 16-inch intake is assumed to connect to the 24-inch transmission line that runs parallel to the dam. Once confirmed, disconnect the 16-inch intake from all other pipes and utilities. The sections of the pipes to be grouted must be completely isolated prior to grouting. Any connecting pipes must be cut and capped. Remove or fully open any valves found upstream of the proposed capping location.

### 3.06 <u>PIPELINE GROUTING/FILLING</u>

- A. If necessary, use masonry or other bulkhead suitable for the pipeline to provide a water-tight seal at upstream end capable of resisting grout pressures. Approved mechanical plugs or inflatable packers may be substituted at the Contractor's option for the bulkhead. Alternative methods to confine the grout or CLSM, such as addition of vertical pipe sections may be allowed.
- B. Use non-shrink grout or CLSM to fill the entire length of pipe between the valve and downstream end and the upstream end of the pipe if a blockage is encountered. No voids or air pockets shall remain within the plug volume of the pipe after the work is complete. If feasible, suitable provision for air venting of the plug volume shall be provided to provide for complete filling. Grouting/filling by gravity is preferable, but in no instance shall grouting pressures exceed 20 pounds per square inch.

### 3.07 <u>BACKFILLING</u>

- A. Prior to backfilling around excavated sections of pipe, the end locations, invert elevations and alignment of the pipe shall be noted for the "as built" plans. The location of the pipe shall also be marked during backfilling with detectable underground marking tape.
- B. Backfilling of pipes using earthen materials shall be in accordance with the requirements of Section 02200.
- C. Concrete backfill for Gate Chambers shall be placed via tremie methods and vibrated during placement.
- D. During concrete placement, observations of the downstream masonry face of the dam shall be made for leaking/flowing concrete in the area of the Gate Chamber(s). If such conditions are observed, the Contractor shall halt placement and attempt to plug the leakage so that the pour may resume.

### PART 4 - MEASUREMENT AND PAYMENT

Refer to Section 01950 – Measurement and Payment for the measurement and payment items related to this Section.

### \* \* \* END OF SECTION \* \* \*

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# SECTION 02762 VIDEO INSPECTION AND CLEANING OF OUTLETS

### PART 1 - GENERAL

### 1.01 <u>SCOPE</u>

- A. The work under this section includes furnishing of all labor, equipment, supplies, materials, supervision, and dewatering (as necessary), for cleaning (and repeated cleaning as necessary) and performing a detailed video survey of the interior surfaces of the low-level outlet and former emergency intake at Grupes Reservoir Dam, as shown on the Contract Drawings and as directed by the Engineer.
- B. The work involves remote filming in the confined spaces of the pipes. The source of water through the pipes is from the Reservoir. It is anticipated that the inspection and cleaning will take place after the reservoir level has been temporarily lowered (as discussed in Section 01565). Therefore, pipes may be partially full of standing water during the survey and may contain sediments that shall be removed as specified herein. Sediment shall be removed in a manner so as not to damage existing pipes or negatively impact water quality of the reservoir or Silvermine Brook.
- C. The Contractor shall be prepared, as part of the work of this Section, to perform cleaning and filming of those pipes specified herein. It is anticipated that both pipes (the low-level outlet at the gatehouse and the former emergency intake at the right abutment) will require access from both the upstream and downstream ends for access by cleaning/inspection equipment. Partial demolition/removal of these pipes, as specified in the Contract Documents, may be performed in conjunction with the Work of this Section to provide such access.
- D. As part of the work of this Section, the Contractor shall provide copies of the completed, edited video survey to the Engineer. Video tapes include a detailed real time voice narration of each segment of the video survey. The video images shall be clear, well lit, stable and in color. The Contractor shall also provide printed inspection logs of surveys. The Contractor shall immediately call the Engineer's attention to any damaged or deteriorated locations in a pipe observed during the course of the survey. The Contractor shall submit formal data reports with all logs and summaries to the Engineer upon completion of work at each structure.

### 1.02 <u>RELATED WORK</u>

- A. The following is a list of related work items that shall be performed or furnished under other Sections of these Specifications as indicated:
  - 1. Section 01565 Temporary Water Control
  - 2. Section 02760 Decommissioning of Intake Pipes, Valves, and Chambers
  - 3. Section 02765 Pipeline Relining

### 1.03 <u>SUBMITTALS</u>

- A. The Contractor shall submit to the Engineer the name, contact information, and qualifications of the Subcontractor engaged to do the video surveying and/or cleaning (if different). This information shall include a list of at least three (3) prior projects of similar scope and purpose equivalent in overall scope and purpose to the work required which demonstrate the Contractor's experience and qualifications for the work.
- B. Submit for Engineer's review and approval a detailed description of the equipment, procedures, and schedules which the Contractor will use for execution of this work, including any concurrent or subsequent Work involving other Sections of the Contract.
- C. Sample of television inspection log that will be used. Provide a legend for all abbreviations, symbols, codes, etc. used on the logs.
- D. Upon completion of the Work, the Contractor shall submit to the District:
  - 1. Three printed copies of the television inspection reports.
  - 2. Three copies of the television inspection video and voice audio recordings saved onto DVD-R media or other media type(s) as approved by the Owner.

# PART 2 - PRODUCTS

## 2.01 <u>PIPE CLEANING EQUIPMENT</u>

- A. Equipment and methods shall be determined by the Contractor to achieve the specified performance. High-velocity pipe cleaning equipment, if used, shall be constructed for ease and safety of operation. All equipment shall be steam cleaned at the site prior to use and observed by the Engineer upon arrival at the site. The equipment shall have a selection of two (2) or more high-velocity nozzles. The nozzles shall be capable of producing a scouring action from 15 to 45 degrees in all size lines (or voids, cavities, openings, spalled zones, and deteriorated and displaced areas) designated to be cleaned. The cleaning equipment should have a vacuum blower capable of generating air flows of up to 4500 CFM in combination with a high-pressure water jetting pump capable of generating flows up to 80 175 GPM at pressures up to 2,500 PSI. The equipment shall carry its own water tank, auxiliary engines, pumps, and hydraulically driven hose reel with sufficient hose length. The water source for use in cleaning operations shall be obtained by the Contractor from the respective reservoir and/or associated waterways without adverse harm on said waterways in a manner satisfactory to the Engineer and District.
- B. Alternately, with the approval of the District, the Contractor may use a rotating wire rope and chain scraper, ENZ golden jet model no. 10.200R/RS, or approved equal.

### 2.02 <u>VIDEO INSPECTION EQUIPMENT</u>

A. The inspection equipment shall be capable of inspecting a minimum of 300 feet of pipe where entry into the pipe can be made from both ends. Where entry can only be made from one end, the equipment shall be capable of inspecting a minimum of 300 feet. The equipment shall be capable of providing a picture of acceptable quality at these maximum lengths, regardless of the vibration caused by normal movement of the camera and the length of the signal conductor cable between the camera and the recording device.

- B. The inspection equipment shall be capable of clearly televising the interior of a 24-inch diameter pipe and all larger sizes.
- C. The television camera used for the inspection shall be one specifically designed and constructed for such inspection.
- D. Lighting for the camera shall be suitable to allow a clear picture of the entire periphery of the pipe.
- E. The camera shall be waterproof and operative in 100% humidity conditions.
- F. The camera, television monitor, and other components of the video system shall be capable of producing a high-quality color image with clear definition of pipe internal features.
- G. A pan and tilt camera shall be used for the television inspection and shall be capable of 360degree rotational scan. The tilt arc shall not be less than 225 degrees and the viewing angle shall be a minimum of 300 degrees. The lens position shall be operated remotely. Cameras incorporating mirrors for viewing sides or cameras using exposed rotating heads are not acceptable.
- H. The camera shall be an auto-iris type with remote controlled manual override. The adjustment of focus and iris shall provide a minimum focal range of from 6 inches in front of the camera lens to infinity.
- I. The distance along the pipe in focus from the initial point of observation shall be a minimum of twice the vertical height of the pipe.
- J. The illumination must be such as to allow an even distribution of light, which will produce a clear picture around the pipe perimeter, regardless of diameter and without the loss of contrast, flare out of picture, or shadowing. The lighting system shall also minimize reflective glare and the intensity shall be fully adjustable.
- K. The television studio shall be insulated against noise and extremes in temperature and shall be large enough for two people for the purpose of viewing the television monitor while the inspection is in progress. The television studio shall be mounted on a mobile vehicle which allows safe and orderly movement of the inspection equipment.
- L. The television monitor screen shall be not less than 17-inches, measured on the diagonal.
- M. The television camera, monitor, and other components of the video system shall be capable of receiving and transmitting a picture having not less than 500 lines of resolution.
- N. The camera shall be mounted on a skid assembly that is able to ride over obstructions and cushion the camera against shock. The skid shall also have guards to keep the camera in line in the event of a turnover due to an obstruction.
- O. The television inspection equipment shall meet the following criteria:

- 1. Color: The following colors shall be clearly differentiated: white, yellow, cyan, green, red, blue, and black.
- 2. Linearity: The background grid shall show squares of equal size, without convergence or divergence over the whole picture. The center circle shall appear round and have the correct height and width relationship.
- 3. Resolution: The live picture shall be displayed on a monitor capable of providing a clear, stable image free of electrical interference with a minimum horizontal resolution not less than 500 lines.
- 4. Color Consistency: To ensure that the camera shall provide similar results when used with its own illumination source, the lighting shall be fixed in intensity prior to commencing the survey. In order to ensure color consistency, generally no variation in illumination shall take place during the survey.
- P. The monitor display shall incorporate an automatically updated record in feet and tenths of a foot of the distance along the pipe from the cable calibration point to the center point of the camera. Use a suitable metering device which enables the length of the pipe being inspected to be accurately measured to within  $\pm 0.2$  feet.

# PART 3 - EXECUTION

## 3.01 <u>GENERAL</u>

This section contains the general requirements for completing the pipe cleaning (and cleaning of, spalled zones, and areas of scaling on the interior of the pipes), and the narrative video camera survey.

- A. Coordinate schedule with the Engineer and provide at least forty-eight (48) hours' notice prior to start of work at the dam.
- B. Dewatering of all pipes (and voids, cavities, openings, spalled zones, and deteriorated and displaced areas), shall be performed to remove existing sediment/debris inside and allow the cleaning and video survey to be performed. Subdrain flow and groundwater seepage through existing cracks and breaks in the pipe (or through existing cracks and breaks present in voids, cavities, openings, spalled zones, and deteriorated and displaced areas), is acceptable, provided the resulting flow does not adversely impact the integrity of the dam embankment and the cleaning and video survey, in the judgment of the Engineer. The maximum depth of flow for pipes 12 inches to 24 inches in diameter shall be 25% of the pipe diameter.
- C. Siltation control measures in accordance with Section 01560 in the form of silt fences and/or sandbags shall be coordinated as directed by the Engineer to prevent downstream migration of sediment flushed from existing pipes (voids, cavities, openings, spalled zones, and deteriorated and displaced areas) during cleaning.

### 3.02 <u>PIPE CLEANING</u>

- A. Flush out with water and water jets existing pipes (voids, cavities, openings, spalled zones, and deteriorated and displaced areas), to be video surveyed, after cleaning and before video survey. Pipes shall be considered clean when less than one inch (1") of existing sediment remains in the pipe invert following cleaning. The measurement of the amount of sediment remaining in the pipe inverts shall be made by the Engineer based on observations made in the video survey. (Voids, cavities, openings, spalled/scaled zones, and deteriorated and displaced areas shall be considered clean when, in the judgment of the Engineer in consultation with the Contractor, subsequent filming will produce a clear record of existing conditions).
- B. The Contractor's attention is called to the advanced age and potential deteriorated condition of the existing pipes and dam appurtenances. Therefore, water and water jet pressures as used for cleaning shall be adjusted as necessary so, to the degree practicable, existing pipes are not damaged.

## 3.03 <u>VIDEO INSPECTION</u>

- A. Television inspect existing pipes before and after cleaning pipes.
- B. Move the camera through the pipe at a moderate rate, stopping where necessary to permit proper documentation of all pertinent features/defects. In no case will the television camera be pulled at a speed greater than 30 feet per minute.
- C. Use manual winches, power winches, TV cable, powered rewinds, or other devices to move the camera through the pipe that do not obstruct the camera view or interfere with proper documentation of the pipe conditions. All winches shall be stable with either locking or ratcheting drums.
- D. If, during the inspection operation, the television camera will not pass through the entire pipe section from one direction, set up equipment so that the inspection can be performed from the opposite direction, if possible.
- E. When manually operated winches are used to pull the television camera through the pipe, use portable radios, telephones, or other suitable means of communication between members of the crew located at each end of the pipe section being inspected to insure good communications.
- F. The importance of accurate distance measurements is emphasized. Measurement for location of pipe features/defects shall be by means of a meter device. Marking on the cable or a similar method will not be allowed. Accuracy of the distance meter shall be checked by use of a measuring wheel, tape, or other suitable distance measuring device.
- G. Record the following pipe features/defects, at a minimum, and report them on the inspection logs:
  - 1. Pipe diameter and material of construction.
  - 2. Joint spacing and the location of joints which appear to be damaged, incorrectly installed, shifted, open, or in any way deficient.

- 3. Description, location, and orientation of pipe structural deficiencies such as cracks, breaks, collapses, corrosion/erosion, etc.
- 4. Description and location of pipe obstructions (such as sediment, roots, or grease).
- 5. Description and location of grade concerns, such as pipe sags, especially in gravity pipes.
- 6. The locations where infiltration is entering the pipe and an estimated infiltration rate at each location.
- H. Indicate direction of survey and distance to each feature/defect from the beginning of the inspection.
- I. Provide an audio description of each observed.
- J. Report on the logs weather conditions, ground conditions, and surface cover.
- K. Repair pipe damaged as a result of the inspections at no cost to the Owner
- L. Position camera head to reduce risk of picture distortion and along the longitudinal axis of the pipe. Position camera lens centrally,  $\pm 10\%$  of the vertical pipe dimension.

# 3.04 **DOCUMENTATION**

- A. Three (3) copies of the completed edited video surveys with narrative, and three copies of the inspection logs shall be produced and provided to the Engineer.
- B. Inspection Logs
  - 1. Printed inspection logs of pipe surveys shall also be kept by the Contractor and will clearly show the location (in relation to the access point) of each infiltration point observed during inspection. In addition, other points of significance such as locations of unusual conditions, roots, pipe connections, broken pipe, presence of scale and corrosion, and other discernible features will be recorded. Provide a copy of the respective structure's inspection logs and all other pertinent records to the Engineer.
  - 2. Printed inspection logs of void, cavity, opening, spalled and scaled zones, and deteriorated and displaced area surveys as directed by the Engineer shall be kept by the Contractor and will clearly show the location in relation to the starting point of the respective survey all points of significance such as locations of unusual conditions, roots, collapsed zones, infiltration points, erosion areas, and other discernible features. Said features will be recorded and a copy of such records will be supplied to the Engineer.
- C. Video Inspection Recordings
  - 1. Provide continuous video tape recordings of the inspection view as it appears on the television monitor. The image recorded shall be equal to or better than the quality of the original picture on the television monitor.

- 2. Provide a visual and voice audio description record of the pipe features/defects observed recorded simultaneously as original live recordings.
- 3. The audio portion of the recording shall be sufficiently free of electrical interference and background noise to produce an oral report that is clear, complete, and easily discernable. The audio portion of the tape report shall include the location and identification of the pipe section inspected, the direction of travel, a description of the features/defects encountered, and the distance traveled.
- 4. Provide television inspection video/audio recordings saved onto CD-R/WR, DVD-R, or other approved media. CDs and DVDs shall be properly identified by video number, location, and project name.
- 5. Video recordings shall, by electronic means, display continuously and simultaneously generated transparent digital information as described below:
  - a. At the start of each pipe section inspected:
    - 1) Size and length of pipe and pipe material
    - 2) Date of inspection
    - 3) Pipe location/identification (mid-level or low-level outlet)
    - 4) Direction of inspection (upstream or downstream)
    - 5) Starting time of inspection
  - b. Continuously during the inspection:

1) Automatic update of the camera's position, in feet and tenths of feet from the beginning of the pipe section

### PART 4 - MEASUREMENT AND PAYMENT

Refer to Section 01950 – Measurement and Payment for the measurement and payment items related to this Section.

## \* \* \* END OF SECTION \* \* \*

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### SECTION 02765 OUTLET PIPE LINING

### PART 1 - GENERAL

#### 1.01 <u>SCOPE OF WORK</u>

- A. The Contractor shall furnish all labor, materials, and equipment and shall perform all work required to rehabilitate and line the existing low-level conduit at Grupes Reservoir Dam.
- B. The intent of the work of this section is to provide a watertight conduit to serve as the low-level outlets for the dam. The restored conduit must be both hydraulically and structurally adequate for all conditions which are present or might be encountered by the conduit. It is the intent of this section that the restoration of the pipe be accomplished through the use of continuous, watertight lining (from end to end) technologies which do not require excavation and/or replacement of the existing pipe, except where shown on the Contract Drawings.
- C. The liner material shall be mated to the inside of the existing pipe. Overall, the hydraulic crosssection shall be maintained as large as possible. The rehabilitated outlets shall have a minimum of the full flow capacity of the original pipes before rehabilitation. The lining shall be such that there is either no annular space between the existing pipe and the liner material or the annulus shall be filled with an appropriate and approved material such as cement grout.
- D. The outlet conduit lining shall, independent of the host pipe, be rated for a minimum internal pressure of 40 feet of (water) head. The outlet conduit lining shall, independent of the host pipe, have a bearing capacity capable of withstanding 45 feet of backfilled embankment material.
- E. The liner material shall be capable of sustaining water velocities of up to 25 fps without scour damage to the lining material. The liner material shall be capable of functioning in extremes of heat and cold without damage or reduced performance. The range of operating temperatures shall be from 100 degrees F. to -20 degrees. F.
- F. The ends of the rehabilitated pipes shall be treated in an appropriate manner to provide an end seal which will prevent damage, water intrusion, and/or separation of the pipe and/or liner. The upstream end of the pipe/liner system shall be compatible with the proposed intake/gate structures.
- G. The design life of the liner system shall be no less than 50 years.
- H. Water control will be required as a part of this work to temporarily divert water away from the upstream and/or downstream ends of the low-level outlet conduit. This will allow the Contractor access to both ends of the pipes. All water control work shall be as per Section 01565 Temporary Water Control and shall be included in the lump sum cost bid for that item.

#### 1.02 EXISTING CONDITIONS

- A. The existing low-level outlet conduit is believed to be a twenty-four-inch diameter cast-iron pipe. Pipe dimensions and materials are to be confirmed by the Contractor.
- B. Prior to the work of this section, the Contractor shall video survey and clean the low-level outlet conduit under a separate pay item. The dimensions and conditions of the pipe shall be confirmed

by the Contractor at this time. Additionally, prior to the Work of this Section and under a separate pay item, the Contractor shall remove the gate from the 30" valve at the dam prior to lining the outlet pipe.

### 1.03 <u>RELATED WORK</u>

- A. The following is a list of related work items that shall be performed or furnished under other sections of these specifications as indicated:
  - 1. Temporary Water Control Section 01565
  - 2. Decommissioning of Intake Pipes, Valves, and Chambers Section 02760
  - 3. Video Inspection and Cleaning of Outlets Section 02762
  - 4. District Standard Specification Item No. 705 HDPE Water Main

### 1.04 <u>SUBMITTALS</u>

- A. The Contractor shall, within ten (10) calendar days of the Notice to Proceed, submit the name, contact information, and qualifications of the Sub-contractor (if any) who shall be engaged to perform the pipeline rehabilitation work. This information shall include a list of at least three (3) prior projects of similar scope and purpose equivalent in overall scope and purpose to the work required which demonstrate the Sub-contractor's experience and qualifications for the work.
- B. Not less than ten (10) calendar days prior to the scheduled start of pipeline rehabilitation, the Contractor shall submit his proposed method of rehabilitation and lining and details of products to be used to the Engineer for review and approval. The contractor shall also submit material data on all materials to be used in the rehabilitation process.

## PART 2 – PRODUCTS

## 2.01 ACCEPTABLE LINING SYSTEMS

- A. Acceptable lining systems shall include "Fold and Form" (FPP) or "Cured-in-Place Pipe" (CIPP) systems or approved equal.
- B. The Contractor may also perform the outlet pipe lining via "slip-lining" the existing cast iron pipe with HDPE water main. HDPE water mains and fittings shall be in accordance with District Standard Specification Item No. 705.

### 2.02 FOLD AND FORM PIPE LINER

- A. PVC alloy shall conform with the latest applicable edition and revision of ASTM-1871 "Standard Specification for Folded/Formed Poly (Vinyl Chloride) Pipe Type A for Existing Sewer and Conduit Rehabilitation."
- B. PVC alloy pipeliner shall be manufactured from virgin PVC Alloy compound, containing no fillers, and in accordance with manufacturer's material specifications.

- C. The pipeliner shall be capable of expanding a full pipe size larger than the nominal diameter without splitting or rupturing.
- D. Upon final installation, the pipeliner shall match the configuration of the host pipe.
- E. The pipeliner shall be capable of negotiating pipeline bends in the host pipe without splitting, rupturing, or wrinkling of pipeliner material.
- F. The pipeliner shall be dimensionally stable immediately after cool-down.
- G. Each production lot of pipeliner shall be inspected and tested at the time of manufacture for defects in accordance with ASTM D-2444, ASTM D-2122, and ASTM D-2152. All pipeliners shall be homogeneous, uniform in color, free of cracks, holes, foreign material, blisters, and deleterious faults. All pipeliners shall conform with the specified dimensions. Material design properties shall be confirmed in accordance with ASTM D-790.
- H. The Tube shall be marked for distance at regular intervals along its entire length, not to exceed 5 ft. Such markings shall include the Manufacturers name or identifying symbol.

# 2.03 <u>CURED-IN-PLACE PIPE (CIPP)</u>

- A. TUBE
  - 1. The Sewn tube shall conform with the latest applicable edition and revision of ASTM-F1216 "Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube," ASTMF1743 "rehabilitation of Existing Pipelines and Conduits by Pulled-in-Place Installation of Cured-in-Place Thermosetting Resin Pipe (CIPP)."
  - 2. Tube The sewn tube shall consist of one or more layers of absorbent non-woven felt fabric and meet the requirements of ASTM F1216, Section 5.1 or ASTM F1743, Section 5.2.1 The tube shall be constructed to withstand installation pressures, have sufficient strength to bridge missing pipe, and stretch to fit irregular pipe sections.
  - 3. The wet-out Tube shall have a relatively uniform thickness that when compressed at installation pressures will equal or exceed the calculated minimum design thickness.
  - 4. The Tube shall be manufactured to a size that when installed will tightly fit the internal circumference and length of the original pipe. Allowance should be made for circumferential stretching during inversion. Overlapped layers of felt in longitudinal seams that cause lumps in the final product shall not be utilized.
  - 5. The outside layer of the Tube shall be coated with an impermeable, flexible membrane that will contain the resin and all the resin impregnation (wet out) procedure to be monitored.
  - 6. The Tube shall be homogeneous across the entire wall thickness containing no intermediate or encapsulated elastomeric layers. No material shall be included in the Tube that may cause delamination in the cured CIPP. No dry or unsaturated layers shall be evident.

- 7. The wall color of the interior pipe surface of CIPP after installation shall be a relatively light reflective color so that a clear detailed examination with closed circuit television inspection equipment may be made.
- 8. Seams in the Tube shall be stronger than the non-seamed felt material.
- 9. The Tube shall be marked for distance at regular intervals along its entire length, not to exceed 5 ft. Such markings shall include the Manufacturers name or identifying symbol.
- B. RESIN

The resin system shall be a corrosion resistant polyester, vinyl ester, or epoxy system including all required catalysts, initiators or hardeners that when cured within the tube create a composite that satisfies the requirements of ASTM F1216 and ASTM F1743, the physical properties herein, and those which are to be utilized in the design of the CIPP for this project. The resin shall produce a CIPP that will comply with the structural and chemical resistance requirements of this specification.

# PART 3 – EXECUTION

### 3.01 <u>GENERAL</u>

- A. The work required and services for the pipeline rehabilitation shall be done in a safe, professional manner and shall conform to any pertinent local or state law, regulation, or code. Good housekeeping consistent with safety shall be maintained.
- B. The pipeline reconstruction shall be performed in accordance with manufacturer's specifications and installation instructions.
- C. The liner shall be installed within the low-level outlet host pipe without causing damage or displacement to the host pipe. Pipe bursting will not be allowed.
- D. The Contractor shall be prepared to correct any minor damage or deficiencies within the host pipe which might prevent the installation of the liner.
- E. The pipe lining system shall result in a final inside diameter of at least 20 inches.

### 3.02 SEDIMENT AND WATER CONTROL

- A. Sediment and water control shall be as per the appropriate sections of these Contract Documents. The Contractor shall prevent the release of any sediment or harmful materials into the watercourse.
- B. The Contractor must divert water around the mid-level and low-level outlets during the course of the work and until such time as the liner and other improvements are ready to accept flow.

## 3.03 <u>VIDEO INSPECTION AND OPERATIONAL TEST</u>

- A. Upon completion of installation, a video inspection of the completed pipe lining shall be performed in accordance with manufacturer's specifications and Section 02762 of these Contract Documents. The Contractor shall demonstrate by means of this inspection that the rehabilitated pipeline meets the intent of the specifications. Any flaws identified during the inspection shall be repaired as per the liner manufacture's recommendations to the satisfaction of the District's Consultant. The cost of final video inspection of the rehabilitated conduit and any repairs found to be necessary shall be included in the Bid Price for this Item.
- B. Final acceptance shall be contingent upon a flow test through the low-level and mid-level outlets with the headwater elevation within one foot of above normal pool level (296.8 feet). The outlets shall demonstrate adequate performance under these conditions. Following the flow test the video inspection described above shall be repeated to demonstrate the continued integrity of the liner.

# PART 4 - MEASUREMENT AND PAYMENT

Refer to Section 01950 – Measurement and Payment for the measurement and payment items related to this Section.

# \* \* \* END OF SECTION \* \* \*

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## SECTION 03300 CAST-IN-PLACE CONCRETE

### PART 1 - GENERAL

### 1.01 <u>SECTION INCLUDES</u>

- A. Reinforced Cast-In-Place Concrete indicated on the Contract Drawings:
  - 1. Retaining/Training Walls at Grupes Dam
  - 2. Concrete Cap at the Top of Grupes Dam
  - 3. Concrete Stairs at Grupes Dam
  - 4. Gatehouse Foundation and Slab at Grupes Dam
- B. Formwork, shoring, bracing, and anchorage
- C. Concrete reinforcement and accessories
- D. Modifications and/or Repairs to concrete

### 1.02 <u>RELATED SECTIONS</u>

- A. District Standard Specifications Item No. 601 Concrete for Structures
- B. Refer to Sheet GH-2 of the Contract Drawings for additional concrete requirements.
- C. Section 01300 Submittals
- D. Section 01451 Independent Testing Services
- E. Section 03305 Concrete Testing
- F. Section 03348 Patterned Concrete Facing

#### 1.03 <u>REFERENCES</u>

- A. Section M.03, Connecticut Department of Transportation, Form 816 Latest Edition Portland Cement Concrete
- B. Article M.06.01, Connecticut Department of Transportation, Form 816 Latest Edition Reinforcing Steel
- C. ACI 207.1R-05 Guide to Mass Concrete
- D. ACI 211.1-91 Standard Practice for Selecting Proportions for Normal Heavyweight, and Mass Concrete
- E. ACI 301-05 Standard Specifications for Structural Concrete
- F. ACI 302.1R-04 Guide for Concrete Floor and Slab Construction
- G. ACI 304.2R-96 Placing Concrete by Pumping Methods
- H. ACI 305R-99 Hot Weather Concreting

- I. ACI 306.1-90 Standard Specification for Cold Weather Concreting
- J. ACI 308R-01 Guide to Curing Concrete
- K. ACI 308.1-98 Standard Specification for Curing Concrete
- L. ACI 309R-05 Guide for Consolidation of Concrete
- M. ACI 318-08 Building Code Requirements for Structural Concrete and Commentary
- N. ACI 347-04 Guide to Formwork for Concrete
- O. ACI 350-06 Code Requirements for Environmental Engineering Concrete Structures
- P. ASTM A82M-07 Specification for Steel Wire, Plain, for Concrete Reinforcement
- Q. ASTM A185M-07 Specification for Steel Welded Wire Reinforcement, Plain, for Concrete
- R. ASTM A615/A615M-07 Specification for Deformed and Plain Billet Steel Bars for Concrete Reinforcement
- S. ASTM A675/A675M-03e1 Specification for Steel Bars, Carbon, Hot-Wrought, Special Quality, Mechanical Properties
- T. ASTM C33-07 Specification for Concrete Aggregates
- U. ASTM C94/C94M-07 Specification for Ready Mixed Concrete
- V. ASTM C150-07 Specification for Portland Cement
- W. ASTM C260-06 Specification for Air Entraining Admixtures for Concrete
- X. ASTM C309-98a Specification for Liquid Membrane-Forming Compounds for Curing Concrete
- Y. ASTM C494/C494M-99a Specification for Chemical Admixtures for Concrete
- Z. ASTM C595-08 Specification for Blended Hydraulic Cements
- AA. ASTM C618-05 Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
- BB. ASTM C881/C881M-02 Specification for Epoxy-Resin-Base Bonding Systems for Concrete
- CC. ASTM C989-06 Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars
- DD. ASTM C1240-05 Specification for Silica Fume Used in Cementitious Mixtures
- EE. ASTM C1602-04 Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
- FF. Concrete Reinforcing Steel Institute Manual of Standard Practice
- GG. Concrete Reinforcing Steel Institute Placing Reinforcing Bars

## 1.04 QUALITY ASSURANCE

- A. Perform work in accordance with ACI 301, ACI 318 and ACI 350R as modified herein.
- B. Maintain copies of ACI 301, ACI 318, and ACI 350R on site.

- C. Required Concrete Manufacturer Qualifications: A firm experienced in manufacturing readymixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
- D. Required Testing Agency Qualifications: An independent agency, acceptable to the District, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548. The Independent Testing Laboratory qualifications shall be submitted under Section 01451.
  - 1. Key personnel must be qualified and experienced in concrete quality assurance.
  - 2. Perform concrete field quality control testing with personnel certified as an ACI Concrete Field Testing Technician, Grade 1 according to the American Concrete Institute (ACI).

# 1.05 <u>SUBMITTALS</u>

- A. The Contractor shall submit to the District and Consultant the following:
  - 1. Submit layout drawings showing the location and extent of all joint waterstops, the type and size of all waterstops to be used and splice locations for each joint. Submit these layout drawings for review prior to the submittal of the reinforcing shop drawings and the start of concrete work.
  - 2. Submit shop drawings for concrete reinforcement prior to fabrication, showing bar bends, details and placement and certified copies of Mill Test Reports of reinforcement materials analysis.
  - 3. Submit Concrete Mix designs including past field performance test results. Submit a mix design for each strength and type of concrete. Submit a complete list of materials including type; brands; source and amount of cement, fly ash, pozzolans, ground slag and admixtures; and applicable reference specifications. Submit additional data regarding concrete aggregate if the source of aggregate changes.
  - 4. Submit sieve analysis and soundness tests for fine and coarse aggregates taken within the last three (3) months.
  - 5. Submit Cement Manufacturer's Certificates of conformance with ASTM C150 taken during the last 3 months.
  - 6. For all pozzolans proposed, submit certificates of conformance with respective ASTM standards indicated in part 2.4.B of this specification.
  - 7. If used, submit product data and material safety data sheets for:
    - a. Concrete admixtures
    - b. Concrete accessories
    - c. Bonding agent
    - d. Penetrating sealant
    - e. Curing compounds
    - f. Form materials
    - g. Form release agents

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- h. Corrosion inhibitor
- i. Anti-washout agent
- j. Synthetic fiber reinforcing
- 8. Submit sample concrete mix delivery slip.
- 9. Submit product data and sample for form ties.
- 10. Submit:
  - a. Formwork shop drawings prepared by or under supervision of a qualified Professional Engineer licensed in the State of Connecticut, detailing fabrication, assembly, and support of formwork.
  - b. Shoring and Reshoring: Indicate proposed schedule and sequence of stripping formwork, shoring removal, and installing and removing reshoring.
- 11. Within five (5) days of Notice to Proceed, the Contractor shall submit a schedule of labor, equipment, and methods of concrete placement, curing and protection for approval. As part of this submittal include means and methods of delivering concrete to placement areas. This submittal shall include production, transportation, placing, protecting, curing and temperature monitoring of concrete during cold weather. This submittal shall also include proposed measures to be taken to mitigate heat generation of mass concrete placement.
- 12. Submit qualification data for concrete supplier, and Contractor's Independent Testing Agency.
- 13. Submit field quality-control test results and inspection reports.
- 14. Submit unconfined compression strength test results for 7, 14, 28-day tests and additional tests as warranted.

## 1.06 <u>PRE-CONCRETE CONFERENCE</u>

- A. Pre-Concrete Conference shall be held after the concrete mix design has been reviewed by the District, the Resident Engineer, and the Consultant and more than 14 days prior to the first concrete placement to review concrete procedures.
- B. Meeting Minutes: Resident Engineer shall record minutes of meeting and distribute to attending parties, within 10 business days of meeting.
- C. Attendance: Contractor; concrete supplier; Independent Testing Laboratory; concrete subcontractor; admixture manufacturer; concrete pumping contractor; District; Resident Engineer; and Consultant.

# PART 2 - PRODUCTS

## 2.01 FORM MATERIALS

- A. Plywood: APA, B-B Plyform Class I exterior.
- B. Lumber: Southern pine, No. 2 grade or equal.

- C. Steel: Minimum 16 ga. sheet, well matched, tight fitting, stiffened to resist loads without excess deflection.
- D. Form Liner: Plywood conforming to PS-1, Grade B-B exterior (concrete form) not less than 1/4 inch thick.
- E. Chamfer Corners: Chamfer, Wood Strip Type; 1" x 1" minimum, maximum possible length.
- F. Form Ties: All structures shall have factory fabricated assembly providing at least 1.5 inch break back dimension with at least a 1-inch diameter tapered wood or plastic cones to leave a uniform hole for patching. Single rod ties require a tightly fitted waterstop washer at the midpoint. Multi rod ties do not require washers.
- G. Form release agent: Non-staining colorless, compatible with finishes, and non-toxic for potable water. CRETE-LEASE 727 Release Agent by Cresset Chemical, Super-X Emulsive by A.H. Harris & Sons, Inc. or equivalent. No diesel fuel will be allowed.
- H. Conform to ACI 301 and ACI 347

### 2.02 <u>REINFORCING STEEL</u>

- A. Bars: ASTM A615 Grade 60; deformed new materials.
- B. Welded wire fabric: ASTM A185
- C. Tie wire: ASTM A82, annealed.
- D. Bolsters, chairs and supports: plastic coated, stainless steel, or epoxy coated.

### 2.03 FABRICATION OF REINFORCING STEEL

- A. Conform to CRSI Code of Standard Practice-Fabrication.
- B. Cold bend bars.
- C. Bend bars around revolving collar of recommended size.

### 2.04 <u>CONCRETE MATERIALS</u>

- A. Portland cement:
  - 1. ASTM C150; Type II. Tricalcium Aluminate (C3A) content in cement less than 8%. Cement shall be furnished from one source during the project. In the event that the proposed cement is not low alkali, submit evidence that the proposed aggregate is not reactive per ASTM C1260 or AASHTO T303.
- B. Pozzolans:
  - 1. Ground Granulated Blast Furnace Slag: ASTM C989 Grade 100 or 120.
  - 2. Fly Ash: ASTM C618 Type F

- C. Aggregates:
  - 1. Fine aggregate shall consist of washed inert natural sand, manufactured sand, or combination thereof, free from mineral or other coatings, soft particles, clay, loam, or other deleterious materials conforming to the requirements of ASTM Specification C-33, and the following requirements:

SIEVE NO.	PERCENT PASSING
4	95 to 100
8	80 to 100
16	50 to 85
30	24 to 60
50	5 to 30
100	0 to 10

- a. Fineness Modulus 2.6 to 3.0
- b. The percent passing the #200 sieve shall not exceed 2 percent by dry sieving or 3% by wet sieving.
- 2. Coarse aggregate shall consist of a well graded crushed stone or a washed gravel or a combination there of, conforming to the requirements of ASTM Specification C-33 and the following requirements. Select aggregate which is not considered susceptible to Alkali-Silica Reactivity (ASR) in accordance with ASTM AC295.

PERCENT PASSING						
SIEVE	<b>NO. 67</b> (3/4")	<b>NO. 57</b> (1")	<b>NO.</b> 8 (3/8")	<b>NO. 467</b> (1 <sup>1</sup> / <sub>2</sub> ")		
$1-\frac{1}{2}$ inch		100		100		
1 inch	100	95-100				
<sup>3</sup> / <sub>4</sub> inch	90-100			35-70		
<sup>1</sup> / <sub>2</sub> inch		25-60	100			
3/8 inch	20-55		85-100	10-30		
No. 4	0-10	0-10	10-30	0-5		
No. 8	0-5	0-5	0-10			
No. 16			0-5			
No. 50						

Limits of deleterious substances and physical property requirements shall be listed in ASTM C33, Table 3, for severe weathering regions.

- D. Water: potable from municipal water supply or shall meet the requirements of ASTM C1602.
- E. Admixtures: All from one common manufacturer.

### 2.05 <u>ADMIXTURES</u>

A. Low Range Water Reducer: Pozzolith 210 by Master Builders; WRDA with HYCOL by Grace Construction Products Division; or equivalent meeting ASTM C494 Type A.

- B. High Range Water Reducer (superplasticiser): Rheobuild 1000 or Glenium 3000 NS by Master Builders; Daracem 100 or ADVA 100 by W.R. Grace; or equivalent meeting ASTM C494 type F.
- C. Air entraining agent: Micro-Air by Master Builders, DAREX II AEA by Grace Construction Products; or equivalent meeting ASTM C260.
- D. Non-corrosive non-chloride accelerator: Pozzutec 20+ by Master Builders; Polarset by W. R. Grace; or equivalent meeting ASTM C494 type C or E.
- E. Not permitted: Calcium chloride, thiocyanates, or admixtures containing chloride ions.
- F. Corrosion-Inhibiting Admixture: Calcium nitrite; commercially formulated, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete and complying with ASTM C 494/C 494M, Type C. Available products include DCI manufactured by Grace Construction Products, W.R. Grace & Co and Rheocrete CNI manufactured by Master Builders, Inc
- G. Anti-washout agent; Concrete placed underwater shall include an anti washout admixture such as Sikament 100SC manufactured by Sika Corporation, or an equivalent product that has been demonstrated to provide equivalent resistance to washout when tested in accordance with the Army Corps of Engineers CRD-C 61-89A, Test Method for Determining the Resistance of Freshly Mixed Concrete to Washing Out in Water.
- H. Synthetic Fiber reinforcing Synthetic fibrous reinforcement shall be in accordance with ASTM C 1116, Type III, synthetic fiber-reinforced concrete, and as follows. Synthetic reinforcing fibers shall be 100 percent virgin polypropylene fibrillated twisted-bundle fibers. Fibers shall have a specific gravity of 0.9, a minim tensile strength of 70 ksi, a length of 2.25 inches graded per manufacturer, and specifically manufactured to an optimum gradation for use as concrete temperature/shrinkage reinforcement. A minimum of 1.5 pounds of fibers per cubic yard of concrete shall be used. Fibers shall be added at the batch plant. Fibers shall be Forta Ultra-Net manufactured by Forta Corporation, Grove City, PA, or an accepted equivalent product.

## 2.06 <u>ACCESSORIES</u>

- A. Joint filler and slab perimeters: J-Joint polyethylene foam with tear off strip for sealant or equivalent; joint filler to be slab thickness in depth less 0.5 inch for sealant.
- B. Expansion joint filler: Self expanding cork by W.R. Meadows or W.R. Grace or equivalent, size as indicated on the Drawings.
- C. PVC water-stops shall be extruded polyvinylchloride with virgin resin and shall be either the flat ribbed type or wire reinforced flat ribbed type:
  - 1. Flat Ribbed Type Waterstop:
    - a. Construction Joints: 0.375 inch thick by 9 inches wide. Type R9-38 by Vinylex Corporation, Style 786 by Greenstreak Plastics Products, Type FR-9380 by Paul Murphy Plastics Company or equivalent.

- D. Epoxy bonding adhesive: Epoxy resin/portland cement moisture resistant bonding agent: Armatec 110 EpoCem by Sika Corporation, Corr-Bond by Euclid Chemical Company, Epobond by L&M Construction Chemicals, Inc. or equivalent.
- E. Structural inserts: of type and size shown on the drawings; Richmond Screw Anchor or Heckman Building Products, Hohman and Barnard, Dayton Sure-Grip or equivalent.
- F. Epoxy dowel anchors: High strength epoxy based, two component, 100% solids resin meeting the requirements of ASTM C881, Type IV or V, Grade 2 or 3 and Class A, B or C (as recommended by the manufacturer). HIT RE 500 Epoxy Adhesive by Hilti, Epoxy-Tie Set by Simpson Strong-Tie, Euco #620 Epoxy System by Euclid Chemical Company or equivalent.
- G. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces. Provide, specially formulated form-release agent with rust inhibitor for steel form-facing materials.
- H. Non-shrink grout shall be a pre-packaged, pre-proportioned cement-based grout meeting the performance requirements of ASTM C1107 and requiring only the addition of potable water. The grout shall not contain metallic aggregate, expansive cement, or aluminum powder. The non-shrink grout shall have a minimum 10-year performance history. 28-day compressive strength shall be not less than 6000 psi when tested in accordance with ASTM C 942 and bond strength shall exceed 2000 psi when tested in accordance with ASTM C882.
- I. Penetrating sealant shall be a solvent-free, penetrating, silane surface treatment that forms a water and chloride repellent impregnation. Sealant shall not act as a vapor barrier and shall not degrade under UV exposure. Minimum solids content shall be 40%.
- J Joint Seals/Fillers shall be as described on the contract drawings.

## 2.07 <u>CONCRETE CLASS</u>

- A. Concrete Cap and Retaining Walls: Class A
- B. Concrete Stairs and Gatehouse Foundation: Class B

## 2.08 <u>CONCRETE</u>

A. Concrete proportioning shall conform to ACI 318, Chapter 5 except as modified in the table below:

Class	Strength (f'c)	Coarse Aggregate	% Air ± (1.5%)	Cem.Fac (LB/CY)	Max W/C Ratio	MinMa	x. Slump
Α	4000 PSI	No. 467 (1 ½ ")	5	611	0.45	3	5
В	4000 PSI	No. 67 (3/4")	6	611	0.45	3	5

## Table 1 - Concrete Class Data

- B. An alternate concrete mix design using blended hydraulic cements and Pozzolans may be proposed. Any alternate mix design proposed shall include a minimum of 30 compressive strength test results from the past 12 months exhibiting a consistent strength and standard deviation. The proposed mix shall contain cementitious materials in the following proportions.
  - 1. Portland Cement No less than 50% of the total by weight.
  - 2. Ground Granulated Blast Furnace Slag No greater than 50% of the total by weight.
  - 3. Fly Ash
    - a. Class A No greater than 35% of the total by weight.
    - b. Class B No greater than 30% of the total by weight.
- C. The maximum slump as indicated in the above table will be as measured at the batch plant, before adding high-range water reducing admixture or plasticizing admixture. Slump shall be 7 inches, plus or minus 1 inch, after addition of admixtures.
- D. Pumped Concrete: Conform to Chapter 4 ACI 304.2
- E. Mass Concrete: Class A concrete for mass placement shall have an initial placement temperature less than 65 degrees Fahrenheit.
  - 1. Temperature may be achieved by cooling the aggregate by chilling or fogging or other suitable and acceptable means that will not significantly alter the moisture content of the aggregate within the stockpile.
  - 2. Mix water may be chilled by refrigeration or chipped or crushed ice may be used in the mix as a substitute for a portion of the mix water, on a 1:1 basis, measured by weight. If ice is used, all ice must be melted before discharge from the mixer.
- F. High range water reducer shall be added either at the concrete batch plant or on site to obtain the slumps as indicated above only with prior approval of the Resident Engineer when circumstances dictate its necessity to facilitate placement.
- G. No additional mix water shall be added to the concrete on site which will increase the watercement ratio of the mix. If additional water is to be added on site, it shall be held back from the specified quantity in the mix design during batching and shall be added on-site for the sole purpose of providing the initial sump as specified prior to adding the high range water reducer. The amount of water held back from the mix shall be clearly indicated on the concrete mix delivery slip. The Resident Engineer shall be notified prior to adding the water on site. The addition of a greater quantity of water than that indicated shall be cause for non-compliance and potential rejection of the concrete truck.
- H. Concrete shall be furnished from one supplier and batch plant during the project.

### 2.09 SELECTION OF CONCRETE PROPORTIONS

- A. The concrete producer shall select the concrete mix proportions on the basis of past field performance and the use of trial mixes. The changes in materials and proportions within the population of background tests shall not have been more closely restricted than they will be for the proposed work. The test record shall represent only a single record of consecutive tests that span a period of not less than 45 calendar days. The concrete mix proportions shall produce an average strength at least as great as the required average strength (f'cr).
- B. Field Experience
  - 1. Concrete mix proportions shall be established on the basis of field test data with similar materials to be used for the project. Past field experience will be considered suitable if it consists of data from one group of at least 30 consecutive compressive strength tests. To be acceptable, the test data shall be based on similar mix proportions to those for the project.
  - 2. The Standard Deviation (s) shall be computed from such test data and the required average strength (f'cr) to be used for the selection of the concrete proportions shall exceed the specified strength (f'c) in accordance with the following formulae:
    - a. When the standard deviation (s) is less than 500 psi:

f'cr = f'c + 1.34s

b. When the standard deviation (s) is greater than or equal to 500 psi:

f'cr = f'c + 2.33s - 500

3. When a concrete producer does not have test data meeting the requirements listed in Section 2.09.B.1, but does have data based on a single group of 15 to 29 consecutive tests, a standard deviation shall be established as the product of the calculated standard deviation and modification factor indicated below. To be acceptable, the test data shall be based on similar mix proportions to those for the project.

NO. OF TESTS	MODIFICATION FACTOR FOR STANDARD DEVIATION		
15	1.16		
20	1.08		
25	1.03		
30 or more	1.00		

4. When a concrete producer does not have test data meeting the requirements listed in Section 2.09.B.3, but does have data based on a two groups of consecutive tests totaling at least 30. To be acceptable, none of the two groups shall consist of less than 10 tests with similar mix proportions to those for the project. The group containing 15 or more test results which have different mix proportions from those for the project shall be within 1,000 psi of the specified strength. A standard deviation shall be established as the product of the calculated standard deviation based upon the group containing 15 or more test results and modification factor indicated above.

- 5. Document that the calculated average strength for the proposed concrete proportions, using past field performance data for the proposed concrete proportions consisting of at least 10 consecutive test records, is at least greater than or equal to the required average strength (f'cr). If the past field performance data consists of two groups of strength tests for two different mixes, plot the average strength versus the water cement ratio of the two mixes. Interpolate between the corresponding mixture proportions to determine the mixture proportions for the required average strength (f'cr).
- C. Laboratory Trial Batches
  - 1. Trial mixes shall be designed and tested. Concrete proportions established from trial mixtures meeting the following restrictions shall be permitted:
    - a. Combination of materials shall be that for proposed work.
    - b. The required average compressive strength (f'cr) shall be 5,200 PSI.
    - c. Trial mixtures having proportions and consistencies required for proposed work shall be made using at least three (3) different water-cementitious materials ratios which will be less than or equal to 0.45 and will produce a range of strengths encompassing the required average strength (f'cr).
    - d. The maximum cement factor as listed in Section 2.08.A shall not be exceeded.
    - e. Trial mixtures shall be designed to produce a slump within + or 0.75 in. of maximum permitted, and for air entrained concrete, within + or 0.5 percent of maximum air content.
    - f. For each water-cementitious materials ratio, at least three (3) test cylinders for each test age shall be made and cured in accordance with ASTM C 192. Cylinders shall be tested at 7, 21 and 28 days.
    - g. Maximum water-cementitious materials ratio for concrete to be used in proposed work shall be selected by the curve to produce the average strength required (f'cr).
- D. Adjustments to Required Average Strength (f'cr).
  - 1. Adjustments in the Required Average Strength (f'cr) may be made during the progress of the work on the following basis:
    - a. When a minimum of fifteen 28-day tests from this project are available, the average strength and standard deviation shall be computed. Should these determinations indicate an excessive compressive strength with a low standard deviation as determined by the Resident Engineer and Consultant, modification of the concrete mix may be made to achieve a lower average strength based upon a new standard deviation. In the event such determination should indicate a lower average strength or higher Standard Deviation than anticipated, the Resident Engineer and Consultant will require corrective measures to be taken immediately which may include one or more of the following but not limited to:
      - (1) An increase in the cementitious material
      - (2) Changes in mixture proportions
      - (3) Reductions in, or better control of, levels of slump supplied.
      - (4) A reduction in the delivery time

- (5) Closer control of air content.
- (6) Decrease in the water-cement ratio.
- (7) An improvement in the quality of the testing, including strict compliance with standard test procedures.
- (8) Procedural changes as deemed necessary by the Resident Engineer or Consultant.

### 2.10 DELIVERY, STORAGE, AND HANDLING OF MATERIALS

- A. Delivery, storage, and handling of materials shall be in accordance with Section 01600
- B. Protect materials from ground and the elements.
- C. Maintain cement in dry condition.
- D. Store reinforcement and all other embedded items on skids.
- E. Remove defective materials from site. Do not store on site.

## PART 3 - EXECUTION

### 3.01 <u>FORMWORK</u>

- A. Conform to ACI 301 and ACI 347
- B. Verify lines, levels, and measurements before proceeding.
- C. Erect plumb and straight. Maintain rigid. Brace sufficiently.
- D. Allow no concrete leakage. Provide continuous, straight, smooth exposed surfaces.
- E. Treat forms with form release agent prior to erecting forms. Protect reinforcing from contact with form release agent.
- F. Earth forms are not permitted.
- G. Provide ports for pumping concrete and temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.
- H. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrenching plates where stripping may damage cast concrete surfaces. Chamfer all exposed outside corners and edges 0.75 inch unless otherwise noted.
- I. Clean out inside of forms of all foreign materials prior to concrete placement.

- J. Maintain specified tolerances.
- K. General: Formwork for parts of the Work that do not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 72 hours after placing concrete, if concrete is hard enough to not be damaged by form removal operations and curing protection operations are maintained.
  - 1. Leave formwork for beam and other structural elements that supports weight of concrete in place until concrete has achieved at least 80 percent of its 28-day design compressive strength.
  - 2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.
- L. Re-shore as required. Comply with ACI318 (ACI 318M) and ACI 301 for design, installation, and removal of shoring and reshoring. Plan sequence of removal of shores and reshore to avoid damage to concrete. Locate and provide adequate reshoring to support construction without excessive stress or deflection.
- M. Form pressures increase with the use of concrete with High Range Water Reducers. Design forms accordingly.
- N. Clean and repair surfaces of forms to be re-used in work. Split, frayed, delaminated, or otherwise damaged form facing material will not be acceptable for exposed surfaces. Apply new form release agent as specified for new formwork.
- O. All concrete formwork, including reinforcing steel and embedment items, shall have a temperature greater than or equal to 50°F at the time of concrete placement.

## 3.02 <u>REINFORCEMENT</u>

- A. Steel Reinforcement shall be installed or placed as shown on the Contract Drawings and the approved Shop Drawings. Placement and details of reinforcement not shown on the plans shall be in accordance with ACI 315 or ACI 318 and CRSI MSP-1. At time of concrete placement, all reinforcement shall be free from loose rust, scale, mud, oil, grease, or any other contaminant that could affect bond with the concrete.
- B. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with ties and bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing.
- C. Furnish reinforcement bars in full lengths to the extent practicable.
- D. Conform to the CRSI Code of Standard Practice Field Erection for surface condition, bending, spacing and placement tolerance.
- E. Weld no reinforcement unless no exceptions are taken by the District or Resident Engineer in writing.
- F. Splicing reinforcement: conform to ACI 318 and ACI 350; welded wire fabric to be lapped  $1\frac{1}{2}$  courses or 12 inches; tie fabric at 24 inches on center maximum spacing.

- G. Provide bar supports on grade use concrete brick; elsewhere use manufactured wire supports.
- H. Do not bend reinforcing partially embedded in the concrete.
- I. Field cutting of the reinforcement will not be allowed.
- J. Mechanical connections shall be installed in accordance with splice device manufacturer's recommendations. Additional mechanical connections proposed by the Contractor shall only be installed only after being reviewed with no exceptions taken by the Resident Engineer.

## 3.03 <u>EMBEDDED ITEMS</u>

A. Contractor shall coordinate the installation and securing of all embedded items such as anchor rods, waterstops, pipes, conduit, embedded angles, reinforcing steel dowels and all other required embedded items indicated in the Contract Documents.

### 3.04 <u>WATERSTOPS</u>

- A. Waterstops shall be continuous around all corners and intersections. Use prefabricated vinyl corners, tees, and crosses. Bending waterstop around corners will not be acceptable.
- B. Splice vinyl waterstops as recommended by manufacturer; develop 80% tensile strength in splice; form continuous seal at joint intersections; terminate with 2" concrete cover where designed to discontinue.
- C. Secure waterstops on both sides at 12" on center maximum spacing; dumbbell type with manufactured clips; place center of waterstop at joint.
- D. Joints: hold vinyl waterstop rigid with split bulkhead forms.
- E. Place concrete uniformly to avoid displacing waterstop.
- F. Thoroughly vibrate concrete around waterstop to avoid honeycombing and voids in concrete and to insure complete contact between waterstop and concrete.
- G. Notify Resident Engineer 24 hours prior to installing waterstops.
- H. Place great importance on the successful installation of joint waterstops.

### 3.05 JOINT SEALS

- A. Protect all compression joint component parts from damage during installation of adjacent materials and thereafter until completion of structure.
- B. The joint system shall be installed as indicated and in strict accordance with the manufacturer's typical details and instructions, along with advice of their qualified representative. A qualified representative of the joint manufacturer shall be present to view the surfaces prepared to receive the joint system and observe and provide direction during the initial installation.
- C. The joint system shall be set to the proper width for the ambient temperature at the time of installation.

### 3.06 SURFACE PREPARATION

- A. Concrete removal, repairs and fabrication shall be as shown on the Drawings and as specified herein.
- B. Except as otherwise indicated, in all locations where new concrete is to be deposited against existing concrete or masonry, bonding compound shall be applied to the surfaces of the existing concrete or masonry prior to placement of new concrete.
- C. Where deteriorated or damaged concrete exists in areas to adjoin new concrete, existing concrete shall be removed to the depth required to expose sound concrete. The surface exposed shall be roughened by chipping, sandblasting, scarifying or other appropriate means before applying bonding compounds, or repair material as specified.
- D. Reinforcing in existing concrete which is exposed as a result of removal of deteriorated concrete shall be wire brushed to remove all loose material and products of corrosion before proceeding with the repair.

# 3.07 PLACING CONCRETE

- A. Notify Resident Engineer and Independent Testing Laboratory 24 hours minimum prior to each placement.
- B. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- C. Do not add water to concrete during delivery, at Project site, or during placement unless accepted by the Resident Engineer
- D. Concrete shall be handled from the mixer to the place of final deposit as rapidly as practicable by methods which will prevent the separation or loss of the ingredients. When concrete is conveyed by chuting, the plant shall be of such size and design as to insure a practically continuous flow in the chute. The slope of the chute shall be such that concrete of the required consistency flows without separation of the ingredients. The chute shall be flushed with water before and after each run; the water used for this purpose is not to be discharged inside the forms. Chutes shall be U-shaped, designed for this function, and in general shall have a slope varying from 25° to 45°.
- E. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. Deposit concrete to avoid segregation.
  - 1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
  - 2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
  - 3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches (150 mm) into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete mixture constituents to segregate.

- 4. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
- 5. Maintain reinforcement in position during concrete placement.
- 6. Slope surfaces uniformly to drain where required.
- 7. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb surface before starting finishing operations.
- F. All concrete shall be tested as specified herein.
- G. Assure placement and proper location of all embedded items.
- H. Place no concrete on frozen ground.
- I. Place concrete from mixing truck to final location quickly and without segregation. Place concrete within 90 minutes of batching. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.
- J. Unless noted otherwise, freefall from concrete truck discharge chute, pump hose and hopper hose shall be 2 feet maximum.
- K. Place continuously and against plastic concrete only.
- L. Do not place partially hardened concrete.
- M. Consolidate concrete by vibrating. Penetrate preceding lift 4 inches to blend layers. Do not use vibrator to move fresh concrete laterally. Insert vibrator at approximately 18-inch intervals. Consolidate concrete without segregation. Conform to ACI 309.
- N. Conform to ACI 306R for placing, curing, and maintaining concrete in cold weather.

		Concrete Thickness					
	Air	Less than			Greater than		
Item	Temperature	12 in.	12-36 in.	36-72 in.	72 in.		
Minimum concrete temperature as placed and maintained							
1		55 F	50 F	45 F	40 F		
Minimum concrete temperature as mixed for indicated air temperature							
2	Above 30 F	60 F	55 F	50 F	45 F		
3	0 to 30 F	65 F	60 F	55 F	50 F		
4	Below 0 F	70 F	65 F	60 F	55 F		

1. Temperature limitations on concrete when delivered to site:

- 2. Conform to ACI 305R for placing, curing, and maintaining concrete in hot weather.
- 3. Temperature of Class B and Class C concrete shall not exceed 90°F at discharge from the mixer.
- O. Provide to the Resident Engineer concrete Delivery Slip prepared at batch plant with each truck load of concrete showing ticket number, date, truck number, mix strength, maximum stone

size, weight of coarse aggregate, weight of fine aggregate, cement weight, volume of concrete, gallons of water added at plant, time water added at plant, quantities of all admixtures used and gallons of water withheld at the plant.

- P. High Range Water Reducing admixtures shall be used for all concrete to be pumped or with a specified water/cement ratio below 0.50.
- Q. Use non-corrosive, non-chloride accelerator when placing concrete in air temperatures below 50°F.
- R. Thoroughly moisten subgrade materials prior to placing slabs on grade.
- S. Unless otherwise shown on the drawings, bond new concrete to hardened concrete with the specified bonding agent or approved equal. Apply as recommended by manufacturer and prewet surface to saturated dry condition.
- T. Contractor shall coordinate concrete truck wash-out area with the District and Resident Engineer.

## 3.08 <u>JOINTS</u>

- A. Provide joints only where shown on the drawings or as otherwise approved after written request.
- B. Install waterstops and joint filler in construction joints as shown on the Drawings. The waterstop shall extend the entire length of the joint and shall be positioned across the center of the joint.
- C. Thoroughly clean the surface of the concrete at construction and control joints and remove laitance prior to placing adjoining concrete. Do not place concrete against the hardened side of a joint for at least 48 hours.
- D. At all cold joints, bond new concrete to hardened concrete with the specified bonding agent or approved equal.

## 3.09 DRILLING AND ADHERING DOWELS

- A. Use rotary drills and cores (non-percussive) and drill holes into concrete to the depth indicated. Hole size shall be one inch larger in diameter than the dowel diameter unless otherwise indicated on the Contract Drawings.
- B. Scour the dowel hole by thoroughly roughening the sides with a coarse, wire flue brush or use the appropriate drill bits to provide a roughened surface appropriate for the epoxy system utilized.
- C. Clean hole of dust and debris with a power vacuum.
- D. Fill hole with high strength epoxy or non-shrink grout as indicated; insert dowel with twisting motion; add grout or epoxy as needed.
- E. Maintain dowel stationary until grout or epoxy cures.
F. If existing reinforcing steel is encountered while drilling, offset the drill hole by a maximum of 2-inches. The new relocated hole shall be in the same line as the line of drilled holes. All offset holes shall be a minimum of 4-inches from a free concrete edge. Maintain the original spacing locations of the remaining dowels as indicated on the Contract Drawings.

# 3.10 <u>TOLERANCES</u>

A. Maximum allowable deviations from dimensions, elevations, slopes, and positions as indicated below:

1.	Top elevation:	<u>+</u> 1/4 in
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2. Thickness:

a. Decrease in specified thickness: 0%b. Increase in specified thickness: No

\*Tolerances apply to concrete dimensions only, not to positioning of vertical reinforcing steel, dowels, or embedded items.

# 3.11 FAILURE TO MEET STRENGTH REQUIREMENTS

- A. The strength of the concrete in place will be considered substandard if any one of the following results occur: Note: A test is defined as the average of two cylinders.
  - 1. The arithmetic average of 28-day cylinder tests for any three (3) consecutive test results are less than the specified strength (f'c).

limit

- 2. More than 10 percent of the 28-day cylinder tests have strengths less than the specified strength (f'c).
- 3. A compressive strength test result falls below the specified strength (f'c) by more than 500 psi.
- B. Concrete which fails to meet the strength requirements as outlined above will be reviewed by the Consultant. The Consultant will determine whether the substandard concrete will be accepted, rejected or additional tests performed.
- C. When Substandard concrete occurs as defined in the above paragraphs A.1 and A.2, the Consultant will require corrective measures to be taken immediately, as listed in Section 2.09.D, in order to increase the average of subsequent strength tests.
- D. When substandard concrete occurs as defined in the above paragraph A.3, the Consultant may require cores drilled in the area of question. If the core tests are inconclusive or impractical to obtain, load tests may be required, and their results evaluated in accordance with ACI 318 Chapter 20. If the average of the three cores is less than 85% of the specified 28-day strength or if one core is less than 75% of the specified 28-day strength, then that portion of the structure shall be strengthened by a method proposed by the Contractor and accepted by the Consultant or replaced by the Contractor at no additional cost to the District.

### 3.12 <u>DEFECTIVE CONCRETE</u>

- A. Defective concrete is defined as concrete in place which does not conform to strength, shapes, alignments, appearances and/or elevation as shown on the drawings and/or presents faulty surface areas.
- B. Reinforcing steel size, quantity, strength, position, or arrangement at variance with the Drawings will be considered defective.
- C. Concrete which differs from the required dimensions or locations in such a manner as to reduce the strength will be considered defective.
- D. Concrete surfaces not finished or not cured in accordance with these specifications shall be classified as defective concrete.
- E. Formed surfaces larger or smaller than dimensional tolerances specified in this Division may be rejected. If the Consultant permits the Contractor to correct the error, such correction shall be as directed and in such a manner as to maintain the strength, function, and appearance of the structure.
- F. Concrete members cast in the wrong location may be rejected and shall be removed at no additional cost to the District if the strength, appearance, or function of the structure is adversely affected.
- G. Inaccurately formed surfaces exposed to view may be rejected and shall be repaired or removed and replaced at no additional cost to the District.
- H. Concrete exposed to view with defects which adversely affect the appearance of the specified finish shall be repaired. Excessive honeycomb or embedded debris in concrete is not acceptable. If, in the opinion of the Consultant, the defects cannot be repaired, the concrete may be accepted or rejected in accordance with the decision of the Consultant.

# 3.13 <u>PROTECTION FROM COLD</u>

- A. Concrete structures shall be covered, insulated, and heated as required to prevent frost penetration beneath the structures until acceptance by the District. The use of ridge barriers for weather protection shall be used as required and as directed by the Resident Engineer.
- B. All material and equipment required for cold weather placement and curing protection shall be available at the project site before commencing concrete placement.
- C. All snow, ice and frost shall be removed from the surfaces, including reinforcement and the subgrade, against which the concrete is to be placed. The temperature of any surface that will come into contact with fresh concrete shall be at least 50 deg F and shall be maintained at a temperature of 50 deg F or above during the placement of concrete and for a minimum of 7 days after placement.
- D. As much as possible, any enclosure for protection shall be in place before depositing of any concrete and the remainder shall be installed as rapidly as possible in order to reduce heat losses to a minimum. Heating within the enclosure shall be attained by such means of artificial heat as will maintain the temperatures specified continuously and with a reasonable degree of uniformity in all parts of the enclosures. All exposed surfaces of concrete within the enclosure shall be kept sufficiently moist to prevent any drying of the surface concrete with possible

resulting damage to the concrete in place. Heating appliances shall not be placed in such a manner as to endanger the enclosure, forms, or supports, or expose any area of concrete to drying out or other injury due to excessive temperatures.

### 3.14 FINISHING FORMED SURFACES

- A. Rough-Formed Finished: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections.
- B. Refer to Section 03348- Patterned Concrete Facing for finishing requirements for patterned surfaces.

#### 3.15 FINISHING TOP OF DAM SURFACE

- A. General: Comply with ACI 3021R recommendations for finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Consolidate surface by hand floating. Re-straighten, cut down high spots, and fill low spots. Repeat float passes and re-straightening until surface is left with a uniform, smooth, granular texture.
- C. While still plastic, texture concrete surface that has been screeded and bull floated. Use stiff brushes or brooms to produce a scored texture transverse to bridge axis. Permit surface to harden sufficiently to retain scored surface.

#### 3.16 MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, 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 indicated or required to complete the Work.

#### 3.17 <u>CONCRETE PROTECTING AND CURING</u>

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing. Concrete and form temperature are to be maintained above 50 degrees Fahrenheit for a minimum of 7 days after placement.
- B. Formed Surfaces: Cure formed concrete surfaces, If forms remain during curing period, continue curing for the remainder of the curing period.
- C. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure all unformed surfaces.
- D. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
  - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
    - a. Water.

- b. Continuous water-fog spray.
- c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers. Provide a secure, waterproof, windproof barrier over the absorptive cover.
- 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
- 3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected by heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

# 3.18 <u>REPAIR OF FORMED SURFACES</u>

- A. Defective Concrete: Repair and patch defective areas when approved by Consultant. Remove and replace concrete that cannot be repaired and patched to Consultant's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part Portland cement to two and one-half parts fine aggregate passing a No. 16 (1.18-mm) sieve, using only enough water for handling, and placing.
- C. Repairing Formed Surfaces: Repair and patch all voids at form ties and all surface defects including color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
  - 1. Immediately after form removal, remove snap-tie cones, cut out honeycombs, rock pockets, and voids more than ½ inch (13 mm) in any dimension in solid concrete, but not less than 1 inch (25 mm) in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat all holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried.
  - 2. Repair defects on surfaces exposed to view by blending white Portland cement and standard Portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area 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.
  - 3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Consultant.
  - 4. Refer to Section 03348-Patterned Concrete Facing for more information for repair of patterned surfaces.
- D. Perform structural repairs of concrete, subject to approval of the Consultant, using epoxy adhesive and patching mortar.

## 3.19 FIELD QUALITY CONTROL

- A. The Contractor shall retain a certified independent testing laboratory to perform quality assurance testing of all concrete placed.
- B. Inspections:
  - 1. Steel reinforcement placement.
  - 2. Embedded items.
  - 3. Verification of use of required design mixture.
  - 4. Concrete placement, including conveying and depositing.
  - 5. Curing procedures and maintain of curing temperature.
  - 6. Verification of concrete strength before removal of shores and forms from beams and slabs.
- C. A curing box capable of maintaining the record moisture and temperature shall be provided by the Contractor. Sample preparation, curing, and testing will be performed in accordance with ASTM designations C172, C31, and C39.
- D. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
  - 1. Compression Strength Tests: ASTM C39; make five test cylinders for each set of tests in accordance with ASTM C31. Precautions shall be taken to prevent evaporation and loss of water from the specimen. Test one cylinder at 7 days. If the 7-day test indicates that compressive strength is at least 80 percent of f'c, confirm results by testing a second cylinder. If the compressive strength is less than 80 percent of f'c, test the second cylinder 14 days. Test two cylinders at 28 days and hold one cylinder in reserve. Samples for strength tests of concrete placed each day shall be taken not less than once a day, nor less than once for each 50 cubic yards of concrete. For the entire project, take no less than five sets of samples and perform strength tests. Each strength test result shall be the average of two cylinders from the same concrete sample tested at 28 days. If the average of any three consecutive strength results is less than f'c or if any strength test results fall below f'c by more than 500 psi, take a minimum of three ASTM C 42 core samples from the in-place work. Location represented by core test shall be considered structurally inadequate if the average of three core tests is less than 75 percent of f'c. Locations represented by erratic core strengths shall be retested. Remove concrete not meeting strength criteria and provide new acceptable concrete. Repair core holes with non-shrink grout. Match color and finish of adjacent concrete.
  - 2. Slump: ASTM C143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
  - 3. Air Content: ASTM C 231, pressure method, for normal-weight concrete, one test for each composite sample, but not less than one test for each day's placement of each concrete mixture.

- 4. Concrete Temperature: ASTM C 1064/C 1064M; one hourly test for Class A concrete; for all other concrete, one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each composite sample.
- 5. Unit Weight: ASTM 567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each concrete mixture.
- 6. Test results shall be reported in writing to Resident Engineer, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
- 7. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by the District or the Consultant but will not be used as sole basis for approval or rejection of concrete.
- 8. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, temperature, or other requirements have not been met. Testing shall be performed as directed by the Consultant. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42/C 42M or by other methods as directed by the Consultant.
- 9. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- 10. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents. Correction of deficiencies will be performed at no additional expense to the District.

# PART 4 - MEASUREMENT AND PAYMENT

Refer to Section 01950 – Measurement and Payment for the measurement and payment items related to this Section.

# \* \* \* END OF SECTION \* \* \*

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## SECTION 03305 CONCRETE TESTING

## PART 1 - GENERAL

### 1.01 <u>DESCRIPTION</u>

- A. This Section describes requirements for quality control testing for cement concrete used in the construction of cast-in-place concrete structures at the site. Testing shall be done both on site and in the laboratory on samples collected from the site.
- B. The Contractor shall engage a qualified, certified, and approved Independent Materials Testing Laboratory to perform all quality control testing for cement concrete placed under the work of this contract. The Independent Testing Laboratory shall conduct all on-site and laboratory testing.
- C. The Contractor shall be responsible for any and all corrective measures necessary based on testing results, as determined necessary by the Engineer.

#### 1.02 <u>SCOPE OF WORK</u>

A. The Scope of Work under this Section shall include all work, labor, materials, equipment, and other effort and expenses necessary to engage a qualified, certified, and approved Independent Materials Testing Laboratory to perform all quality control testing for cement concrete placed under the work of this contract. The work shall include all necessary field work, laboratory testing, and reporting by the Independent Testing Laboratory.

## 1.03 <u>RELATED SECTIONS</u>

- A. Section 01300 Submittals
- B. Section 03300 Cast-In-Place Concrete

#### 1.05 <u>REFERENCES</u>

- A. ASTM C31/C31M-06 Standard Practice for Making and Curing Concrete Test Specimens in the Field
- B. ASTM C39/C39M-05e1 Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
- C. ASTM C42/C42M-04 Standard Test Method of Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
- D. ASTM C172-07a Practice for Sampling Freshly Mixed Concrete
- E. ASTM C231-04 Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method

- F. ASTM E329-07a Specification for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction
- G. ASTM C1602/C1602M-06 Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
- H. ACI 301-05 Standard Specifications for Structural Concrete
- I. ACI 350.1-01/350.1R-01 Tightness Testing of Environmental Engineering Concrete Structures

# 1.06 <u>QUALIFICATIONS</u>

- A. Independent Testing Laboratory shall conform to concrete testing requirements of ASTM E329.
- B. Key personnel must be qualified and experienced in concrete quality assurance.
- C. Perform concrete field quality control testing with personnel certified as an ACI Concrete Field-Testing Technician, Grade 1 according to the American Concrete Institute (ACI).

# 1.07 <u>SUBMITTALS</u>

- A. The Contractor shall be responsible for the submittals for review and acceptance by the District and Consultant at no additional cost to the District. Submittals shall include Independent Testing Laboratory's qualifications, all testing reports, etc.
- B. Independent Testing Laboratory will submit one copy each of all test reports to each of the following: District, Engineer, Contractor, and concrete supplier.
- C. Independent Testing Laboratory will submit reports within 5 days of testing or inspection.
- D. Independent Testing Laboratory will telephone the Resident Engineer within 24 hours if tests indicate deficiencies.

# 1.06 QUALITY CONTROL

- A. The responsibility of the Resident and Design Engineer includes the inspection of the test results provided by the Independent Testing Laboratory for compliance with project specifications. Tests shall be conducted by the Contractor's Independent Testing Laboratory as required below and supplemented at the discretion of the District.
- B. The Contractor shall be required to engage, at his own expense, a qualified independent testing agency to perform all required quality control tests. The independent testing agency is subject to approval by the District. Testing by the Contractor's independent agency shall be considered the primary testing agency.

# PART 2 - PRODUCTS – Not Used

# PART 3 - EXECUTION

# 3.01 <u>CAST-IN-PLACE CONCRETE</u>

- A. The Contractor shall provide the following notifications to the Resident Engineer, Design Engineer, and Independent Testing Laboratory with respect to upcoming concrete placements:
  - 1. A weekly notification of planned concrete placements.
  - 2. Notification of specific placements a minimum of 24 hours in advance.
  - 3. Notification of any request for additional sample collection and testing a minimum of 24 hours in advance. The District shall have the option to observe the additional testing, at its discretion.
- B. Obtain one composite sample for each day's pour of each concrete mix exceeding 5 CY, but less than 25 CY, plus one set for each additional 50 CY or fraction thereof. Measurements shall be taken not less than once per day. Each composite sample shall consist of six (6) standard test cylinder samples (6" x 12").
- C. Perform compressive strength tests per ASTM C39; Test 2 cylinders at 7 days; 2 cylinders at 28 days. Hold one cylinder for later testing. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at age indicated. One average for lab cured specimens and a separate average for field cured specimens. Two remaining cylinders shall be retained until notified by the District of approval for disposal.
- D. Perform one slump test at the point of placement for each composite sample, but not less than one test for each day's pour of each concrete mix. Perform additional tests when concrete consistency appears to change. If applicable, perform slump and air entrainment tests before addition of High Range Water Reducer (when the high range water reducer is added on site) and slump and air entrainment tests after addition of High Range Water Reducer (all concrete).
- E. Perform one air content test for each composite sample, but not less than one test for each day's pour of each concrete mix. Air content test shall be per ASTM C231, pressure method, for normal-weight concrete, and per ASTM C173, volumetric method, for structural lightweight concrete.
- F. Sample concrete for testing of air and slump at the discharge end of the truck. When concrete is pumped, concrete taken for test cylinders shall be at the discharge end of the pump hose. All concrete sampled for testing shall be taken from the beginning of the concrete truck discharge. No concrete shall be placed until the testing is complete. All concrete sampled for casting of cylinders shall be taken from the middle third of the concrete truck discharge.
- G. Perform Concrete Temperature testing per ASTM C1064; one test hourly when air temperature is 40° F and below and when 80° F and above, and one test for each

composite sample.

- H. Perform Unit Weight testing per ASTM C567, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.
- I. Perform strength, slump and air entrainment tests at other times when directed by the Resident Engineer.
- J. Additional testing and sampling required as a result of deficient results or improper curing shall be paid for by the Contractor.
- K. Contractor shall provide and maintain an insulated, heated concrete cylinder curing box, 4 foot square minimum, with a min.-max. thermometer and maintain the temperature between 60°F and 80°F. Contractor to coordinate the location and specific details of the curing box with the Resident Engineer and Independent Testing Laboratory and Resident Engineer.
- L. Contractor shall provide access to the site at all times for the Independent Testing Laboratory Personnel.
- M. Test results shall be reported in writing to the District, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-and 28-day tests.

# 3.02 <u>ADDITIONAL TESTS</u>

- A. Independent Testing Laboratory shall provide additional testing of in-place concrete as directed by Resident Engineer due to non-compliance or considered substandard. Additional tests may consist of non-destructive testing, cores drilled from the area in question or load tests. Costs of additional testing will be paid by the Contractor.
- B. When the concrete strength is substandard as defined in Specification 03300 Section 3.11 paragraph A, concrete core specimens shall be obtained and tested from the affected area.
  - 1. Three (3) cores shall be taken for each sample in which the strength requirements were not met. The drilled cores shall be obtained and tested in conformance with ASTM C 42 "Method of Obtaining and Testing Drilled Cores and Sawed Beams of Concrete".
- C. Field cured cylinders may be cast and tested by the Independent Testing Laboratory at the request of the Contractor. The costs of these tests shall be borne by the Contractor. If the field cured cylinders are cast and tested prior to 28-days to determine the in-place concrete strength in order to facilitate an accelerated schedule for subsequent concrete placements, or backfilling the following criteria must be met:

- 1. The Contractor shall notify the Resident Engineer and Independent Testing Laboratory 48 hours in advance of the concrete placement. The Resident Engineer will determine at that point if the results of the field cured cylinders may be used to determine the in-place concrete strength. The Contractor shall notify the Resident Engineer as to when the field cured cylinders will be tested and for what purpose.
- 2. A minimum of 2 cylinders shall be cast for each separate test the Contractor requests. A test consisting of at least two cylinders will be required to be considered valid.
- 3. The field cured cylinders shall be left in the field and located such that they are exposed to the identical environmental conditions as the concrete structure. The cylinders shall remain at this location a minimum of 14 days prior to testing.
- 4. The Resident Engineer shall determine if the strengths indicated by the field cured cylinder tests are adequate for their intended purpose.
- D. The Resident Engineer or Contractor shall reject concrete delivered without a complete concrete delivery batch ticket as specified. Copies of the signed batch ticket will be furnished by the concrete supplier to the Contractor and the Resident Engineer. The Resident Engineer and Contractor shall inspect the concrete transit truck's barrel revolution counter and gauge for measuring water added to the concrete. The Resident Engineer or Contractor shall reject concrete which exceeds the maximum barrel revolution of 300 or which has had water added during transit. The Resident Engineer or Contractor shall reject concrete exceeding specified time limitations. Concrete not conforming to these Specifications shall be rejected by the Contractor or the Resident Engineer before discharging into the forms.
- E. Load Testing
  - 1. Should the compression test of the cores taken from the structure fail to be in compliance with these Specifications, the CONTRACTOR will be directed by the District to conduct a load test of the structure in conformance with ACI 318 under the direction of the Contractor's laboratory testing firm. Should the load test fail, the structure shall be removed from the site and replaced. All tests associated with the load testing and removal and replacement of the structure will be by the Contractor, at no cost to the District.

# PART 4 – MEASURMENT AND PAYMENT

No measurement shall be made of any work performed under this section. No separate payment shall be made for any work performed under this section. The cost of any work done, or facilities provided under this section is incidental to the work shall be included under other bid items within the Contract.

#### \* \* \* END OF SECTION \* \* \*

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### SECTION 03348 PATTERNED CONCRETE FACING

#### PART 1 GENERAL

#### 1.01 <u>SECTION INCLUDES</u>

Construction of textured and colored formed concrete surfaces using simulated stone masonry molds and color stain system designed to duplicate closely the appearance of the existing stone masonry at the dam.

#### 1.02 <u>RELATED SECTIONS</u>

Section 03300 - Cast-in-place Concrete: Cast-in-place concrete, concrete reinforcements, accessories, curing, and form work. Quality standards specified in Section 03300 shall apply to concrete used for this Section.

#### 1.03 <u>REFERENCES</u>

- A. ACI 305R-99 Hot Weather Concreting
- B. ACI 306.1-90 Standard Specification for Cold Weather Concreting
- C. ACI 308R-01- Guide to Curing Concrete
- D. ACI 350-06 -Code Requirements Environmental Engineering Concrete Structures
- E. ASTM C1602/C1602M-06 Specification for Mixing Water Used in the Production of Hydraulic Cement Production

#### 1.04 <u>DESIGN REQUIREMENTS</u>

- A. Design and pattern of the concrete surface of the reinforced concrete cap and concrete training/retaining/parapet walls shall match the natural stone surface of the existing stone masonry dam as closely as possible. Patterning of simulated stone masonry shall appear natural and non-repeating.
- B. The extent of the patterned concrete shall include the following:
  - 1. Upstream and downstream faces of the concrete cap at the top of the non-overflow portion of the dam.
  - 2. Reservoir and landside face of the eastern training/parapet walls
  - 3. Downstream face of the east abutment stair retaining wall.
- C. The patterned concrete shall begin 8-inches below the top of the walls and cap (See Detail 6, Sheet S4), and extend to the limits described for each location:
  - 1. To 3" above the bottom of the concrete cap at the top of the non-overflow portion of the dam.

- 2. To 12" below finished grade at the reservoir and landside faces of the eastern training/parapet walls (or top of footing, if at/above grade)
- 3. To the top of footing at the downstream face of the east abutment stair retaining wall.
- D. The top of the walls shall not be patterned. Seam lines or match lines caused from two of more molds coming together will not be apparent when viewing final wall. Final coloration of cast stone concrete surface shall accurately simulate the appearance of real stone to the satisfaction of the District, including the one or multiple colors, shades, flecking, and veining that is apparent in real stone. It shall also demonstrate the colors that may be apparent from aging, such as staining from oxidation, rusting and/or organic staining from soil and /or vegetation. Note that in part 1, SUBMITTAL and part 3, EXECUTION, a sample and mockup are required. Upon approval by Resident Engineer, mockup shall serve as quality standard for the project.

## 1.05 <u>SUBMITTAL</u>

- A. Manufacture Name and Product Information.
- B. Color Photographs of potential patterns and colors for preliminary approval.
- C. Sample Panel: Within 14 days of receiving the general contract, General Contractor is required to submit a 24" x 24" sample of the simulated stone masonry finish as per the pattern preliminarily accepted by the District. Sample is to demonstrate the finish described in section 1.04, DESIGN REQUIREMENTS: Approval of sample panel is required by the Resident Engineer.
- D. Shop Drawings: Plan, elevation, and details to show overall pattern, joint locations, form tie locations, and end, edge, and other special conditions.
- E. Samples: Form ties, sample, and description, showing method of separation when forms are removed.

## 1.06 <u>QUALITY ASSURANCE</u>

- A. Manufacturer of simulated stone masonry molds and custom coloring system: Five years' experience making stone masonry molds and color stains to create formed concrete surfaces to match natural stone shapes, surface textures, and colors.
- B. Pre-Installation Meeting: Schedule a conference with manufacturer representative to assure understanding of simulated stone masonry, molds use, color application, requirements for construction of mockup, and to coordinate the work.

#### 1.07 <u>PROJECT CONDITIONS</u>

Environmental requirements: Apply color stain when ambient temperatures are between 50- and 100-degrees F. Consult manufacturer if conditions differ from this requirement.

## 1.08 <u>SEQUENCING</u>

Schedule color stain application with earthwork and back-filling of any wall areas. Delay adjacent

plantings until color application is completed. Coordinate work to permit coloring applications without interference from other trades.

## PART 2 PRODUCTS

#### 2.01 <u>MANUFACTURERS</u>

Acceptable Manufacturers for formliner systems include:

- A. Custom Rock® Concrete Wall System, Custom Rock, St. Paul, Minnesota 55116, phone (651) 699-1345.
- B. Creative Formliners, 3411 Windom Rd, Brentwood Maryland 20722, phone (301) 864-3676.

Or equal, as approved by the District.

## 2.02 <u>MATERIALS</u>

- A. Simulated masonry molds: Reusable and easily attachable to forms. Molds shall not compress more than 1/4 in. when concrete is poured at rate of 10 vertical feet per hour. Molds shall be removable without causing deterioration of surface or underlying concrete.
- B. It is anticipated that the wall mold pattern shall be "New England Drystack" by Custom Rock, "ASH001: Ashlar Series Worn Stone" by Creative Formliners, or equivalent. **The Contractor shall confirm the mold pattern matches the existing dam**. The District shall be the sole judge of the appropriateness of the pattern and color scheme.
- C. Release Agent: NSF 61 approved (non-toxic/drinking water safe) and compatible with simulated stone masonry molds and with color stain system to be applied to surface. Consult manufacturer.
- D. Form ties: Shall be made of either metal or fiberglass. Metal ties, which result in a portion of the tie permanently embedded in the concrete, shall be designed to separate at least one inch back from finished surface, leaving only a neat hole that can be plugged with patching material. Contractor shall submit the type of form ties to the Resident Engineer for approval prior to use in this work,
- E. Mortar Joints: Joints shall be colored to simulate the existing mortar, or the new mortar used for repointing areas of the downstream masonry per Section 04400.
- F. Color stain: Special stain mix as provided by manufacturer, shall achieve color variations present in the natural stone being simulated for this project, as referenced in section 1.04 DESIGN REQUIREMENTS. Stain shall create a surface finish that is breathable (allowing water vapor transmission), and that resists deterioration from water, acid, alkali, fungi, sunlight, or weathering. Stain mix shall be a waterborne, low V.O.C. material, less than 180 grams/liter.

## PART 3 EXECUTION

#### 3.01 <u>ACCEPTABLE INSTALLERS</u>

Formed concrete construction: five years' experience pouring vertically formed architectural concrete. Installer shall be trained in manufacturer's special techniques in order to achieve realistic surfaces, including color stain system application.

### 3.02 <u>CONSTRUCTION</u>

Mockup: Build on site 14 days before work starts, using same materials, methods and work force that will be used for the project. Resident Engineer will determine specific requirements and location, and whether mockup shall be incorporated into the project.

- A. Size: 50 sq. ft., or larger, if needed to adequately illustrate the pattern and texture selected. Mockup shall include finishing detail(s) at top and bottom of walls/pattern.
- B. Include an area to demonstrate wall mold butt joint and if appropriate, continuation of pattern through expansion joint.
- C. After concrete work on mockup is completed and cured for a minimum of 28 days, and after surface is determined to be acceptable for coloring, apply color stain system.
- D. After coloring is determined to be acceptable by the Resident Engineer, construction of project may proceed, using mockup as quality standard.

### 3.03 SPECIAL TECHNIQUES - FORMING TEXTURED CONCRETE

- A. Simulated Stone Masonry Molds preparation: Clean and make free of buildup prior to each pour. Inspect for blemishes or tears. Repair if needed following manufacturer's recommendations.
- B. Simulated Stone Masonry Molds attachments: Place stone molds with less than 1/4-inch separation between them. Attach molds to form securely following manufacturer's recommendations.
- C. Form release agent: Apply following manufacturers' recommendations.
- D. Form stripping and related construction shall avoid creating defects in finished surface.
- E. If the pattern selected has molds connecting through the middle of the stones, carefully remove the seam line created by abutting molds. Match the texture and shape of the surrounding stone, avoiding visible seams or mold marks.
- F. Place form ties at thinnest points of molds (high points of finished wall). Neatly patch the remaining hole after disengaging the protruding portion of the tie so that it will not be visible after coloring the concrete surface.

G. Where an expansion joint must occur at a point other than at mortar or rustication joints, such as at the face of concrete texture, which is to have the appearance of stone, consult manufacturer for proper treatment of expansion material.

## 3.04 <u>SPECIAL TECHNIQUES - APPLYING COLOR STAIN SYSTEM.</u>

- A. All Simulated Stone surfaces that are to be stained shall be at least 30 days old.
- B. Clean surface prior to application of stain materials to assure that surface is free of latency, dirt, dust, grease, efflorescence, paint, or other foreign material, following manufacturer's instructions for surface preparation. Do not sandblast. Preferred method to remove latency is pressure washing with water, minimum 3,000 psi (a rate of three to four gallons per minute), using fan nozzle perpendicular to and at a distance of one or two feet from surface. Completed surface shall be free of blemishes, discoloration, surface voids, and unnatural form marks.

#### 3.05 <u>PROTECTION</u>

Where exposed soil is adjacent which may spatter dirt or soil from rainfall, or where surface may be subject to over spray from other processes, provide temporary cover of completed work.

# PART 4 - MEASUREMENT AND PAYMENT

Refer to Section 01950 – Measurement and Payment for the measurement and payment items related to this Section.

# \* \* \* END OF SECTION \* \* \*

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### SECTION 04400 RESTORATION OF MASONRY

## PART 1 - GENERAL

### 1.01 <u>DESCRIPTION</u>

- A. The Work of this Section shall be to supply all materials, equipment, labor, and incidentals necessary to restore existing masonry structures.
- B. The existing masonry structures which shall require repair include:
  - 1. Downstream face of Dam and Spillway.
  - 2. Selected upstream areas of Dam.
  - 3. Left and Right Spillway Training Walls.
- C. The types of restoration expected shall include:
  - 1. Limited cleaning and removal of vegetation from block faces and joints.
  - 2. Resetting of loose stone masonry blocks.
  - 3. Repointing of stone masonry.
- D. The intent of the restoration work is to improve the stability and durability of the existing masonry structures where these have been observed to be displaced and deteriorated
- E. The Contractor is advised of the historical nature of the dam. All masonry joint repointing and restoration shall be done with such materials and in such a manner as to create a neat, clean, and visually attractive appearance for the masonry without damaging the stone masonry. Skilled masons shall be employed for all finishing work.
- F. The extent of restoration shall be determined by the District. The "base scope" of this work is intended to encompass only the area of historic seepage on the western 1/3 of the downstream face. The "additional" (contingency) scope of this work shall cover all other portions of the stone masonry which are to remain.
- G. The work of this Section shall specifically include, but not be limited to, all necessary provisions for
  - 1. Safe access to the work areas, including scaffolding other such methods.
  - 2. Cleaning of the stone masonry and masonry joints. Cleaning is intended to remove soil, biological material and vegetation, deteriorated mortar and loose masonry and thus assist in proper repair work. General cleaning of the existing stone masonry is not required or desired.

- 3. Replacement of missing stones using stone masonry salvaged from portions of walls removed under other work of the Contract
- 4. Repointing and restoring of any remaining exposed masonry joints on the structure.
- 5. Post-repointing removal and cleaning of any grout or mortar spills onto the face of the masonry stones.

## 1.02 <u>SCOPE OF WORK</u>

The Scope of this Work under the Pay Item for this Stone Masonry Restoration shall include furnishing of all labor, equipment, supplies, materials, and utilities required to clean, as needed, repair, and repoint existing masonry in such a manner as to improve its stability and durability. Cleaning shall include removal of soil and organic matter from portions of the masonry where repairs are required, including all joints, and the raking of loose, deteriorated, and old mortar from all joints. Repairs shall include physically replacing missing masonry blocks using salvaged stone. Resetting may require cutting of masonry blocks to permit resetting without disturbing adjacent blocks. Repointing of all joints shall involve the replacement of surface mortar in all stone masonry joints in indicated areas.

### 1.03 <u>RELATED WORK</u>

The following is a list of related work items that shall be performed or furnished under other sections of these specifications as indicated:

- A. Pre- and Post-Construction Surveys see Section 01436
- B. Temporary Facilities and Controls see Section 01500
- C. Site Protection and Restoration see Section 01740
- D. Concrete see Section 000

## 1.04 <u>SAFETY AND ACCESS</u>

The Contractor shall be responsible for the provision of access to the work area and safe working conditions in accordance with the Contractor's Site-Specific Safety Plan and all local, state, and Federal safety codes.

#### 1.05 <u>SUBMITTALS</u>

Not less than ten (10) working days prior to the scheduled start of work, the Contractor shall submit information on the following items to the Engineer for review:

- A. All materials to be used for the work of this section, including mortars and grouts. Materials previously submitted under other Section may be referenced.
- B. A schedule for the execution of the work.

- C. An access plan showing the proposed method of providing a safe and stable working platform for the site.
- D. A diagram showing locations for the various work items (repointing, grouting, resetting)
- E. A description of the methods and procedures for removing old mortar from joints, preparing joints for repointing mortar, and installing repointing mortar.
- F. Names and qualifications of masons who will execute the work.

## 1.06 QUALITY ASSURANCE

- A. The Masons performing the repointing shall have a minimum of three (3) years of experience in repointing masonry and shall have performed at least five (5) projects repointing masonry structures within the last five years.
- B. Obtain mortar mix materials from a single manufacturer for each different product required. Comply with manufacturers' recommended procedures.
- C. Mock-Up: Before starting work, prepare and repoint a sample area of not less than 10 feet high and 10 feet long using the procedures, proposed colors and texture, finish, and workmanship for approval by the District. The test section shall be located in the western 1/3 of the downstream face, at a location to be selected by the District. The Contractor shall NOT perform any additional re-pointing until the District has approved the sample section. If the District does not approve the sample section, the Contractor's masons shall make appropriate adjustments and prepare a new sample section.

### 1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to project site in original unopened containers or bundles with labels informing about manufacturer, product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions for multi-component materials.
- B. Store and handle materials in compliance with manufacturers' recommendations to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

#### 1.06 <u>PROJECT CONDITIONS</u>

- A. Do not proceed with installation of any mortar products when ambient and substrate temperature conditions are outside the limits permitted by mortar/grout manufacturer of below 40 degrees Fahrenheit (4.4 degrees Celsius).
- B. Do not proceed with installation of mortar or joint grout until contaminants capable of interfering with their adhesion are removed from joint substrate.

#### PART 2 - PRODUCTS

# 2.01 PORTLAND CEMENT MORTAR PRODUCTS:

Mortar for use in re-pointing of joints shall be a Portland cement-based material.

A. General Re-Pointing Portland Cement Mortar

Standard Portland Cement Mortar shall be Type N in general conformance with ASTM C270, Specification for Mortar for Unit Masonry. The mortar mix shall be submitted to and approved of by the Engineer. Minimum 28-day compressive strength shall be 750 psi as per ASTM C-109 Modified. Materials shall be as follows:

- 1. <u>Portland Cement:</u> ASTM C150 Type I/II or Type II, grey or white as required to match original mortar. Fly ash, slag and pozzolans are not permitted as substitutes for Portland cement.
- 2. <u>Hydrated Lime:</u> ASTM C207 Type S, incorporated as a finely divided powder in uniform particle size, free of lumps, flakes, or other inconsistencies.
- 3. <u>Mortar Aggregate</u>: ASTM C144 Natural sand blend, rounded to sub-angular in shape, washed, screened, and dried, with zero- or near zero-270 crystalline silica content. Aggregate to be selected to match the color and texture of the original mortar aggregates as closely as possible while remaining in compliance with ASTM C144 grading and soundness requirements.
- 4. <u>Mortar Colors</u>: Inorganic mineral oxides meeting the requirements of ASTM C797, at levels not to exceed 10% on cement weight, except for carbon black, which may not exceed 2% on cement weight.
- 5. <u>Admixtures</u>: NO admixtures shall be used without the express written consent of the Engineer and the mortar manufacturer. Calcium chloride is not permitted in any mortar. Admixtures containing more than 0.1% chloride ions are NOT permitted.
- B. General Repair Mortar Products

Products in the SikaRepair line of repair mortars, as manufactured by Sika Corporation, Lyndhurst, New Jersey, are considered to conform to the requirements of the specification.

C. Instant-Setting Portland Cement Water-Stop:

SikaSet Plug, as manufactured by Sika Corporation, Lyndhurst, New Jersey, is considered to conform to the requirements of the specification and have performed satisfactorily for rapid concrete repairs for a minimum of ten years. If necessary, this type of mortar may be used where water is present.

## 2.02 WATER

The water used in the re-pointing/repair work shall be potable, fresh, clean, and free from deleterious materials. Water from the Reservoir or Fall Brook is not considered suitable for use and therefore shall not be used in the repointing work.

## 2.03 MISCELLANEOUS MATERIALS

Provide backer material for modified repointed masonry joints, which prevents three-sided adhesion, and controls sealant depth.

#### 2.04 CLEANING SOLUTIONS

Cleaning solutions, if used, shall be non-toxic and drinking water safe.

# PART 3 – EXECUTION

#### 3.01 <u>GENERAL</u>

- A. Repair any damage to masonry walls caused by the Contractor's operation at no additional cost to the District.
- B. Removal and re-setting of stone masonry blocks is prohibited, unless approved by the District.
- C. The Contractor shall be responsible for maintaining a safe, clean, and accessible work site at all times.
- D. All OSHA requirements, and all applicable local environmental requirements, and CTDEEP permit conditions shall be satisfied.
- E. Acceptable appearance of repointing work shall be confirmed by the District on the basis of its inspection of the Sample Section prepared by the Contractor's masons. The sample section shall be prepared prior to repointing of the rest of the masonry. Provide the District up to 48 hours to inspect and approve the sample section work.

#### 3.02 EXAMINATION AND PREPARATION OF AREA

- A. Examine missing, deteriorated, or displaced masonry and joints on the masonry structures to determine which repairs will be necessary. Consult with District for final extents of the work.
- B. Clean all vegetation, soil deposits, and loose/unsound grout substrate by mechanical means from all exposed surfaces of stone masonry. Remove mortar using hand or power tools compatible with the stone masonry units. Select equipment and methods that will not damage or change the appearance of the stone masonry units.

- C. Exposed surfaces where masonry must be repaired or are within and/or adjacent to joints which must be repointed shall be inspected and cleaned of all vegetation, deposits, sediment, loose substrate, and any other deleterious material by use of high pressure waterblast, high pressure air, and/or with hand tools such as hammer and/or brush. No sandblasting or chemicals which could pollute the adjacent waterbodies or wetland resources shall be used in cleaning.
- D. Barriers should be constructed to collect debris and water for disposal and to minimize the effects of infiltration into the upstream and downstream waterways, and procedures shall be taken to minimize contamination of these waterways due to cleaning procedures. After cleaning, all masonry should be inspected for previously obscured deficiencies.
- E. Cleaning and refinishing of exposed masonry surfaces shall be undertaken such that a uniform appearance results without damaging the stone masonry. Cleaning is only intended to provide for appropriate surface conditions to facilitate repairs and repointing and enhancing mortar bonding. General cleaning of the entire exposed surface of the masonry is not intended.

# 3.03 MORTAR MIXING

- A. Measure mortar materials to achieve consistent mix proportions, yields, workability, and color from batch to batch. Measurement shall be by volume or equivalent weight; do not measure by shovel.
- B. Mix and pre-hydrate mortar materials in accordance with the appendix to ASTM C270 for tuck pointing mortar.
- C. Retemper mortar as needed. Discard unused mortar 2-1/2 hours after initial mixing.

#### 3.04 MASONRY RESETTING

- A. If areas are discovered where masonry has been significantly displaced or stones are physically missing, the masonry blocks shall physically be reset. Displaced masonry shall be removed until only firm and stable masonry remains and then replaced. Missing masonry stones shall be replaced using stone salvaged from dismantled portions of the wall. The Contractor shall cut stones as necessary to fit gaps in the wall.
- B. In locations where displaced blocks to be reset are below other stable blocks, the displaced block shall be cut out to avoid disturbing adjoining masonry.
- C. Provide full mortar bedding and joints for reset blocks.

## 3.05 <u>MASONRY REPOINTING</u>

A. Rake and clean out or remove any deteriorated or loose mortar, stone, or foreign material which would interfere with the repointing. <u>Rake joints to a minimum</u> depth of 2.5 times the width of the joint. Do not rake more than 1/3 of the total depth of the joint.

- B. Clean out joints immediately before installing mortar to comply with recommendations of mortar manufacturers. Remove dust and debris from the joints to a clean surface to allow for mortar adhesion. Dampen joints to be pointed. Allow masonry units to absorb surface water and remove standing water from the joints.
- C. Do not repoint mortar joints unless the ambient air temperature is between 40 and 90 deg F and will remain so for at least 48 hours after completion of the work. Protect freshly placed mortar from freezing or rapid surface drying.
- D. Tightly pack mortar into joints in layers as required to control shrinkage. The joint shall be a minimum of <sup>3</sup>/<sub>4</sub>" thick, placed in maximum <sup>1</sup>/<sub>4</sub>-inch thick layers. Allow each layer to become "thumbprint hard" before applying the next layer.
- E. Install modified repointed masonry joints (i.e., with an appropriate backer material) where existing mortar is unsound or non-existent for a depth of two inches (2") or greater from the face of the masonry block, or as directed by the Engineer.
- F. After the final layer becomes "thumbprint hard," tool the joints to match the original joints.
- G. After initial set, brush area to remove residual mortar or laitance. Do NOT leave mortar residue or stains on masonry face.

### 3.05 CURING, CLEANING, AND SITE RESTORATION

- A. Cure mortar joints and bedding with water for minimum of 72 hours, or as directed by the mortar manufacturer. Protect from heat, cold, and water action while curing.
- B. Clean excess mortar from joints and clean exposed stone surfaces on completion. Remove mortar droppings, dust, and other foreign substances from masonry surfaces.
- C. Remove equipment, materials, and debris from downstream area. Restore downstream area in accordance with Section 01740.

# PART 4 - MEASUREMENT AND PAYMENT

Refer to Section 01950 – Measurement and Payment for the measurement and payment items related to this Section.

# \* \* \* END OF SECTION \* \* \*

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## SECTION 05500 METAL FABRICATIONS

### PART 1 - GENERAL

#### 1.01 <u>SECTION INCLUDES</u>

- A. Construction maintenance access brackets
- B. Structural steel shapes
- C. Hatches
- D. Fasteners (concrete anchors and bolts)
- E. Surface preparation, shop coatings and galvanizing

#### 1.02 PRODUCTS FURNISHED BUT NOT INSTALLED UNDER THIS SECTION

A. Anchor Rods

#### 1.03 PRODUCTS NOT FURNISHED OR INSTALLED UNDER THIS SECTION

- A. Pedestrian Rail Section 05501
- B. Aluminum Handrails Section 05730

#### 1.04 <u>RELATED SECTIONS</u>

- A. Section 01300 Submittals
- B. Section 03300 Cast-in-Place Concrete
- C. Pedestrian Rail
- D. Prefabricated Bridges
- E. Aluminum Handrails

### 1.05 <u>REFERENCES</u>

- A. ASTM A36/A36-05 Specification for Carbon Structural Steel
- B. ASTM A48/A48M-03 Specification for Gray Iron Castings
- C. ASTM A53/A53M-07 Specification for Pipe, Steel, Black and Hot-dipped Zinc-coated welded and Seamless,
- D. ASTM A123/A123M-02 Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron & Steel Products
- E. ASTM A153/A153M-05 Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
- F. ASTM A276-06 Specification for Stainless Steel Bars and Shapes
- G. ASTM A307-07b Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength

- H. ASTM A325-07a Specification for Structural Bolts, Steel, Heat treated 120/105 KSI minimum Tensile Strength
- I. ASTM A490-02 08a Specifications for Heat-Treated Steel Structural Bolts, 150KSI Minimum Tensile Strength
- J. ASTM A500-07 Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
- K. ASTM A563-07a Specification for Carbon and Alloy Steel Nuts.
- L. ASTM A992/A992M-06a Standard Specification for Steel for Structural Shapes for Use in Building Framing
- M. ASTM A1011/A1011M-07 Specification for Steel, Sheet, and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low Alloy, and High Strength Low Alloy with Improved Formability, and Ultra-High Strength
- N. ASTM B209-07 Specification for Aluminum and Aluminum Alloy Sheet & Plate
- O. ASTM B221-06 Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles and Tubes
- P. ASTM B308/B308M-02 Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles
- Q. ASTM B429-06 Specification for Aluminum-Alloy Extruded Structural Pipe and Tube
- R. ASTM C881/C881M-02 Specification for Epoxy-Resin-Base Bonding Systems for Concrete
- S. ASTM F436-07a Specification for Hardened Steel Washers
- T. ASTM F593-02e2 Specification for Stainless Steel Bolts, Hex Cap Screws and Studs
- U. ASTM F594-02 Specification for Stainless Steel Nuts
- V. ASTM F1554-07a Specification for Anchor Bolts, Steel 36, 55 and 105 KSI Yield Strength
- W. SSPC Steel Structures Painting Council
- X. SSPC-SP1 Solvent Cleaning
- Y. SSPC-SP2 Hand Tool Cleaning
- Z. SSPC-SP3 Power Tool Cleaning
- AA. SSPC-SP4 Flame Cleaning of New Steel
- BB. SSPC-SP5 White Metal Blast Cleaning
- CC. SSPC-SP6 Commercial Blast Cleaning
- DD. SSPC-SP7 Brush Off Blast Cleaning
- EE. SSPC-SP8 Pickling
- FF. SSPC-SP10 Near-White Blast Cleaning
- GG. Designation System for Aluminum Finishes Aluminum Association

- HH. Aluminum Design Manual (2005) Aluminum Association
- II. Aluminum Standards And Data (2006) Aluminum Association
- JJ. Manual of Steel Construction (13th Edition) American Institute of Steel Construction (AISC)
- KK. AWS D1.1/D1.1M-2006 Structural Welding Code-Steel American Welding Society
- LL. AWS D1.2/D1.21M-2003 Structural Welding Code-Aluminum American Welding Society,
- MM. Standard Amp 510-92 Metal Stairs Manual (5th Edition) National Association of Architectural Metal Manufacturers (NAAMM)

#### 1.06 <u>SUBMITTALS</u>

- A. Submit complete shop drawings showing fabrication, welding, connections, erection, finishes, materials, and dimensions including plans, elevations, sections and details of all metal fabrications and connections and location of item in structure. Photocopies of Contract Drawings, in whole or part, will not be accepted as shop drawings.
- B. Submit product data in accordance with the provisions of Section 01300.
- C. Submit design computations when required.
- D. Submit Railing Test Reports meeting OSHA requirements, standard details and manufacturer's installation instructions when requested by the Resident Engineer.
- E. Submit samples indicating surface quality, welding and finish when requested by the Engineer.
- F. Submit certification from galvanizer stating that galvanizing is in accordance with Specifications.
- G. Submit certification for each welder stating the type of welding and positions qualified for, the code and procedure qualified under, date qualified, and the firm and individual certifying the qualification tests. If the qualification date of the welding operator is more than one-year old, the welding operator's qualification certificates shall be accompanied by a current certificate by the welder attesting to the fact that he has been engaged in welding since the date of certification, with no break in welding service greater than 6 months.

#### 1.07 <u>QUALITY ASSURANCE</u>

- A. Conform to AISC Manual of Steel Construction for the design, fabrication and erection of structural steel.
- B. Conform to AWS Structural Welding Code Steel for welding of structural steel.
- C. Conform to the Aluminum Design Manual for the design, fabrication, and erection of structural aluminum.
- D. Conform to AWS Structural Welding Code Aluminum for welding of structural aluminum.

#### 1.08 <u>COORDINATION</u>

- A. The Contractor shall coordinate with the work of other Sections. Verify at the site both the dimensions and the work of other trades adjoining items before fabrication and installation of items herein specified.
- B. Furnish to the pertinent trades all items included under this Section that are to be built into the work of other Sections.

#### 1.09 FIELD MEASUREMENTS

A. Field measurements shall be taken at the site to verify, or supplement indicated dimensions and to insure proper fitting of all items.

#### 1.10 DELIVERY, STORAGE, HANDLING

- A. Coordinate delivery of products.
- B. Protect products from damage prior to and after installation.
- C. Remove damaged material from the site.

## **PART 2 - PRODUCTS**

#### 2.01 STRUCTURAL STEEL SHAPES

- A. Material:
  - 1. Wide flange beams ("W" Shapes)-ASTM A992 (Grade 50)
  - 2. Channels, angles, and other beams ("S" Shapes) ASTM A36 (Grade 36)
  - 3. Plates-ASTM A572 (Grade 50)
  - 4. Structural Steel Tubing: ASTM A500, Grade B
- B. Finish: Hot-Dipped Galvanized: ASTM A153

### 2.02 <u>MISCELLANEOUS STAINLESS-STEEL FABRICATIONS</u>

- A. Structural shapes, bolts, and fasteners
  - 1. Material: AISI Type 316
  - 2. Finish: Mill
- B. Bars, plates, and sheets
  - 1. Material: AISI Type 316
  - 2. Finish: Mill

# 2.03 MISCELLANEOUS FABRICATIONS

A. Includes other miscellaneous metal fabrications and assemblies shown on the Contract Drawings but not specified elsewhere.

- B. Aluminum:
  - 1. Material: Alloy 6061-T6 (ASTM B209)
  - 2. Finish: Mill
- C. Structural Steel Shapes and Plates:
  - 1. Material: Wide flange beams ("W" shapes) (ASTM A992) or angles and channels (ASTM A36)
  - 2. Finish: Hot-Dipped Galvanized (ASTM A123)
- C. Welded and Seamless Steel Pipe ASTM A53, Grade B
- D. Cold Formed Welded and Seamless Steel Tubing: ASTM A500, Grade B
- E. Stainless Steel Shapes: AISI Type 316.

# 2.04 <u>FASTENERS</u>

- A. Concrete anchorage:
  - 1. Epoxy Anchors. ASTM C881. Non-expanding two component epoxy resin with AISC Type 316 Stainless Steel threaded rod with washer and nut. HIT RE500 by Hilti Fastening Systems; Chemset Capsule Series by Ramset Fastening Systems, or equivalent.
  - 2. Expansion Anchors Stainless steel AISI Type 316 for galvanized and aluminum fabrications; cadmium plated for painted steel fabrications. Kwik-Bolt III by Hilti Fastening Systems or Tru Bolt Stud Anchor by Ramset Fastening System or equivalent.
  - 3. Anchor Rods
    - a. Material: ASTM F1554 Grade 55
    - b. Finish: Hot-Dipped Galvanized ASTM A153
- B. Bolted Joints:
  - 1. Aluminum Fabrications: Stainless Steel ASTM F593 & F594 Alloy Group 2 (Type 316)
  - 2. Steel Fabrications (specified in this Section):
    - a. ASTM A325 (Painted) for Painted Steel Fabrications
    - b. ASTM A325 (Hot-Dipped Galvanized: ASTM A153) for Hot Dipped Galvanized Steel Fabrications.
  - 3. Stainless Steel Fabrications: Stainless Steel ASTM F593& F594 Alloy Group 2 (Type 316).
- C. Provide all fasteners with nuts, flat washers, and lock washers of the same material as the anchors or bolts. Provide beveled washers for sloped surfaces.
- D. Provide a minimum of 2 fasteners per connection.

## PART 3 - EXECUTION

#### 3.01 <u>FABRICATION</u>

- A. All miscellaneous metal members shall fit closely together and shall be straight and true, and the finished work shall be free from burrs, bends, twists, and open joints.
- B. Tolerances:
  - 1. Squareness: 1/8-inch maximum difference in diagonal measurements.
  - 2. Maximum Offset between faces: 1/16 inch.
  - 3. Maximum misalignment of adjacent members: 1/16 inch.
  - 4. Maximum Bow: 1/8 inch in 48 inches.
  - 5. Maximum Deviation From Plane: 1/16 inch in 48 inches.
- C. All holes, angles, supports, and braces shall be provided as required.
- D. Except as otherwise indicated on the drawings, gusset plates shall have a minimum thickness of 3/8-inch.
- E. Holes shall be made in steel members for attachment of wood blocking, nailers, etc. Holes shall be sized to suit the fasteners indicated on the drawings: where size and spacing are not indicated, holes shall be 9/16-inch diameter, at 3 feet o.c.
- F. Sheared and flame cut edges shall be true to line and free from rough corners and projections.
- G. Re-entrant cuts/corners shall be filleted to a radius of not less than  $\frac{1}{2}$  inch.
- H. Holes shall be punched, subpunched and reamed, or drilled in accordance with AISC "Specifications for Structural Steel." Holes shall not be made by flame cutting.
- I. Holes shall be 1/16 inch larger than the nominal bolt diameter, except holes for cast-inplace anchor bolts which shall be 5/16 inch larger than the nominal bolt diameter and as otherwise shown on the Drawings.
- J. The use of oversize or slotted holes not shown on the Drawings shall be subject to prior review by the Engineer.
- K. Bent plate shall be in accordance with AISC "Minimum Radius for Bending."
- L. Welding shall be done in a sequence which minimizes distortion and shrinkage.
- M. Fabrication holes, notches, etc. not required by nor shown on the Drawings shall be subject to prior review by the Resident Engineer.

#### 3.02 CONNECTIONS (GENERAL)

- A. Connections shall consist of the following:
  - Steel Framing Connections: All steel framing connections not detailed on the Drawings shall be bolted connections designed by the fabricator subject to the provisions of the design drawings, specifications and the referenced AISC Specifications. All connections shall be designed to support one-half the total uniform load capacity of the framing member as shown in Table 3-6 of the AISC Manual of Steel Construction. All connections shall be either standard double angle connections from Table 10-1 or

standard shear plate connections from Table 10-9a of the AISC Manual of Steel Construction.

## 3.03 <u>CONNECTIONS (BOLTED)</u>

- A. "Snug-Tight" condition shall be defined as that tightness attained with a few impacts from an impact wrench or the full effort of an ironworker using an ordinary spud wrench to bring the connected elements into firm contact.
- B. Unfinished bolts shall conform to ASTM A307 and be tightened to a Snug-Tight condition. The nuts of all unfinished bolts shall be secured against loosening by denting the bolt threads with a chisel, or by other means reviewed and no exceptions taken by the Engineer.
- C. High strength steel bolted connections shall conform to the RCSC/AISC Specification for Structural Joints Using ASTM A325 or A490 Bolts. The connections shall be bearing type, unless noted otherwise on the drawings. Erector shall furnish with his proposal a full and detailed description of all installation and inspection procedures for high strength bolting.
- D. Epoxy anchors shall be tightened to 80% of the epoxy manufacturers recommended maximum torque using a calibrated torque wrench.
- E. High strength steel bolts and stainless-steel bolts shall be tightened to a Snug-Tight condition with either spud wrenches or pneumatic impact wrenches.
- F. All bolts shall have washers between the tightened element and the structural member. Beveled washers shall be used where flange slope exceeds 1:20.
- G. The sockets used to tighten high strength bolts shall score or mark the nuts so that nuts have been tightened can be easily identified. High strength bolts or nuts once tightened shall not be loosened then re-used. Care shall be taken not to damage the threads of high strength bolts during installation. Joints shall be properly aligned and drifted, and holes reamed, if required, to permit bolts to be slipped into place by hand. No burning is allowed for hole adjustment.

# 3.04 <u>CONNECTIONS (SHOP AND FIELD WELDING OF FERROUS METALS)</u>

- A. Welding shall be only for the connections and assemblages shown on the drawings or specified herein, and shall be performed in the shop, except where specifically noted to be done in the field.
- B. All welding shall be done only by certified welders using welding procedures and welding equipment. Welders employed on the work shall be experienced structural welders, previously qualified by tests as prescribed in the Structural Welding Code Steel using the base metals and electrodes specified herein.
- C. Welding materials and workmanship shall conform to the Structural Welding Code Steel. All welds shall be considered Prequalified if they conform to the Prequalified joints specified in Chapter 3 of the Structural Welding Code - Steel.
- D. Welding electrodes shall conform to the requirements of Structural Welding Code Steel and shall be the E70XX series.
- E. Welding shall be by the manual shielded metal-arc process. If the fabricator wishes to use other processes, full details of materials, equipment, and procedures shall be submitted to

and approved by the Engineer before any welding, other than as specified herein, is performed.

- F. All welds shall be free of undercut, unfilled craters, and cracks, and shall have smoothly faired contours. Flux and loose scale shall be be-removed from previous weld bead before succeeding bead is laid.
- G. All temporary (tack) welds shall meet all the specified requirements of the final welds. Tack welds that will be incorporated into the final weld shall be cleaned and thoroughly fused with final weld. Defective, cracked, or broken tack welds shall be removed before final welding. Tack welds not incorporated into the final weld shall be removed.
- H. No welding shall be performed during the following weather conditions:
  - 1. Ambient temperature in the immediate vicinity of the weld is below 0°F,
  - 2. If the welded surfaces are wet or are exposed to rain or snow,
  - 3. High wind velocity. A temporary wind shelter may be used in order to reduce the wind directly exposed to the weld to a maximum of 5 mph,
  - 4. Other inclement conditions that will hamper good workmanship.
- I. All welds shall be marked by either submitting written records that indicate the location of welds made by each welder or by identifying the welds with a number, letter or symbol that corresponds to the individual welders.
- J. Welds other than those indicated on the design drawings may be used only if reviewed and no exceptions are taken by the Engineer.
- K. When welding is unsatisfactory or indicates inferior workmanship as determined by the Engineer, corrective measures shall be required. Where requirements prescribe the removal of part of the weld or a portion of the base metal, such removal shall be by machining, grinding, chipping, or machining. All weld repairs shall be proposed by the General Contractor and reviewed by the Engineer with No Exceptions Taken. Defective or unsound welds shall be corrected either by removing and replacing the entire weld, or as follows:
  - 1. Overlap, excessive convexity or excessive reinforcement: Reduce to size by removal of excess weld metal.
  - 2. Cracks in weld or base metal: The extent of the crack shall be verified by acid etching, MT, or PT methods. The crack and sound metal 2 inches beyond each end of the crack shall be removed and rewelded.
  - 3. Excessive concavity of weld or crater, Undersize welds, Undercutting: Clean and deposit additional weld metal.
  - 4. Incomplete fusion, excessive weld porosity or slag inclusions: Remove and replace the defective portions of weld.
  - 5. Removal of adjacent base metal during welding: Clean and reform base metal full size by depositing additional weld metal.
  - 6. Base metals distorted from welding: Straighten by mechanical means or by application of a limited amount of localized heat.
- L. Where work performed subsequent to the making of a deficient weld has rendered the weld inaccessible or has caused new conditions which would make the correction of the deficiency dangerous or ineffective, the original conditions shall be restored by removal of

welds or members or both before making the necessary corrections, or else the deficiency shall be corrected by additional work according to a revised design approved by the Engineer.

M. In the event that faulty welding or its removal for rewelding, shall so damage the base metal that in the judgment of the Engineer its retention is not in accordance with the intent of the Drawings and Specifications, the Contractor shall remove and replace the damaged material at no additional cost to the Owner.

### 3.05 ERECTION AND INSTALLATION

- A. All unmatched holes in shop assembly of field connections shall be reamed and the pieces match marked before disassembly. Drift pins shall be used only for bringing members into position and not to enlarge or distort holes. Any piece weakened by reaming to compensate for eccentricity to a point where the strength of the joint is impaired shall be rejected and a new and satisfactory piece shall be provided by the Contractor at his own expense. Slotted holes and washers shall be provided for truing up steel requiring accurate alignment.
- B. Camber of beams and girders shall be that indicated on the Drawings. Where no camber is indicated, any minor camber resulting from rolling or shop assembly shall be upward.
- C. The use of a gas cutting torch in the field for correcting fabrication errors will not be permitted upon any primary member of the structural framing. The use of a gas cutting torch will be permitted only on secondary members, and then only after the review and no exceptions taken by the Engineer.
- D. Layout, locate, level and plumb items, to be installed. Coordinate items to be installed in substrates.
- E. Drill and otherwise prepare substrates for fastening. Install non-shrink grout as required.
- F. Coat surfaces of ferrous, non-ferrous metals including galvanized metals in contact with masonry, concrete, grout, or dissimilar metals with Polyamide Epoxy Primer.
- G. Splice pipe rails in field with internal sleeves fastened with set screws on one end and welded on other.
- H. Install railing in accordance with manufacturers recommendations.

## 3.06 <u>GALVANIZING</u>

- A. Blast clean to near white metal in accordance with SSPC-SP10.
- B. Hot dip galvanizes fabricated items in accordance with ASTM A123 and hardware items in accordance with ASTM A153.
- C. Assembled and non-assembled steel as indicated on Drawing shall be galvanized.
- D. Galvanize items after assembly when possible.
- E. Thickness of galvanizing shall be as specified in ASTM A123 and A153 except coating shall not be less than 2 oz. (3.3 mils) per square foot.
- F. Galvanizing shall provide a visually acceptable substrate for applied coatings and shall be free of lumps, globules, sharp edges, or heavy deposits which will interfere with intended use or an esthetic appearance of materials.
- G. After erection touch-up all damaged galvanized surfaces and field welds as follows:

- 1. Surfaces to be reconditioned with zinc-rich paint shall be clean, dry, and free of oil, grease, and corrosion.
- 2. Areas to be repaired shall be power disc sanded to bright metal. To ensure that a smooth reconditioned coating can be affected, surface preparation shall extend into the undamaged galvanized coating.
- 3. At galvanized surfaces, apply organic zinc repair paint complying with requirements of ASTM A780. Galvanizing repair paint shall have 65 percent zinc by weight.
- 4. The paint shall be spray applied in multiple coats until a dry film thickness of 4-6 mils minimum has been achieved. A finish coat of aluminum paint shall be applied to provide a color blend with the surrounding galvanizing.
- 5. Coating thickness shall be verified by measurements with a magnetic or electromagnetic gauge.
- 6. Acceptable Repair Paint:
  - a. ZIRP by Duncan Galvanizing.
  - b. Tneme Zinc by Tnemec.
  - c. Or equivalent.

#### 3.07 <u>SURFACE PREPARATION AND SHOP COATINGS</u>

- A. Provide Surface Preparation and Shop Coatings in accordance with specification Section 09905, except for areas which to be field welded shall be protected with a shop coat of linseed oil.
- B. Shop coats shall be compatible with and made by the same manufacturer as the field topcoats as specified in Section 09900. Contractor shall coordinate.
- C. After erection touch-up all abrasions and field welds with same material used on shop coating.

#### 3.08 <u>CLEANING</u>

A. Clean surfaces of all work of this section as well as the areas in the vicinity.

#### 3.09 <u>PROTECTION</u>

- A. Protect installed work.
- B. Protect from splatter or debris from adjacent construction.
- C. Protect work from excess construction loading.

# PART 4 - MEASUREMENT AND PAYMENT

Refer to Section 01950 – Measurement and Payment for the measurement and payment items related to this Section.

### \* \* \* END OF SECTION \* \* \*

 $J:\label{eq:scalar} J:\label{eq:scalar} 5501 DECORATIVE PEDESTRIAN RAIL

## PART 1 – GENERAL

#### 1.01 <u>SCOPE</u>

- A. The work of this section shall include all labor, materials, and all necessary accessory items to provide and install the Pedestrian Rail at the top of Grupes Reservoir Dam.
- B. Pedestrian Rails shall be installed at the locations shown on the plans. In general, Pedestrian rails shall be installed along the upstream and downstream edges of the top of dam.
- C. It is the intended that the decorative pedestrian railings be manufactured from similar materials as the pedestrian bridges and have an appearance matching the bridge railings.

## 1.02 <u>RELATED WORK</u>

- A. Carefully examine all of the Contract Documents for requirements which affect the work in this section. Other specification sections which directly relate to the work of this section include, but are not limited to, the following:
  - 1. Section 05500 Metal Fabrication
  - 5. Section 13125 Prefabricated Bridges

#### 1.03 <u>QUALITY ASSURANCE</u>

- A. The Contractor shall provide laborers and supervisors who are thoroughly familiar with the type of construction involved and the materials specified.
- B. The Pedestrian Rail Fabricator shall have at least 5 years of experience on similar projects. The Fabricator shall certify that the Pedestrian Rail conforms to all OSHA and ANSI requirements, along with those of the Contract Drawings and specifications.
- C. All welding shall be performed in accordance with AWS Dl.1.

#### 1.04 <u>REFERENCES</u>

- A. ASTM A307-07b Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength
- B. American Welding Society (AWS) AWS D1.1 Standard Welding Code Steel

## 1.05 <u>SUBMITTALS</u>

A. No less than two (2) weeks prior to placing the order for the material, submit complete shop drawings showing fabrication, welding, connections, erection, finishes, materials, and dimensions including plans, elevations, sections and details of all metal fabrications and connections and location of item in structure. Photocopies of Contract Drawings, in whole

or part, will not be accepted as shop drawings.

- B. Submit product information per Section 01300.
- C. Submit Railing Test Reports meeting OSHA requirements, standard details and manufacturer's installation instructions when requested by the Resident Engineer.
- D. Submit railing samples indicating surface quality, welding and finish when requested by the District or Resident Engineer.
- E. Submit certification for each welder stating the type of welding and positions qualified for, the code and procedure qualified under, date qualified, and the firm and individual certifying the qualification tests. If the qualification date of the welding operator is more than one-year old, the welding operator's qualification certificates shall be accompanied by a current certificate by the welder attesting to the fact that he has been engaged in welding since the date of certification, with no break in welding service greater than 6 months.
- F. Submit surface preparation and shop coats for the Pedestrian Rail.

## 1.06 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Pedestrian rail panels, gates, posts, and accessories shall be delivered to the construction site in packed cartons.
- B. Each package shall be identified and shall bear the name of manufacturer.
- C. Store all materials in a secure and dry area.

# PART 2 – PRODUCTS

#### 2.01 <u>SYSTEM DESCRIPTION</u>

A. The manufacturer shall apply a total ornamental steel fencing system of the style, strength, and color defined herein and on the Contract Plans for the pedestrian bridges. The system shall be a total package including all components; pickets, posts, stringers, gates, and hardware as required. A single manufacturer and style shall be used throughout the project.

#### 2.02 <u>MATERIALS</u>

- A. Steel material for the pedestrian rail shall be unpainted, weathering steel conforming to ASTM A847 and/or ASTM A588, A242, or A606.
- B. Posts shall be 4-inch square by 1/4" thick.
- C. All bolts, nuts and washers shall conform to ASTM A307.

## 2.03 FABRICATION

- A. Pickets, rails, and posts shall be pre-cut to specified lengths. Pedestrian Rail Panels shall be fabricated in 5-foot lengths and shall be 38-inches tall. Rail panels lengths and final post spacing shall design/installed to provide sufficient room for thermal expansion/contractions. Posts shall be 42 inches long Base plates shall be welded to the bottom of all posts. The top rail shall be flush with the top of the post. The bottom of the bottom rail shall be no more that 4-inches above the top of dam surface.
- B. The horizontal spacing of the safety rail bars shall match the pedestrian bridges. The transitions between separate sections of pedestrian rails shall have a seamless appearance.
- C. Allow for thermal action resulting from the maximum range (change) in ambient temperature in the design, fabrication, and installation of rail systems, to prevent opening of joints, buckling, and other detrimental effects, including overstressing of connections and components.
- D. Provide weep holes or other means to exit entrapped water from hollow sections of railing members exposed to exterior, condensation, or moisture from other sources.
- E. The finish and coloring of the pedestrian rails shall match the pedestrian bridges, as specified in Section 13125.

# PART 3 – EXECUTION

# 3.01 <u>PREPARATION</u>

A. All new installation shall be laid out by the Contractor in accordance with the construction plans.

#### 3.02 INSTALLATION

- A. Rail posts shall be set according as per the approved layout plan, plus or minus 1/2". Maximum post center to center dimension shall be as per the manufacturer's directions but in no event shall exceed 5 feet. Pedestrian Rail panels shall be attached to posts with brackets supplied by the manufacturer.
- B. Rail posts shall be attached to the top of dam with anchor bolts (to be designed by the manufacturer/fabricator). Four anchor bolts shall be embedded into the pedestrian rail foundation at each post location.
- C. Base plates for the posts shall be leveled, as required, using approved non-shrink grout.

## 0.03 ERECTION TOLERANCES

- A. Install railing system plumb and level, securely fastened, with vertical members plumb.
  - 1. Maximum variation from plumb:  $\frac{1}{4}$  inch (6.0 mm).

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- 2. Maximum misalignment from true positions: <sup>1</sup>/<sub>4</sub> inch (6.0 mm).
- 3. Maximum misalignment between adjacent separated members: 1/8 inch (3.0 mm).

# PART 4 - MEASUREMENT AND PAYMENT

Refer to Section 01950 – Measurement and Payment for the measurement and payment items related to this Section.

# \* \* \* END OF SECTION \* \* \*

 $J:\label{eq:starses} J:\label{eq:starses} 05730 ALUMINUM HANDRAILS AND RAILINGS

#### PART 1 GENERAL

#### 1.01 SCOPE

- A. This section specifies the requirements for furnishing and installing aluminum safety railings. The work under this section includes the furnishing of all labor, equipment, supplies, materials and utilities required for the removal and disposal of the existing railing, preparation and cleaning of concrete surfaces, and installation of new aluminum safety railing as shown on the Drawings. All work shall be performed in accordance with the plans and specifications and to the satisfaction of the District and Engineer.
- B. The intent of the Work of this Section is to provide an aluminum safety railing system along the top of the left abutment retaining/training wall, and at new staircases, and shall perform to all applicable OSHA standards.

#### 1.02 REFERENCES

- A. AA DAF-45 Designation System for Aluminum Finishes; The Aluminum Association.
- B. ANSI A1264.1 Safety Requirements for Workplace Floor and Wall Openings, Stairs, and Railing Systems.
- C. ANSI/ASCE 7 Minimum Design Loads for Buildings and Other Structures.
- D. ASTM B 209 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- E. ASTM B 211 Standard Specification for Aluminum and Aluminum-Alloy Rolled or Cold Finished Bar, Rod, and Wire.
- F. ASTM B 221 Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
- G. ASTM B 247 Standard Specification for Aluminum and Aluminum Die Forgings, Hand Forgings, and Rolled Ring Forgings.
- H. ASTM B 429 Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube.
- I. ASTM E 935 Standard Test Methods for Permanent Metal Railing Systems and Rails for Buildings.
- J. 29 CFR 1910.23 Guarding floor and wall openings; Occupational Safety and Health Administration.
- K. 2018 Connecticut State Building Code

# 1.03 RELATED SECTIONS

A. Section 1300 – Submittals

- B. Section 03300 Cast-in-Place Concrete
- C. Section 05500 Metal Fabrications

# 1.04 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Engineer, fabricate, and install handrails, guardrails, and railing systems to withstand the structural loading required by applicable codes.
- B. Comply with requirements of building authorities having jurisdiction in the Project location and the following:
  - 1. Handrail Standard: ANSI A1264.1
  - 2. Occupational Safety and Health Administration 29 CFR 1910.29 Fall Protection Systems and Falling Object Protection-Criteria and Practices.
- B. Thermal and Corrosion Control:
  - 1. Allow for thermal action resulting from the maximum range (change) in ambient temperature in the design, fabrication, and installation of rail systems, to prevent opening of joints, buckling, and other detrimental effects, including overstressing of connections and components.
  - 2. Prevent galvanic action and other forms of corrosion by isolating dissimilar metals or materials, preventing direct contact with each other.

# 1.05 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's specifications and installation instructions for all components of each product type specified.
- C. Shop Drawings: Prepared specifically for this project.
  - 1. Show complete layout; plan views, elevations, connections, details for fabrication and attachment to other elements, and other installation details. Indicate materials, methods, finishes and types of joinery, fasteners, anchorages, and accessory items.
  - 2. Include calculations signed and sealed by the registered Connecticut Professional engineer responsible for structural design of system.

# 1.06 QUALITY ASSURANCE

- A. Load Tests: Submit test results from ASTM E 935 conducted on the manufacturer's supplied system indicating compliance with required structural loading.
- B. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

- C. Manufacturer/Installer qualifications demonstrating documented experience successfully executing projects with similar scope within the last 3 years.
- D. Manufacturer/Installer Qualifications: Provide handrails, guardrails, and railing systems from one source, produced by a manufacturer and craftsmen having resources to provide consistent quality in appearance and physical properties, without delaying the work.
- E. Closeout Submittals: Provide manufacturer's maintenance instructions that include recommendations for periodic cleaning and maintenance of all components.

# 1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver handrails, guardrails, railing systems, and related components in protective packaging. Inspect materials to ensure that specified products have been received.
- B. Store components to avoid damage from moisture, abrasion, and other construction activities.

#### 1.08 SEQUENCING

Ensure that products of this Section are supplied to affected trades in time to prevent interruption of construction progress.

#### 1.09 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
- B. Field Measurements: Take measurements of actual dimensions where necessary for fit without gaps. Indicate measurements on shop drawings.

#### PART 2 PRODUCTS

#### 2.01 MANUFACTURERS

- A. Acceptable Manufacturers:
  - 1. Moultrie Rail Systems; 1403 GA-133, Moultrie, GA 31788; Tel: (800) 841-8674, Fax: (229) 890-7245, Website: http://moultrierail.com/
  - Thompson Fabricating Co.; 1411 Commerce Place, Tarrant, AL. 35217; Tel: (800) 824-6182, Fax: (205) 841-0822, Website: <u>http://www.tfco.com/</u>
  - 3. Superior Aluminum Products, Inc.; 555 East Main Street, P.O. Box 430, Russia, OH 45363; Tel: (800) 548-8656, Fax: (937) 526-3904, Website: https://www.superioraluminum.com/
- B. Alternate systems or manufacturers may be submitted for approval.

C. Provide all handrails, guardrails, and railing systems from a single manufacturer.

# 2.02 HORIZONTAL PIPE RAILING

- A. Horizontal Pipe Guard Railing: 1.5-inch (3.81 cm) Schedule 40 pipe with 1.9 inch (4.83 cm) outside diameter runs between posts and utilizes concealed fasteners. No joints shall be fastened via welding. All top rails shall be continuous through the full length of the system, except for expansion/contraction joints.
- B. Round Posts: 1.5 inch (3.81 cm) Schedule 40 with 1.9 outside diameter with reinforcement inserts; ASTM B 429.
- C. Base: Size to fit the posts specified:
  - 1. Heavy-Duty Surface Mounted Base.
  - 2. Cover Flange for Embedded Posts.
  - 3. Side-Mount Corner Base.
  - 4. Side-Mount Base
  - 5. As indicated on approved Shop Drawings.

# 2.03 MATERIALS

- A. General: Provide material free from surface blemishes where exposed to view in the finished installation.
- B. Aluminum: Alloy 6063-T6.
  - 2. Extruded Pipe: 1-1/2-inch (38.1 mm) Schedule 40; ASTM B 429.
  - 3. Bars, Rods, and Tubes: ASTM B 221.
  - 4. Plate and Sheet: ASTM B 209.
- C. Base Flanges, Anchors, and Inserts:
  - 1. Manufacturer's standard machined socket bases from solid aluminum 6063 stock; no castings of any type allowed (die or sand).
  - 2. Anchors and inserts as required to support work specified, in accord with approved shop drawings and shall comply with all applicable Federal standards.
- D. Fittings and Fasteners: Provide concrete anchorage for fastening and complying with applicable Federal standards. Same basic material and alloy as parts being joined, unless otherwise indicated. Do not use metals that will be corrosive or incompatible with materials being fastened; do not utilize pop-rivets, sheet metal screws, adhesives, or cast fittings.
  - 1. Fasteners: Series 300 stainless steel.
  - 2. Component Fittings: Machined from solid 6063 alloy incorporating expanding internal tines.

#### 2.04 MANUFACTURED UNITS

- A. WESRAIL II aluminum pipe component railing system and all related items, as supplied by Moultrie Manufacturing Company.
- B. Tuf Rail System and all related items, as supplied by Thompson Manufacturing Co.
- C. Series 500 Aluminum Pipe Railing system and all related items, as supplied by Superior Aluminum Products, Inc.
- D. Approved Equal

#### 2.05 FABRICATION

- A. Fabricate handrails and railing systems to comply with manufacturer's printed requirements, project design requirements, details, dimensions, finish, and member sizes, including post spacing and anchorage, but not less than the structural requirements to support loading.
  - 1. Clearly mark component units for site assembly and installation.
  - 2. Use connections that maintain structural capacity of joined members.
  - 3. All pipe cuts shall be square and accurate for minimum joint gap. Cuts shall be clean and free of chamfer, from deburring, nicks, and burrs.
- B. Provide weep holes or other means to exit entrapped water from hollow sections of railing members exposed to exterior, condensation, or moisture from other sources.
- C. If railing is angled horizontally, machine to proper angle into the post.
- D. Fabricate railing system to meet step railing requirements; riser and tread dimensions of the steps.
- E. Provide components required for anchorage of framing. Fabricate anchors and related components of material and finish as required, or as specifically noted.

#### 2.06 FINISHES

- A. Anodized Aluminum: Mil Finish Anodized (215R1).
- B. Alternate finishes may be proposed for approval by the District. Samples of the finish should be provided.

#### PART 3 EXECUTION

#### 3.01 EXAMINATION

- A. Examine system components, substrate, and conditions where railing systems are to be installed.
- B. Do not begin installation until substrates have been properly prepared.

Grupes Reservoir Dam Rehabilitation Project C. Notify Engineer and District in writing of unsatisfactory conditions. Do not proceed with the work until unsatisfactory conditions have been corrected.

# 3.02 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surrounding construction to receive railing system installations to comply with manufacturer's requirements.
- C. Review and coordinate setting drawings, shop drawings, templates, and instructions for assembly and installation of railing system and related items to be embedded in concrete and masonry.
- D. Ensure that adjacent surfaces, structures, and finishes are protected from damage by construction activities of this Section.
- E. Use wood blocks and padding to prevent damage to railing members and fittings during erection.

# 3.03 INSTALLATION

- A. Install railing system and related components in strict accordance with manufacturer's printed installation instructions and approved project shop drawings.
- B. Separate aluminum which might contact concrete, masonry, or other metals (to include steel anchoring and fasteners), by means of asphaltic or bituminous paint or other approved coating or method to prevent electrolytic action.
- C. Preassemble railing system, including posts, in easy to lift sections whenever possible.
- D. Align rails so that variations from level for horizontal members do not exceed 1/4 inch in 12 feet.
- E. Adjust, level, and securely install railing system components.
- F. Avoid springing assembled components of system into place.
- G. Keep perimeter lines straight, plumb, and level.
- H. Install the posts by means of core holes as shown on the Contract Drawings or by use of base flanges (if approved) anchored onto the top of the concrete surface using an approved stainless-steel anchor bolt system made by Hilti or approved equal.
- I. Provide for thermal expansion and contraction by use of expansion joints/gaps in top rails, 40 foot (6.096 m) maximum intervals.
  - 1. Strictly adhere to manufacturer's instructions for locations of expansion joints and fastening of expansion sleeves.

- 2. Attach top rail to posts located at maximum 5 foot (1.524 m) on center spacings.
- 3. Install bottom rails in un-spliced lengths between posts.
- 4. Install posts of continuous sections from mounting base to top rail.
- J. Provide for water to drain from the railing system hollow sections by drilling weep holes at bottom locations or other approved methods.

#### 3.04 ERECTION TOLERANCES

- A. Install railing system plumb and level, securely fastened, with vertical members plumb.
  - 1. Maximum variation from plumb:  $\frac{1}{4}$  inch (6.0 mm).
  - 2. Maximum misalignment from true positions:  $\frac{1}{4}$  inch (6.0 mm).
  - 3. Maximum misalignment between adjacent separated members: 1/8 inch (3.0 mm).

#### 3.05 CLEANING

- A. Immediately upon completion of installation, remove all dust or foreign matter from components; clean all railing system surfaces using clean water and mild soap or detergent and in accordance with AAMA 609 and AAMA 610-02.
- B. Do not use abrasive agent or harsh chemicals.

#### 3.06 PROTECTION

- A. Provide adequate protection for all surfaces of completed installations to prevent damage during remainder of construction activities.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

#### PART 4 - MEASUREMENT AND PAYMENT

Refer to Section 01950 – Measurement and Payment for the measurement and payment items related to this Section.

#### \* \* \* END OF SECTION\* \* \*

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#### SECTION 11131 STOP PANELS AND SCREENS

#### PART 1 - GENERAL

#### 1.01 <u>DESCRIPTION</u>

A. Work under this item shall consist of design of the stop panels and screens to allow adjustment of water level intake height within the gatehouse as shown on the drawings. The stop panels and screen shall be able to be removed and replaced easily. The stop panels and screens shall seal to each other without any special or additional material.

#### 1.02 <u>RELATED SECTIONS</u>

- A. Section 01300 Submittals
- B. Section 05500 Metal Fabrications

#### 1.03 <u>DESIGN REQUIREMENTS</u>

- A. Design Criteria
  - 1. The stop panels and screens shall be structurally designed to withstand the maximum load combination of all axial, bending, shear, torsion, and thermal loads and shall be designed to resist fatigue cycle loading from the maximum loading condition caused by static and dynamic loadings in any position.
  - 2. Maximum allowable leakage for the stop panels shall be 0.1 gallons per minute per linear foot of wetted seal between adjoining panels.
  - 3 The stop panels shall be sufficiently rigid to limit the deflection of the panel no more than 1/360 of the span of the panel under the maximum design head.
  - 4. The stop panels and screens shall be designed for a maximum of 10 feet of differential head. The screens shall be designed to withstand 10 feet of differential head if the screens are 100% blinded.

#### 1.04 <u>SUBMITTALS</u>

- A. Submit complete description of all materials including dimensions and the material thickness of all structural components of the stop panels, guide frames and accessories. Provide the stop panel size, weight, material, and seal details. Information regarding the stop panel manufacturer shall also be provided.
- B. Submit Shop Drawings showing all details of construction, details required for installation, maintaining and removal.
- C. Submit calculations for maximum bending stress and deflection of the stop panels under the maximum design head stamped by a registered Professional Engineer in the State of Connecticut.

D. Submit testing methodology for proving the functionality of the stop panels after installation and prior to acceptance.

#### 1.05 <u>QUALITY ASSURANCE</u>

- A. Qualifications:
  - 1. The stop panels, guide frames and lifter shall be furnished by a single manufacturer with a minimum of 10-years' experience designing and manufacturing low leakage stop panels under similar conditions.

# B. Manufacturers:

- 1. Whipps Inc.; Athol, Massachusetts
- 2. Hydro Gate; Denver, CO
- 3. Rodney Hunt Company, Orange, MA
- 4. Steel Fab, Inc., Fitchburg, MA
- 5. Or equivalent.

# 1.06 DELIVERY, STORAGE, AND HANDLING

- A. Handle to minimize damage to the surfaces.
- B. Ship items/components on wood dunnage and restrained to prevent distortion and/or damage during shipping. Protective pads, supports and blocking shall be provided.
- C. Receive, unload, and inspect all items/components for short or damaged materials. Defective and short materials shall be replaced or made good at no expense to the District.
- D. Contractor shall store and maintain all equipment in strict accordance with the manufacturer's written short term and long-term storage requirements.
- E. Store on-site on wood dunnage separating steel to steel contact and to keep off the ground and so that water accumulations shall drain freely.
- F. All items/components shall be protected by suitable weather tight ventilated covering.
- G. Store material to be readily accessible, with factory markings visible.
- H. A packing list, listing the contents of each container shall be placed in a moisture proof envelope and securely fastened to the outside of each container.

# 1.07 <u>COORDINATION</u>

A. The Contractor shall coordinate the work of Section 11282 – Intake Structure with this Section. Verify at the site both the dimensions and the work of other trades and adjoining items, prior to the fabrication and installation of items herein specified.

B. Furnish to pertinent trades all items included under this section that are built into the work of other sections.

#### 1.08 FIELD MEASUREMENTS

A. Field measurements of the intake structure shall be taken at the site prior to fabrication in order to verify indicated dimensions and to insure proper fitting of all items.

#### PART 2 - PRODUCTS

#### 2.01 <u>GENERAL</u>

- A. Stop panels shall be as specified herein and have the characteristics and dimensions indicated.
- B. The stop panels shall be provided with a continuous resilient lip type seal along the bottom and both sides. The guide frames shall not incorporate seals.
- C. All structural components of the stop panels shall be fabricated of aluminum and shall have adequate strength to prevent distortion during normal handling, during installation and while in service.
- D. All structural components of the guide frames shall be fabricated of Type 316 stainless steel and shall have adequate strength to prevent distortion during normal handling, during installation and while in service.
- E. All welds shall be performed by welder with AWS certification.
- F. Finish: Mill finish on aluminum and stainless steel. All aluminum in contact with concrete shall be shop coated with a heavy coat of bitumastic paint. Welds on aluminum shall be cleaned to provide a uniform finish. Welds on stainless steel shall be sandblasted to remove weld burn and scale.
- G. Materials:

<u>Components</u>	Materials		
Frame Guides and Invert	Stainless Steel, Type 316		
Stop Panels, Storage Rack	6061-T6 Aluminum		
Lip Seal	Urethane, Neoprene ASTM D-2000, or EPDM		
Fasteners, Nuts and Bolts	Stainless Steel, Type 3016ASTM F-593 & 594 or ASTM A276		

H. There shall be two (2) sets of guides and two (2) sets of stop panels and screens. The total number of stop panels shall be 6, and the total number of screens shall be 6.

#### 2.02 FRAME GUIDES

- A. The frame guides or grooves and invert member shall be constructed of Type 316 stainless steel with a minimum thickness of <sup>1</sup>/<sub>4</sub>-inch.
  - 1. Frame design shall allow for embedded mounting and grout.
  - 2. An invert member shall be provided across the bottom of the guides. The invert member shall be of the flush bottom type.
  - 3. Frame mounted seals are not acceptable.

# 2.03 <u>STOP PANELS</u>

- A. The stop panels shall be constructed of extruded aluminum shapes with a minimum thickness of 5/16-inch. Each panel shall have a nominal height of 4 feet.
- B. Each stop panel shall be identical and designed to stack in any order.
- C. Stop panels shall be designed to safely withstand a maximum unbalanced full-height head of 10 feet and maximum bending stress shall not exceed 7,600 psi at the maximum operating head.
- D. Adequate drainage shall be provided for each stop panel.

#### 2.03 STAINLESS STEEL SCREENS

- A. The stainless-steel screens shall be constructed of type 304 stainless steel.
- B. The nominal height of the screens shall be 4'-6" high as per the screen schedule. The screens shall be designed to work in unison with the aluminum stop panels and designed to be mounted in the stop panel guides.
- C. Each screen shall be identical and designed to stack in any order. Each screen assembly shall be a minimum of 4 inches deep.
- D. The screen material shall be SS304 and shall have an opening of 3/8" x 3/8" and shall be mounted to the screen assembly.
- E. The screen assembly shall be provided with a UHMW strip on the bottom edge to allow any screen to be mounted on top of any stop log.
- F. Fiber glass or aluminum screen assemblies will not be accepted.

# 2.05 <u>SEALS</u>

A. Each stop panel shall be outfitted with a continuous resilient lip seal along the bottom and both sides to restrict leakage in accordance with the requirements listed in this specification.

- 1. The continuous lip seal shall be constructed of urethane or rubber and shall be mechanically retained to the stop panel. Seals shall be mounted in a manner that allows for easy replacement in the event of damage.
- 2. Stop panels that utilize rubber "J" seals or "P" seals are not acceptable.

# 2.06 <u>STOP LOG LIFTER</u>

- A. A lifter shall be provided and shall be constructed of aluminum, stainless steel, or a steel with U.H.M.W. guide bars and type 316 stainless steel fasteners.
- B. The lifter shall be capable of installing and removing all of the logs. Latching and unlatching of the logs shall be easily accomplished by personnel on the operating deck with the use of a lanyard.

#### 2.07 <u>SCREEN SHELF</u>

- A. The screen shelf shall be constructed of aluminum and shall be bolted or welded to the top stop log.
- B. The shelf shall be capable of supporting all of the screens in both channels. Latching and unlatching the top stop log with the lifter shall be easily accomplished by personnel on the operating deck with the use of a lanyard.

#### **PART 3 - EXECUTION**

#### 3.01 INSTALLATION

- A. Installation of the stop panels, guide frames and appurtenances shall be done in a professional manner.
- B. The Contractor shall review the installation drawings and installation instruction prior to installing the guide frames. The guide frames shall be installed in a true vertical plane, square and plumb.
- C. The Contractor shall fill the void in between the guide frames and the wall with nonshrink grout as shown on the installation drawing and in accordance with the manufacturer's recommendations.

#### 3.02 <u>TESTING</u>

- A. After installation, all stop panels shall be field tested in the presence of the Resident Engineer and a duly Authorized Representative of the manufacturer who is fully trained in the installation, startup, and operation of the equipment to ensure that all items of equipment are in full compliance with this Section.
- B. The stop panels shall be inserted into the guide frames to confirm that they operate in accordance with the specification.

- C. Each stop panel assembly shall be water tested by the Contractor over the specified head and maximum specified leakage rate. If leakage past the stop panels exceeds the allowable leakage, the stop panels shall be removed, modified, and retested until the stop panels has satisfactorily passed the tests. No separate payments will be made for testing and adjusting the stop panel assembly.
- D. The manufacturer's representative and Contractor shall fill out the stop panel certification form included at the end of this specification. Stop panel certification will not be considered complete until this form has been provided to the Resident Engineer.

# PART 4 - MEASUREMENT AND PAYMENT

Refer to Section 01950 – Measurement and Payment for the measurement and payment items related to this Section.

# \* \* \* END OF SECTION \* \* \*

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# EQUIPMENT CERTIFICATION

Owner:	Date:
Project:	
Contractor:	
Equipment Manufacturer:	
Equipment:	
This certifies that the entire equipment/system con Contract Documents.	forms to the requirements of the
(Authorized Representative of the Manufacturer	(Date)
(Contractor)	(Date)
(Resident Engineer)	(Date)
Grupes Reservoir Dam	

# SECTION 11295 INTAKE SLIDE GATES

#### PART 1 - GENERAL

#### 1.01 DESCRIPTION

- A. The Work of this section includes the furnishing of all labor, tools, equipment, and materials necessary for the installation of three 30-inch by 30-inch intake slide gates at the Grupes Reservoir Dam Gatehouse. The Work further includes the provision and installation of the slide gates, frames, seals, stems, guides, and operators, as shown on the drawings.
- B. It is the intent of this Specification that at the conclusion of the Work of this Section, all intake gates shall be installed in such a manner as to be fully operational and water-tight within the standards cited below.

#### 1.02 <u>SCOPE OF WORK</u>

A. The Contractor shall provide all materials and perform all work as necessary to install the slide gate. The Contractor shall install new gate operators and stem covers at all gates to provide for manual operation.

#### 1.03 <u>RELATED WORK SPECIFIED ELSEWHERE</u>

- A. The following is a list of related work items that shall be performed or furnished under other sections of these specifications as indicated:
  - 1. Temporary Dewatering and Water Control Section 01565
  - 2. Metal Fabrications Section 05500
  - 3. Supplemental Architectural Specifications Attachment D

#### 1.04 FIELD MEASUREMENTS

A. The Contractor shall make all such measurements as necessary to establish and/or verify dimensions and elevations prior to commencement of work.

#### 1.05 LOCATION AND STORAGE OF MATERIALS

A. If some or all portions of the gate are temporarily stored, they shall be stored in such a manner that they will be kept safe from theft or damage. The Contractor shall assume all responsibility.

#### 1.06 <u>REFERENCES</u>

- A. ASTM A276 Standard Specification for Stainless Steel Bars and Shapes
- B. ASTM A240 Standard Specification for Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for pressure vessels and for general applications.

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- C. ASTM B584 Standard Specification for Copper Alloy and Sand Castings for General Application
- D. ASTM D2000 Standard Classification System for Rubber Products in Automotive Applications
- E. ASTM D4020 Standard Specification for UHMW Polyethylene Molding and Extrusion Material
- F. ASTM F593 Standard Specification for Stainless Steel Bolts, Hex Cap Screws and Studs
- G. ASTM F594 Standard Specification for Stainless Steel Nuts
- H. AWS D1.6 Structural Welding Code, Stainless Steel
- I. AWWA C561 Fabricated Stainless Steel Slide Gates
- J. SSPC SP6 Commercial Blast Cleaning

#### 1.07 <u>DESIGN REQUIREMENTS</u>

- A. Design Criteria
  - 1. The slide gates and stems shall be structurally designed to withstand the maximum load combination of all axial, bending, shear, torsion, and thermal loads and shall be designed to resist fatigue cycle loading from operation or by loadings caused by static and dynamic forces in any position.
  - 2. Maximum allowable leakage shall be in accordance with the requirements of AWWA C561.
  - 3. All gate components will be designed to safely withstand a head of 24 feet seated and unseated, unless otherwise shown on the Drawings. The slide gate should be designed for forces due to throttling flows.

#### 1.08 <u>SUBMITTALS</u>

- A. A minimum of fourteen (14) days prior to fabrication, the Contractor shall submit the following:
  - 1. Shop/Design drawings showing gates, frames, and operating stem, guides all support locations, all dimensions including bolt holes, materials, finish, method of attachment, seals and floorstands.
  - 2. Specifications and descriptions of the gates and operator mechanism, including short term and long-term storage requirements and maintenance and operating instructions.
  - 3. Submit manufacturer's certificate that slide gates have passed shop leakage testing as specified.
  - 4. A plan and construction sequence for installation of the gates.

# **PART 2 - PRODUCTS**

#### 2.01 <u>GATE SYSTEMS</u>

- A. Slide gates shall be standard-type, rising stem gates as manufactured by Whipps, Hydrogate, Steel-Fab, or approved equal.
- B. The new slide gates shall meet the standards of AWWA C56.
- C. Slide gate components shall be as follows:
  - 1. Frame:
    - a. Frame shall be constructed of structural members or formed plate welded to form a rigid one-piece frame. Frame shall be stainless steel, Type 304 and 304L, meeting the requirements of ASTM A240.
    - b. The minimum material thickness of all members except seal retainers shall be <sup>1</sup>/<sub>4</sub> inch (6.4 mm).
    - c. All mating surfaces of the frame shall be accurately formed to ensure proper operation.
    - d. The frame shall be of the extra-wide flange back design suitable for mounting to a concrete wall.
    - e. The frame configuration shall be of the flush bottom type and shall allow the replacement of all seals without removing the gate frame from the concrete wall.
  - 2. Slide:
    - a. Slide shall be constructed of flat plate reinforced with formed plates or structural members to limit deflection to 1/720th of the gate span under the design head. Slide shall be stainless steel, Type 304 and 304L, meeting the requirements of ASTM A240.
    - b. The minimum material thickness of all members except seal retainers shall be  $\frac{1}{4}$  inch (6.4 mm).
    - c. All mating surfaces shall be accurately formed to ensure proper operation.
  - 3. Guides:
    - a. Guides shall be stainless steel, Type 304 and 304L, meeting the requirements of ASTM A240.
    - b. Designed to withstand the total thrust due to the water pressure and the wedging action.
    - c. Guides shall be of a length to fully support the slide in the fully open position.
  - 4. Wedges:
    - a. Wedges shall be stainless steel, Type 304, meeting the requirements of ASTM A276 or UHMW polyethylene, meeting the requirements of ASTM D4020.
    - b. For gates with seats that are not self-adjusting, adjustable wedges or pressure pads shall be provided to ensure seat contact when the gate is fully closed, when deemed necessary by the gate manufacturer to meet the specified leakage.

- 5. Seat Facings:
  - a. The gate shall have an integral seat-seal system, or a seal separate from the seat.
  - b. Seat shall be cast or extruded UHMW polyethylene meeting the requirements of ASTM D4020.
  - c. Seats and seals shall be secured to the frame or to the slide in a manner to ensure they will remain in place, free of distortion or loosening during the life of the gate.
- 6. Wall Thimble (When Applicable):
  - a. Furnished for all fabricated slide gates that are not attached to pipe flanges or directly to the concrete wall.
  - b. Thimbles shall be stainless steel, Type 304 and 304L, meeting the requirements of ASTM A276 and ASTM A240.
  - c. Minimum material thickness of all members shall be ¼-inch.
- 7. Flush Bottom Seal: A rubber compressible resilient seal shall be attached to the bottom of the slide or frame with stainless steel fasteners. Rubber Seal shall be neoprene rubber meeting the requirements of ASTM D-2000.

# 2.02 <u>GATE OPERATOR STEMS</u>

- A. Gate operator stems shall be threaded stainless steel rods sized to provide appropriate factor of safety against forces developed during gate operation.
- B. Gate operator stem guides shall be provided as recommended by the manufacturer. A minimum of one guide per gate shall be installed.
- C. Slide gate components shall be as follows:
  - 1. Stem:
    - a. Shall be made of 316 stainless steel, meeting the requirements of ASTM A-276. Stem shall be a minimum of 1-1/2" diameter solid stainless-steel bar, designed to transmit in compression at least 2 times the rated output of the operating manual mechanism with a 40-pound effort on the crank or hand wheel. The stem shall have a slenderness ratio (L/R) less than 200. Tubular stems or sections of stems shall not be acceptable.
    - b. Threaded portion: Machine rolled or machine cut threads of the full depth Acme type. The threaded portion shall have a 16 micro-inch finish or better.
    - c. Sections shall be joined by stainless steel couplings threaded and keyed or bored and pinned to the stems.
    - d. All threaded and keyed couplings of the same size shall be interchangeable.
    - e. Per AWWA C-561, tube sections or tubular stems shall not be allowed.
  - 2. Stem Guides:
    - a. Stem guides shall be 304L stainless steel with cast or extruded UHMW polyethylene bushings.

b. Adjustable in two directions and will be spaced at sufficient intervals to adequately support the stem. Stem guide spacing shall not exceed an l/r ratio of 200.

# 2.03 <u>STEM COVERS</u>

A. New stem covers shall be provided. Stem covers shall be clear plastic stem covers that will not discolor, crack, or become opaque for at least 5 years after installation. The covers shall be capped, vented, and long enough to allow full travel of the gate. Stem covers shall be marked to indicate gate opening position.

#### 2.04 <u>GATE OPERATORS</u>

- A. <u>Floor Stands</u> Floorstands shall be type 304 stainless steel, weatherproof cast iron or cast aluminum and of sufficient length to position the actuator and auxiliary manual handwheel between 36" and 48" above the finished floor. The floorstand shall be designed to withstand the maximum actuator output with a safety factor of four.
- B. <u>Manual Operator</u> Operator shall have a declutch lever and hand wheel for manual operation. Lubrication fittings shall be provided in the gear housing to permit lubrication of all gears and bearings. A maximum effort of 40 lbs. shall be required to operate the gate after it is unseated from its wedging devices.

# PART 3 - EXECUTION

# 3.01 <u>PREPARATION</u>

A. All weld burn and discoloration on the stainless-steel components shall be sandblasted to provide a uniform finish.

#### 3.02 <u>SHOP TESTING</u>

- A. All slide gates shall be shop tested with the specified unseating head and verify the maximum shop leakage rate 0.025 gallons per linear foot of seat facing per minute.
- B. Any imported gate, manufactured outside the United States, shall be fully shop tested at a test facility within the United States to verify the maximum shop leakage rate 0.025 gallons per linear foot of seat facing per minute.
- C. The shop test, at the discretion of the Engineer, shall be witnessed. If the Engineer is not present, the shop test shall be videoed, and a copy sent to the Engineer for record purposes prior to delivery to the site.

#### 3.03 INSTALLATION

A. Install the slide gate equipment and appurtenances as shown on the Contract Drawings and in accordance with the manufacturer's instructions and recommendations.

- B. Final Tests Before Startup: Perform the following preventive maintenance operations and checks before startup:
  - 1. Remove covers from grease-lubrication type bearings, flush bearings with kerosene and thoroughly clean. Fill with new lubricant according to manufacturer's recommendations.
  - 2. Check that stems are free to rotate by hand. Do no operate if bound or dragging slightly, until the cause of the trouble is determined and corrected.
  - 3. Test and adjust gate operations and tolerances. Replace damaged and malfunctioning equipment.

# 3.04 <u>FIELD TESTING</u>

A. Slide gates shall have a maximum permissible leakage rate of 0.05 gallons per linear foot of seat facing per minute. All gates shall be field tested at the discretion of the District, and tests shall either be certified by the Contractor and witnessed by the District and/or the Engineer.

# 3.05 ADJUSTING AND CLEANING

- A. Adjust wedges to prevent undesirable rotation or lateral motion.
- B. Clean slide gates of dirt and debris to the satisfaction of the Engineer.
- C. Do not mar surfaces during cleaning. All weld splatter, weld burn, etc. shall be removed and all scratches shall be polished in the production facility prior to shipment.

# PART 4 - MEASUREMENT AND PAYMENT

Refer to Section 01950 – Measurement and Payment for the measurement and payment items related to this Section.

# \* \* \* END OF SECTION \* \* \*

 $J:\label{eq:linear} J:\label{eq:linear} 125 PREFABRICATED BRIDGES

# PART 1 GENERAL

#### 1.01 SCOPE

- A. This section specifies the requirements for a fully engineered clear span bridge(s) of steel construction and shall be regarded as minimum standards for design and construction.
- B. The work to be done under this Section consists of furnishing all labor, materials, apparatus and equipment necessary and required to furnish and install a pre-fabricated brigde with handrails which spans the width of the existing spillway and a second bridge spanning from the top of the dam to the Gatehouse, as shown on the Drawings.
- C. Installation of new footbridges and railing includes provision of all miscellaneous hardware for attaching components of the approved system as well as securely attaching/anchoring the assembled bridge and railing systems to the existing dam.
- D. The Contractor's submitted and accepted systems shall match the general appearance and style of the footbridge, platform and railings shown on the Contract Drawings.

#### 1.02 RELATED SECTIONS

- A. Section 01300 Submittals
- B. Section 05500 Metal Fabrications
- C. Section 05501 Decorative Pedestrian Rail

#### 1.03 QUALIFIED SUPPLIERS

- A. Each bidder is required to identify their intended bridge supplier as part of the bid submittal. Qualified suppliers must have at least 10 years of experience fabricating these type structures.
- B. Pre-approved Manufacturers:

CONTECH Engineered Solutions, LLC8301 State Highway 29 North4021 Gault Avenue SouthAlexandria, Minnesota 56308Fort Payne, Alabama 359671-800-328-20471-800-749-7515

C. Suppliers other than those listed above may be used provided the engineer or owner's agent evaluates the proposed supplier and approves the supplier 5 days prior to bid. The Contractor must provide the following documentation, for any proposed supplier who is not pre-approved, at least 10 days prior to bid:

- 1. Representative drawings
- 2. Warranty information
- 3. Inspection and Maintenance procedures
- 4. AISC Shop Certification
- 5. AWS Certified Fabricator Certification
- 6. Welder Qualifications
- 7. Evidence of 2 Certified Weld Inspectors (CWI's) on staff
- D. Proposed suppliers must have at least ten (10) years of experience designing and fabricating these type of structures and a minimum of ten (10) successful bridge projects, of similar construction, each of which has been in service at least seven (7) years. List the location, bridge size, owner, and a contact for reference for each project.
- E. The engineer will evaluate and verify the accuracy of the submittal prior to bid. If the engineer determines that the qualifying criteria have not been met, the contractor's proposed supplier shall be rejected. The engineer's ruling shall be final.
- F. If an alternate manufacturer is approved, the Manufacturer's representative is to be in attendance at the project pre-construction meeting.

# 1.04 DESIGN CODES/REFERENCES

Structural members shall be designed in accordance with recognized engineering practices and principles as follows:

- A. Structural Steel: Shall be in accordance with "LRFD Guide Specification for the Design of Pedestrian Bridges" latest edition (AASHTO).
- B. Welded Tubular Connections: All welded tubular connections shall be checked, when within applicable limits, for the limiting failure modes outlined in AASHTO or in accordance with the "Manual of Steel Construction: LRFD; (Load Resistance Factor Design)" as published by the American Institute of Steel Construction (AISC).
- C. Top Chord Stability shall be in accordance with the Structural Stability Research Council (SSRC), formerly Column Research Council, as described below:
  - 1. The top chord shall be considered as a column with elastic lateral supports at the panel points. The critical buckling force of the column, so determined, shall exceed the maximum force from dead load and live load (uniform or vehicular) in any panel of the top chord by not less than 50 percent for parallel chord truss bridges or 100 percent for bowstring bridges. The design approach to prevent top chord buckling shall be as outlined by E.C. Holt's research work in conjunction with the Column Research Council on the stability of the top chord of a half through truss.

- 2. For uniformly loaded bridges, the vertical truss members, the floor beams, and their connections (transverse frames) shall be proportioned to resist a lateral force of not less than 1/100k times the top chord compressive load, but not less than .004 times that top chord load, applied at the top chord panel points of each truss. The top chord load is determined by using the larger top chord axial force in the members on either side of the "U-frame" being analyzed. For end frames, the same concept applies except the transverse force is 1% of the axial load in the end post member.
- 3. For bridges with vehicle loads, the lateral force applied at the top chord elevation for design of the transverse frames shall not be less than 1% of the top chord compression due to dead load plus any vehicle loading.
- 4. The bending forces in the transverse frames, as determined above, act in conjunction with all forces produced by the actual bridge loads as determined by an appropriate analysis which assumes that the floor beams are "fixed" to the trusses at each end.
- 5. The effects of three-dimensional loading (including "U-frame" requirements) shall be considered in the design of the structure. The "U-frame" forces shall be added to the forces derived from a three-dimensional analysis of the bridge.

# 1.05 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's specifications and installation instructions for all components of each product type specified.
- C. Shop Drawings: Prepared specifically for this project.
  - 1. Show complete layout; plan views, elevations, connections, details for fabrication and attachment to other elements, and other installation details. Indicate materials, methods, finishes and types of joinery, fasteners, anchorages, and accessory items.
  - 2. Include calculations signed and sealed by the registered Connecticut Professional engineer responsible for structural design of system.
  - 3. Shop Drawings and calculation package shall indicate that designs are in conformance with all applicable OSHA standards, meets pedestrian loading requirements as per the applicable building code(s).
  - 4. Submittal package shall be stamped by a professional engineer licensed in the State of Connecticut.

# 1.06 QUALITY ASSURANCE

- A. Field Measurements: The Contractor shall verify all dimensions prior to fabrication and installation to insure proper fitment of all components.
- B. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

Grupes Reservoir Dam
Rehabilitation Project

- C. Guarantee: The Contractor shall obtain in the Owner's name the standard written manufacturer's guarantee of all materials furnished under this Section where such guarantees are offered in the manufacturer's published product data. All of these guarantees shall be in addition to, and not in lieu of, other liabilities which the Contractor may have by law or other provisions of the Contract Documents.
- D. Closeout Submittals: Provide manufacturer's maintenance instructions that include recommendations for periodic cleaning and maintenance of all components.

#### 1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver handrails, guardrails, railing systems, and related components in protective packaging. Inspect materials to ensure that specified products have been received.
- B. Store components to avoid damage from moisture, abrasion, and other construction activities.

#### 1.08 SEQUENCING

Ensure that products of this Section are supplied to affected trades in time to prevent interruption of construction progress.

#### 1.09 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
- B. Field Measurements: Take measurements of actual dimensions where necessary for fit without gaps. Indicate measurements on shop drawings.

#### PART 2 PRODUCTS

#### 2.01 STEEL

- A. Steel for pedestrian bridges shall be unpainted, weathering steel.
- B. Bridges shall be fabricated from high strength, low alloy, atmospheric corrosion resistant ASTM A847 cold formed welded square and rectangular tubing and/or ASTM A588, or ASTM A242, ASTM A606 plate and structural steel shapes (Fy = 50,000 psi). The minimum corrosion index of atmospheric corrosion resistant steel, as determined in accordance with ASTM G101, shall be 6.0.
- C. Other steel components required for bridge construction (e.g., bearings, mounting hardware, bolts, connectors) shall be fabricated in accordance with the requirements of Section 05500.
- D. All steel items embedded or attached to concrete shall be 304 stainless steels, unless otherwise approved.

#### 2.02 STEEL GRATE DECKING

- A. Pedestrian bridges shall be provided with a steel grate deck.
- B. The grate decking shall utilize bearing bars spaced a maximum 1-3/16" on center with welded crossbars at 4" centers maximum. The grating shall be designed to carry the imposed deck loads at the stringer or floor beam spacings used in the bridge as determined by the bridge designer.
- C. Grate decking shall be designed for concentrated loads as specified in Section 1.04. Grate decking shall be designed using only the bars engaged by the "tire print area" unless cross bars suitable for transverse load distribution are utilized. Grating shall be galvanized in accordance with ASTM A123 with smooth bearing bars.

# 2.03 RUB RAILS

A. The bridges shall be supplied with a 1"x 5-1/2" (actual size) naturally durable hardwood (Ipe - Tabebuia Spp Lapacho Group, or approved equal) rubrail. Rubrail shall be partially air dried to a moisture content of 15% to 20%, shall be supplied S4S (surfaced four sides), E4E (eased four edges), with the edges eased to a radius of 1/8". When measured at 30% moisture content, the width and thickness shall not vary from specified dimensions by more than  $\pm$  0.04 inches. Ends of each piece shall be sealed with "Anchorseal" Mobil CER-M or an equal aquious wax log sealer.

# 2.04 FABRICATION

- A. Drain Holes When the collection of water inside a structural tube is a possibility, either during construction or during service, the tube shall be provided with a drain hole at its lowest point to let water out.
- B. Welds
  - Special attention shall be given to developing sufficient weld throats on tubular members. Fillet weld details shall be in accordance with AWS D1.1, Section 3.9 (See AWS Figure 3.2). Unless determined otherwise by testing, the loss factor "Z" for heel welds shall be in accordance with AWS Table 2.8. Fillet welds which run onto the radius of a tube shall be built up to obtain the full throat thickness. The maximum root openings of fillet welds shall not exceed 3/16" in conformance with AWS D1.1, Section 5.22. Weld size or effective throat dimensions shall be increased in accordance with this same section when applicable (i.e. fit-up gaps> 1/16").
  - 2. The fabricator shall have verified that the throat thickness of partial joint penetration groove welds (primarily matched edge welds or the flare-bevel-groove welds on underhung floor beams) shall be obtainable with their fit-up and weld procedures. Matched edge welds shall be "flushed" out when required to obtain the full throat or branch member wall thickness.
  - 3. For full penetration butt welds of tubular members, the backing material shall be fabricated prior to installation in the tube so as to be continuous around the full tube perimeter, including corners. Backing may be of four types:

- A "box" welded up from four (4) plates.
- Two "channel" sections, bent to fit the inside radius of the tube, welded together with full penetration welds.
- A smaller tube section which slides inside the spliced tube.
- A solid plate cut to fit the inside radius of the tube.
- 4. Corners of the "box" backing, made from four plates, shall be welded and ground to match the inside corner radii of the chords. The solid plate option shall require a weep hole either in the chord wall above the "high side" of the plate or in the plate itself. In all types of backing, the minimum fit-up tolerances for backing must be maintained at the corners of the tubes as well as across the "flats".
- C. Bridge(s) shall be fabricated by a fabricator who is currently certified by the American Institute of Steel Construction to have the personnel, organization, experience, capability, and commitment to produce fabricated structural steel for the category "Major Steel Bridges" as set forth in the AISC Certification Program with Fracture Critical Endorsement. Quality control shall be in accordance with procedures outlined for AISC certification. For painted structures, the fabricator must hold a "Sophisticated Paint Endorsement" as set forth in the AISC certification program. Furthermore, the bridge(s) shall be fabricated in a facility owned and/or leased by the corporate owner of the manufacturer, and fully dedicated to bridge manufacturing.

# 2.05 FINISHING

# A. Blast Cleaning

- 1. All Blast Cleaning shall be done in a dedicated OSHA approved indoor facility owned and operated by the bridge fabricator. Blast operations shall use Best Management Practices and exercise environmentally friendly blast media recovery systems.
- 2. To aid in providing a uniformly "weathered" appearance, all exposed surfaces of steel shall be blast cleaned in accordance with Steel Structures Painting Council Surface Preparation Specifications No. 7 Brush-Off Blast Cleaning, SSPC SP7 latest edition.
- 3. Exposed surfaces of steel shall be defined as those surfaces seen from the deck and from outside of the structure. Stringers, floor beams, lower brace diagonals and the inside face of the truss below deck and bottom face of the bottom chord shall not be blasted. Anodized Aluminum: Mil Finish Anodized (215R1).

# PART 3 EXECUTION

#### 3.01 GENERAL DESIGN FEATURES

- A. Contractor shall provide pre-engineered, prefabricated bridges as shown on the Contract Drawings. Elevations, sections, and details shown on the Drawings are intended to convey overall design intent. Contractor shall provide shop drawings for approval.
- B. The intended bridge type for this Project shall be a "bowstring" arch truss, as indicated on the Contract Drawings.
- C. Bridge spans shown on the Drawings shall be as measured from each end of the bridge structure. Bridge width shall be 8'-0" and shall be as measured from the inside face of structural elements at deck level.
- D. The bridge shall have a vertical camber at midspan of 1.2% under the full dead load deflection.
- E. The bridge manufacturer shall determine the distance from the top of the deck to the top and bottom truss members based upon structural and/or shipping requirements.
- F. All members of the vertical trusses (top and bottom chords, verticals, and diagonals) shall be fabricated from square and/or rectangular structural steel tubing. Other structural members and bracing shall be fabricated from structural steel shapes or square and rectangular structural steel tubing.
- G. Unless the floor and fastenings are specifically designed to provide adequate lateral support to the top flange of open shape stringers (w-shapes or channels), a minimum of one stiffener shall be provided in each stringer at every floor beam location.
- H. Attachments
  - 1. <u>Safety Rails</u> Horizontal safety rails shall be placed on the structure up to a minimum height of 42" above the deck surface. Safety rails shall be spaced so as to prevent a 4" sphere from passing through the truss. Safety rails shall be placed on the inside or outside of the structure at the bridge fabricator's option. Safety rails placed on the inside of the truss shall have their ends sealed and ground smooth so as to produce no sharp edges. The safety rail system shall be designed for an infill loading of 200 pounds, applied horizontally at right angles, to a one square foot area at any point in the system.
  - 2. <u>Toe Plate</u> The bridge shall be supplied with a steel toe plate mounted to the inside face of both trusses. The toe plate shall be a minimum of 4 inches high. Toe plating will be welded to the truss members at a height adequate to provide a 2" gap between the bottom of the plate and the top of the deck or the top of the bottom chord, whichever is higher. The span of unstiffened flat toe plating (from center to center of supports) shall not exceed 5'-8".
  - 3. <u>Rub Rails</u> Rubrails shall be attached flush to the inside face of the bridge truss verticals and fastened with two carriage bolts at each support location. The span of

the rubrail from centerline to centerline of support shall not exceed 6'-6". The top of the rubrail shall be 3'-0" above the top of the deck (measured at the outside edge of the deck).

# 3.02 ENGINEERING

- A. Structural design of the bridge structure(s) shall be performed by or under the direct supervision of a licensed professional engineer and done in accordance with recognized engineering practices and principles. The Licensed Professional Engineer is to hold a current P.E. or S.E. license (where required) in the state where the bridge will be erected.
- B. Design Loads In considering design and fabrication issues, this structure shall be assumed to be statically loaded. No dynamic analysis shall be required, nor shall fabrication issues typically considered, for dynamically loaded structures be considered for this bridge. The Fracture Critical requirements have been waived, including article 8.2.3 of the AASHTO LRFD Guide Specification for Design of Pedestrian Bridges, December 2009.
  - 1. <u>Dead Load</u> The bridge structure design shall consider its own dead load (superstructure and original decking), as well as the additional loads listed below.
  - 2. <u>Live Load</u> Main supporting members shall be designed for a pedestrian live load of 90 pounds per square foot of bridge walkway area. The pedestrian live load shall be applied to those areas of the walkway so as to produce maximum factored load in the member being designed.
  - 3. <u>Concentrated Loads</u> The bridge superstructure, floor system and decking shall be designed for each of the following point load conditions: A four wheeled vehicle with the appropriate wheelbase, tire track and tire print area shall be applied. Bridge widths between 7 and including 10 feet shall be designed for an H-5 vehicle load (considering an 80% rear wheel distribution). A vehicle impact allowance is not required.
  - 4. <u>Wind Load Horizontal</u> The bridge(s) shall be designed for a minimum wind load of 35 pounds per square foot on the full vertical projected area of the bridge as if enclosed. Wind load shall be considered in accordance with AASHTO Signs and Luminaires, but in no case will the wind load be taken as less than 35 pounds per square foot. The wind load shall be applied horizontally at right angles to the longitudinal axis of the structure. The wind loading shall be considered both in the design of the lateral load bracing system and in the design of the truss vertical members, floor beams and their connections.
  - 5. <u>Wind Load Overturning</u> The effect of forces tending to overturn structures shall be calculated assuming that the wind direction is at right angles to the longitudinal axis of the structure. In addition, an upward force shall be applied at the windward quarter point of the transverse superstructure width. This force shall be 20 pounds per square foot of deck.
  - 6. <u>Top Chord/Rainling Loads</u> The top chord, truss verticals, and floor beams shall be designed for lateral wind loads as described above and for any loads required to provide top chord stability; however, in no case shall the load be less than 50 pounds

per lineal foot or a 200 pound point load, whichever produces greater stresses, applied in any direction at any point along the top chord or at the top of the safety system (42" or 54" above deck level), if higher than the top chord.

- 7. <u>Load Combinations</u> The load combinations shall follow AASHTO LRFD "Standard Specifications for Highway Bridges" latest edition.
- C. Design Limitations
  - 1. <u>Vertical Deflection</u> The vertical deflection of the main trusses due to service pedestrian live load shall not exceed 1/360 of the span. The deflection of the floor system members (floor beams and stringers) due to service pedestrian live load shall not exceed 1/360 of their respective spans. Deflection limits due to occasional vehicular traffic shall not be considered..
  - 2. <u>Horizontal Deflection</u> The horizontal deflection of the structure due to lateral wind loads shall not exceed 1/360 of the span under design wind load.
  - 3. <u>Vibrations</u> Vibration of the structure shall not cause discomfort or concern to users. Except as specified herein, the fundamental frequency in a vertical mode without live load shall be greater than 3.0 hertz. In the lateral direction, the fundamental frequency of the bridge shall be greater than 1.3 hertz.
  - 4. <u>Minimum Thickness of Metal</u> The minimum thickness of all structural steel members shall be 1/4" nominal and be in accordance with the AISC Manual of Steel Constructions' "Standard Mill Practice Guidelines". For ASTM A500 and ASTM A847 tubing, the section properties used for design shall be per the Steel Tube Institute of North America's Hollow Structural Sections "Dimensions and Section Properties".
  - 5. <u>Wind Load Overturning</u> The effect of forces tending to overturn structures shall be calculated assuming that the wind direction is at right angles to the longitudinal axis of the structure. In addition, an upward force shall be applied at the windward quarter point of the transverse superstructure width. This force shall be 20 pounds per square foot of deck.
  - 6. <u>Top Chord/Railing Loads</u> The top chord, truss verticals, and floor beams shall be designed for lateral wind loads as described above and for any loads required to provide top chord stability; however, in no case shall the load be less than 50 pounds per lineal foot or a 200 pound point load, whichever produces greater stresses, applied in any direction at any point along the top chord or at the top of the safety system (42" or 54" above deck level), if higher than the top chord.

# 3.03 BEARINGS

A. Bridge bearings shall consist of a steel setting or slide plate placed on the abutment or grout pad. The bridge bearing plate which is welded to the bridge structure shall bear on this setting plate. One end of the bridge will be fixed by fully tightening the nuts on the anchor bolts at that end. The opposite end will have finger tight only nuts to allow movement under thermal expansion or contraction.

- B. The bridge bearings shall sit in a recessed pocket on the concrete abutment. Minimum 28day strength for the abutment concrete shall be 3,000 PSI. The bearing seat shall be a minimum of 16" wide. The step height (from bottom of bearing to top-of-deck) shall be determined by the bridge manufacturer.
- C. Bridges in excess of 100 feet in length or bridges with dead load reactions of 15,000 pounds or more (at each bearing location) shall have Teflon on Teflon or stainless steel on Teflon slide bearings placed between the bridge bearing plate and the setting plate. The top slide plate shall be large enough to cover the lower Teflon slide surface at both temperature extremes.

# 3.04 FOUNDATIONS

- A. Unless specified otherwise, the bridge manufacturer shall determine the number, diameter, minimum grade, and finish of all anchor bolts. The anchor bolts shall be designed to resist all horizontal and uplift forces to be transferred by the superstructure to the supporting foundations.
- B. Engineering design of the anchor bolt embedments, shall be the responsibility of the Contractor. The contractor shall provide all materials for (including anchor bolts) and construction of the bridge supporting foundations. The contractor shall install the anchor bolts in accordance with the manufacturer's anchor bolt spacing dimensions.
- C. Information as to bridge support reactions and anchor bolt locations will be furnished by the bridge manufacturer after receipt of order and after the bridge design is complete.

#### 3.05 DELIVERY AND ERECTION

- A. Delivery is made to a location nearest the site which is easily accessible to normal over-theroad tractor/trailer equipment. The Contractor's attention is called to the fact that the proposed bridge locations will likely require traversing a minimum of 350' of unimproved/gravel roadway.
- B. The manufacturer shall provide detailed, written instruction in the proper lifting procedures and splicing procedures (if required). The method and sequence of erection shall be the responsibility of the Contractor.
- C. The bridge manufacturer shall provide written inspection and maintenance procedures to be followed by the bridge owner.

#### 3.06 PROTECTION

- A. Provide adequate protection for all surfaces of completed installations to prevent damage during remainder of construction activities.
- B. Bridges shall not be subjected to loading by Contractor equipment and/or materials for other portions of the Work, greater than the design loads
- C. Touch-up, repair or replace damaged products before Substantial Completion.

# 3.07 WARRANTY

- A. The bridge manufacturer shall warrant that it can convey good title to the goods, that they are free of liens and encumbrances and that their steel structure(s) are free of design, material, and workmanship defects for a period of ten years from the date of delivery.
- B. Durable hardwood decking, or hardwood attachments shall carry a ten-year warranty against rot, termite damage or fungal decay.

# PART 4 - MEASUREMENT AND PAYMENT

Refer to Section 01950 – Measurement and Payment for the measurement and payment items related to this Section.

#### \* \* \* END OF SECTION\* \* \*

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# **ELECTRICAL SPECIFICATIONS**



# SECTION 26 04 00 - GENERAL CONDITIONS FOR ELECTRICAL TRADES

#### PART 1 GENERAL

#### 1.1 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section "Summary."

#### 1.2 RELATED REQUIREMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. This section applies to certain sections of Division 8 "Openings", Division 33 "Utilities" and this section applies to all sections of Division 26, "Electrical" of this project specification unless specified otherwise in the individual sections.
- C. The Drawings of other trades (Architectural, Structural and Civil) shall be examined for coordination and familiarity of work with other Contractors. Any duplication or omission of provisions in this project should be brought to the attention of the Owners prior to Bidding.
- D. The Drawings of equipment suppliers shall be examined for coordination and familiarity of work with Owner's equipment suppliers.

#### 1.3 DESCRIPTION

- A. The General Conditions and Supplementary General Conditions are a part of this Division and are to be considered a part of this Contract.
- B. Where items of the General Conditions and Supplementary General Conditions are repeated in other Sections of the Specifications, it is merely intended to qualify or to call particular attention to them. It is not intended that any other parts of the General Conditions and Supplementary General Conditions shall be assumed to be omitted if not repeated therein. This Section applies equally and specifically to all Contractors supplying labor and/or equipment and/or materials as required under each Section of this Division. Where conflicts exist between the drawings and the specifications or between this section of the specifications and other sections, the more stringent or higher cost option shall apply.
- C. It is the intent of this Section of the Specifications to establish a standard of quality and performance characteristics for basic materials and installation methods used in building electrical, communications and electronic safety and security systems.

#### 1.4 INTENT

A. This contract is for all labor, materials and equipment required for installation. The system shall be complete and finished in all respects, tested and ready for operation.

Work shall include calibration of equipment with factory settings. All materials, equipment and apparatus shall be new and of first class quality.

- B. Any apparatus, appliance, material or work not shown on drawings but mentioned in the specifications, or vice versa, or any incidental accessories necessary to make the work complete and perfect in all respects and ready for operation as determined by good trade practice even if not particularly specified, shall be furnished, delivered and installed under their respective Divisions without any additional expense to the Owner.
- C. Minor details not usually shown or specified but necessary for proper installation and operation shall be included in the work as though they were hereinafter shown or specified.
- D. Work under each Section shall include giving written notice to the Owner and Engineer of any materials or apparatus believed inadequate or unsuitable; in violation of laws, ordinances, rules or regulations of authorities having jurisdiction; and any necessary items of work omitted. In the absence of such written notice, it is mutually agreed that work under each Section has included the cost of all required items for the accepted, satisfactory functioning of the entire system without extra compensation.
- E. Wherever a particular piece of equipment, device or material is specifically indicated on the Drawings by model number, type, series or other means, that specification shall take precedence over equipment or materials specified herein. For example: If a particular switch is specified on the Drawings, its specification takes precedence over switch specified herein.

#### 1.5 **DEFINITIONS**

- A. Word "Subcontractor" means specifically the subcontractor working under this Division. Other Contractors are specifically designated "Mechanical Subcontractor", "General Contractor" and so on. Note: Take care to ascertain limits of responsibility for connecting equipment which requires connections by two or more trades.
- B. Word "install" shall mean set in place complete with all mounting facilities and connections as necessary ready for normal use or service.
- C. Words "furnish" or "supply" shall mean purchase, deliver to, and off-load at the job site, all ready to be installed including where appropriate all necessary interim storage and protection.
- D. Word "provide" shall mean furnish (or supply) and install as necessary.
- E. Word "finished" refers to all rooms and areas scheduled to be painted in Room Finish Schedule on the drawings. All rooms and areas not covered in Schedule, including underground tunnels and areas above ceilings shall be considered not finished, unless otherwise noted.
- F. Words "approved equal" mean any product which in the opinion of the Engineer is equal in quality, arrangement, appearance, and performance to the product specified.

- G. Word "wiring" shall mean cable assembly, raceway, conductors, fittings and any other necessary accessories to make a complete wiring system. Word "product" shall mean any item of equipment, material, fixture, apparatus, appliance or accessory installed under this Division.
- H. Substitutions: Requests for changes in products, materials, equipment, and methods of construction required by Contract Documents proposed by the Contractor after award of the Contract are considered requests for "substitutions."
- I. Indicated: The term "indicated" refers to graphic representations, notes, or schedules on the Drawings, other paragraphs or schedules in the Specifications, and similar requirements in the Contract Documents. Where terms such as "shown," "noted," "scheduled," and "specified" are used, it is to help the reader locate the reference; no limitation on location is intended.
- J. Directed: Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean "directed by the Engineer," "requested by the Engineer," and similar phrases.
- K. Approve: The term "approved," where used in conjunction with the Engineer's action on the Contractor's submittals, applications, and requests, is limited to the Engineer's duties and responsibilities as stated in General and Supplementary Conditions.
- L. Regulation: The term "Regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.
- M. Remove: The term "remove" means "to disconnect from its present position, remove from the premises and to dispose of in a legal manner."
- N. Standard Product Warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Owner.
- O. Special Warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the Owner.

#### 1.6 DRAWINGS

- A. Drawings are diagrammatic and indicate the general arrangement of systems and work included in the Contract. Consult the Architectural Drawings and Details for exact location of fixtures and equipment; where same are not definitely located, obtain this information from the Architect. (Do not scale the drawings)
- B. Work under each Section shall closely follow Drawings in layout of work; check Drawings of other Divisions to verify spaces in which work will be installed. Maintain maximum headroom; where space conditions appear inadequate, Owner and Engineer shall be notified before proceeding with installations.
- C. The Owner may, without extra charge, make reasonable modifications in the layout as needed to prevent conflict with work of other trades and/or for proper execution of the work.
- D. Where variances occur between the Drawings and Specifications or within either of the Documents, the item or arrangement of better quality shall be included in the Contract price. The Owner and Engineer shall decide on the item and the manner in which the work shall be installed.

### 1.7 SURVEYS AND MEASUREMENTS

- A. Before submitting his Bid, the Contractors shall visit the site and become thoroughly familiar with all existing conditions under which his work will be installed. All new equipment and systems shall be fully operational under this Contract before the job is considered complete. The Contractors shall be held responsible for any assumptions he makes, any omissions or errors he makes as a result of his failure to become fully familiar with the existing conditions at the site and the Contract Documents.
- B. The Contractor shall base all measurements, both horizontal and vertical, from established bench marks. All work shall agree with these established lines and levels. Verify all measurements at the site and check the correctness of same as related to the work.
- C. Should the Contractor discover any discrepancies between actual measurements and those indicated which prevent following good practice or which interfere with the intent of the Drawings and Specifications, the Engineer will be notified and work will not proceed until instructions from the Engineer are received.

### 1.8 CODES AND STANDARDS

- A. Reference Standard Compliance
  - 1. Where equipment or materials are specified to conform to industry and technical society reference standards of the organizations such as American National Standards Institute (ANSI), American Society for Testing and Materials (ASTM), National Electrical Manufacturers Association (NEMA), and Underwriters Laboratories Inc. (UL), submit proof of such compliance. The label or listing by the specified organization will be acceptable evidence of compliance.
  - 2. Independent Testing Organization Certificate: In lieu of the label or listing, indicated above submit a certificate from an independent testing organization, competent to perform testing, and approved by the engineer. The certificate shall state that the item has been tested in accordance with the specified organization's test methods and that the item complies with the specified organization's reference standard.
- B. The Following Codes and Standards listed below apply to all electrical work. Wherever Codes and/or Standards are mentioned in these Specifications, the latest adopted edition or revision shall be followed:
  - 2022 Connecticut State Building Code
  - 2022 Connecticut State Fire Safety Code
  - 2021 International Building Code

2021 International Mechanical Code 2020 National Electrical Code

- C. The following Standards shall be used where referenced by the following abbreviations: American Institute of Architects AIA ANSI American National Standards Institute ASME American Society of Mechanical Engineers American Society of Testing and Materials ASTM **Environmental Protection Agency** EPA FM Factory Mutual **Federal Specification** FSSC Institute of Electrical and Electronics Engineers IEEE NBS National Bureau of Standards NEMA National Electrical Manufacturers Association International Electrical Testing Association NETA NFPA National Fire Protection Association National Safety Council NSC Occupational Safety and Health Administration **OSHA** Underwriters' Laboratories UL
- D. All materials furnished and all work installed shall comply with the rules and recommendations of the NFPA, the requirements of the local utility companies, the recommendations of the fire insurance rating organization having jurisdiction and the requirements of all Governmental departments having jurisdiction.
- E. The Contractor shall include in the work, without extra cost to the Owner, any labor, materials, services, apparatus and Drawings in order to comply with all applicable laws, ordinances, rules and regulations, whether shown on Drawings and/or specified or not.

### 1.9 PERMITS AND FEES

A. The Contractor shall give all necessary notices, obtain all permits; and pay all Government and State sales taxes and fees where applicable, and other costs, including utility connections or extensions in connection with the work, file all necessary Drawings, prepare all documents and obtain all necessary approvals of all Governmental and State departments having jurisdiction, obtain all required certificates of inspection for his work, and deliver a copy to the Owner and Engineer before request for acceptance and final payment for the work.

### 1.10 EQUIPMENT SUBSTITUTIONS

A. In these Contract Documents, one or more makes of materials, apparatus or appliances may have been specified for use in this installation. These describe the basis of design and approved equivalents. This has been done for convenience in fixing the standard of workmanship, finish and design required for installation without consideration of any or all costs associated but not limited to (structural, mechanical, or electrical feeder, breaker, or transformer requirements). The Contractor acknowledges that not all requirements are shown for either alternate acceptable manufacturers listed or those alternates requiring a request for substitution and it is their responsibility to coordinate all requirements necessary to accommodate any change from the basis of design listed or scheduled. The Contractor is required to submit any and all costs (including costs associated or required

by all trades) along with performance differences as part of their request for substitution. The details of workmanship, finish and design, and the guaranteed performance of any material, apparatus or appliance which the Contractor desires to deviate for those mentioned herein shall also conform to these standards.

- B. Where no specific make of material, apparatus or appliance is mentioned, any first-class product made by a reputable manufacturer may be submitted for the Engineers review.
- C. Where two or more names are given as approved manufacturers of equivalents, the Contractor must use the specified item or one of the named equivalents which still must meet all of the performance characteristics of the basis of design make and model. Where one name only is used and is followed by the words "or approved equal", the Contractor must use the item named or he is required to apply for a substitution. Where one name only is used, the Contractor must use that item named.
- D. Where the Contractor proposes to deviate (provide an equivalent or request for substitution) from the equipment or materials as hereinafter specified, they are required to submit a request for substitution in writing. The Contractor shall state in their request whether it is a substitution or a non approved equivalent to that specified and the amount of credit or extra cost involved. A copy of said request shall be included in the Base Bid with manufacturer's equipment cuts. The Base Bid shall be based on using the materials and equipment as specified with no exceptions.
- E. Where the Contractor proposes to use an item of equipment other than specified or detailed on the Drawings which requires any redesign of the structure, partitions, foundations, piping, wiring or any other part of the mechanical, electrical or architectural layout, all such redesign and all new drawings and detailing required therefore shall be prepared by the Engineers/Architects of Record at the expense of the Contractor and at no additional cost to the Owner.
- F. Where such accepted deviation resulting from using an approved equivalent or substitution requires a different quantity and arrangement of piping, ductwork, valves, pumps, insulation, wiring, conduit and equipment from that specified or indicated on the Drawings, the Contractor shall, after acceptance by the Engineer, furnish and install any such additional equipment required by the system at no additional cost to the Owner, including any costs added to other trades due to the deviation.
- G. Equipment, material or devices submitted for review as an "equivalent" shall meet the following requirements:
  - 1. The equivalent shall have the same construction features such as, but not limited to:
    - a. Material thickness, gauge, weight, density, etc.
    - b. Welded, riveted, bolted, etc., construction.
    - c. Finish, undercoating, corrosion protection.
    - d. In the case of lighting fixtures, equivalent shall also meet the form, shape, and function in the opinion of the Architect and Engineer.
  - 2. The equivalent shall perform with the same or better operating efficiency.
  - 3. The equivalent shall be locally represented by the manufacturer for service, parts and technical information.
  - 4. The equivalent shall bear the same labels of performance certification as is applicable to the specified item, such as UL or NEMA labels.

- H. Equipment, material or devices submitted for review as a "substitution" shall meet the following requirements:
  - 1. Substitution Request Submittal: Requests for substitution will be considered if received in writing 14 days before the bid date. Requests received later than 14 days before the bid date may be considered or rejected at the discretion of the Engineer/Owner. Once the Contractor submits a complete request for substitution as determined by the Engineer, the Engineer reserves the right to request the time necessary to evaluate the request for substitution and review it with the Owner.
  - 2. Submit three (3) copies of each request for substitution for consideration.
  - 3. Identify the product, or the fabrication or installation method to be replaced in each request. Include related Specification Section and Drawing numbers. Provide complete documentation showing compliance with the requirements for substitutions, and the following information, as appropriate:
    - a. Product Data, including Drawings and descriptions of products, fabrication and installation procedures.
    - b. Samples, where applicable or requested.
    - c. A detailed comparison of significant qualities of the proposed substitution with those of the Work specified. Significant qualities may include elements such as size, weight, durability, performance and visual effect.
    - d. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by the Owner and separate Contractors that will become necessary to accommodate the proposed substitution.
    - e. A statement indicating the substitution's effect on the Contractor's Construction Schedule compared to the schedule without approval of the substitution. Indicate the effect of the proposed substitution on overall Contract Time.
    - f. Cost information, including a proposal of the net change, if any in the Contract Sum.
    - g. Certification by the Contractor that the substitution proposed is equal-to or better in every significant respect to that required by the Contract Documents, and that it will perform adequately in the application indicated. Include the Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of the failure of the substitution to perform adequately.
    - h. Engineer's Action: Within one week of receipt of the request for substitution, the Engineer will notify the Contractor of acceptance or rejection of the proposed substitution. If a decision on use of a proposed substitute cannot be made or obtained within the time allocated, use the product specified by name. Acceptance of a product substitution will be in the form of an Addendum.
    - i. Other Conditions: The Contractor's substitution request will be received and considered by the Engineer when one or more of the following conditions are satisfied, as determined by the Engineer; otherwise requests will be returned without action except to record noncompliance with these requirements.
      - 1) The request is directly related to an "or equal" clause or similar language in the Contract Documents.

- 2) The specified product or method of construction cannot be provided within the Contract Time. The request will not be considered if the product or method cannot be provided as a result of failure to pursue the Work promptly or coordinate activities properly.
- 3) A substantial advantage is offered the Owner, in terms of cost, time, energy conservation or other considerations of merit, after deducting offsetting responsibilities the Owner may be required to bear. Additional responsibilities for the Owner may include additional compensation to the Engineer for redesign and evaluation services, increased cost of other construction by the Owner or separate Contractors, and similar considerations.

### 1.11 SUBMITTAL PROCEDURES

- A. Provide Submittals in accordance with the requirements of Division 1 and as indicated in the following.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.
  - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals and related activities that require sequential activity.
  - 2. Coordinate transmittal of different types of submittals for related elements of the Work so processing will not be delayed by the need to review submittals concurrently for coordination. The Engineer reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Processing: Allow sufficient review time so that installation will not be delayed as a result of the time required to process submittals, including time for resubmittals.
  - 1. Allow two weeks for initial review. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. The Engineer will promptly advise the Contractor when a submittal being processed must be delayed for coordination.
  - 2. If an intermediate submittal is necessary, process the same as the initial submittal.
  - 3. Allow two weeks for reprocessing each submittal.
  - 4. No extension of Contract Time will be authorized because of failure to transmit submittals to the Engineer sufficiently in advance of the Work to permit processing.
- D. Submittal Preparation: Place a permanent label or title block on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label or title block.
  - 1. Include the following information on the label for processing and recording action taken.
    - a. Project name.
    - b. Date.
    - c. Name and address of Engineer.
    - d. Name and address of Contractor.

- e. Name and address of subcontractor.
- f. Name and address of supplier.
- g. Name of manufacturer.
- h. Number and title of appropriate Specification Section.
- i. Drawing number and detail references, as appropriate.
- E. Submittal Transmittal: Package each submittal appropriately for transmittal and handling. Transmit each submittal from Contractor to Engineer using a transmittal form. Submittals received from sources other than the Contractor will be returned without action. On the transmittal, record relevant information and requests for data. On the form, or separate sheet, record deviations from Contract Document requirements, including minor variations and limitations. Include Contractor's certification that information complies with Contract Document requirements.
- F. Except for submittals for record, information or similar purposes, where action and return is required or requested, the Engineer will review each submittal, mark to indicate action taken, and return promptly. Compliance with specified characteristics is the Contractor's responsibility.
- G. Action Stamp: The Engineer will stamp each submittal with a uniform, self-explanatory action stamp. The stamp will be appropriately marked, to indicate the action taken.

#### 1.12 SHOP DRAWINGS

- A. Submit newly prepared information, drawn to accurate scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the Project is not considered Shop Drawings.
- B. The Contractor shall submit for review detailed shop drawings of all equipment and material specified in each section and coordinated ductwork layouts. No material or equipment may be delivered to the job site or installed until the Contractor has received shop drawings for the particular material or equipment which have been properly reviewed. Shop drawings shall be submitted within 60 days after award of Contract before any material or equipment is purchased. The Contractor shall submit for review copies of all shop drawings to be incorporated in the Electrical Contract. Refer to the General Conditions and Supplementary General Conditions for the quantity of copies required for submission. Where quantities are not specified, provide seven (7) copies for review.
- C. Provide shop drawings for all devices specified under equipment specifications for all systems including fire alarm, switchgear, clock, lighting, etc., or where called for elsewhere in the Specifications. Shop drawings shall include manufacturers' names, catalog numbers, cuts, diagrams, dimensions, identification of products and materials included, compliance with specified standards, notation of coordination requirements, notation of dimensions established by field measurement and other such descriptive data as may be required to identify and accept the equipment. A complete list in each category (example: all fixtures) of all shop drawings, catalog cuts, material lists, etc., shall be submitted to the Engineer at one time. No consideration will be given to a partial shop drawing submittal.

- D. Submittals shall be marked with the trade involved, i.e., Electrical, HVAC, Fire Protection, etc. when the submittal could involve more than one trade.
- E. Where multiple quantities or types of equipment are being submitted, provide a cover sheet (with a list of contents) on the submittal identifying the equipment or material being submitted.
- F. Failure to submit shop drawings in ample time for review shall not entitle the Contractor to an extension of Contract time. No claim for extension by reason of such default will be allowed, nor shall the Contractor be entitled to purchase, furnish and/or install equipment which has not been reviewed by the Engineer.
- G. The Contractor shall furnish all necessary templates, patterns, etc., for installation work and for the purpose of making adjoining work conform; furnish setting plans and shop details to other trades as required.
- H. Acceptance rendered on shop drawings shall not be considered as a guarantee of measurements or building conditions. Where drawings are reviewed, review does not mean that drawings have been checked in detail; said approval does not in any way relieve the Contractor from his responsibility or necessity of furnishing material or performing work as required by the Contract Drawings and Specifications. Verify available space prior to submitting shop drawings.
- I. Acceptance of shop drawings shall not apply to quantity nor relieve Contractor of his responsibility to comply with intent of Drawings and Specifications.
- J. Acceptance of shop drawings is final and no further changes will be allowed without the written consent of the Engineer.
- K. Shop drawing submittal sheets which may show items that are not being furnished shall have those items crossed off to clearly indicate which items will be furnished.
- L. Bidders shall not rely on any verbal clarification of the Drawings and/or Specifications. Any questions shall be referred to the Engineer in writing at least five (5) working days prior to Bidding to allow for issuance of an Addendum.
- M. Do not use Shop Drawings without an appropriate final stamp indicating action taken in connection with construction.

### 1.13 COORDINATION DRAWINGS

- A. Prepare coordination drawings in accordance with Division 1 Section "PROJECT COORDINATION," to a scale of 1/4"=1'-0" or larger; detailing major elements, components, and systems of electrical equipment and materials in relationship with other systems, installations, and building components. Indicate locations where space is limited for installation and access and where sequencing and coordination of installations are of importance to the efficient flow of the Work, including (but not necessarily limited to) the following:
  - 1. Indicate the proposed locations of light fixtures, switchboards, panelboards, lighting inverters, conduits, cabinets, etc. Include the following:
  - 2. Clearances for installing and maintaining insulation.

- 3. Clearances for servicing and maintaining equipment, including NEC requirements and space for equipment disassembly required for periodic maintenance.
- 4. Equipment connections and support details.
- 5. Exterior wall and foundation penetrations.
- 6. Fire-rated wall and floor penetrations.
- 7. Sizes and locations of required concrete pads and bases.
- B. Indicate scheduling, sequencing, movement, and positioning of large equipment into the building during construction.
- C. Prepare floor plans, elevations, and details to indicate penetrations in floors, walls, and ceilings and their relationship to other penetrations and installations.

### 1.14 COORDINATION WITH OTHER DIVISIONS

- A. All work shall be carried out in conjunction with other trades and full cooperation shall be given in order that all work may proceed with a minimum of delay and interference. Particular emphasis is placed on timely installation of major apparatus and furnishing other Contractors, especially the Contractor or Construction Manager, with information as to openings, chases, sleeves, bases, inserts, equipment locations, panels, etc., required by other trades.
- B. The Contractors are required to examine all of the Project Drawings and mutually arrange work so as to avoid interference with the work of other trades. The Engineer shall make final decisions regarding the arrangement of work which cannot be agreed upon by the Contractors.
- C. Where the work of the Contractor will be installed in close proximity to or will interfere with work of other trades, the Contractors will cooperate in working out space conditions to make a satisfactory adjustment.
- D. If the work under a Section is installed before coordinating with other Divisions or Sections or so as to cause interference with work of other Sections, the necessary changes to correct the condition shall be made by the Contractor causing the interference without extra charge to the Owner.
- E. If so directed in other Sections, the Contractor indicated shall prepare composite working drawings and sections clearly showing how the work is to be installed in relation to the work of other trades, at no extra charge to the Owner.
- F. Div. 27 Communications: This contractor is required to provide all required power, infrastructure (conduit, raceways, backboxes, drag lines,...etc.) and installation of specialty backboxes to support the installation of the systems provided by the Owner. Coordinate requirements with the Owner.
- G. Div. 28 Security: This contractor is required to provide all required power, infrastructure (conduit, raceways, backboxes, drag lines, telecommunications station outlets...etc.) to support the installation of the system provided by the Owner. Coordinate all work with the Owner.

#### 1.15 WORKMANSHIP

- A. Service Support: The equipment items shall be supported by service organizations which are reasonably convenient to the equipment installation in order to render satisfactory service to the equipment on a regular and emergency basis during the warranty period of the contract.
- B. Modification of References: In each of the publications referred to herein, consider the advisory provisions to be mandatory, as though the word, "shall" had been substituted for "should" wherever it appears.
- C. The Contractor shall furnish the services of an experienced superintendent who shall be constantly in charge of the installation of the work together with all skilled workmen, journeymen, electricians, helpers and laborers required to unload, transfer, erect, connect, adjust, start, operate and test each system.
- D. Unless otherwise specifically indicated on the Drawings or Specifications, all equipment and materials shall be installed with the acceptance of the Engineer and in accordance with the recommendations of the manufacturer. This includes the performance of such tests as the manufacturer recommends.
- E. All labor for installation of electrical systems shall be performed by experienced, skilled tradesmen under the supervision of a licensed journeyman foreman. All work shall be of a quality consistent with good trade practice and shall be installed in a neat, workmanlike manner. The Engineer reserves the right to reject any work which, in his opinion, has been installed in a substandard, dangerous or unserviceable manner. The Contractor shall replace said work in a satisfactory manner at no extra cost to the Owner.

### 1.16 SHUTDOWNS

- A. When installation of a new system requires the temporary shutdown of an operating system, the connection of the new system shall be performed at such time as designated by the Owner.
- B. The Engineer and the Owner shall be notified in writing of the estimated duration of the shutdown period at least ten (10) days in advance of the date the work is to be performed.
- C. Work shall be arranged for continuous performance whenever possible. The Contractor shall provide all necessary labor, including overtime if required, to assure that existing operating services will be shut down only during the time actually required to make necessary connections.

### 1.17 TEMPORARY UTILITIES

- A. General: Provide new materials and equipment; if acceptable to the Engineer, undamaged previously used materials in serviceable condition may be used. Provide materials suitable for the use intended.
- B. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Take necessary fire prevention measures. Do not

overload facilities, or permit them to interfere with progress. Do not allow hazardous dangerous or unsanitary conditions, or public nuisances to develop or persist on the site.

- C. First Aid Supplies: Comply with governing regulations.
- D. Fire Extinguishers: Provide hand-carried, portable UL-rated, class "A" fire extinguishers for temporary offices and similar spaces. In other locations provide hand-carried, portable, UL-rated, class "ABC" dry chemical extinguishers, or a combination of extinguishers of NFPA recommended classes for the exposures.
- E. Provide temporary lighting throughout construction activities.
  - 1. Use Charges: Cost or use charges for temporary facilities are not chargeable to the Owner or Engineer, and will not be accepted as a basis of claims for a Change Order.
  - 2. Temporary Electric Power Service: Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period. Include meters, transformers, overload protected disconnects, automatic ground-fault interrupters, and main distribution switch gear.
    - a. Except where overhead service must be used, install electric power service underground.
    - b. Power Distribution System: Install wiring overhead, and rise vertically where least exposed to damage. Where permitted, wiring circuits not exceeding 125 Volts, AC 20 ampere rating, and lighting circuits may be nonmetallic sheathed cable where overhead and exposed for surveillance.
  - 3. Temporary Telephones: Provide temporary telephone service for all personnel engaged in construction activities, throughout the construction period.
- F. Environmental Protection: Provide protection, operate temporary facilities and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways and subsoil might be contaminated or polluted, or that other undesirable effects might result. Avoid use of tools and equipment which produce harmful noise. Restrict use of noise making tools and equipment to hours that will minimize complaints from persons or firms near the site.
- G. Termination and Removal: Unless the Engineer requires that it be maintained longer, remove each temporary facility when the need has ended, or when replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with the temporary facility. Repair damaged Work, clean exposed surfaces and replace construction that cannot be satisfactorily repaired. Materials and facilities that constitute temporary facilities are property of the Contractor. The Owner reserves the right to take possession of Project identification signs.

### 1.18 PROTECTION OF MATERIALS AND EQUIPMENT

A. Work under each Section shall include protecting the work and material of all other Sections from damage by work or workmen and shall include making good all damage thus caused.

- B. The Contractor shall be responsible for work and equipment until the facility has been accepted by the Owner. Protect work against theft, injury or damage and carefully store material and equipment received on site which is not immediately installed. Close open ends of work with temporary covers or plugs during construction to prevent entry of foreign material.
- C. Work under each Section includes receiving, unloading, uncrating, storing, protecting, setting in place and completely connecting equipment supplied under each Section. Work under each Section shall also include exercising special care in handling and protecting equipment and fixtures, and shall include the cost of replacing any of the equipment and fixtures which are missing or damaged.
- D. Equipment and material stored on the job site shall be protected from the weather, vehicles, dirt and/or damage by workmen or machinery. Insure that all electrical or absorbent equipment or material is protected from moisture during storage.

### 1.19 ADJUSTING AND TESTING

- A. After all the equipment and accessories to be furnished are in place, they shall be put in final adjustment and subjected to such operating tests so as to assure the Engineer that they are in proper adjustment and in satisfactory, permanent operating condition.
- B. Where requested by the Engineer, a factory-trained service representative shall inspect the installation and assist in the initial startup and adjustment to the equipment. The period of these services shall be for such time as necessary to secure proper installation and adjustments. After the equipment is placed in permanent operation, the service representative shall supervise the initial operation of the equipment and instruct the personnel responsible for operation and maintenance of the equipment. The service representative shall notify the Contractor in writing that the equipment was installed according to manufacturers' recommendations and is operating as intended by the manufacturer.

### 1.20 CLEANING

- A. The Contractor shall thoroughly clean all equipment of all foreign substances, oils, dust, dirt, etc., inside and out before final acceptance by the Engineer.
- B. If any part of a system should be stopped or damaged by any foreign matter after being placed in operation, the system shall be disconnected, cleaned and reconnected wherever necessary to locate and/or remove obstructions. Any work damaged in the course of removing obstructions shall be repaired or replaced when the system is reconnected at no additional cost to the Owner.
- C. During the course of construction, all conduits shall be capped in an acceptable manner to insure adequate protection against the entrance of foreign matter.
- D. Upon completion of all work under the Contract, the Contractor shall remove from the premises all rubbish, debris and excess materials left over from his work.
- E. Complete the following cleaning operations before requesting inspection for Certification of Substantial Completion.

- 1. Remove labels that are not permanent labels.
- 2. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compound and other substances that are noticeable visionobscuring materials. Replace chipped or broken glass and other damaged transparent materials.
- 3. Clean exposed exterior and interior hard-surfaced finishes to a dust-free condition, free of stains, films and similar foreign substances. Restore reflective surfaces to their original reflective condition. Leave concrete floors broom clean. Vacuum carpeted surfaces and panelboard interiors.
- 4. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean light fixtures and lamps.
- F. Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the Owner's property. Do not discharge volatile, harmful or dangerous materials into drainage systems. Remove and dispose of ALL waste materials, packaging material, skids etc. from the site and dispose of in a lawful manner in accordance with municipal, state and federal regulations.
- G. Where extra materials of value remaining after completion of associated Work have become the Owner's property, arrange for disposition of these materials as directed.

### 1.21 OPERATING AND MAINTENANCE

- A. Upon completion of all work and tests, the Contractor shall furnish the necessary skilled labor and helpers for operating his system and equipment for a period specified under each applicable Section of this Division. During this period, he shall fully instruct the Owner or the Owner's representative in the operation, adjustment and maintenance of all equipment furnished. The Contractor shall give at least seven (7) days notice to the Owner and the Engineer in advance of this period.
- B. The Contractor shall include the maintenance schedule for the principal items of equipment furnished under this Division.
- C. The Contractor shall physically demonstrate procedures for all routine maintenance of all equipment furnished under each respective Section to assure accessibility to all devices.
- D. An authorized manufacturer's representative shall attest in writing that the equipment has been properly installed prior to startup of any major equipment. The following equipment will require this inspection: emergency generator, fire alarm system, nurse call system, paging systems, etc. These letters will be bound into the operating and maintenance books.
- E. Refer to individual trade Sections for any other particular requirements related to operating instructions.
- F. Demonstration shall be recorded on electronic media with two (2) copies turned over to the Owner.

#### **GRUPES RESEVOIR**

# 1.22 OPERATING AND MAINTENANCE MANUALS

- A. Prepare operating and maintenance manuals in accordance with the requirements of Division 1 and as follows. The Contractor shall prepare six (6) copies of a complete maintenance and operating instructions manual, bound in booklet form. Organize operating and maintenance data into suitable sets of manageable size. Bind properly indexed data in individual heavy-duty, 3-ring, vinyl-covered binders, with pocket folders for folded sheet information. Mark appropriate identification on front and spine of each binder.
- B. Manual shall include the following:
  - 1. Description of function, normal operating characteristics and limitations, performance curves, engineering data and tests, and complete nomenclature and commercial numbers of replacement parts.
  - 2. Manufacturer's printed operating procedures to include start-up, break-in, and routine and normal operating instructions; regulation, control, stopping, shutdown, and emergency instructions; and summer and winter operating instructions.
  - 3. Maintenance procedures for routine preventative maintenance and troubleshooting; disassembly, repair, and reassembly; aligning and adjusting instructions.
  - 4. Servicing instructions and lubrication charts and schedules.
  - 5. Emergency instructions.
  - 6. Spare parts list.
  - 7. Copies of warranties.
  - 8. Wiring diagrams.
  - 9. Recommended "turn around" cycles.
  - 10. Inspection procedures.
  - 11. Shop Drawings and Product Data.
  - 12. Equipment start-up reports.
- C. Include in the manual, a tabulated equipment schedule for all equipment. Schedule shall include pertinent data such as: make, model number, serial number, voltage, normal operating current, belt size, filter quantities and sizes, bearing number, etc. Schedule shall include maintenance to be done and frequency.
- D. Maintenance and instruction manuals shall be submitted to the Owner at the same time as the seven (7) day notice is given prior to the instruction period.

### 1.23 ACCEPTANCES

- A. The equipment, materials, workmanship, design and arrangement of all work installed under the Electrical Sections shall be subject to the review of the Engineer.
- B. Within 30 days after the awarding of a Contract, the Electrical Contractor shall submit to the Engineer, for review, a list of manufacturers of equipment proposed for the work under the Electrical Sections. The intent to use the exact makes specified does not relieve the Contractor of the responsibility of submitting such a list.
- C. If extensive or unacceptable delivery time is expected on a particular item of equipment specified, the Contractor shall notify the Owner and Engineer, in writing, within 30 days

SECTION 26 04 00 – Page 16 of 21 GENERAL CONDITIONS FOR ELECTRICAL TRADES of the awarding of the Contract. In such instances, deviations may be made pending acceptance by the Engineer or the Owner's representative.

- D. Where any specific material, process or method of construction or manufactured article is specified by reference to the catalog number of a manufacturer, the Specifications are to be used as a guide and are not intended to take precedence over the basic duty and performance specified or noted on the Drawings. In all cases, the Electrical Contractor shall verify the duty specified with the specific characteristics of the equipment offered for review. Equipment characteristics are to be used as mandatory requirements where the Contractor proposes to use an acceptable equivalent.
- E. If material or equipment is installed before it is reviewed and/or approved, the Contractor shall be liable for its removal and replacement at no extra charge to the Owner if, in the opinion of the Engineer, the material or equipment does not meet the intent of, or standard of quality implied by, the Drawings and Specifications.
- F. Failure on the part of the Engineer to reject shop drawings or to reject work in progress shall not be interpreted as acceptance of work not in conformance with the Drawings and/or Specifications. Work not in conformance with the Drawings and/or Specifications shall be corrected whenever it is discovered.

## 1.24 RECORD DRAWINGS

- A. General: Do not use record documents for construction purposes; protect from deterioration and loss in a secure, fire-resistive location; provide access to record documents for the Engineer's reference during normal working hours.
- B. Record Drawings: Maintain a clean, undamaged set of blue or black line white-prints of Contract Drawings and Shop Drawings. Mark the set to show the actual installation where the installation varies substantially from the Work as originally shown. Mark whichever drawing is most capable of showing conditions fully and accurately; where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.
  - 1. Mark record sets with red erasable pencil; use other colors to distinguish between variations in separate categories of the Work.
  - 2. Mark new information that is important to the Owner, but was not shown on Contract Drawings or Shop Drawings.
  - 3. Note related Change Order numbers where applicable.
  - 4. Organize record drawing sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates and other identification on the cover of each set.
  - 5. Final record documents shall be prepared in the latest Revit version and floppy disks or CD ROM of all drawings and a clean set of reproducible mylar sepias shall be turned over to the Owner at the completion of the work.

### 1.25 WARRANTIES AND BONDS

A. The following general administrative and procedural requirements for warranties and bonds required by the Contract Documents, including manufacturers standard warranties on products and special warranties are to be included:

- 1. General close-out requirements included in Section "Project Close-out."
- 2. Specific requirements for warranties for the Work and products and installation that are specified to be warranted are included in the individual Sections of Divisions 2 through 28.
- 3. Certifications and other commitments and agreements for continuing services to Owner are specified elsewhere in the Contract Documents.
- B. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.
- C. Separate Prime Contracts: Each prime Contractor is responsible for warranties related to its own Contract.

#### 1.26 WARRANTY REQUIREMENTS

- A. Related Damages and Losses: When correcting warranted Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.
- B. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.
- C. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.
- D. Owner's Recourse: Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligations, right and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights, or remedies.
- E. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.
- F. The Owner reserves the right to refuse to accept Work for the Project where a special warranty, certification, or similar commitment is required on such Work or part of the Work, until evidence is presented that entities required to countersign such commitments are willing to do so.
- G. Submit written warranties to the Engineer prior to the date certified for Substantial Completion. If the Engineer's Certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the Work, or a designated portion of the Work, submit written warranties upon request of the Engineer.

1.

- H. When a designated portion of the Work is completed and occupied or used by the Owner, by separate agreement with the Contractor during the construction period, submit properly executed warranties to the Engineer within fifteen days of completion of that designated portion of the Work.
- I. When a special warranty is required to be executed by the Contractor, or the Contractor and a subcontractor, supplier or manufacturer, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the Owner through the Engineer for approval prior to final execution.
  - Refer to individual Sections of Divisions 2 through 33 for specific content requirements, and particular requirements for submittal of special warranties.
- J. Form of Submittal: At Final Completion compile two copies of each required warranty and bond properly executed by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual.
- K. Bind warranties and bonds in heavy-duty, commercial quality, durable 3-ring vinyl covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2" by 11" paper.
  - 1. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product, and the name, address and telephone number of the installer.
  - 2. Identify each binder on the front and the spine with the typed or printed title "WARRANTIES AND BONDS," the Project title or name, and the name of the Contractor.
  - 3. When operating and maintenance manuals are required for warranted construction, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

# 1.27 GUARANTEES

- A. The Contractor shall guarantee all material and workmanship under these Specifications and the Contract for a period of one (1) year from the date of final acceptance by Owner. During this guarantee period, all defects developing through faulty equipment, materials or workmanship shall be corrected or replaced immediately by this Contractor without expense to the Owner. Such repairs or replacements shall be made to the Engineers satisfaction.
- B. Contractor shall provide name, address, and phone number of all contractors and subcontractors and associated equipment they provided

## 1.28 PROJECT CLOSE-OUT

- A. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications and similar documents.
- B. Deliver tools, spare parts, extra stock, and similar items.

- C. Complete start-up testing of systems, and instruction of the Owner's operating and maintenance personnel. Discontinue or change over and remove temporary facilities from the site, along with construction tools, mock-ups, and similar elements.
- D. Complete final clean up requirements, including touch-up painting. Touch-up and otherwise repair and restore marred exposed finishes.
- E. Inspection Procedures: On receipt of a request for inspection, the Engineer will either proceed with inspection or advise the Contractor of unfilled requirements. The Engineer will prepare the Certificate of Substantial Completion following inspection, or advise the Contractor of construction that must be completed or corrected before the certificate will be issued.
  - 1. The Engineer will repeat inspection when requested and assured that the Work has been substantially completed.
  - 2. Results of the completed inspection will form the basis of requirements for final acceptance.

END OF SECTION 26 04 00

# **CADD File Release Form**

#### DELIVERY OF CADD FILES FOR:

Project Name

In accepting and utilizing any drawings or other data on any form of electronic media generated and provided by the Design Professional, the Client covenants and agrees that all such drawings and data are instruments of service of the Design Professional, who shall be deemed the author of the drawings and data, and shall retain all common law, statutory law and other rights, including copyrights.

The Client further agrees not to use these drawings and data, in whole or in part, for any purpose or project other than the project which is the subject of this Agreement. The Client agrees to waive all claims against the Design Professional resulting in any way from any unauthorized changes or reuse of the drawings and data for any other project by anyone other than the Design Professional.

In addition, the Client agrees, to the fullest extent permitted by law, to indemnify and hold the Design Professional harmless from any damage, liability or cost, including reasonable attorneys' fees and costs of defense, arising from any changes made by anyone other than the Design Professional or from any reuse of the drawings and data without the prior written consent of the Design Professional.

Under no circumstances shall transfer of the drawings and other instruments of service on electronic media for use by the Client be deemed a sale by the Design Professional, and the Design Professional makes no warranties, either express or implied, of merchantability and fitness for any particular purpose.

Client's Signature

Company - Title

Architects' Signature

Firm - Title

Owner's Signature

Company - Title

Date

Date

Date

Date

# SECTION 26 05 03 - EQUIPMENT WIRING CONNECTIONS

### PART 1 GENERAL

### 1.1 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section "Summary."

### 1.2 SUMMARY

- A. Section includes electrical connections to equipment.
- B. Related Sections:
  - 1. Section 26 05 19 Building Wire and Cable.
  - 2. Section 26 05 33 Raceway and Boxes for Electrical Systems.
  - 3. Section 26 27 26 Wiring Devices.
- C. Related Requirements:
  - 1. The Drawings of other trades (Architectural) shall be examined for coordination and familiarity of work with other Contractors. Any duplication or omission of provisions in this project should be brought to the attention of the Owners prior to Bidding.

### 1.3 REFERENCES

- A. National Electrical Manufacturers Association:
  - 1. NEMA WD 1 General Requirements for Wiring Devices.
  - 2. NEMA WD 6 Wiring Devices-Dimensional Requirements.

### 1.4 SUBMITTALS

- A. Section 01 33 00 Submittal Procedures: Submittal procedures.
- B. Product Data: Submit wiring device manufacturer's catalog information showing dimensions, configurations, and construction.
- C. Manufacturer's installation instructions.

## 1.5 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 Execution and Closeout Requirements: Submittal procedures.
- B. Project Record Documents: Record actual locations, sizes, and configurations of equipment connections.
- 1.6 COORDINATION
  - A. Section 01 30 00 Administrative Requirements Coordination and project conditions.

- B. Obtain and review equipment schedules and specifications for equipment furnished under other sections.
- C. Obtain and review shop drawings, product data, manufacturer's wiring diagrams, and manufacturer's instructions for equipment furnished under other sections.
- D. Determine connection locations and requirements, including requirements for enclosed switches, control stations, safety devices, security devices, control wiring, and accessories for equipment furnished under other sections or by the Owner.
- E. Sequence rough-in of electrical connections to coordinate with installation of equipment. Do not proceed with rough-in without coordination of requirements for equipment furnished under other sections.
- F. Sequence electrical connections to coordinate with start-up of equipment.

## PART 2 PRODUCTS

## 2.1 CORD AND PLUGS

- A. Manufacturers:
  - 1. Hubbell.
  - 2. Leviton.
  - 3. Bryant.
  - 4. Substitutions: Section 01 60 00 Product Requirements
- B. Attachment Plug Construction: Conform to NEMA WD 1.
- C. Configuration: NEMA WD 6; match receptacle configuration at outlet furnished for equipment.
- D. Cord Construction: Type SO, SJO multi-conductor flexible cord with identified equipment grounding conductor, suitable for use in damp locations.
- E. Size: Suitable for connected load of equipment, length of cord, and rating of branch circuit overcurrent protection.

### PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Section 01 30 00 Administrative Requirements Coordination and project conditions.
- B. Verify equipment is ready for electrical connection, for wiring, and to be energized.

# 3.2 INSTALLATION

A. Make electrical connections.

- B. Make conduit connections to equipment using flexible conduit. Use liquidtight flexible conduit with watertight connectors in damp or wet locations.
- C. Connect heat producing equipment using wire and cable with insulation suitable for temperatures encountered.
- D. Install receptacle outlet to accommodate connection with attachment plug.
- E. Install cord and cap for field-supplied attachment plug.
- F. Install suitable strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.
- G. Install disconnect switches, controllers, control stations, security devices, safety devices and control devices to complete equipment wiring requirements.
- H. Install fuses, fuse holders and terminal block jumpers to complete equipment wiring requirements.
- I. Install interconnecting conduit and wiring between devices and equipment to complete equipment wiring requirements.
- J. Install conduit and wiring for interconnection of alarm initiating devices, control panels and annuciators furnished with equipment.
- K. Install conduit and wiring for interconnection of power supplies furnished by other divisions.

### 3.3 ADJUSTING

- A. Section 01 70 00 Execution and Closeout Requirements Testing, adjusting, and balancing.
- B. Cooperate with utilization equipment installers and field service personnel during checkout and starting of equipment to allow testing and balancing and other startup operations. Provide personnel to operate electrical system and checkout wiring connection components and configurations.

END OF SECTION 26 05 03

# SECTION 26 05 19 - BUILDING WIRE AND CABLE

### PART 1 GENERAL

### 1.1 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section "Summary."

## 1.2 SUMMARY

- A. Section includes building wire; and rated feeder wiring and wiring connectors and connections.
- B. Related Sections:
  - 1. Section 26 05 53 Identification for Electrical Systems: Product requirements for wire identification.

## 1.3 REFERENCES

- A. International Electrical Testing Association:
  - 1. NETA ATS Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.
- B. National Fire Protection Association:
  - 1. NFPA 70 National Electrical Code.
  - 2. NFPA 262 Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces.

### 1.4 SYSTEM DESCRIPTION

- A. Product Requirements: Provide products as follows:
  - 1. Solid conductor for feeders and branch circuits 10 AWG and smaller.
  - 2. Stranded conductors for control circuits.
  - 3. Conductor not smaller than 12 AWG for power and lighting circuits.
  - 4. Conductor not smaller than 14 AWG for control circuits.
  - 5. Increase wire size in branch circuits to limit voltage drop to a maximum of 3 percent.
- B. Wiring Methods: Provide the following wiring methods:
  - 1. Concealed Dry Interior Locations: Use only building wire, Type THHN/THWN insulation, in raceway.
  - 2. Exposed Dry Interior Locations: Use only building wire, Type THHN/THWN insulation, in raceway.
  - 3. Wet or Damp Interior Locations: Use only building wire, Type THWN-2/XHHW-2 insulation, in conduit.
  - 4. Exterior Locations: Use only building wire, Type XHHW-2 insulation, in rigid conduit.

### 1.5 DESIGN REQUIREMENTS

A. Conductor sizes are based on copper.

#### 1.6 SUBMITTALS

- A. Section 01 33 00 Submittal Procedures Requirements for submittals.
- B. Product Data: Submit for building wire and each cable assembly type.
- 1.7 CLOSEOUT SUBMITTALS
  - A. Section 01 70 00 Execution and Closeout Requirements: Requirements for submittals.
  - B. Project Record Documents: Record actual locations of components and circuits.

### 1.8 QUALITY ASSURANCE

- A. Provide wiring materials located in plenums with peak optical density not greater than 0.5, average optical density not greater than 0.15, and flame spread not greater than 5 feet (1.5 m) when tested in accordance with NFPA 262.
- B. Perform Work in accordance with the current issue of the State of Connecticut Building code.
- C. Maintain one copy of each document on site.

#### 1.9 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

#### 1.10 FIELD MEASUREMENTS

A. Verify field measurements are as indicated on Drawings.

### 1.11 COORDINATION

- A. Section 01 30 00 Administrative Requirements: Requirements for coordination.
- B. Where wire and cable destination is indicated and routing is not shown, determine routing and lengths required.

### PART 2 PRODUCTS

### 2.1 BUILDING WIRE

- A. Manufacturers:
  - 1. American Insulated Wire Corporation.
  - 2. General Cable Co.
  - 3. SouthWire.

- 4. Substitutions: Section 01 60 00 Product Requirements.
- B. Product Description: Single conductor insulated wire.
- C. Conductor: Copper.
- D. Insulation: Refer to section 1.4, B.

## 2.2 WIRING CONNECTORS

- A. Split Bolt Connectors:
  - 1. Ilsco.
  - 2. Thomas Betts.
  - 3. Burndy.
  - 4. Buchanan.
  - 5. Substitutions: Substitutions: Section 01 60 00 Product Requirements.
- B. Solderless Pressure Connectors:
  - 1. Ilsco.
  - 2. Thomas Betts.
  - 3. Burndy.
  - 4. Buchanan.
  - 5. Substitutions: Substitutions: Section 01 60 00 Product Requirements.
- C. Spring Wire Connectors:
  - 1. Ilsco.
  - 2. Thomas Betts.
  - 3. Burndy.
  - 4. Buchanan.
  - 5. Substitutions: Substitutions: Section 01 60 00 Product Requirements.

### D. Compression Connectors:

- 1. Ilsco.
- 2. Thomas Betts.
- 3. Burndy.
- 4. Buchanan.
- 5. Substitutions: Substitutions: Section 01 60 00 Product Requirements.

# 2.3 TERMINATIONS

- A. Terminal lugs for Wires 6 AWG and Smaller: Solderless, compression type copper.
- B. Lugs for Wires 4 AWG and Larger: Color keyed, compression type copper, with insulating sealing collars.

### 2.4 WIRING ACCESSORIES

- A. Electrical Tape:
  - 1. Manufacturers:
    - a. 3M
    - b. Plymouth Rubber Europa

- Substitutions: See Division 01 General Requirements.
- 2. Vinyl Color Coding Electrical Tape: Integrally colored to match color code indicated; listed as complying with UL 510; minimum thickness of 7 mil; resistant to abrasion, corrosion, and sunlight; suitable for continuous temperature environment up to 221 degrees F.
- 3. Vinyl Insulating Electrical Tape: Complying with ASTM D3005 and listed as complying with UL 510; minimum thickness of 7 mil; resistant to abrasion, corrosion, and sunlight; conformable for application down to 0 degrees F and suitable for continuous temperature environment up to 221 degrees F.
- 4. Rubber Splicing Electrical Tape: Ethylene Propylene Rubber (EPR) tape, complying with ASTM D4388; minimum thickness of 30 mil; suitable for continuous temperature environment up to 194 degrees F and short-term 266 degrees F overload service.
- Heat Shrink Tubing: Heavy-wall, split-resistant, with factory-applied adhesive; rated 600 B. V; suitable for direct burial applications; listed as complying with UL 486D. 1.
  - Manufacturers:

c.

- a. 3M
  - Burndy LLC. b.
  - c. Thomas & Betts Corporation
  - Substitutions: See Division 01 General Requirements. d.
- C. Oxide Inhibiting Compound: Listed; suitable for use with the conductors or cables to be installed.
  - Manufacturers: 1.
    - a. Burndy LLC.
    - Ideal Industries, Inc. b.
    - Ilsco c.
    - d. Substitutions: See Division 01 – General Requirements.
- D. Wire Pulling Lubricant: Listed; suitable for use with the conductors or cables to be installed and suitable for use at the installation temperature.
  - Manufacturers: 1
    - a. 3M
    - b. American Polywater Corporation
    - Ideal Industries, Inc. c.
    - Substitutions: See Division 01 General Requirements. d.
- E. Cable Ties: Material and tensile strength rating suitable for application.
  - Manufacturers:
    - Burndy LLC. a.
    - Substitutions: See Section 01 Product Requirements. b.
  - Provide plenum rated cable ties. 2.

### PART 3 EXECUTION

3.1 **EXAMINATION** 

1.

Section 01 30 00 – Administrative Requirements: Coordination and project conditions. A.

- B. Verify interior of building has been protected from weather.
- C. Verify mechanical work likely to damage wire and cable has been completed.
- D. Verify raceway installation is complete and supported.

### 3.2 PREPARATION

- A. Completely and thoroughly swab raceway before installing wire.
- 3.3 INSTALLATION
  - A. Route wire and cable to meet Project conditions.
  - B. Neatly train and lace wiring inside boxes, equipment, and panelboards.
  - C. Identify and color code wire and cable under provisions of this section. Identify each conductor with its circuit number or other designation indicated.
  - D. Special Techniques–Building Wire in Raceway:
    - 1. Pull conductors into raceway at same time.
    - 2. Install building wire 4 AWG and larger with pulling equipment.
  - E. Special Techniques Cable:
    - 1. Protect exposed cable from damage.
    - 2. Support cables above accessible ceiling, using spring metal clips or cable ties to support cables from structure. Do not rest cable on ceiling panels.
    - 3. Use suitable cable fittings and connectors.
  - F. Special Techniques Wiring Connections:
    - 1. Clean conductor surfaces before installing lugs and connectors.
    - 2. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.
    - 3. Tape uninsulated conductors and connectors with electrical tape to 150 percent of insulation rating of conductor.
    - 4. Install split bolt connectors for copper conductor splices and taps, 6 AWG and larger.
    - 5. Install solderless pressure connectors with insulating covers for copper conductor splices and taps, 8 AWG and smaller.
    - 6. Install insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller.
  - G. Install stranded conductors for control circuits 14 AWG and smaller. Install crimp on fork terminals for device terminations. Do not place bare stranded conductors directly under screws.
  - H. Install terminal lugs on ends of 600 volt wires unless terminal lugs are furnished on connected device, such as circuit breakers.
  - I. Size lugs in accordance with manufacturer's recommendations for terminating wire sizes. Install 2-hole type lugs to connect wires 4 AWG and larger to copper bus bars.

J. For terminal lugs fastened together such as on motors, transformers and other apparatus, or when spaced between studs is small enough that lugs can turn and touch each other, insulate for dielectric strength 2-1/2 times normal potential of circuit.

#### 3.4 WIRE COLOR

- A. General:
  - 1. For wire sizes 10 AWG and smaller, install wire colors in accordance with the following:
    - a. Black and red for single phase circuits at 120/240 volts.
    - b. Black, red, and blue for circuits at 120/208 volts single or three phase.
    - c. Orange, brown, and yellow for circuits at 277/480 volts single or three phase.
  - 2. For wire sizes 8 AWG and larger, identify wire with colored tape at terminals, splices and boxes.
- B. Neutral Conductors: White. When two or more neutrals are located in one conduit, individually identify each with proper circuit number.
- C. Branch Circuit Conductors: Install three or four wire home runs with each phase uniquely color coded.
- D. Feeder Circuit Conductors: Uniquely color code each phase as indicated above.
- E. Ground Conductors:
  - 1. For 6 AWG and smaller: Green.
  - 2. For 4 AWG and larger: Identify with green tape at both ends and visible points including junction boxes.

### 3.5 FIELD QUALITY CONTROL

- A. Inspect and test in accordance with NETA ATS, except Section 4.
- B. Perform inspections and tests listed in NETA ATS, Section 7.3.1.

END OF SECTION 26 05 19

# SECTION 26 05 26 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

### PART 1 GENERAL

### 1.1 SECTION INCLUDES

- A. Grounding and bonding requirements.
- B. Conductors for grounding and bonding.
- C. Connectors for grounding and bonding.
- D. Ground bars.
- E. Ground rod electrodes.
- F. Ground plate electrodes.
- G. Ground enhancement material.

### 1.2 RELATED REQUIREMENTS

- A. Division 01 General Requirements
- B. Division 03– Concrete.
- C. Section 26 0400 General Conditions for Electrical Trades
- D. Section 26 0519 Electrical Power Conductors and Cables: Additional requirements for conductors for grounding and bonding, including conductor color coding.
  Includes oxide inhibiting compound
  - 1. Includes oxide inhibiting compound.
- E. Section 26 0553 Identification for Electrical Systems: Identification products and requirements.
- F. Section 26 5100 Lighting: Additional grounding and bonding requirements for polemounted luminaires.
- G. Section 33 7900 Site Grounding.
- 1.3 REFERENCE STANDARDS (follow the most currently adopted amended version)
  - A. IEEE 81 IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Grounding System.
  - B. NECA 1 Standard for Good Workmanship in Electrical Construction.
  - C. NEMA GR 1 Grounding Rod Electrodes and Grounding Rod Electrode Couplings.
  - D. NETA ATS Acceptance Testing Specifications for Electrical Power Equipment and Systems.

- E. NFPA 70 National Electrical Code.
- F. NFPA 99 Health Care Facilities Code.
- G. NFPA 780 Standard for the Installation of Lightning Protection Systems.
- H. UL 467 Grounding and Bonding Equipment.

## 1.4 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
  - 1. Coordinate the work with other trades to provide steel reinforcement complying with specified requirements for concrete-encased electrode.
  - 2. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.
- B. Sequencing:
  - 1. Do not install ground rod electrodes until final backfill and compaction is complete.

## 1.5 SUBMITTALS

- A. See Division 01 General Requirements.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for grounding and bonding system components.
- C. Shop Drawings:
  - 1. Indicate proposed arrangement for signal reference grids. Include locations of items to be bonded and methods of connection.
- D. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
- E. Field quality control test reports.
- F. Project Record Documents: Record actual locations of grounding electrode system components and connections.

### 1.6 QUALITY ASSURANCE

- A. Conform to requirements of NFPA 70.
- B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
- C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- D. Installer Qualifications for Signal Reference Grids: Company with minimum five years documented experience with high frequency grounding systems.

- E. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.
- 1.7 DELIVERY, STORAGE, AND HANDLING
  - A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

## PART 2 PRODUCTS

### 2.1 GROUNDING AND BONDING REQUIREMENTS

- A. Do not use products for applications other than as permitted by NFPA 70 and product listing.
- B. Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for a complete grounding and bonding system.
- C. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
- D. Grounding System Resistance:
  - 1. Achieve specified grounding system resistance under normally dry conditions unless otherwise approved by Architect. Precipitation within the previous 48 hours does not constitute normally dry conditions.
  - 2. Grounding Electrode System: Not greater than 5 ohms to ground, when tested according to IEEE 81 using "fall-of-potential" method.
  - 3. Between Grounding Electrode System and Major Electrical Equipment Frames, System Neutral, and Derived Neutral Points: Not greater than 0.5 ohms, when tested using "point-to-point" methods.
- E. Grounding Electrode System:
  - 1. Provide connection to required and supplemental grounding electrodes indicated to form grounding electrode system.
    - a. Provide continuous grounding electrode conductors without splice or joint.
    - b. Install grounding electrode conductors in raceway where exposed to physical damage. Bond grounding electrode conductor to metallic raceways at each end with bonding jumper.
  - 2. Other Metal Piping:
    - a. Provide connection to all metallic gas piping and miscellaneous metal piping of continuous lengths.
    - b. Bond in accordance with NFPA 70.
    - c. Size bonding conductor in accordance with NFPA 70.
  - 3. Ground Rod Electrode(s):
    - a. Provide three electrodes in an equilateral triangle configuration unless otherwise indicated or required.

- b. Space electrodes not less than 22 feet from each other and any other ground electrode.
- c. Provide ground enhancement material around electrode where indicated.
- d. Provide ground access well for each electrode.
- 4. Provide additional ground electrode(s) as required to achieve specified grounding electrode system resistance.
- F. Service-Supplied System Grounding:
  - 1. For each service disconnect, provide grounding electrode conductor to connect neutral (grounded) service conductor to grounding electrode system. Unless otherwise indicated, make connection at neutral (grounded) bus in service disconnect enclosure.
  - 2. For each service disconnect, provide main bonding jumper to connect neutral (grounded) bus to equipment ground bus where not factory-installed. Do not make any other connections between neutral (grounded) conductors and ground on load side of service disconnect.
- G. Bonding and Equipment Grounding:
  - 1. Provide bonding for equipment grounding conductors, equipment ground busses, metallic equipment enclosures, metallic raceways and boxes, device grounding terminals, and other normally non-current-carrying conductive materials enclosing electrical conductors/equipment or likely to become energized as indicated and in accordance with NFPA 70.
  - 2. Provide insulated equipment grounding conductor in each feeder and branch circuit raceway. Do not use raceways as sole equipment grounding conductor.
  - 3. Where circuit conductor sizes are increased for voltage drop, increase size of equipment grounding conductor proportionally in accordance with NFPA 70.
  - 4. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
  - 5. Terminate branch circuit equipment grounding conductors on solidly bonded equipment ground bus only. Do not terminate on neutral (grounded) or isolated/insulated ground bus.
  - 6. Provide bonding for interior metal piping systems in accordance with NFPA 70. This includes, but is not limited to:
    - a. Metal water piping where not already effectively bonded to metal underground water pipe used as grounding electrode.
    - b. Metal process piping.
  - 7. Provide bonding for metal building frame.
- H. Communications Systems Grounding and Bonding:
  - 1. Provide intersystem bonding termination at service equipment or metering equipment enclosure and at disconnecting means for any additional buildings or structures in accordance with NFPA 70.
  - 2. Provide bonding jumper in raceway from intersystem bonding termination to each communications room or backboard and provide ground bar for termination.
    - a. Bonding Jumper Size: 6 AWG, unless otherwise indicated or required.
    - b. Raceway Size: 3/4 inch trade size unless otherwise indicated or required.
    - c. Ground Bar Size: 1/4 by 2 by 12 inches unless otherwise indicated or required.
    - d. Ground Bar Mounting Height: 18 inches above finished floor unless otherwise indicated.

# 2.2 GROUNDING AND BONDING COMPONENTS

- A. General Requirements:
  - 1. Provide products listed, classified, and labeled as suitable for the purpose intended.
  - 2. Provide products listed and labeled as complying with UL 467 where applicable.
- B. Conductors for Grounding and Bonding, in Addition to Requirements of Section 26 0519:
  - 1. Use insulated copper conductors unless otherwise indicated.
    - a. Exceptions:
      - 1) Use bare copper conductors where installed underground in direct contact with earth.
      - 2) Use bare copper conductors where directly encased in concrete (not in raceway).
  - 2. Factory Pre-fabricated Bonding Jumpers: Furnished with factory-installed ferrules; size braided cables to provide equivalent gage of specified conductors.
- C. Connectors for Grounding and Bonding:
  - 1. Description: Connectors appropriate for the application and suitable for the conductors and items to be connected; listed and labeled as complying with UL 467.
  - 2. Unless otherwise indicated, use exothermic welded connections for underground, concealed and other inaccessible connections.
    - a. Exceptions:
      - 1) Use mechanical connectors for connections to electrodes at ground access wells.
  - 3. Unless otherwise indicated, use mechanical connectors, compression connectors, or exothermic welded connections for accessible connections.
    - Exceptions:

a.

- 1) Use exothermic welded connections for connections to metal building frame and bridge structure.
- 4. Manufacturers Mechanical and Compression Connectors:
  - a. Advanced Lightning Technology (ALT)
  - b. Burndy LLC.
  - c. Harger Lightning & Grounding
  - d. Thomas & Betts Corporation
  - e. Substitutions: See Division 01 General Requirements.
- 5. Manufacturers Exothermic Welded Connections:
  - a. Burndy LLC.
  - b. Cadweld, a brand of Erico International Corporation
  - c. ThermOweld, a brand of Continental Industries, Inc.Substitutions: See Division 01 General Requirements.
- D. Ground Bars:
  - 1. Description: Copper rectangular ground bars with mounting brackets and insulators.
  - 2. Size: As indicated.
  - 3. Holes for Connections: As indicated or as required for connections to be made.
  - 4. Manufacturers:
    - a. Advanced Lightning Technology (ALT)

- b. Erico International Corporation
- c. Harger Lightning & Grounding
- d. ThermOweld, a brand of Continental Industries, Inc.
- e. Substitutions: See Division 01 General Requirements.
- E. Ground Rod Electrodes:
  - 1. Comply with NEMA GR 1.
  - 2. Material: Copper-bonded (copper-clad) steel.
  - 3. Size: 3/4 inch diameter by 10 feet length, unless otherwise indicated.
  - 4. Where rod lengths of greater than 10 feet are indicated or otherwise required,
  - sectionalized ground rods may be used.
  - 5. Manufacturers:
    - a. Advanced Lightning Technology (ALT)
    - b. Erico International Corporation
    - c. Galvan Industries, Inc.
    - d. Harger Lightning & Grounding
    - e. Substitutions: See Division 01 General Requirements.
- F. Chemically-Enhanced Ground Electrodes:
  - 1. Description: Copper tube factory-filled with electrolytic salts designed to provide a low-impedance ground in locations with high soil resistivity; straight (for vertical installations) or L-shaped (for horizontal installations) as indicated or as required.
  - 2. Length: 10 feet.
  - 3. Integral Pigtail: Factory-attached, sized not less than grounding electrode conductor to be attached.
  - 4. Backfill Material: Grounding enhancement material recommended by electrode manufacturer.
  - 5. Manufacturers:
    - a. Advanced Lightning Technology (ALT)
    - b. Erico International Corporation
    - c. Harger Lightning & Grounding
    - d. ThermOweld, subsidiary of Continental Industries
    - e. Substitutions: See Division 01 General Requirements.
- G. Ground Enhancement Material:
  - 1. Description: Factory-mixed conductive material designed for permanent and maintenance-free improvement of grounding effectiveness by lowering resistivity.
  - 2. Resistivity: Not more than 20 ohm-cm in final installed form.
  - 3. Manufacturers:
    - a. Erico International Corporation
    - b. Harger Lightning & Grounding
    - c. ThermOweld, subsidiary of Continental Industries
    - d. Substitutions: See Division 01 General Requirements.
- H. Ground Access Wells:

1.

- Description: Open bottom round or rectangular well with access cover for testing and inspection; suitable for the expected load at the installed location.
  - a. Areas Exposed to Light Vehicular Traffic: Rated for not less than 22,500 pounds vertical design load.

- 2. Size: As required to provide adequate access for testing and inspection, but not less than minimum size requirements specified.
  - a. Round Wells: Not less than 8 inches in diameter.
  - b. Rectangular Wells: Not less than 12 by 12 inches.
- 3. Depth: As required to extend below frost line to prevent frost upheaval, but not less than 10 inches.
- 4. Cover: Factory-identified by permanent means with word "GROUND".
- 5. Manufacturers:
  - a. Advanced Lightning Technology (ALT)
  - b. Erico International Corporation
  - c. Harger Lightning & Grounding
  - d. ThermOweld, subsidiary of Continental Industries
  - e. Substitutions: See Division 01 General Requirements.
- I. Oxide Inhibiting Compound: Comply with Section 26 0519.

### PART 3 EXECUTION

### 3.1 EXAMINATION

- A. Verify that work likely to damage grounding and bonding system components has been completed.
- B. Verify that field measurements are as shown on the drawings.
- C. Verify that conditions are satisfactory for installation prior to starting work.

# 3.2 PREPARATION

A. Remove paint, rust, mill oils, surface contaminants at connection points.

### 3.3 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
- B. Perform work in accordance with NECA 1 (general workmanship).
- C. Ground Rod Electrodes: Unless otherwise indicated, install ground rod electrodes vertically. Where encountered rock prohibits vertical installation, install at 45 degree angle or bury horizontally in trench at least 30 inches deep in accordance with NFPA 70 or provide ground plates.
  - 1. Outdoor Installations: Unless otherwise indicated, install with top of rod 6 inches below finished grade.
  - 2. Indoor Installations: Unless otherwise indicated, install with 4 inches of top of rod exposed.
- D. Make grounding and bonding connections using specified connectors.
  - 1. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors. Do not remove conductor strands to facilitate insertion into connector.

- 2. Remove nonconductive paint, enamel, or similar coating at threads, contact points, and contact surfaces.
- 3. Exothermic Welds: Make connections using molds and weld material suitable for the items to be connected in accordance with manufacturer's recommendations.
- 4. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
- 5. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
- E. Install in accordance with IEEE 142.
- F. Install rod electrodes at locations as indicated on Drawings. Install additional rod electrodes to achieve specified resistance to ground.
- G. Equipment Grounding Conductor: Install separate, insulated conductor within each feeder and branch circuit raceway. Terminate each end on suitable lug, bus, or bushing.
- H. Install continuous grounding using underground cold water system, driven rods and building steel as grounding electrode. Where water piping is not available, install artificial station ground by means of driven rods or buried electrodes.
- I. Permanently ground entire light and power system in accordance with NEC, including service equipment, distribution panels, lighting panelboards, switch and starter enclosures, motor frames, grounding type receptacles, and other exposed non-current carrying metal parts of electrical equipment.
- J. Accomplish grounding of electrical system by using insulated grounding conductor installed with feeders and branch circuit conductors in conduits. Size grounding conductors in accordance with NEC. Install from grounding bus of serving panel to ground bus of served panel, grounding screw of receptacles, lighting fixture housing, light switch outlet boxes or metal enclosures of service equipment. Ground conduits by means of grounding bushings on terminations at panelboards with installed number 12 conductor to grounding bus.
- K. Permanently attach equipment and grounding conductors prior to energizing equipment.
- L. Common Ground Bonding with Lightning Protection System: Bond electric power system, grounding electrode system directly to lightning protection system earth connection at closest point to electric service grounding electrode. Use bonding conductor sized the same as system grounding conductor and install in conduit.
- M. Identify grounding and bonding system components in accordance with Section 26 0553.

# 3.4 FIELD QUALITY CONTROL

- A. See Division 01 General Requirements.
- B. Inspect and test in accordance with NETA ATS except Section 4.
- C. Perform inspections and tests listed in NETA ATS, Section 7.13.

- D. Perform ground electrode resistance tests under normally dry conditions. Precipitation within the previous 48 hours does not constitute normally dry conditions.
- E. Investigate and correct deficiencies where measured ground resistances do not comply with specified requirements.
- F. Submit detailed reports indicating inspection and testing results and corrective actions taken.

END OF SECTION
## SECTION 26 05 29 – HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

### PART 1 GENERAL

# 1.1 RELATED DOCUMENTS

A. Each Contractor, Subcontractor and/or supplier providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01 Section "Summary".

## 1.2 SUMMARY

- A. Section Includes:
  - 1. Conduit supports.
  - 2. Formed steel channel.
  - 3. Spring steel clips.
  - 4. Sleeves.
  - 5. Mechanical sleeve seals.
  - 6. Equipment bases and supports.
- B. Related Sections:
  - 1. Section 03 30 00 Cast-In-Place Concrete: Product requirements for concrete for placement by this section.

### 1.3 REFERENCES

- A. ASTM International:
  - 1. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.
  - 2. ASTM E119 Standard Test Methods for Fire Tests of Building Construction and Materials.
  - 3. ASTM E814 Standard Test Method for Fire Tests of Through-Penetration Fire Stops.
  - 4. ASTM E1966 Standard Test Method for Fire-Resistive Joint Systems.
- B. FM Global:
  - 1. FM Approval Guide, A Guide to Equipment, Materials & Services Approved By Factory Mutual Research For Property Conservation.
- C. National Fire Protection Association:
  - 1. NFPA 70 National Electrical Code.

### 1.4 SUBMITTALS

- A. Section 01 33 00 Submittal Procedures: Requirements for submittals.
- B. Shop Drawings: Indicate system layout with location and detail of trapeze hangers.
- C. Product Data:
  - 1. Hangers and Supports: Submit manufacturers catalog data including load capacity.

- D. Design Data: Indicate load carrying capacity of trapeze hangers and hangers and supports.
- E. Manufacturer's Installation Instructions:
   1. Hangers and Supports: Submit special procedures and assembly of components.

#### 1.5 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years experience.
- B. Installer: Company specializing in performing work of this section with minimum three years experience, approved by manufacturer.

#### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Accept materials on site in original factory packaging, labeled with manufacturer's identification.
- C. Protect from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original packaging.

#### 1.7 ENVIRONMENTAL REQUIREMENTS

A. Section 01 60 00 – Product Requirements: Environmental conditions affecting products on site.

### PART 2 PRODUCTS

### 2.1 SUPPORT AND ATTACHMENT COMPONENTS

- A. General Requirements:
  - 1. Provide all required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of electrical work.
  - 2. Provide products listed, classified, and labeled as suitable for the purpose intended, where applicable.
  - 3. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer's application criteria as required for the load to be supported. Include consideration for vibration, equipment operation, and shock loads where applicable.
  - 4. Do not use products for applications other than as permitted by NFPA 70 and product listing.
  - 5. Do not use wire, chain, perforated pipe strap, or wood for permanent supports unless specifically indicated or permitted.
  - 6. Steel Components: Use corrosion resistant materials suitable for the environment where installed.

- a. Indoor Dry Locations: Use zinc-plated steel or approved equivalent unless otherwise indicated.
- b. Outdoor under metal grate bridge: Use PVC coated galvanized steel components.
- c. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel, stainless steel, fiberglass or approved equivalent unless otherwise indicated.
- d. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
- e. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.

## 2.2 CONDUIT SUPPORTS

- A. Manufacturers:
  - 1. Allied Tube & Conduit Corp.
  - 2. O-Z Gedney Co.
  - 3. Thomas and Betts
  - 4. Substitutions: Section 01 60 00 Product Requirements.
- B. Hanger Rods: Threaded high tensile strength galvanized carbon steel with free running threads.
- C. Beam Clamps: Malleable Iron, with tapered hole in base and back to accept either bolt or hanger rod. Set screw: hardened steel.
  - 1. Provide PVC coated beam clamps when used with PVC coated conduit.
- D. Conduit clamps for trapeze hangers: Galvanized steel, notched to fit trapeze with single bolt to tighten.
  - 1. Provide PVC coated beam clamps when used with PVC coated conduit.
- E. Conduit clamps general purpose: Two hole malleable iron for surface mounted conduits.
  - 1. Provide PVC coated beam clamps when used with PVC coated conduit.
- F. Cable Ties: High strength nylon temperature rated to 185 degrees F, self-locking.

### 2.3 FORMED STEEL CHANNEL

- A. Manufacturers:
  - 1. Allied Tube & Conduit Corp.
  - 2. B-Line Systems.
  - 3. Unistrut Corp.
  - 4. Substitutions: Section 01 60 00 Product Requirements
- B. Product Description: Hot-Dipped- Galvanized 12 gage thick steel. With holes 1-1/2 inches on center.
  - 1. Provide PVC coated steel channel and fittings when used with PVC coated conduit.
- 2.4 SPRING STEEL CLIPS
  - A. Manufacturers:

- 1. Allied Tube & Conduit Corp.
- 2. B-Line Systems
- 3. Unistrut Corp.
- 4. Substitutions: Section 01 60 00 Product Requirements
- B. Product Description: Galvanized steel with mounting hole and screw closure.

## 2.5 SLEEVES

- A. Sleeves for conduit, raceway, cable tray, busway, or cable through Non-fire Rated Floors: 18 gage thick galvanized steel.
- B. Sleeves for conduit, raceway, cable tray, busway, or cable through Non-fire Rated Beams, Walls, Footings, and Potentially Wet Floors: Steel pipe or 18 gage thick galvanized steel.
- C. Sleeves for conduit, raceway, cable tray, busway, or cable through Fire Rated and Fire Resistive Floors and Walls, and Fire Proofing: Prefabricated fire rated sleeves including seals, UL listed matching fire resistive rating of the penetration.

## PART 3 EXECUTION

## 3.1 EXAMINATION

- A. Section 01 30 00 Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify openings are ready to receive sleeves.

### 3.2 PREPARATION

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter affecting bond of firestopping material.
- B. Obtain permission from Architect before using powder-actuated anchors.

# 3.3 INSTALLATION – HANGERS AND SUPPORTS

- A. Anchors and Fasteners:
  - 1. Concrete Structural Elements: Provide precast inserts and expansion anchors.
  - 2. Steel Structural Elements: Provide beam clamps, spring steel clips, steel ramset fasteners, and welded fasteners.
  - 3. Concrete Surfaces: Provide self-drilling anchors and expansion anchors.
  - 4. Hollow Masonry, Plaster, and Gypsum Board Partitions: Provide toggle bolts and hollow wall fasteners.
  - 5. Solid Masonry Walls: Provide expansion anchors and preset inserts.
  - 6. Sheet Metal: Provide sheet metal screws.
  - 7. Wood Elements: Provide wood screws.
- B. Inserts:
  - 1. Install inserts for placement in concrete forms.

- 2. Install inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
- 3. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches.
- 4. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.
- 5. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut recessed into and grouted flush with slab.
- C. Install conduit and raceway support and spacing in accordance with NEC.
- D. Do not fasten supports to pipes, ducts, mechanical equipment, or conduit.
- E. Install multiple conduit runs on common hangers.
- F. Supports:
  - 1. Fabricate supports from structural steel or formed steel channel. Install hexagon head bolts to present neat appearance with adequate strength and rigidity. Install spring lock washers under nuts.
  - 2. Install surface mounted cabinets and panelboards with minimum of four anchors.
  - 3. In wet and damp locations install steel channel supports to stand cabinets and panelboards 1 inch off wall.

### 3.4 INSTALLATION – SLEEVES

- A. Exterior watertight entries: Seal with adjustable interlocking rubber links.
- B. Conduit penetrations not required to be watertight: Sleeve and fill with silicon foam.
- C. Set sleeves in position in forms. Provide reinforcing around sleeves.
- D. Size sleeves large enough to allow for movement due to expansion and contraction. Provide for continuous insulation wrapping.
- E. Extend sleeves through floors 6 inches above finished floor level. Caulk sleeves.
- F. Where conduit or raceway penetrates floor, ceiling, or wall, close off space between conduit or raceway and adjacent work with fire stopping insulation and caulk. Provide close fitting metal collar or escutcheon covers at both sides of penetration.

# 3.5 FIELD QUALITY CONTROL

- A. Section 01 70 00 Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- 3.6 CLEANING
  - A. Section 01 70 00 Execution and Closeout Requirements: Requirements for cleaning.

#### **GRUPES RESEVOIR**

# 3.7 PROTECTION OF FINISHED WORK

- A. Section 01 70 00 Execution and Closeout Requirements: Requirements for protecting finished Work.
- B. Protect adjacent surfaces from damage by material installation.

END OF SECTION 26 05 29

# SECTION 26 05 33 - RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

### PART 1 GENERAL

### 1.1 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section "Summary."

### 1.2 SUMMARY

- A. Section Includes:
  - 1. Conduit Applications
  - 2. General Requirements
  - 3. Galvanized steel rigid metal conduit (RMC).
  - 4. PVC-coated galvanized steel rigid metal conduit (RMC).
  - 5. Flexible metal conduit (FMC).
  - 6. Liquidtight flexible metal conduit (LFMC).
  - 7. Electrical metallic tubing (EMT).
  - 8. Rigid polyvinyl chloride (PVC) conduit.
  - 9. Liquidtight flexible nonmetallic conduit (LFNC).
  - 10. Boxes.
  - 11. Underground Boxes/Handholes.
  - 12. Accessories.
  - B. Related Sections:
    - 1. Section 26 05 03 Equipment Wiring Connections.
    - 2. Section 26 05 26 Grounding and Bonding for Electrical Systems.
    - 3. Section 26 05 29 Hangers and Supports for Electrical Systems.
    - 4. Section 26 05 53 Identification for Electrical Systems.
    - 5. Section 26 27 26 Wiring Devices.
    - 6. Section 26 51 00 Interior Lighting.

### 1.3 REFERENCES

- A. American National Standards Institute:
  - 1. ANSI C80.1 Rigid Steel Conduit, Zinc Coated.
  - 2. ANSI C80.3 Specification for Electrical Metallic Tubing, Zinc Coated.
  - 3. ANSI C80.5 Aluminum Rigid Conduit (ARC).
- B. National Electrical Manufacturers Association:
  - 1. NEMA 250 Enclosures for Electrical Equipment (1000 Volts Maximum).
  - 2. NEMA FB 1 Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.
  - 3. NEMA RN 1 Polyvinyl-Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit.
  - 4. NEMA OS 1 Sheet Steel Outlet Boxes, Device Boxes, Covers, and Box Supports.

- 5. NEMA OS 2 Nonmetallic Outlet Boxes, Device Boxes, Covers, and Box Supports.
- 6. NEMA RN 1 Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit.
- 7. NEMA TC 2 Electrical Polyvinyl Chloride (PVC) Tubing and Conduit.
- 8. NEMA TC 3 PVC Fittings for Use with Rigid PVC Conduit and Tubing.

#### 1.4 SYSTEM DESCRIPTION

- A. Raceway and boxes located as indicated on Drawings, and at other locations required for splices, taps, wire pulling, equipment connections, and compliance with regulatory requirements. Raceway and boxes are shown in approximate locations unless dimensioned. Provide raceway to complete wiring system.
- B. Underground: Provide rigid steel conduit.
- C. Underground within 5 feet from Foundation Wall: Provide rigid steel conduit.
- D. Exposed under Metal Grate Bridge: Provide PVC coated rigid steel conduit. Provide cast iron junction boxes.
- E. Outdoor Locations, Above Grade: Provide rigid steel conduit. Provide cast metal, pull, and junction boxes.
- F. Interior Wet and Damp Locations: Provide rigid steel conduit. Provide cast metal outlet, junction, and pull boxes. Provide flush mounting outlet box in finished areas.

#### 1.5 DESIGN REQUIREMENTS

A. Minimum Raceway Size: 3/4 inch unless otherwise specified.

#### 1.6 SUBMITTALS

- A. Section 01 33 00 Submittal Procedures: Submittal procedures.
- B. Product Data: Submit for the following:
  - 1. Flexible metal conduit.
  - 2. Liquidtight flexible metal conduit.
  - 3. Rigid steel conduit.
  - 4. PVC coated rigid steel conduit.
  - 5. Raceway fittings.
  - 6. Conduit bodies.
  - 7. Pull and junction boxes.
- C. Manufacturer's Installation Instructions: Submit application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, and installation of Product.

## 1.7 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 Execution and Closeout Requirements: Closeout procedures.
- B. Project Record Documents:
  - 1. Record actual routing of conduits larger than 2 inch.
  - 2. Record actual locations and mounting heights of outlet, pull, and junction boxes.

## 1.8 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 Product Requirements: Product storage and handling requirements.
- B. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.
- C. Protect PVC conduit from sunlight.

## 1.9 COORDINATION

- A. Section 01 30 00 Administrative Requirements: Coordination and project conditions.
- B. Coordinate installation of outlet boxes for equipment connected under Section 26 05 03.

### PART 2 PRODUCTS

### 2.1 METAL CONDUIT

- A. Manufacturers:
  - 1. Allied Tube and Conduit.
  - 2. Western Tube and Conduit.
  - 3. Wheatland Tube Company.
  - 4. Substitutions: Section 01 60 00 Product Requirements.
- B. Rigid Steel Conduit: ANSI C80.1.
- C. Rigid Aluminum Conduit: ANSI C80.5.
- D. Fittings and Conduit Bodies: NEMA FB 1; material to match conduit.

# 2.2 PVC-COATED GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

### A. Manufacturers:

- 1. Allied Tube and Conduit.
- 2. Western Tube and Conduit.
- 3. Wheatland Tube Company.
- 4. Substitutions: See Division 01 General Requirements.
- B. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit with external polyvinyl chloride (PVC) coating complying with NEMA RN 1 and listed and labeled as complying with UL 6.

- C. Exterior Coating: Polyvinyl chloride (PVC), nominal thickness of 40 mil.
- D. Interior Coating: Urethane, minimum thickness of 2 mil.
- E. PVC-Coated Fittings:
  - 1. Manufacturer: Same as manufacturer of PVC-coated conduit to be installed.
  - 2. Non-Hazardous Locations: Use fittings listed and labeled as complying with UL 514B.
  - 3. Hazardous (Classified) Locations: Use fittings listed and labeled as complying with UL 1203 for the classification of the installed location.
  - 4. Material: Use steel or malleable iron.
  - 5. Exterior Coating: Polyvinyl chloride (PVC), minimum thickness of 40 mil.
  - 6. Interior Coating: Urethane, minimum thickness of 2 mil.
- F. PVC-Coated Supports: Furnish with exterior coating of polyvinyl chloride (PVC), minimum thickness of 15 mil.

## 2.3 PVC COATED LIQUIDTIGHT FLEXIBLE METAL CONDUIT

- A. Manufacturers:
  - 1. AFC Cable Systems.
  - 2. Calbrite.
  - 3. Electri-flex Company.
  - 4. Substitutions: Section 01 60 00 Product Requirements.
- B. Fittings: NEMA FB 1; material to match conduit.

### 2.4 OUTLET BOXES

- A. Manufacturers:
  - 1. Erico Products.
  - 2. Raco.
  - 3. Thomas & Betts Corp.
  - 4. Substitutions: Section 01 60 00 Product Requirements.
- B. Cast Boxes: NEMA FB 1, Type FD, aluminum. Furnish gasketed cover by box manufacturer.
- C. Wall Plates: Furnish gasketed cover.
- D. Provide boxes listed for "EXTRA DUTY" for exterior receptacle locations.

### 2.5 CAST IRON PULL AND JUNCTION BOXES

- A. Manufacturers:
  - 1. Appleton.
  - 2. Crouse-Hinds.
  - 3. O Z Gedney.
  - 4. Substitutions: Section 01 60 00 Product Requirements.

- B. Surface Mounted Cast Iron Box: NEMA 4; flat-flanged, surface mounted junction box:
  - 1. Material: Cast iron alloy.
  - 2. Cover: Galvanized steel; furnish with ground flange, neoprene gasket, and stainless steel cover screws.
- 2.6 Underground Boxes/Handholes:
  - 1. Description: In-ground, open bottom boxes furnished with flush, non-skid covers with legend indicating type of service and stainless steel tamper resistant cover bolts.
  - 2. Size: As indicated on drawings or as required.
  - 3. Depth: As required to extend below frost line to prevent frost upheaval, but not less than 12 inches.
  - 4. Provide logo on cover to indicate type of service.
  - 5. Applications:
    - a. Sidewalks and Landscaped Areas Subject Only to Occasional Nondeliberate Vehicular Traffic: Use polymer concrete enclosures, with minimum SCTE 77, Tier 15 load rating.
    - b. Pathways in Areas Subject Only To Occasional Nondeliberate Vehicular Traffic: Use polymer concrete enclosures, with minimum SCTE 77, Tier 22 load rating.
  - 6. Polymer Concrete Underground Boxes/Enclosures: Comply with SCTE 77.
    - a. Manufacturers:
      - 1) Hubbell Incorporated; Quazite Products
      - 2) NewBasis
      - 3) MacLean Highline
      - 4) Substitutions: See Division 01 General Requirements
    - b. Combination fiberglass/polymer concrete boxes/enclosures are acceptable.

### 2.7 ACCESSORIES

- A. Conduit Joint Compound: Corrosion-resistant, electrically conductive; suitable for use with the conduit to be installed.
- B. Pull Strings: Use nylon cord with average breaking strength of not less than 200 pound-force (890 N).
- C. Sealing Compound for Sealing Fittings: Listed for use with the particular fittings to be installed.
- D. Mechanical Sleeve Seals
- E. Manufacturers:
  - 1. Thunderline Link-Seal, Inc.
  - 2. NMP Corporation.
  - 3. PSI Link-Seal.
  - 4. Substitutions: See Division 01 General Requirements

- F. Product Description: Modular mechanical type, consisting of interlocking synthetic rubber links shaped to continuously fill annular space between object and sleeve, connected with bolts and pressure plates causing rubber sealing elements to expand when tightened, providing watertight seal and electrical insulation.
  - 1. Use: Provide for all penetrations through foundation walls.

### PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Section 01 30 00 Administrative Requirements: Coordination and project conditions.
- B. Verify outlet locations and routing and termination locations of raceway prior to rough-in.

## 3.2 INSTALLATION

- A. Ground and bond raceway and boxes in accordance with Section 26 05 26.
- B. Fasten raceway and box supports to structure and finishes in accordance with Section 26 05 29.
- C. Identify raceway and boxes in accordance with Section 26 05 53.
- D. Arrange raceway and boxes to maintain headroom and present neat appearance.

#### 3.3 INSTALLATION – RACEWAY

- A. Raceway routing is shown in approximate locations unless dimensioned. Route to complete wiring system.
- B. Arrange raceway supports to prevent misalignment during wiring installation.
- C. Support raceway using malleable iron straps and split hangers.
- D. Group related raceway; support using conduit rack. Construct rack using steel channel specified in Section 26 05 29.
- E. Do not support raceway with wire or perforated pipe straps. Remove wire used for temporary supports
- F. Do not attach raceway to ceiling support wires or other piping systems.
- G. Route exposed raceway parallel and perpendicular to walls.
- H. Maintain clearance between raceway and piping for maintenance purposes.
- I. Maintain 12 inch clearance between raceway and surfaces with temperatures exceeding 104 degrees F.
- J. Cut conduit square using saw or pipe cutter; de-burr cut ends.

- K. Bring conduit to shoulder of fittings; fasten securely.
- L. Install conduit hubs to fasten conduit to sheet metal boxes in damp and wet locations and to cast boxes.
- M. Install no more than equivalent of three 90 degree bends between boxes. Install conduit bodies to make sharp changes in direction, as around beams. Install factory elbows for bends in metal conduit larger than 2 inch size.
- N. Avoid moisture traps; install junction box with drain fitting at low points in conduit system.
- O. Seal all raceway entering a building from the exterior with sealant identified for use with the cable insulation, shield or other cabling components.
- P. Install fittings to accommodate expansion and deflection where raceway crosses expansion joints.
- Q. Install suitable pull string or cord in each empty raceway except sleeves and nipples.
- R. Install suitable caps to protect installed conduit against entrance of dirt and moisture.

#### 3.4 INSTALLATION – BOXES

- A. Install wall mounted boxes at elevations to accommodate mounting heights as indicated on Drawings.
- B. Adjust box location prior to rough-in to accommodate intended purpose.
- C. Orient boxes to accommodate wiring devices oriented as specified in Section 26 27 26.
- D. Do not fasten boxes to ceiling support wires or other piping systems.
- E. Support boxes independently of conduit.
- F. Install gang box where more than one device is mounted together. Do not use sectional box.
- G. Install gang box with plaster ring for single device outlets.

# 3.5 INTERFACE WITH OTHER PRODUCTS

- A. Install conduit to preserve fire resistance rating of partitions and other elements, using materials and methods in accordance with Section 07 84 13.
- B. Route conduit through roof openings for piping and ductwork or through suitable roof jack with pitch pocket. Coordinate location with roofing installation.
- C. Locate outlet boxes to allow luminaires positioned as indicated on reflected ceiling plan.

D. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices.

### 3.6 ADJUSTING

- A. Section 01 70 00 Execution and Closeout Requirements: Testing, adjusting, and balancing.
- B. Adjust flush-mounting outlets to make front flush with finished wall material.
- C. Install knockout closures in unused openings in boxes.

## 3.7 CLEANING

- A. Section 01 70 00 Execution and Closeout Requirements: Final cleaning.
- B. Clean interior of boxes to remove dust, debris, and other material.
- C. Clean exposed surfaces and restore finish.

END OF SECTION 26 05 33

# SECTION 26 05 53 – IDENTIFICATION FOR ELECTRICAL SYSTEMS

### PART 1 GENERAL

- 1.1 RELATED DOCUMENTS
  - A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section "Summary."

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Nameplates.
  - 2. Labels.
  - 3. Wire markers.
  - 4. Conduit markers.
  - 5. Stencils.
  - 6. Warning Signs and Labels.
  - 7. Underground Warning Tape.
  - 8. Misc. Identification Products.
- B. Related Sections:
  - 1. Section 09 90 00 Painting and Coating: Execution requirements for painting specified by this section.

#### 1.3 SUBMITTALS

- A. Section 01 33 00 Submittal Procedures Submittal procedures.
- B. Product Data:
  - 1. Submit manufacturer's catalog literature for each product required.
  - 2. Submit electrical identification schedule including list of wording, symbols, letter size, color coding, tag number, location, and function.
- C. Manufacturer's Installation Instructions: Indicate installation instructions, special procedures, and installation.

### 1.4 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of tagged devices; include tag numbers.

## 1.5 COORDINATION

A. Coordinate identification names, abbreviations, colors and other features with requirements of other Sections requiring identification. Use consistent designations throughout the project.

- B. Coordinate installation of identification application with completion of covering and painting of surfaces where identification is to be applied.
- C. Install identification before installation of acoustical ceilings and similar concealment.

### 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Section 01 60 00 Product Requirements: Requirements for transporting, handling, storing, and protecting products.
- B. Accept identification products on site in original containers. Inspect for damage.
- C. Accept materials on site in original factory packaging, labeled with manufacturer's identification, including product density and thickness.
- D. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

### 1.7 ENVIRONMENTAL REQUIREMENTS

- A. Section 01 60 00 Product Requirements: Environmental conditions affecting products on site.
- B. Install nameplates only when ambient temperature and humidity conditions for adhesive are within range recommended by manufacturer.

### PART 2 PRODUCTS

### 2.1 NAMEPLATES

- A. Manufacturers:
  - 1. Seton.
  - 2. Brady.
  - 3. Ideal Industries
  - 4. Substitutions: Section 01 60 00 Product Requirements. Product Description: Laminated three-layer plastic with engraved black letters on white contrasting background color. White letters on Red background for emergency equipment.
- B. Product Description: Laminated three-layer plastic with engraved white letters on black contrasting background color.
- C. Letter Size:
  - 1. 1/8 inch high letters for identifying individual equipment and loads.
  - 2. 1/4 inch high letters for identifying grouped equipment and loads.
- D. Minimum nameplate thickness: 1/8 inch.

# 2.2 EQUIPMENT LABELS

A. Manufacturers:

- 1. Seton.
- 2. Brady.
- 3. Ideal Industries
- 4. Substitutions: Section 01 60 00 Product Requirements. Product Description: Laminated three-layer plastic with engraved black letters on white contrasting background color. White letters on Red background for emergency equipment.

# 2.3 WARNING LABELS AND SIGNS

- A. Manufacturers:
  - 1. Seton.
  - 2. Brady.
  - 3. Ideal Industries
  - 4. Substitutions: Section 01 60 00 Product Requirements.
- B. Comply with NFPA 70 and OSHA 29 CFR 1910.145.
- C. Self-Adhesive Warning Labels: Factory printed, multicolor, pressure sensitive adhesive labels, configured for display on front cover, door, or other access to equipment unless otherwise indicated. Use for interior applications.
- D. Baked-enamel Warning Signs:
  - 1. Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend and size required for application.
  - 2.  $\frac{1}{4}$  inch grommets in corners for mounting.
  - 3. Use for exterior applications.

# 2.4 WIRE MARKERS

- A. Manufacturers:
  - 1. Seton.
  - 2. Brady.
  - 3. Ideal Industries

### 2.5 CONDUIT AND RACEWAY MARKERS

- A. Manufacturers:
  - 1. Seton.
  - 2. Brady.
  - 3. Ideal Industries
- B. Legend:
  - 1. 208 Volt System: 208 VOLTS.
  - 2. 480 Volt System: 480 VOLTS
  - 3. Emergency Power Systems: Emergency (with voltage following "Emergency")
  - 4. Standby Power Systems: Standby (with voltage following standy).
  - 5. Telephone System: Telephone
  - 6. Voice/Data Systems: Voice/Data
  - 7. Security System: Security

### 2.6 UNDERGROUND WARNING TAPE

- A. Manufacturers:
  - 1. Brady Corporation
  - 2. Brimar Industries, Inc.
  - 3. Seton Identification Products
  - 4. Substitutions: Division 01 General Requirements.
- B. Foil-backed Detectable Type Tape: 3 inches wide, with minimum thickness of 5 mil (0.1 mm), unless otherwise required for proper detection.
- C. Legend: Type of service, continuously repeated over full length of tape.
- D. Color:
  - 1. Tape for Buried Power Lines: Black text on red background.
  - 2. Tape for Buried Communication, Alarm, and Signal Lines: Black text on orange background.

## 2.7 DEVICE IDENTIFICATION

- A. Service Equipment:
  - 1. Labeling:
    - a. Indicate the maximum available fault current at the equipment, including the date the fault current calculation was performed. Label shall include warning for "Arc Flash Hazard" and requirement for "PPE protection".
    - b. Indicate Equipment designation.
  - 2. Identification:
    - a. Permanent directory at the service and utility meters indicating the location and feeders for:
      - 1) Generator and automatic transfer switches indicating emergency and standby power sources.
- B. Panelboards:
  - 1. Labeling:
    - a. Indicate power supply origin (panelboard or transformer) of source feeding the panelboard.
    - b. Indicate Panelboard designation.
- C. Receptacles:
  - 1. Labeling:
    - a. Indicate source panel and circuit number at each cover plate.
    - b. Cover plates shall be labeled with information indicated above using a permanent label.
- D. Enclosed switches, circuit breakers, and motor controllers:
  - 1. Identify voltage and phase.
  - 2. Identify power source and circuit number. Include location when not within sight of equipment.
  - 3. Identify load(s) served. Include location when not within sight of equipment.

## PART 3 EXECUTION

- 3.1 PREPARATION
  - A. Degrease and clean surfaces to receive adhesive for identification materials.

## 3.2 INSTALLATION

- A. Install identifying devices after completion of painting.
- B. Nameplate Installation:
  - 1. Install nameplate parallel to equipment lines.
  - 2. Install nameplate for each interior electrical distribution and control equipment enclosure with corrosive-resistant mechanical fasteners, or adhesive.
  - 3. Install nameplates for each interior control panel and major control components located outside panel with corrosive-resistant mechanical fasteners.
  - 4. Install nameplates for each exterior control panel and equipment enclosure to equipment front using corrosive-resistant fasteners or rivets.
  - 5. Secure nameplate to inside surface of door on recessed panelboard in finished locations.
  - 6. Install nameplates for the following:
    - a. Panelboards.
    - b. Disconnects.
    - c. Transfer Switches.
    - d. Control Panels.
- C. Label Installation:
  - 1. Install label parallel to equipment lines.
  - 2. Install label for identification of individual control device stations.
  - 3. Install labels for permanent adhesion and seal with clear lacquer.
- D. Wire Marker Installation:
  - 1. Install wire marker for each conductor at panelboard gutters, pull boxes and junction boxes.
  - 2. Mark data cabling at each end. Install additional marking at accessible locations along the cable run.
  - 3. Install labels at data outlets identifying patch panel and port designation.
- E. Underground Warning Tape Installation:
  - 1. Install underground warning tape along length of each underground conduit, raceway, or cable 12 inches below finished grade, directly above buried conduit, raceway, or cable.

END OF SECTION 26 05 53

# SECTION 26 24 16 - PANELBOARDS

#### PART 1 GENERAL

#### 1.1 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section "Summary."

#### 1.2 SUMMARY

- A. Section includes distribution and branch circuit panelboards.
- B. Related Sections:
  - 1. Section 26 05 26 Grounding and Bonding for Electrical Systems.
  - 2. Section 26 05 53 Identification for Electrical Systems.

#### 1.3 REFERENCES

- A. Institute of Electrical and Electronics Engineers:
  - 1. IEEE C62.41 Recommended Practice on Surge Voltages in Low-Voltage AC Power Circuits.
- B. National Electrical Manufacturers Association:
  - 1. NEMA AB 1 Molded Case Circuit Breakers and Molded Case Switches.
  - 2. NEMA FU 1 Low Voltage Cartridge Fuses.
  - 3. NEMA ICS 2 Industrial Control and Systems: Controllers, Contactors, and Overload Relays, Rated Not More Than 2000 Volts AC or 750 Volts DC.
  - 4. NEMA ICS 5 Industrial Control and Systems: Control Circuit and Pilot Devices.
  - 5. NEMA KS 1 Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum).
  - 6. NEMA PB 1 Panelboards.
  - 7. NEMA PB 1.1 General Instructions for Proper Installation, Operation, and Maintenance of Panelboards Rated 600 Volts or Less.
- C. International Electrical Testing Association:
  - 1. NETA ATS Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.
- D. National Fire Protection Association:
  - 1. NFPA 70 National Electrical Code.
- E. Underwriters Laboratories Inc.:
  - 1. UL 67 Safety for Panelboards.
  - 2. UL 1283 Electromagnetic Interference Filters.
  - 3. UL 1449 Transient Voltage Surge Suppressors.
- 1.4 SUBMITTALS
  - 1. Shop Drawings: Indicate outline and support point dimensions, voltage, main bus ampacity, integrated short circuit ampere rating, circuit breaker and fusible switch arrangement and sizes and with built in type 1 surge protection (SPD).

- B. Product Data: Submit catalog data showing specified features of standard products.
- C. Main disconnect ratings (if applicable):
  - 1. Voltage and ampacity ratings of the disconnect.
  - 2. Voltage, ampacity, and interrupting ratings of fuses.
- D. Branch device ratings including:
  - 1. Voltage, ampacity, and interrupting ratings of fused branch device.

### 1.5 CLOSEOUT SUBMITTALS

- A. Project Record Documents: Record actual locations of panelboards and record actual circuiting arrangements.
- B. Operation and Maintenance Data: Submit spare parts listing; source and current prices of replacement parts and supplies; and recommended maintenance procedures and intervals.

## 1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum five years documented experience.
- B. Fusible branch circuit panelboards shall be listed to UL 67.

### 1.7 MAINTENANCE MATERIALS

A. Furnish two of each panelboard key. Panelboards keyed alike.

# PART 2 PRODUCTS

### 2.1 BRANCH CIRCUIT PANELBOARDS

- A. Manufacturers:
  - 1. General Electric.
  - 2. Square D.
  - 3. Eaton/Cutler Hammer.
  - 4. Substitutions: Not permitted.
- B. Product Description: NEMA PB1, circuit breaker type, lighting and appliance branch circuit panelboard.
- C. Panelboard Bus: Copper current carrying components, ratings as indicated on Drawings. Furnish copper ground bus in each panelboard.
- D. Minimum Integrated Short Circuit Rating: Calculated based on primary transformer available SCR and as indicated on plans.
- E. SPD Devices: Provide integral Type 1 panel mounted surge protective device modules within all 240/120 volt branch power panelboards.
  - 1. IEEE C62.41surge protective device.
  - 2. 200 kA short circuit current rating.

- 3. Minimum current rating per phase: 250 kA.
- F. Molded Case Circuit Breakers: NEMA AB 1, bolt-on type thermal magnetic trip circuit breakers, with common trip handle for all poles, listed as Type SWD for lighting circuits, Type HACR for air conditioning equipment circuits, Class A ground fault interrupter circuit breakers as indicated on Drawings. Do not use tandem circuit breakers.
- G. Enclosure: NEMA PB 1, Type 1.
- H. Cabinet Box: 6 inches deep, 20 inches wide for 240 volt and less panelboards.
- I. Cabinet Front: Flush cabinet front with concealed hinge, metal directory frame, and flush lock keyed alike. Finish in manufacturer's standard gray enamel.

## PART 3 EXECUTION

### 3.1 INSTALLATION

- A. Install panelboards in accordance with NEMA PB 1.1.
- B. Install panelboards plumb.
- C. Install recessed panelboards flush with wall finishes.
- D. Height: 6 feet to top of panelboard; install panelboards taller than 6 feet with bottom no more than 4 inches above floor.
- E. Install filler plates for unused spaces in panelboards.
- F. Provide typed circuit directory for each branch circuit panelboard. Revise directory to reflect circuiting changes to balance phase loads.
- G. Install engraved plastic nameplates in accordance with Section 26 05 53.
- H. Install labeling indicated power supply origin of source feeding panelboard in accordance with Section 26 05 53.
- I. Ground and bond panelboard enclosure according to Section 26 05 26. Connect equipment ground bars of panels in accordance with NFPA 70.

### 3.2 FIELD QUALITY CONTROL

- A. Section 01 70 00 Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Inspect and test in accordance with NETA ATS, except Section 4.
- C. Perform circuit breaker inspections and tests listed in NETA ATS, Section 7.6.
- D. Perform switch inspections and tests listed in NETA ATS, Section 7.5.

E. Perform controller inspections and tests listed in NETA ATS, Section 7.16.1.

# 3.3 ADJUSTING

- A. Section 01 70 00 Execution and Closeout Requirements: Requirements for starting and adjusting.
- B. Measure steady state load currents at each panelboard feeder; rearrange circuits in panelboard to balance phase loads to within 20 percent of each other. Maintain proper phasing for multi-wire branch circuits.

END OF SECTION 26 24 16

# **SECTION 26 27 26 - WIRING DEVICES**

### PART 1 GENERAL

### 1.1 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section "Summary."

### 1.2 SUMMARY

- A. Section includes wall switches; receptacles; device plates and box covers.
- B. Related Sections:
  - 1. Section 26 05 33 Raceway and Boxes for Electrical Systems: Outlet boxes for wiring devices.

#### 1.3 REFERENCES

- A. National Electrical Manufacturers Association:
  - 1. NEMA WD 1 General Requirements for Wiring Devices.
  - 2. NEMA WD 6 Wiring Devices-Dimensional Requirements.

## 1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's catalog information showing dimensions, colors, and configurations.
- B. Samples: Submit two samples of each wiring device and wall plate illustrating materials, construction, color, and finish.

#### 1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

### 1.6 EXTRA MATERIALS

A. Furnish two of each style, size, and finish wall plate.

### PART 2 PRODUCTS

# 2.1 RECEPTACLES

- A. Manufacturers:
  - 1. Hubbell Wiring Products.
  - 2. Leviton.
  - 3. Bryant.
  - 4. Pass and Seymour.

- 5. Substitutions: Section 01 60 00 Product Requirements.
- B. Product Description: NEMA WD 1, General-duty general use receptacle.
- C. Device Body: Off White.
- D. Configuration: NEMA WD 6, type as indicated on Drawings.
- E. Convenience Receptacle: Type 5-20R.
- F. GFCI Receptacle: Convenience receptacle with integral ground fault circuit interrupter to meet regulatory requirements.
- G. Specification grade device.

## 2.2 WALL PLATES.

- A. Manufacturers:
  - 1. Hubbell Wiring Products.
  - 2. Leviton.
  - 3. Bryant.
  - 4. Pass and Seymour.
  - 5. Substitutions: Section 01 60 00 Product Requirements.
- B. Decorative Cover Plate: 302 stainless steel.
- C. Weatherproof Cover Plate: Gasketed cast metal plate and gasketed device cover.
  1. Provide "in-use" gasketed cover plates for exterior GFCI receptacles.

### PART 3 EXECUTION

- 3.1 EXAMINATION
  - A. Verify outlet boxes are installed at proper height.
  - B. Verify wall openings are neatly cut and completely covered by wall plates.
  - C. Verify branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

### 3.2 PREPARATION

A. Clean debris from outlet boxes.

### 3.3 INSTALLATION

- A. Install devices plumb and level.
- B. Install receptacles with grounding pole on top.
- C. Connect wiring device grounding terminal to outlet box with bonding jumper and branch circuit equipment grounding conductor.

- D. Install weatherproof receptacle cover, in outdoor areas.
- E. Connect wiring devices by wrapping solid conductor around screw terminal. Install stranded conductor for branch circuits 10 AWG and smaller. When stranded conductors are used in lieu of solid, use insulated crimp on fork terminals for device terminations. Do not place bare stranded conductors directly under device screws.

# 3.4 INTERFACE WITH OTHER PRODUCTS

A. Coordinate locations of outlet boxes provided under Section 26 05 33 to obtain mounting heights as specified and as indicated on drawings.

## 3.5 FIELD QUALITY CONTROL

- A. Inspect each wiring device for defects.
- B. Verify each receptacle device is energized.
- C. Test each receptacle device for proper polarity.
- D. Test each GFCI receptacle device for proper operation.

### 3.6 ADJUSTING

A. Adjust devices and weatherproof devices to be level.

END OF SECTION 26 27 26

## SECTION 26 28 26 - MANUAL TRANSFER SWITCH & GENERATOR DOCKING STATION

### PART 1 GENERAL

### 1.1 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section "Summary."

## 1.2 SUMMARY

- A. Section includes transfer switches in individual enclosures.
- B. Related Sections:
  - 1. Section 26 05 53 Identification for Electrical Systems.

## 1.3 REFERENCES

- A. National Electrical Manufacturers Association:
  - 1. NEMA ICS 10 Industrial Control and Systems: AC Transfer Switch Equipment.
- B. International Electrical Testing Association:
  - 1. NETA ATS Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.
- C. Underwriters Laboratories Inc.:
  1. UL 1008 Transfer Switch Equipment.

# 1.4 SUBMITTALS

A. Product Data: Submit catalog sheets showing voltage, switch size, ratings and size of switching and overcurrent protective devices, operating logic, short circuit ratings, dimensions, and enclosure details.

### 1.5 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 Execution and Closeout Requirements: Closeout procedures.
- B. Project Record Documents: Record actual locations of enclosed transfer switches.
- C. Operation and Maintenance Data: Submit routine preventative maintenance and lubrication schedule. List special tools, maintenance materials, and replacement parts.

### 1.6 QUALITY ASSURANCE

- A. Manual transfer switch shall be UL listed and labeled under the UL 1008 standard.
- B. Manual transfer switch manufacturer shall provide a complete factory assembled, wired and tested manual transfer switch.

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- C. Manual transfer switch shall be factory Hi-pot tested for a period of not less than 60 seconds.
- D. Manual transfer switch installation shall meet all applicable NEC standards.
- E. Manual transfer switch shall be suitable for use as service entrance equipment.

### 1.7 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience, and with service facilities within 100 miles of Project.

### 1.8 WARRANTY

A. Manual transfer switches and generator docking stations shall be covered by manufacturer's warranty for a minimum period of (1) one year after shipment from manufacturer.

# 1.9 MAINTENANCE SERVICE

- A. Section 01 70 00 Execution and Closeout Requirements: Maintenance service.
- B. Furnish service and maintenance of transfer switches for one year from Date of Substantial Completion.

### PART 2 PRODUCTS

### 2.1 MANUAL TRANSFER SWITCH

- A. Manufacturers:
  - 1. Asco.
  - 2. ESL Power Systems.
  - 3. Russelectric.
  - 4. Substitutions: Section 01 60 00 Product Requirements.
- B. General:
  - 1. Manual transfer switch manufacturer must have produced and sold UL 1008 Listed manual transfer switches as a standard product for a minimum of (3) years.
  - 2. Manual transfer switches shall be molded case circuit breaker type; knife switch or fused switches are not acceptable.
  - 3. Contractor shall be responsible for the equipment until it has been installed and is finally inspected, tested and accepted in accordance with the requirements of this Specification.
  - 4. Manual transfer switches shall be StormSwitch as manufactured by ESL Power Systems, Inc. or equal as approved by the Engineer.

- C. Manual transfer switch shall consist of (2) two mechanically-interlocked molded case circuit breakers, cam-style male connectors, power distribution block and grounding terminals, all housed within a padlockable enclosure.
- D. Manual transfer switch enclosure shall be Type 3R, constructed of continuous seamwelded, powder coated galvanneal steel. The main access shall be through an interlocked, hinged door that extends the full height of the enclosure. Access for portable generator cables with female cam-style plugs shall be via a drawn flange cable entry openings in the bottom of enclosure for wall mount units. A hinged flap door shall be provided to cover the cable openings when cables are not connected; the hinged flap door shall allow cable entry only after the main access door has been opened. Enclosure shall be powder coated after fabrication; color shall be wrinkle gray RAL 7035.
- E. Cam-style male connectors (inlets) shall be UL Listed single-pole separable type and rated 400 amps at 600VAC. Cam-style male connectors shall be color coded. Cam-style male connectors shall be provided for each phase and for ground, and shall also be provided for neutral if required. Each of the phase cam-style male connectors within the enclosure shall be factory-wired to a molded case circuit breaker. The ground cam-style male connectors shall be bonded to the enclosure, and a ground lug shall be provided for connection of the facility ground conductor. The neutral cam-style male connectors, if required, shall be factory wired to a power distribution block. None of the cam-style male connectors shall be accessible unless both molded case circuit breakers are in the "OFF" position and the main access door is open.
- F. A power distribution block shall be provided for load-side field wiring. The power distribution block shall be factory wired to the molded case circuit breakers.
- G. Molded case circuit breakers shall be UL Listed and the short circuit interrupt rating shall be a minimum of 35kAIC at 480VAC. Trip rating of the molded case circuit breakers shall be as shown on the drawings. One molded case circuit breaker shall be fed from utility power; the other molded case circuit breaker shall be fed from the cam-style male connectors to supply power from a portable generator. Both molded case circuit breakers shall include UL Listed door-mounted operating mechanisms, preventing the opening of the main access door unless both breakers are in the "OFF" position. Both molded case circuit breakers shall be mounted behind a deadfront panel. The load-side of the molded case circuit breakers shall not be energizable unless the main access door is closed and one of the molded case circuit breakers is in the "ON" position. The (2) molded case circuit breakers shall be safety interlocked by mechanical means to ensure that only one breaker can be closed at any given time.
- H. Manual transfer switch shall be suitable for use as service equipment in the USA.

### 2.2 GENERATOR DOCKING STATION

- A. General:
  - 1. All equipment shall be new.
  - 2. Generator docking station manufacturer must have produced and sold generator tap boxes as a standard product for a minimum of (2) years.

SECTION 26 28 26 – Page 3 of 6 MANUAL TRANSFER SWITCH & GENERATOR DOCKING STATION

- 3. Contractor shall be responsible for the equipment until it has been installed and is finally inspected, tested and accepted in accordance with the requirements of this Specification.
- 4. Generator docking station shall be TempTap Inlet Boxes as manufactured by ESL Power Systems, Inc. or equal as approved by the Engineer.
- B. Generator docking station shall consist of cam-style male connectors and grounding terminals, all housed within a padlockable enclosure.
- C. Generator docking station enclosure shall be Type 3R, constructed of continuous seamwelded, powder coated galvanneal steel. The main access shall be through a hinged door that extends the full height of the enclosure. Access for portable generator cables with female cam-style plugs shall be via cable entry openings in the bottom of the enclosure. A hinged flap door shall be provided to cover the cable openings when cables are not connected; the hinged flap door shall allow cable entry only after the main access door has been opened. Enclosure shall be powder coated after fabrication; color shall be wrinkle gray RAL 7038.
- D. Cam-style male connectors (inlets) shall be UL Listed single-pole separable type and rated 400 amps at 600VAC. Cam-style male connectors shall be color coded. Cam-style male connectors shall be provided for each phase and for ground, and shall also be provided for neutral if required. The ground cam-style male connectors shall be bonded to the enclosure, and a ground lug shall be provided for connection of the facility ground conductor. None of the cam-style male connectors shall be accessible unless the main access door is open.

# PART 3 EXECUTION

### 3.1 INSTALLATION

- A. Install engraved plastic nameplates in accordance with Section 26 05 53.
- B. Prior to installation of manual transfer switches and generator docking station, Contractor shall examine the areas and conditions under which the manual transfer switch is to be installed and notify the Engineer in writing if unsatisfactory conditions exist.
- C. Manual transfer switch and generator docking station shall be installed as shown on the drawings and per the manufacturer's written instructions. In addition, the installation shall meet the requirements of local codes, the National Electrical Code and National Electrical Contractors Association's "Standard of Installation".
- D. Conduit entry into the manual transfer switch and generator docking station shall be by Contractor; Contractor shall furnish and install listed watertight conduit hubs, as manufactured by MYERS or T&B, for each conduit entry. The incoming hub size shall match the conduit size for feeders and ground as shown on the drawings. The outgoing hub size shall match the conduit size for loads and ground as shown on the drawings. Hubs shall be properly installed and tightened to maintain Type 3R integrity of the enclosures.

E. Contractor shall terminate feeder conductors, load conductors and ground per the manufacturer's instructions. All field wiring terminations shall be torqued as required per the instructions on the manual transfer switch's power distribution block, circuit breaker & ground lug.

## 3.2 FIELD QUALITY CONTROL

- A. Section 01 70 00 Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Inspect and test in accordance with NETA ATS, except Section 4.
- C. Perform inspections and tests listed in NETA ATS, Section 7.22.3.

## 3.3 FIELD TESTING

- A. Prior to energizing manual transfer switch, the Contractor shall perform the following checks and tests as a minimum:
  - 1. Verify mounting and connections are complete and secure.
  - 2. Verify internal components and wiring are secure.
  - 3. Perform continuity check of all circuits.
  - 4. Perform 1,000 VDC megger test on feeder, load and ground cables.
  - 5. Verify deadfront is secure.
  - 6. With the manual transfer switch deadfront in place and the main access door closed and properly latched, actuate both Operator Mechanisms; verify only (1) breaker at a time can be turned to the "ON" position.
  - 7. Confirm operation of the manual transfer switch ground receptacle by attaching a plug to the manual transfer switch ground receptacle and then verify that the plug is grounded to the facility ground.
  - 8. Once utility power has been applied, confirm operation of manual transfer switch by following directions on main access door.
- B. Prior to energizing generator docking station, the Contractor shall perform the following checks and tests as a minimum:
  - 1. Verify mounting and connections are complete and secure.
  - 2. Verify internal components and wiring are secure.
  - 3. Perform continuity check of all circuits.
  - 4. Perform 1,000 VDC megger test on phase and ground cables.
  - 5. Verify deadfront is secure.
  - 6. Confirm operation of the generator docking station ground receptacle by attaching a plug to the generator tap box ground receptacle and then verify that the plug is grounded to the facility ground.

### 3.4 ADJUSTING

A. Section 01 70 00 – Execution and Closeout Requirements: Testing, adjusting, and balancing.

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B. Adjust control and sensing devices to achieve specified sequence of operation.

# 3.5 DEMONSTRATION AND TRAINING

- A. Demonstrate operation of transfer switch in normal, and emergency modes.
- B. Provide a minimum of 2 hours instruction to Owner & personnel by manufacturer's authorized representative.

END OF SECTION 26 28 26

# SECTION 26 51 00 - LIGHTING

## PART 1 GENERAL

### 1.1 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section "Summary."

## 1.2 SUMMARY

- A. Section includes interior luminaires, drivers, and accessories.
- B. Related Sections:
  - 1. Section 26 05 26 Grounding and Bonding for Electrical Systems.
  - 2. Section 26 05 33 Raceway and Boxes for Electrical Systems.

### 1.3 REFERENCES

- A. International Engineering Society of North America:
  - 1. IESNA LM-79: Approved Method- Electrical and Photometric Measurements of Solid-State Lighting Products.
  - 2. IESNA LM-80: Approved Method for Measuring Lumen Maintenance of LED light Sources.

# 1.4 SUBMITTALS

- A. Section 01 33 00 Submittal Procedures: Submittal procedures.
- B. Shop Drawings: Indicate dimensions and components for each luminaire not standard product of manufacturer.
- C. Product Data: Submit dimensions, ratings, and performance data:
  - 1. Arrange in order of luminaire designation.
  - 2. Include data on features, accessories, and finishes.
  - 3. Include physical description and dimensions of luminaires.
  - 4. Include emergency lighting units, including batteries and chargers.
  - 5. Include life, output (lumens, CCT, and CRI), and energy efficiency data.
  - 6. Photometric data and adjustment factors based on laboratory tests, complying with IESNA LM-79 and IESNA LM-80.
    - a. Manufacturers' Certified Data: Photometric data certified by manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products.
    - b. Testing Agency Certified Data: Photometric data certified by a qualified independent testing agency. Photometric data for remaining luminaires shall be certified by manufacturer.
    - c. TM-21 report for L70 rating at color temperature specified.

- D. Samples: Submit two color chips 3 x 3 inch in size illustrating luminaire finish color where indicated in luminaire schedule.
- E. Qualification Data: For testing laboratory providing photometric data for luminaires.
  - 1. Seismic Qualification Certificates: For luminaires, accessories, and components, from manufacturer.
    - a. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
    - b. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
  - 2. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
  - 3. Product Test Reports: For each luminaire, for tests performed by a qualified testing agency.
  - 4. Sample warranty.

## 1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

### 1.6 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.
- 1.7 MAINTENANCE MATERIALS
  - A. Furnish two of each plastic lens type.

### PART 2 PRODUCTS

### 2.1 INTERIOR LUMINAIRES

- A. Manufacturers:
  - 1. Manufacturers represented by Apex Lighting.
  - 2. Manufacturers represented by Reflex Lighting.
  - 3. Manufacturers represented by Lighting Affiliates.
  - 4. Manufacturers represented by Illuminate/Vanguard Lighting.
- B. Substitutions:
  - 1. Substitutions: Section 26 04 00 Product Requirements and as follows:
    - a. Approved equals to the basis of design fixture shall be accepted for review with the proposed substitute fixture meeting the following minimum requirements:
      - 1) Be of the same general size, style and shape, including but not limited to lens construction and shading.
      - 2) Be of equal or better quality and construction.
      - 3) Be supplied with all required accessories to match the specified fixture.
      - 4) Be supplied with all remote drivers, power supplies and cabling lengths to meet specified performance and control.

- 5) Provide the same or better distribution, efficiency, source lumen output, and L70 lumen depreciation metric.
- b. Provide point-by point photometric calculations at the request of the Engineer for evaluation.
- c. The basis of design fixture listed in the Lighting Fixture Schedule lists part numbers, specifications, options, accessories and source output available at the time of design. Substitutions shall meet these requirements as scheduled.
- d. The evaluation of an approved equal shall be at the sole discretion of the Architect and Engineer.
- C. Product Description: Complete interior luminaire assemblies, with features, options, and accessories as scheduled.
- D. Performance requirements:
  - 1. Seismic Performance: Luminaires and lamps shall be labeled vibration and shock resistant.
  - 2. Luminaire requirements
    - a. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
    - b. NRTL Compliance: Luminaires for hazardous locations shall be listed and labeled for indicated class and division of hazard by an NRTL.
    - c. Recessed Fixtures: Comply with NEMA LE 4.
    - d. Bulb shape complying with ANSI C79.1.
    - e. Lamp base complying with ANSI C81.61.
    - f. CRI of minimum 80.
    - g. LED lamp life, minimum of 50,000 hours.
    - h. TM-21 L70 lumen depreciation metric calculated at color temperature listed.
    - i. Internal ballast/driver.
    - j. Lens Thickness: At least 0.125 inch minimum unless otherwise indicated.

# 2.2 MATERIALS

- A. Metal Parts:
  - 1. Free of burrs and sharp corners and edges.
  - 2. Sheet metal components shall be steel unless otherwise indicated.
  - 3. Form and support to prevent warping and sagging.
  - 4. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.
  - 5. Diffusers and Globes:
    - a. Refer to Interior Light Fixture Schedule for types.
    - b. Acrylic Diffusers: One hundred percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
    - c. Glass: Annealed crystal glass unless otherwise indicated.

d. Lens Thickness: At least 0.125 inch minimum unless otherwise indicated.

### 6. Housings:

- a. Extruded-aluminum housing and heat sink unless otherwise indicated.
- b. Powder-coat finish unless otherwise indicated, color selection by Architect.
- 7. Factory-Applied Labels: Comply with UL 1598. Include recommended lamps. Locate labels where they will be readily visible to service personnel, but not seen from normal viewing angles when lamps are in place.
  - a. Label shall include the following lamp characteristics:
    - 1) "USE ONLY" and include specific lamp type.
    - 2) Lamp diameter, shape, size, wattage, and coating.
    - 3) CCT and CRI for all luminaires.

# B. METAL FINISHES

1. Variations in finishes are unacceptable in the same piece. Variations in finishes of adjoining components are acceptable if they are within the range of approved Samples and if they can be and are assembled or installed to minimize contrast.

### 2.3 LUMINAIRE FIXTURE SUPPORT COMPONENTS

- A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for channel and angle iron supports and nonmetallic channel and angle supports.
- B. Single-Stem Hangers: 1/2-inch steel tubing with swivel ball fittings and ceiling canopy. Finish same as luminaire.
- C. Wires: ASTM A 641/A 641 M, Class 3, soft temper, zinc-coated steel, 12 gage minimum.
- D. Rod Hangers: 3/16-inch minimum diameter, cadmium-plated, threaded steel rod.
- E. Hook Hangers: Integrated assembly matched to luminaire, line voltage, and equipment with threaded attachment, cord, and locking-type plug.

### 2.4 LED DRIVERS

- A. Manufacturers:
  - 1. eldoLED
  - 2. Lutron.
  - 3. General Electric Co.
  - 4. Philips Electronics North America.
  - 5. Osram/Sylvania.
  - 6. Substitutions: Section 01 60 00 Product Requirements.
- B. Product Description: LED dimming driver.
  - 1. 4-Wire (0-10V DC Voltage Controlled) Dimming Drivers
  - 2. Digital (DALI Low Voltage Controlled) Dimming Drivers
  - 3. Digital Multiplex (DMX Low Voltage Controlled) Dimming Drivers
#### C. General:

- 1. LED dimming shall be equal in range and quality to a commercial grade incandescent dimmer. Quality of dimming to be defined by dimming range, freedom from perceived flicker or visible stroboscopic flicker, smooth and continuous change in level (no visible steps in transitions), natural square law response to control input, and stable when input voltage conditions fluctuate over what is typically experience in a commercial environment. Demonstration of this compliance to dimming performance will be necessary for substitutions or prior approval.
- 2. Ten-year expected life while operating at maximum case temperature and 90 percent non-condensing relative humidity.
- 3. Driver must limit inrush current.
  - a. Base specification: Meet or exceed NEMA 410 driver inrush standard of 430 Amps per 10 Amps load with a maximum of 370 Amps<sup>2</sup> seconds.
  - b. Preferred Specification: Meet or exceed 30mA<sup>2</sup>s at 277VAC for up to 50 watts of load and 75A at 240us at 277VAC for 100 watts of load.
- 4. Withstand up to a 1,000 volt surge without impairment of performance as defined by ANSI C62.41 Category A.
- 5. No visible change in light output with a variation of plus/minus 10 percent line voltage input.
- 6. Total Harmonic Distortion less than 20% percent and meet ANSI C82.11 maximum allowable THD requirements at full output. THD shall at no point in the dimming curve allow imbalance current to exceed full output THD.
- 7. Driver must support automatic adaptation, allowing for future luminaire upgrades and enhancements and deliver improved performance:
  - a. Adjustment of forward LED voltage, supporting 3V through 55V.
  - b. Adjustment of LED current from 200mA to 1.05A at the 100 percent control input point in increments of 1mA
  - c. Adjustment for operating hours to maintain constant lumens (within 5 percent) over the 50,000 hour design life of the system, and deliver up to 20 percent energy savings early in the life cycle.
- 8. Driver must be able to operate for a (+/- 10%) supply voltage of 120V through 277VAC at 60Hz.
- 9. Driver should be UL Recognized under the component program and shall be modular for simple field replacement. Drivers that are not UL Recognized or not suited for field replacement will not be considered.
- 10. Driver shall include ability to provide no light output when the analog control signal drops below 0.5 V, or the DALI/DMX digital signal calls for light to be extinguished and shall consume 0.5 watts or less in this standby. Control deadband between 0.5V and 0.65V shall be included to allow for voltage variation of incoming signal without causing noticeable variation in fixture to fixture output.
- D. Light Quality
  - 1. Over the entire range of available drive currents, driver shall provide step-free, continuous dimming to black from 100 percent to 1 percent and 10% relative light output where indicated, or 100 10% light standard. Driver shall respond similarly when raising from 1% to 100%
    - a. Driver must be capable of configuring a linear or logarithmic dimming curve, allowing fine grained resolution at low light levels

- 2. Drivers to track evenly across multiple fixtures at all light levels, and shall have an input signal to output light level that allows smooth adjustment over the entire dimming range.
- 3. Driver and luminaire electronics shall deliver illumination that is free from objectionable flicker as measured by flicker index (ANSI/IES RP-16-10). At all points within the dimming range from 100-1 percent luminaire shall have:
  - a. LED dimming driver shall provide continuous step-free, flicker free dimming similar to incandescent source.
  - b. Base specification: Flicker index shall less that 5% at all frequencies below
  - c. 1000 Hz.
  - d. Preferred specification: Flicker index shall be equal to incandescent, less that 1% at all frequencies below 1000 Hz.
- E. Control Input
  - 1. 4-Wire (0-10V DC Voltage Controlled) Dimming Drivers
    - a. Must meet IEC 60929 Annex E for General White Lighting LED drivers
    - b. Connect to devices compatible with 0 to 10V Analog Control Protocol, Class 2, capable of sinking 0.6 ma per driver at a low end of 0.3V. Limit the number of drivers on each 0-10V control output based on voltage drop and control capacity.
    - c. Must meet ESTA E1.3 for RGBW LED drivers
  - 2. Digital (DALI Low Voltage Controlled) Dimming Drivers
    - a. Must meet IEC 62386
  - 3. Digital Multiplex (DMX Low Voltage Controlled) Dimming Drivers
    - a. Must meet DMX / RDM: USITT DMX512A and ANSI E1.20 (Explore & Address)
    - b. Capable of signal interpolation and smoothing of color and intensity transitions

#### 2.5 LED FIXTURES

- A. Refer to light fixture schedule.
- B. Minimum allowable efficacy of 80 lumens per watt.
- C. Integral junction box with conduit fittings.

#### PART 3 EXECUTION

#### 3.1 INSTALLATION

- A. Install suspended luminaires using pendants supports. Install pendant length required to suspend luminaire at indicated height.
  - 1. Suspended Luminaire Support:
    - a. Pendants and Rods: Where longer than 48 inches, brace to limit swinging.
    - b. Stem-Mounted, Single-Unit Luminaires: Suspend with twin-stem hangers. Support with approved outlet box, heavy-duty swivel hangers and accessories that hold stem and provide damping of luminaire

oscillations. Support outlet box vertically to building structure using approved devices.

- B. Install surface mounted luminaires plumb and adjust to align with building lines and with each other. Secure to prevent movement.
- C. Install recessed luminaires to permit removal from below.
- D. Install wall-mounted luminaires at height as indicated on Drawings and as scheduled.
- E. Install accessories furnished with each luminaire.
- F. Connect luminaires to branch circuit using flexible conduit, except for emergency lighting which shall be in conduit completely.
- G. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within luminaire.
- H. Install specified lamps in each luminaire.
- I. Ground and bond interior luminaires in accordance with Section 26 05 26.

#### 3.2 FIELD QUALITY CONTROL

- A. Section 01 70 00 Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Operate each luminaire after installation and connection. Inspect for proper connection and operation.

#### 3.3 ADJUSTING

- A. Section 01 70 00 Execution and Closeout Requirements: Testing, adjusting, and balancing.
- B. Aim and adjust luminaires as indicated on Drawings.

#### 3.4 CLEANING

- A. Section 01 70 00 Execution and Closeout Requirements: Final cleaning.
- B. Remove dirt and debris from enclosures.
- C. Clean photometric control surfaces as recommended by manufacturer.
- D. Clean finishes and touch up damage.

#### 3.5 **PROTECTION OF FINISHED WORK**

- A. Section 01 70 00 Execution and Closeout Requirements: Protecting finished work.
- B. Relamp luminaires having failed lamps at Substantial Completion.

# 3.6 SCHEDULES

A. Refer to Drawings.

END OF SECTION 26 51 00

#### SECTION 33 71 19 - ELECTRICAL UNDERGROUND DUCTS AND HANDHOLES

#### PART 1 GENERAL

#### 1.1 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section "Summary."

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Rigid steel conduit.
  - 2. Underground duct markers.
  - 3. Cast-in-place manhole accessories.
- B. Related Sections:
  - 1. Section 26 05 33 Raceways and Boxes for Electrical Systems.
  - 2. Section 31 08 00 Excavation: Product and execution requirements for excavation and backfill required by this section.
  - 3. Section 31 08 00 Fill: Requirements for backfill to be placed by this section.
  - 4. Section 31 23 33 Trenching: Execution requirements for trenching required by this section.

#### 1.3 REFERENCES

- A. American National Standards Institute:
  - 1. ANSI C80.1 Rigid Steel Conduit, Zinc Coated.
- B. ASTM International:
  - 1. ASTM A48/A48M Standard Specification for Gray Iron Castings.
  - 2. ASTM C857 Standard Practice for Minimum Structural Design Loading for Underground Precast Concrete Utility Structures.
  - 3. ASTM C858 Standard Specification for Underground Precast Concrete Utility Structures.
  - 4. ASTM C891 Standard Practice for Installation of Underground Precast Concrete Utility Structures.
  - 5. ASTM C1037 Standard Practice for Inspection of Underground Precast Concrete Utility Structures.
- C. Institute of Electrical and Electronics Engineers:
  - 1. IEEE C2 National Electrical Safety Code.
- D. National Electrical Manufacturers Association:
  - 1. NEMA FB 1 Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.
  - 2. NEMA TC 2 Electrical Polyvinyl Chloride (PVC) Tubing and Conduit.
  - 3. NEMA TC 3 PVC Fittings for Use with Rigid PVC Conduit and Tubing.
  - 4. NEMA TC 6 PVC and ABS Plastic Utilities Duct for Underground Installation.

- 5. NEMA TC 9 Fittings for ABS and PVC Plastic Utilities Duct for Underground Installation.
- 6. NEMA TC 10 PVC and ABS Plastic Communications Duct for Underground Installation.
- 7. NEMA TC 14 Filament Wound Reinforced Thermosetting Resin Conduit and Fittings.
- E. Underwriters Laboratories Inc.:
  - 1. UL 651A Type EB and A Rigid PVC Conduit and HDPE Conduit.

#### 1.4 SYSTEM DESCRIPTION

- A. Interconnected system of encased conduits, ducts, manholes and handholes to distribute service entrance secondary conductors, telephone, data communications, and exterior branch circuit wiring.
- B. Conduit and duct routing and handhole locations are shown in approximate locations unless dimensions are indicated. Route and locate to complete duct bank system.
- C. Exterior branch circuit and lighting: Use rigid plastic underground conduit. Provide rigid steel conduit sweeps up into bases and structures.
- D. Telephone: Comply with Utility Company requirements for primary service ducts and conduits.

#### 1.5 SUBMITTALS

- A. Section 01 33 00 Submittal Procedures: Requirements for submittals.
- B. Product Data: Submit for metallic conduit, nonmetallic conduit, ducts, and handholes.
- C. Manufacturer's Installation Instructions: Submit application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, and installation of Product.

#### 1.6 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 Execution and Closeout Requirements: Requirements for submittals.
- B. Project Record Documents: Record actual routing and elevations of underground conduit and duct, and locations and sizes of handholes.

#### 1.7 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.

#### 1.8 COORDINATION

A. Section 01 30 00 – Administrative Requirements: Requirements for coordination.

B. Coordinate Work with existing underground utilities and structures.

#### PART 2 PRODUCTS – REFER TO SECTTION 26 05 33

#### PART 3 EXECUTION

#### 3.1 EXAMINATION

- A. Section 01 30 00 Administrative Requirements: Verification of existing conditions before starting work.
- B. Verify routing and termination locations of duct bank prior to excavation for rough-in.
- C. Verify locations of handholes prior to excavating for installation.

#### 3.2 INSTALLATION

- A. Install Work in accordance with the requirements of the City of Norwalk First Taxing district and the State of Connecticut DOT standards.
- 3.3 INSTALLATION DUCT BANK
  - A. Install duct to locate top of ducts at depths as indicated on Drawings.
  - B. Install conduit and duct with minimum slope of 4 inches per 100 feet (0.33 percent). Slope conduit and duct toward manholes and away from building entrances.
  - C. Cut conduit and duct square using saw or pipe cutter; de-burr cut ends.
  - D. Insert conduit and duct to shoulder of fittings; fasten securely.
  - E. Join nonmetallic conduit and duct using adhesive as recommended by manufacturer.
  - F. Wipe nonmetallic conduit and duct dry and clean before joining. Apply full even coat of adhesive to entire area inserted in fitting. Allow joint to cure for 20 minutes, minimum.
  - G. Install no more than equivalent of three 90-degree bends between pull points.
  - H. Install fittings to accommodate expansion and deflection.
  - I. Terminate conduit and duct at handhole entries using end bell.
  - J. Provide suitable pull string in each empty duct except sleeves and nipples.
  - K. Swab duct. Use suitable caps to protect installed duct against entrance of dirt and moisture.
  - L. Backfill trenches in accordance with Section 31 23 33.

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## 3.4 INSTALLATION – PRE-CAST HANDHOLE

- A. Excavate for handhole installation in accordance with Section 31 23 16.
- B. Install and seal precast sections in accordance with ASTM C891.
- C. Install handholes plumb.
- D. Backfill handhole excavation in accordance with Section 31 23 33.

END OF SECTION 33 71 19

#### SECTION 33 79 00 - SITE GROUNDING

#### PART 1 GENERAL

#### 1.1 RELATED DOCUMENTS

- A. The Contractor, Subcontractors, and/or suppliers providing goods and services referenced in or related to this Section shall also be bound by the Related Documents identified in Division 01 Section "Summary."
- B. Related Sections:
  - 1. 26 05 26 Grounding and Bonding for Electrical Systems.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Rod electrodes.
  - 2. Active electrodes.
  - 3. Exothermic connections.
  - 4. Mechanical connectors.
  - 5. Wire.

#### 1.3 REFERENCES

- A. Institute of Electrical and Electronics Engineers:
  - 1. IEEE 142 Recommended Practice for Grounding of Industrial and Commercial Power Systems.
  - 2. IEEE C2 National Electrical Safety Code.
- B. International Electrical Testing Association:
  - 1. NETA ATS Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.

#### 1.4 SYSTEM DESCRIPTION

A. Rod electrodes for local grounding at service entrance, lightning protection and exterior metallic structures.

#### 1.5 PERFORMANCE REQUIREMENTS

A. Overall Resistance to Ground: 25 ohms.

## 1.6 SUBMITTALS

- A. Section 01 33 00 Submittal Procedures: Requirements for submittals.
- B. Shop Drawings: Indicate layout and installation details of grounding components.
- C. Product Data: Submit data for grounding electrodes and connectors.
- D. Test Reports: Indicate overall resistance to ground.

#### 1.7 CLOSEOUT SUBMITTALS

- A. Section 01 70 00 Execution and Closeout Requirements: Requirements for submittals.
- B. Project Record Documents: Record actual locations of electrodes and connections.

#### 1.8 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years documented experience.

#### PART 2 PRODUCTS

#### 2.1 ROD ELECTRODES

- A. Manufacturers:
  - 1. Copperweld, Inc.
  - 2. Erico, Inc.
  - 3. O-Z Gedney Co.
  - 4. Thomas & Betts, Electrical
  - 5. Substitutions: Section 01 60 00 Product Requirements.

## B. Product Description:

- 1. Material: Copper-clad steel.
- 2. Diameter: 3/4 inch.
- 3. Length: 10 feet.
- C. Connector: Connector for exothermic welded connection.

## 2.2 EXOTHERMIC CONNECTIONS

- A. Manufacturers:
  - 1. Cadweld, Erico, Inc.
  - 2. Copperweld, Inc.
  - 3. ILSCO Corporation.
  - 4. O-Z Gedney Co.
  - 5. Thomas & Betts, Electrical.
  - 6. Substitutions: Section 01 60 00 Product Requirements
- B. Product Description: Exothermic materials, accessories, and tools for preparing and making permanent field connections between grounding system components.

#### 2.3 MECHANICAL CONNECTORS

- A. Manufacturers:
  - 1. Copperweld, Inc.
  - 2. Erico, Inc.
  - 3. ILSCO Corporation
  - 4. O-Z Gedney Co.
  - 5. Thomas & Betts, Electrical.

- 6. Substitutions: Section 01 60 00 Product Requirements
- B. Description: Bronze connectors, suitable for grounding and bonding applications, in configurations required for particular installation.

#### 2.4 WIRE

- A. Material: Stranded copper.
- B. Horizontal Electrodes: 4/0 AWG, minimum size.
- C. Connections to Electrodes: 2/0 AWG, minimum size.
- D. Bonding Other Objects: 2 AWG, minimum size.
- E. Mechanical Connector: Bronze.
- F. Grounding Boxes: Bronze.

#### PART 3 EXECUTION

- 3.1 EXAMINATION
  - A. Section 01 30 00 Administrative Requirements: Verification of existing conditions before starting work.
  - B. Verify final backfill and compaction has been completed before driving rod electrodes.

#### 3.2 INSTALLATION

- A. Install rod electrodes in vertical position with bottom at least 5 feet below frost line.
- B. Install interconnecting wire 2 feet below frost line.
- C. Provide chemical treatment at each vertical electrode site.
  - 1. Saturate treatment chemicals with water following application.
  - 2. Dig circular trench centered on electrode. Make trench 12 inches deep with 18 inch inside diameter. Uniformly distribute 50 lb of treatment material in bottom of trench and cover with topsoil.

#### 3.3 FIELD QUALITYCONTROL

- A. Section 01 70 00 Execution and Closeout Requirements: Field inspecting, testing, adjusting, and balancing.
- B. Inspect and test in accordance with NETA ATS, except Section 4.
- C. Perform inspections and tests listed in NETA ATS, Section 7.13. Make final grounding system measurements three or four days after chemical treatment.

#### 3.4 DEMONSTRATION

- A. Section 01 70 00 Execution and Closeout Requirements: Requirements for demonstration and training.
- B. Demonstrate location of each accessible grounding connection and each chemical treatment well.

END OF SECTION 33 79 00

# **ARCHITECTURAL SPECIFICATIONS**

## PROJECT MANUAL AND SPECIFICATIONS

# GRUPES RESERVOIR DAM REHABILITATION PROJECT NEW CANAAN, CONNECTICUT

#### **APRIL 2022**

**PREPARED BY:** 

# **ARCHITECT**

STEIN TROOST LLC architecture

one morgan ave norwalk CT 06851

# GRUPES RESERVOIR DAM REHABILITATION PROJECT NEW CANAAN, CONNECTICUT

# TECHNICAL SPECIFICATIONS

DIVISION/SECTION	<u>TITLE</u>	NO. OF PA	AGES
<b>DIVISION 1</b>	GENERAL REQUIREME	NTS	
SECTIONS 01 10 00	GENERAL REQUIREMEN	TS	3
SECTIONS 01 30 00	ADMINISTRATIVE REQU	INISTRATIVE REQUIREMENTS3	
SECTIONS 01 40 00	UALITY REQUIREMENTS 1		
SECTIONS 01 50 00	TEMPORARY FACILITIES	S AND CONTROLS	5
SECTIONS 01 60 00	PRODUCT REQUIREMENTS 1		
SECTIONS 01 70 00	EXECUTION AND CLOSE	OUT REQUIREMENTS	2
<b>DIVISION 2</b>	EXISTING CONDITIONS	<b>)</b>	
<b>DIVISION 3</b>	CONCRETE		
<b>DIVISION 4</b>	MASONRY		
SECTION 04 20 00	UNIT MASONRY		
<b>DIVISION 5</b>	METALS		
SECTION 05 50 00	METAL FABRICAT	TIONS	
<b>DIVISION 6</b>	WOOD & PLASTICS		
SECTION 06 10 00	ROUGH CARPENT	RY	
SECTION 06 40 00	ARCHITECTURAL	WOODWORK	5
<b>DIVISION 7</b>	THERMAL & MOISTUR	E PROTECTION	
SECTION 07 11 13	BITUMINOUS DAM	<b>MPPROOFING</b>	
SECTION 07 30 00	FIBERGLASS ROO	FING SHINGLES	
SECTION 07 46 10	FIBER CEMENT SI	DING & TRIM	
SECTION 07 62 00	FLASHING AND SI	HEET METAL	
SECTION 07 92 00	SEALANTS & CAU	LKING	
<b>DIVISION 8</b>	DOORS & WINDOWS		
SECTION 08 11 13	METAL DOORS &	FRAMES	
SECTION 08 52 13	CLAD WINDOWS		

SECTION 08 70 00	BUILDERS HARDWARE	10
DIVISION 9	FINISHES	
SECTION 09 90 00	PAINTING	8
DIVISION 10	SPECIALTIES	
NONE		
<b>DIVISION 11</b>	EQUIPMENT	
NONE		
DIVISION 12	FURNISHINGS	
NONE		
DIVISION 13	SPECIAL CONSTRUCTION	
NONE		
DIVISION 14	ELEVATORS	
NONE		

**END OF INDEX** 

# SECTION 01 10 00 GENERAL REQUIREMENTS

## PART 1 GENERAL

## 1.1 SECTION INCLUDES

# A. PROJECT IDENTIFICATION: GRUPES RESERVOIR DAM, REHABILITATION PROJECT, NEW CANAAN, CONNECTICUT

## B. OWNERS REPRESENTATIVE:

- C. The Architect is Stein|Troost architecture or his/their accredited representative, and is referred to in the Contract Documents as "Architect" or "Architects" or by pronouns which imply them. As information for the Contractor, the Architect's status is defined as follows:
  - 1. As the authorized representative of GRUPES RESERVOIR DAM, REHABILITATION PROJECT, NEW CANAAN, CONNECTICUT. The Architect is responsible for review of Shop Drawings, materials and equipment intended for the work, in accordance with the "General Conditions" and the "Supplementary General Conditions".
- D. PROJECT SUMMARY: This Project is the construction of a gate house.
- E. PERMITS AND FEES: Apply for, obtain, and pay for permits, fees, and utility company charges required to perform the work. Submit copies to Owner.
- F. STANDARDS, CODES AND SPECIFICATIONS:
  - 1. For products specified by association or trade standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
  - 2. References to standard specifications and codes refer to the editions current at the bid due date. An exception is, buildings exceeding the threshold limit must be in substantial compliance with the requirements of the effective code at the time of receipt of completed application to the State Building Inspector (SBI). References include their addenda and errata, if any, and shall be considered a part of these specifications as if they were printed herein in full.
  - 3. The manufacturers' standard warranties or guarantees shall apply when their products are used on this project.
  - 4. Whenever miscellaneous items or work are not covered by these specifications, they shall be governed by the applicable provisions of these Supplementary General Conditions.
- G. PROJECT DOCUMENTS
  - 1. The Specifications and the Drawings describe and illustrate the materials and labor necessary for the work of this Project. Do not scale drawings.
  - 2. The General Conditions and Supplementary General Conditions apply to each Section of the Specification.
  - 3. In the event of conflicts or discrepancies among the Contract Documents,

interpretations will be based on the following priorities:

- a. The Agreement
- b. Addenda, with those of later date having precedence over those of earlier date.
- c. The Supplementary Conditions
- d. The General Conditions of the Contract for Construction
- e. Drawings and Specifications
- f. In the case of any inconsistency between Drawings and 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.
- H. DIMENSIONS: Verify dimensions indicated on drawings with field dimensions before fabrication or ordering of materials. Do not scale drawings.
- I. EXISTING CONDITIONS: Notify Architect of existing conditions differing from those indicated on the drawings. Do not remove or alter structural components without prior written approval.
- J. COORDINATION:
  - 1. Coordinate the work of the several trades to assure the efficient and orderly sequence of installation of construction elements.
  - 2. Prepare coordination drawings for areas above ceilings where close tolerances are required between building elements and mechanical and electrical work.
  - 3. Verify that characteristics of interrelated equipment are compatible; coordinate work of various Sections having interdependent responsibilities for installing, connecting and placing equipment in service.
  - 4. Verify location of utilities and existing conditions.

# K. INSTALLATION REQUIREMENTS, GENERAL:

- 1. Inspect substrates and report unsatisfactory conditions in writing.
- 2. Do not proceed until unsatisfactory conditions have been corrected.
- 3. Take field measurements prior to fabrication where practical. Form to required shapes and sizes with true edges, lines and angles. Provide inserts and templates as needed for work of other trades.
- 4. Install materials in exact accordance with manufacturer's instructions and approved submittals.
- 5. Install materials in proper relation with adjacent construction and with proper appearance.
- 6. Restore units damaged during installation. Replace units which cannot be restored at no additional expense to the Owner.
- 7. Refer to additional installation requirements and tolerances specified under individual specification sections.

# L. CONTRACTOR'S USE OF PREMISES

1. The Contractor shall confine his operations, including storage of apparatus, equipment and materials to the contract limit lines as directed by the Owner or

his Representative.

- 2. The areas and/or spaces, including their access, shall be maintained free and clear throughout the contract term.
- 3. It is expected that all work areas will be cleaned up daily.
- M. DEFINITIONS:
  - 1. Provide: Furnish and install, complete with all necessary accessories, ready for intended use. Pay for all related costs.
  - 2. Match Existing: Match existing as acceptable to the Owner.
- N. INTENT:
  - 1. Drawings and specifications are intended to provide the basis for proper completion of the work suitable for the intended use of the Owner. Anything not expressly set forth but which is reasonable implied or necessary for proper performance of the project shall be included.
- PART 2 PRODUCTS Not applicable to this Section
- PART 3 EXECUTION Not applicable to this Section

# END OF SECTION

# SECTION 01 30 00 ADMINISTRATIVE REQUIREMENTS

# PART 1 GENERAL

## 1.1 SECTION INCLUDES

- A. Administration of Contract: Provide administrative requirements for the proper coordination and completion of work including the following:
  - 1. Supervisory personnel.
  - 2. Preconstruction conference.
  - 3. Project meetings, minimum of two per month; prepare and distribute minutes. A schedule of regular project meetings will be established, once contract has been awarded.
- B. Reports: Submit daily and special reports.
- C. Work Schedule: Submit progress schedule, updated monthly.
- D. Schedule of Values: Submit schedule of values.
- E. Perform Surveys: Lay out the work and verifying locations during construction. Perform final site survey.
- F. Emergency Contacts: Submit and post a list of emergency telephone numbers and address for individuals to be contacted in case of emergency.
- G. Record Documents: Submit record drawings and specifications; to be maintained and annotated by Contractor as work progresses.

## 1.2 PROJECT PHOTOGRAPHS

- A. General Contractor shall photograph project weekly documenting key construction components. They shall be distributed to owner's representatives and Architect monthly. Photographs shall show progress of work, identify area in photo and each photo shall indicate date photographed.
- B. On the date the work is begun and on or about the first day of each month thereafter (until the work is at least 95 percent completed), the Contractor shall take photographs of the construction.
- C. Take a minimum of (24) photo in digital format each month. Deliver pictures to the Owners representative & Architect at the end of each month.

## 1.3 SCHEDULES & REPORTS

A. Contractor shall provide close administrative and procedural coordination of scheduling and reporting requests with those of other Contractors. Contractor shall be responsive to overall coordination responsibilities of the Project. Maintain coordination and correlation between separate reports by updating at a monthly or bi-

weekly time intervals.

- B. Contractor shall submit a Bar-Chart Schedule not more than seven days after the Date of Notice to Proceed. On the schedule, indicate a time bar for each major category of work to be performed at site, properly sequenced and coordinated with other elements of the work. Show completion of the work sufficiently in advance of the date of substantial completion of the work. The Bar-Chart shall be updated monthly.
- C. When there is 90 days remaining to the scheduled date of substantial completion a schedule showing the completion of each item with inspections that remains.

# 1.4 SUBMITTALS

- A. Types of Submittals: Provide types of submittals listed in individual sections and number of copies required below.
  - 1. Shop drawings, reviewed and annotated by the Contractor 4 copies or 1 copy and 1 electronic copy
  - 1. Product data 4 copies or 1 copy and 1 electronic copy
  - 2. Samples -3, plus extra samples as required indicating range of color, finish, and texture to be expected.
  - 3. Inspection and test reports or 1 copy and 1 electronic copy.
  - 4. Warranties 2 copies.
  - 5. Survey data 2 copies & 1 electronic copy.
  - 6. Closeout submittals 2 copies & 1 electronic copy.
- B. SAMPLES:
  - 1. Submit samples of items where specifically required. Furnish information and data for items or materials offered as equals to those specified to establish their equality.
  - 2. Mark samples to show:
    - a. Name and number of project.
    - b. Name or trade, type, quality or grade and any further designation necessary to identify the items or materials.
    - c. Manufacturer's or producer's name.
    - d. Name of Contractor, and Subcontractor, if any
  - 3. Submit samples of size and/or number sufficient to show quality, type, range of color, finish and texture.
- C. SHOP DRAWINGS:
  - 1. The Contractor shall review the Shop Drawings, stamp with his approval and submit them with reasonable promptness and in orderly sequence so as to cause no delay in his work or in the work of any subcontractor. Shop Drawings shall be identified for item, material and project number. The Contractor shall inform the Architect, in writing, of any deviation in the Shop Drawings from the requirements of the Contract Documents. Shop drawings shall show adjacent and connected equipment and construction.
  - 2. The Architect will review and comment on Shop Drawings with reasonable

promptness so as to cause no delay but only for conformance with the design concept of the project and with the information given in the Contract Documents. Promptness and reasonable promptness as stated shall be understood to mean: to enable the Architect to retain shop drawings, product data, and samples for review for at least 10 working days. Contractor shall assume that the Architect will require 10 working days for review of submittals. If submittals need to be expedited for the contractor's purposes, then the Architect's will be notified in writing. Submittals shall be submitted for review within 90 days after the award of the Contract. If the Contractor's submittals are not submitted for review within 90 days after award of the contract, the Architects review period of 10 working days is waived and additional review time shall not be considered a basis for the extension of the Contract Time or Contract Sum.

- 3. Details shall be large scale or full size.
- D. Warranties: Provide warranties as specified; warranties shall not limit length of time for remedy of damages Owner may have by legal statute. Contractor, supplier or installer responsible for performance of warranty shall sign warranties.
- PART 2 PRODUCTS Not applicable to this Section
- PART 3 EXECUTION Not applicable to this Section

# END OF SECTION

# SECTION 01 40 00 QUALITY REQUIREMENTS

# PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. Quality Monitoring: Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality. Perform quality control procedures and inspections during installation.
- B. Standards: Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- C. Tolerances: Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate. Comply with manufacturers' tolerances.
- D. Reference Standards: For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- E. Comply with manufacturers' instructions and specifications for storage and use of their products.
- F. Manufacturer's Field Services: When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to perform the following as applicable, and to initiate instructions when necessary.
  - 1. Observe site conditions.
  - 2. Conditions of surfaces and installation.
  - 3. Quality of workmanship.
  - 4. Start-up of equipment.
  - 5. Test, adjust and balance of equipment.
- G. Mock-Ups: Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes. Accepted mock-ups shall be a comparison standard for the remaining Work.
- H. Removal of Mock-Ups: Where mock-up has been accepted by Architect and no longer needed, remove mock-up and clear area when directed to do so.
- PART 2 PRODUCTS Not applicable to this Section
- PART 3 EXECUTION Not applicable to this Section

## END OF SECTION

01 40 00-1

# SECTION 01 50 00 TEMPORARY FACILITIES AND CONTROLS

# PART 1 GENERAL

## 1.1 SECTION INCLUDES

# A. TEMPORARY ELECTRICITY AND LIGHTING

- 1. Power and lighting may be taken from the power company's nearest pole with temporary poles, if needed, to extend the line to project. If permanent power lines have been installed before beginning project, then temporary lines can be brought in from the last pole. Upon completion of the project, remove temporary lines.
- 2. Provide service required for construction with branch wiring and distribution boxes located to provide power and lighting by construction-type extension cords. Provide service to and connect general contractor's and owner's field offices.
- 3. All costs of temporary power and lighting shall be paid by the Contractor.

# B. FIRE PROTECTION

- 1. The Contractor, during construction, shall be responsible to provide suitable fire protection equipment during the course of the work.
- 2. Bitumen or tar shall be melted on the ground only. No flammable material shall be stored in the structure in excess of amounts allowed by the authorities. No gasoline shall be stored in or close to the building at any time. The Contractor shall assign a responsible employee to be in charge of fire protection measures.

## C. TEMPORARY SANITARY FACILITIES

- 1. The Contractor shall provide chemical toilets with toilet tissue. The Contractor shall maintain the facilities in a sanitary condition.
- 2. If women are employed in the Work, provide separate, designated facilities for them of the same kind. Provide an adequate number of each kind of facility for each gender.
- 3. If women are employed in the Work, provide separate, designated facilities for them of the same kind. Provide an adequate number of each kind of facility for each gender.

# D. TEMPORARY WATER

1. Water for construction purposes may be taken from the existing service. The Contractor shall provide connections, meter and pipe to the water main or nearest hydrant, subject to the approval of the Owner. Upon completion of work, the Contractor shall remove the temporary connections and back fill if necessary. If new water service is installed before construction is complete, the new system may be used provided it is returned to the Owner in as-new condition. The Contractor shall pay for water used, as metered.

# E. TEMPORARY HEATING, COOLING AND VENTILATING

1. Provide temporary heat during construction for work included in the Contract to counteract low temperatures or excessive dampness. Maintain until final completion of the Contract, unless otherwise approved by the Owner in writing. Windows, doors, ventilators and similar openings shall be temporarily closed. Provide heat and ventilation to maintain specified conditions for construction operations and to protect materials and finishes from damage by temperature or humidity. The permanent heating system is not to be used for temporary heating unless approved, in writing, by the Owner and LEED verifier. Costs shall be paid by the Contractor. See individual Sections for temperature/humidity limits. Temporary heating methods shall comply with OSHA regulations and other applicable codes, statutes, rules and regulations.

# F. CONSTRUCTION EQUIPMENT

- 1. Each Trade subcontractor shall furnish, for the proper and complete performance of its work, tools, apparatus and appliances, hoists and/or cranes and power for same, scaffolding, runways, ladders, temporary supports and bracing and similar work or material necessary to insure convenience and safety in the execution of the Contract except where this is specified in any Specification Section. All such items shall comply with OSHA regulations and applicable codes, statutes, rules and, regulations, including compliance with the requirements of the current edition of the "Manual of Accident Prevention in Construction" published by the A.G.C. and the standards of the State Labor Department.
- 2. Staging, exterior and interior, required for the execution of this Contract, shall be
- 3. Furnished, erected and relocated by each trade subcontractor requiring the same, if necessary, and removed by the General Contractor. Staging shall be maintained in a safe condition without charge to and for the use of all trades as needed.

# G. BARRIERS AND ENCLOSURES

- 1. Provide barriers to prevent public entry into construction areas and to protect existing facilities from damage by construction operations.
- 2. Provide barriers around trees and plants designated to remain. Protect against vehicular traffic, materials' dumping, chemically injurious materials, puddling or running water.
- 3. Provide temporary, insulated, weather tight closures at openings to the exterior to provide acceptable working conditions and protection for materials, to allow for temporary heating and to prevent entry of unauthorized persons. Provide doors with self-closing hardware and locks.
- 4. Barriers and enclosures shall be in conformance with code requirements.
- H. PROTECTION
  - 1. Protect building, equipment, furnishings, grounds and plantings from damage. Any damage shall be repaired or otherwise made good at no expense to the owner and in a time frame to be decided upon by the Owner.

- 2. Upon completion of inspection, testing, sample-taking and similar services, repair damaged construction and restore substrates and finished to eliminate deficiencies, including deficiencies in visual qualities of exposed finishes.
- 3. Provide protective coverings and barricades to prevent damage or physical injury. The Contractor shall be held responsible for, and must make good at his own expense, any water or other type of damage due to improper coverings. Protect the public and building personnel from injury.
- 4. Provide temporary protection for installed products. Control traffic in immediate area to minimize damage.
- 5. Provide protective coverings for walls, projections, jambs, sills and soffits of openings. Protect finished floors from traffic, movement of heavy objects and storage. Prohibit traffic and storage on waterproofed and roofed surfaces and on lawn and landscaped areas.
- I. SECURITY
  - 1. Provide security program and facilities to protect work, from unauthorized entry, vandalism and theft.
  - 2. The Contractor shall be solely responsible for damage, loss or liability due to theft or vandalism.
- J. TRAFFIC WAYS
  - 1. The Contractor may use on site paved roads and parking areas but shall not encumber same or their access. Public highways shall not be blocked by standing trucks, parked cars, material storage, construction operations or in any other manner.
  - 2. Contractor is to make arrangements to use flagmen to maintain traffic flow. Costs to be paid for by the Contractor.
  - 3. Public roads and existing paved roads, drives and parking areas on Owner's property shall be kept free from scrap or debris due to construction operations and any damage to their surface caused by the Contractor shall be repaired by him at his own expense.
  - 4. If the Work of the Contract affects public use of any street, road, highway or thoroughfare, the contractor shall confer with the police authority having jurisdiction to determine if and how many police are needed for public safety, in addition to any barriers and signals that may be needed. The Contractor will be responsible for payment of any needed police services.

# K. TEMPORARY CONTROLS

- 1. The Contractor is to refer to governing codes, such as OSHA, EPA, and USDA covering most temporary environment controls.
- 2. Air quality and noise control: To reduce impact to air quality and noise during construction, the Contractor is to use water and /or calcium chloride for dust control, and construction equipment is to be maintained fully tuned and serviced.
- 3. Soil erosion and sedimentation: The Contractor is to follow sedimentation and erosion control plan included in the Contract Documents.
- 4. Pollution control: Construction impact from accidental spillage or discharge of

hazardous substances is to be mitigated and or prevented by the Contractor maintaining equipment properly, by regular inspection for leaks, repairing all leaks immediately, and by containing and properly cleaning all leaks or spills.

# L. CLEANING

- 1. Maintain areas under Contractor's control free of waste materials, debris, rubbish and unneeded construction material. Maintain in a clean and orderly condition.
- 2. Where material or debris has washed or flowed into or been placed in existing watercourses, ditches, gutters, drains, pipes, structures and work done under this Contract, or elsewhere during the course of the Contractor's operations, such material or debris shall be entirely removed and satisfactorily disposed of during the progress of the Work, and the ditches, channels, drains, pipes, structures, and work, etc., shall upon completion of the Work, be left in a clean and neat condition.
- 3. On or before substantial completion of the Work, the Contractor shall, tear down and remove all temporary buildings and structures built by him; shall remove all temporary work, tools, and machinery or other construction equipment furnished by him; shall remove, acceptably disinfect, and cover all organic matter and material containing organic matter in, under, and around privies, houses, and other buildings used by him; shall remove all rubbish from any grounds which he has occupied; and shall leave the roads and all parts of the premises and adjacent property affected by his operations in a neat and satisfactory condition.
- 4. The Contractor shall restore or replace, when and as directed, any public or private property damaged by his work, equipment, or employees to a condition at least equal to that existing immediately prior to the beginning of operations. To this end the Contractor shall perform as required all necessary highway or driveway, walk and landscaping work. Suitable materials, equipment, and methods shall be used for such restoration.
- 5. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces and other closed or remote spaces before closing the space.
- 6. Control cleaning operations so that dust and other particulate will not adhere to wet or newly coated surfaces.
- 7. Remove waste materials, debris and rubbish from site daily and dispose of off site. No scrap/debris shall remain inside the building or anywhere on site upon final acceptance of the project.
- 8. The Contractor shall remove and replace all filters on all mechanical equipment prior to owner occupancy. The contractor shall remove and replace said filters during the course of the work to prevent any damage to the equipment. See also General Conditions

# M. TRANSPORTATION AND HANDLING

- 1. Materials and equipment shall be delivered, stored and handled to prevent intrusion of foreign matter and damage by weather or breakage. Packaged materials shall be delivered and stored in original, unbroken packages.
- 2. All materials must be stored within the Contract Limit Lines.

- 3. Promptly inspect shipments to assure that products comply with requirements, that quantities are correct and products are undamaged.
- 4. Packages, materials and equipment showing evidence of damage will be rejected and replaced at no additional cost to the Owner

PART 2 PRODUCTS - Not applicable to this Section

PART 3 EXECUTION - Not applicable to this Section

# END OF SECTION

# SECTION 01 60 00 PRODUCT REQUIREMENTS

## PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. Manufacturers: Provide products from one manufacturer for each type or kind as applicable.
- B. Product Selection: Provide products selected and reviewed by Architect.
- C. Products submitted for substitution shall be submitted with complete documentation, and include construction costs of substitution including related work.
- D. Substitutions: Request for substitution must be in writing. Conditions for substitution include:
  - 1. Specified material cannot be coordinated with other work.
  - 2. Specified material is not acceptable to authorities having jurisdiction.
  - 3. Substantial advantage is offered to the Owner in terms of cost, time, or other valuable consideration.
- E. Substitution Requests: Substitutions shall be submitted prior to award of contract, unless otherwise acceptable. Approval of shop drawings, product data, or samples containing substitutions is not an approval of a substitution.
- F. Store products in accordance with manufacturer's instructions with seals and labels intact and legible. Store sensitive products in weather tight enclosures; maintain within temperature and humidity range required by manufacturer.
- G. For exterior storage of fabricated products, place on sloped supports above ground. Cover products subject to deterioration with impervious sheet covering; provide ventilation to avoid condensation.
- H. Store loose granular material on solid surfaces in a well-drained area; prevent mixing with foreign matter.
- I. Arrange storage to provide access for inspection. Periodically inspect to insure products are undamaged and are maintained under required conditions. Keep log showing date, time and problems, if any.
- J. Stone, masonry units and similar materials shall be stored on platforms or dry skids and shall be adequately covered and protected against damage.

PART 2 PRODUCTS - Not applicable to this Section

PART 3 EXECUTION - Not applicable to this Section

## END OF SECTION

# SECTION 01 70 00 EXECUTION AND CLOSEOUT REQUIREMENTS

# PART 1 GENERAL

## 1.1 SECTION INCLUDES

## A. FIELD ENGINEERING:

- 1. Provide field engineering services to establish and record grades, lines and elevations.
- 2. The Contractor shall retain a Professional Engineer or Land Surveyor registered by the State of Connecticut to provide line, grades, elevations and control to lay out the building, underground utility lines and site work from the horizontal and vertical control information furnished by the Owner and to establish and record the necessary elevations.
- 3. The Contractor shall satisfy himself as to the accuracy of the horizontal and vertical control information furnished by the Owner, and shall not take advantage of errors which may be included in the control information. Stakes and markings shall be preserved.

# B. CUTTING AND PATCHING

- 1. The Contractor shall install sleeves, inserts and hangers furnished by the trades as needed for the installation of the Work required with installation drawing, locating the work.
- 2. Permission shall be obtained from the Engineer before cutting beams, arches, lintels or other structural members.
- 3. Do cutting and patching to integrate elements of work and to uncover ill timed, defective and non conforming work. Provide penetrations of existing surfaces. Provide samples for testing. Seal penetrations through floors, walls, ceilings and roofs, as applicable; restore or preserve fire rated construction. Construction and finishes shall match original work.
- 4. Repair any and all damage to work of other trades caused by cutting and patching operations, using skilled mechanics of the trades involved.

# C. SUBSTANTIAL COMPLETION: THE FOLLOWING ARE PREREQUISITES TO SUBSTANTIAL COMPLETION. PROVIDE THE FOLLOWING.

- 1. Punch list prepared by Contractor and subcontractors as applicable.
- 2. Supporting documentation.
- 3. Warranties.
- 4. Certifications.
- 5. Occupancy permit.
- 6. Start-up and testing of building systems.
- 7. Change over of locks.
- 8. Meter readings.

- D. FINAL ACCEPTANCE: PROVIDE THE FOLLOWING PREREQUISITES TO FINAL ACCEPTANCE.
  - 1. Final payment request with supporting affidavits.
  - 2. Completed punch list.
- E. PROJECT CLOSEOUT: PROVIDE THE FOLLOWING DURING PROJECT CLOSEOUT.
  - 1. Submission of record documents.
  - 2. Submission of maintenance manuals.
  - 3. Training and turnover to Owner's personnel.
  - 4. Final cleaning and touch-up.
  - 5. Removal of temporary facilities.
- F. PROJECT RECORD DOCUMENTS
  - 1. The Contractor shall keep one copy of the Specifications, Drawings, Addenda, approved Shop Drawings, Change Orders, Schedules and Instructions in good order at the site and marked to record all changes made during construction. The documents shall be available to the Architect/Engineer and Owner or their authorized representatives at all times. Update the documents for each job meeting.
  - 2. Record Drawings during Construction:
  - 3. The Contractor shall keep two sets of prints of the Contract Drawings at the site on which he shall record changes as they occur on the job. Maintain the record sets separate from documents used for construction.
  - 4. Keep documents current; do not permanently conceal any work until required information has been recorded.
  - 5. The Contractor shall also hire the services of an Engineer or Land Surveyor registered by the State of Connecticut to determine and record the location of exterior underground utility lines.
  - 6. The record of exterior underground utilities shall be made at the time of installation. The drawing shall bear the seal of the Engineer or Land Surveyor and his statement of accuracy.
  - 7. At the conclusion of construction, the Contractor shall turn one set of the drawings over to the Architect and one set to the owner.
- G. WARRANTIES AND GUARANTEES
  - 1. The Contractor shall guarantee all materials and workmanship for a period of one year from the date of acceptance of the work. In addition, the Contractor shall furnish the warranties listed in these Specifications. Submit copies of each to the Architect in the supplier's standard form.
  - 2. Submit certification that finish materials have fire rated finishes or treatment as specified.

PART 2 PRODUCTS - Not applicable to this Section PART 3 EXECUTION- Not applicable to this Section END OF SECTION

# SECTION 04 20 00 UNIT MASONRY

#### PART 1 - GENERAL

#### 1.01 WORK INCLUDED

- A. Provide unit masonry where shown on the drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related Work:
  - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions and Supplementary General Conditions.
  - 2. Section 07 92 00 Sealants & Caulking Section 08 11 13 – Metal Doors & Frames Section 09 90 00 - Painting
  - 3. Install precast lintels & sills and other materials as shown on the drawings.
  - 4. Coordinate installation of doors & frames and windows as erecting masonry.

#### 1.02 QUALITY ASSURANCE

- A. Comply with provisions of the General and Supplementary General Conditions.
- B. Masonry work shall conform to all requirements of the ACI-ASCE "Specifications for Masonry Structures", ACI-ASCE 530.1-88, except as modified by the Supplemental Requirements below.
- C. Codes and Standards: The work shall conform to the latest edition and latest addenda thereto of the following codes and standards:

State of Connecticut Basic Building Code

ACI-ASCE 530-88, "Building Code Requirements for Masonry Structures"

ACI-ASCE 530.1-88, "Specifications for Masonry Structures"

Concrete blocks shall conform to ASTM C90, TYPE 1. The provisions of ASTM C90 Paragraph 7.3.1 apply with regard to imperfections.

D. Installed compressive strength requirement to be 1500 psi; in accordance with ACI 530.1 for concrete and brick masonry.

- E. Special Inspection: The Owner will engage the services of a qualified independent agency who will function as "Special Inspector" for this project. The special inspector, as a representative of the Owner, will confirm that the provisions of the Building Code are complied with and will provide and/or supervise inspection and testing requirements, as necessary.
- F. The Owner will engage the services of an independent testing/inspection agency to inspect masonry construction in place, and to perform required tests.
  - 1. Any observed deviation from the Construction Documents or from approved shop drawings by the testing/inspection agency shall be brought to the immediate attention of the Contractor for corrective action. A summary of corrective work performed by the Contractor will be included in the inspection report.
- G. Inspection: In-place masonry work will be inspected to confirm compliance with requirements of the Contract Documents.
  - 1. Inspect erection of masonry units for compliance with unit thickness, joint thickness, specified pattern and bedment area requirements.
  - 2. Inspect reinforcement for compliance with size, location and drawings. Inconsistencies between Contract Documents and approved Shop Drawings shall be brought to the immediate attention of the Architect for resolution.
  - 3. Inspect installation of anchorage devices to supporting structure for type and spacing.
  - 4. Record weather conditions, preconditioning and protection provided for masonry materials and assemblies when ambient temperatures fall below 40 degrees F or rise above 100 degrees F.

# 1.03 SUBMITTALS

- A. Comply with pertinent provisions of Article 5 of the General Conditions and Sections of the Supplementary General Conditions.
- B. Product Data: Submit manufacturer's specifications and other data for each type of masonry unit, accessory, and other manufactured products, including certifications that each type complies with specified requirements. Include instructions for handling, storage, installation and protection. Transmit a copy of each instruction to the installer.

- C. Samples: Submit samples of each exposed masonry unit and color of masonry mortar for Architect's selections. Include in each set of samples the full range of exposed colors and textures to be expected in completed work.
- D. Mock-ups:
  - 1. At an area on the site where approved by the Architect, provide mock-up unit masonry panel.
    - a. Make each mock-up panel approximately 4'-0" high and 4'-0" long.
    - b. Provide one mock-up panel for each combination of masonry unit, bond pattern, mortar color, and joint type used in the work.
    - c. The mock-up panels may be part of the Work, and may be incorporated into the finished work, when approved by the Architect.
    - d. Revise as necessary to secure the Architect's approval.
- E. Materials: Submit Certificates of Compliance for the following materials and products:
  - 1. Masonry Block Standard; A.S.T.M. C-90 (latest revision) Type I, Moisture-controlled
  - 2. Mortar; ASTM C270
  - 3. Grout; ASTM C476
  - 4.. Galvanized anchors; ASTM A366 (sheet steel), ASTM A36 (structural steel) or ASTM A307 (standard fasteners) with ASTM A153 zinc coating

# 1.04 PRODUCT HANDLING

- A. Comply with pertinent provisions of the Supplementary General Conditions.
- B. Store masonry units above ground on level platforms which allow air circulation under the stacked units.
- C. Cover and protect against wetting prior to use.

# PART 2 - PRODUCTS

# 2.01 MASONRY UNITS

- A. Brick.
  - 1. Provide standard "Glen-Gery Brick" Molded Series 250-M Modular. Mack Brick Company, 2 Old Depot Hill Road, Enfield, CT 06082. Contact Chris Meyers 1-860-627-6625.
- B. Masonry Units
  - 1. Provide in Standard 8" thickness, 8" high and 16" & 8" long units.
  - 2. Units to be Manufactured by The Westbrook Concrete Block Co., Inc. P.O. Box 700 Westbrook, CT 06498

# 2.02 REINFORCING AND ACCESSORIES

- A. Masonry Reinforcing:
  - Typical Wall anchor HB "LOX-ALL" 170-2X-SH truss eye wire reinforcing w/continuous wire spaced 16"o.c. vertical with 9 gage HDG wire. In 8" walls, center reinforcing in wall. Reinforcing shall be cover by mortar to be a minimum of 5/8" to exterior and a minimum of a <sup>1</sup>/<sub>2</sub>" to interior.
  - 2. Top Course anchor HB-5213-2X, HDG, 12 GA Backplate, 16" o.c. horizontal.
- D. Non-Metallic Expansion Joint Strips: Provide 1/8" premolded, compressible, elastic fillers of foam, closed cell rubber, neoprene, or extruded plastic, conforming to ASTM D1056, Class RE41.
- E. Bond Breaker Strips: 15-lb. asphalt roofing felt complying with ASTM D226, or 15-lb. coal-tar roofing felt complying with ASTM D227.
- F. Pre-molded Control Joint Strips: Tee shaped PVC strips with a Shore A Durometer hardness of 85 +/-5 when tested in accordance with ASTM D2240, for standard concrete masonry unit walls.

# 2.03 MORTAR

A. Mortar to be color selected by architect. Mortar to comply with the requirements of "Mortar and Grout for Reinforced Masonry", ASTM C476.

- 1. Portland Cement: ASTM C150, Type I, except Type III may be used for cold weather construction.
- 2. Hydrated Lime: ASTM C207, Type S.
- 3. Aggregates:

Fine aggregate: ASTM C144, except for joints less than 1/4" use aggregate graded with 100% passing the No. 16 sieve.

Coarse aggregate: ASTM C404, with 95% to 100% passing the 3/8" sieve.

- 4. Water: Clean and potable.
- B. Mortar: One part (all parts by volume measurement) portland cement and onequarter part lime putty or hydrated lime, and damp loose sand not less than two and one-quarter and not more than three times the sum of the volumes of cement and lime used. Minimum compressive strength in 28 days shall be 1800 psi.
- C. Use type S mortar for exterior and interior walls.
- D. Mortar joints shall be tooled and not raked.
- E. Batch Control:
  - 1. Measure and batch materials as indicated elsewhere in this section, such that the required proportions for mortar can be accurately controlled and maintained. Measurement of sand exclusively by shovel will not be permitted.
  - 2. Mix mortar with the maximum amount of water consistent with workability to provide maximum tensile bond strength within the capacity of the mortar.
  - 3. Mix mortar ingredients for a minimum of 5 minutes in mechanical batch mixer. Use clean water free of deleterious materials which would impair the work. Do not use mortary which has begun to et, or if more than 201/2 hours has elapsed since initial mixing.
- F. Re-temper mortar with water as required to maintain a high plasticity.
  - 1. On mortar boards, re-temper only by adding water within a basin formed with mortar, and by working the mortar into the water.

2.04 GROUT
- A. Grout to conform to ASTM Specification (C476) and to be proportioned within the following limits:
  - 1. Fine grout for filling spaces less than 4" in both horizontal directions:

Parts by volume of Portland cement complying with ASTM 150, Type I -1

Parts by volume of hydrated lime or lime putty - 0 to 1/10

Aggregate measure in a damp, loose condition - 2-1/4 to 3 times the sum of the volumes of the Cementitious materials

2. Course grout for filling 4" spaces or larger in both horizontal directions:

Parts by volume of Portland cement complying with ASTM 150, Type I -1

Parts by volume of hydrated lime or lime putty - 0 to 1/10

Aggregate measured in a damp, loose condition - 1 to 2 times the sum of the volumes of the Cementitious materials

- 3. Do not use calcium chloride in mortar or grout.
- B. MIXING
  - 1. Provide "fine or coarse grout" conforming to ASTM C476 80; coarse grout to have 28 day strength of 2000 psi.
  - 2. When the minimum grout compressive strength in required to be more than 2000 psi, provide laboratory design mix prepared as required for design mixes of concrete under Section 03300 of the Specifications.
  - 3. Proportions: For "fine and coarse grout", provide proportions in 2.04 A. 1. and 2. above, with sufficient water to achieve fluid consistency.
  - 4. "Fluid consistency" is interpreted as meaning as fluid as possible for pouring in place without segregation of materials.

## 2.05 OTHER MATERIALS

- A. Provide other materials not specifically described, but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.
- B. Architectural Precast Concrete Trim Integrally colored architectural precast concrete units as indicated on the drawings Shop drawings by the Manufacturer shall be submitted for approval.
  - a. The General Contractor shall verify all dimensions and coordinate the shop drawings with field conditions and other trades.
  - b. Samples (6" sq. x 2"t) shall be submitted in a color selected by the Architect. Color to be achieved by using color pigments and any of the following as required to achieve the selected color to be selected.
  - c. Precast shall have a smooth, dense, fine-grained texture achieved by acid etching. The finished product shall show no obvious repairs or imperfections other than minimal color variations when viewed with the unaided eye at a 10 foot distance in good typical daylight illumination.
  - d. Precast shall be reinforced with a minimum area of steel equal to one quarter of one percent of the concrete's cross section area. If the surfaces are to be exposed to the weather, the reinforcement shall be galvanized or epoxy coated when covered with less than 2 inches of material for bars larger than 5/8 inch and 1-1/2 inches for bars 5/8 inch or smaller.
  - e. The mix design used shall yield concrete with a minimum compressive strength of 5000 psi per ASTM C39-86 and with a water absorption that is not to exceed 6% by weight per ASTM C 642.
  - f. After installation, any exterior stair treads or other units that may come in contact with salt or other deicing compounds must be sealed with a penetrating sealer submitted & reviewed by the Architect. Applicable standards for inspection and quality control shall be per Appendix J (Architectural Trim Requirements) in PCI MNL 117 "Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products" (3rd Edition)

# PART 3 - EXECUTION

# 3.01 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until satisfactory conditions are corrected.

## 3.02 ENVIRONMENTAL CONDITIONS

- A. Protect masonry construction from direct exposure to wind and sun when erected in ambient air temperature of 99 degrees F in the shade, with relative humidity less than 50%.
- B. Protection of Work: During erection, cover tops of walls with heavy waterproof sheeting at the end of each day's work. Cover partially complete structures when work is not in progress. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.
- C. Cold Weather Protection: Comply with Referenced Unit Masonry Standard for Cold Weather Construction and the following:
  - 1. Do not lay masonry units that are wet or frozen.
  - 2. Remove masonry damaged by freezing.

# 3.03 INSTALLATION OF MASONRY UNITS

- A. General
  - 1. Do not commence installation of the work of this Section until horizontal and vertical alignment of foundation is within 1" of plumb and the lines shown on the Drawings.
  - 2. Lay only dry masonry units.
  - 3. Use masonry saws to cut and fit masonry units.
  - 4. Set units plumb, true to line, and with level courses accurately spaced.
  - 5. Clean the surface of foundations free from dirt, debris, and latence, and expose the aggregate prior to start of installing first course.
  - 6. Accurately fit the units to plumbing, ducts grilles, openings and other interfaces, neatly patching all holes.
  - 7. Keep the walls continually clean, preventing grout and mortar stains. If grout does run over, clean immediately.

- 8. Thickness: Build masonry construction to the full thickness shown, except, build single-wythe walls to the actual thickness of the masonry units, shown or specified.
- 9. Build chases and recesses as shown and as required for the work of other trades. Provide not less than 8" of masonry between chase or recess and jamb of openings, and between adjacent chases and recesses.
- 10. Coordinate installation of Doors & Frames as erecting masonry.
- B. Unit Masonry pattern bonds:

1. The CMU to be in running bond with vertical joints located at center of masonry units in the alternate course below, unless otherwise indicated on drawings.

- C. Do not use chipped or broken units. If such units are discovered in the finished wall, the Architect may require their immediate removal and replacement with new units at no additional cost to the Owner.
- D. Laying up of Masonry Units:
  - 1. Place units in mortar with full shoved bed and head joints.
  - 2. Align vertical cells of hollow units to maintain a clear and unobstructed system of flues.
  - 3. All masonry units shall be laid plumb and true to lines and shall be laid with completely filled head (vertical) and bed (horizontal) joints. Furrowing of bed joints is not permitted. Closures shall be rocked into place with the head joint mortar thrown against the two adjacent units in place. Hold racking to an absolute minimum.
  - 4. Provide cleanouts at the bottom of each cell of masonry units for removing mortar droppings. Do not close the cleanouts until they have been inspected and approved by the inspector.
  - 5. Frozen Materials and Work: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen work.

- 6. Built-In Work: As the work progresses, build-in items specified under this and other sections of these specifications. Fill in solidly with masonry around built-in items.
  - a. Fill space between hollow metal frames and masonry solidly with mortar.
  - b. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath in the joint below and rod mortar or grout into core.
- 7. Prevent grout or mortar from staining the face of masonry to be left exposed or painted. If grout or mortar does contact the face of such masonry, it shall be immediately removed. All sills, ledges, etc., shall be protected from dropping of mortar and door jambs and corners shall be protected from damage during construction.
- E. Face Joints/Tooling:
  - 1. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into places. Do not swish head joints.
  - 2. Lay hollow concrete masonry units with full mortar coverage on horizontal and vertical face shells; also bed webs in mortar in starting course on footings, foundation walls and slabs and adjacent to cells or cavities to be reinforced or to be filled with concrete or grout.
  - 3. Remove masonry units disturbed after laying; clean and relay in fresh mortar. Do not pound corners at jambs to fit stretcher units which have been set in position. If adjustments are required, remove units, clean off mortar, and reset in fresh mortar.
  - 4. Collar Joints: Fill joints between wythes solidly with mortar by parging, and shove units solidly into parging.
  - 5. Horizontal and vertical face joints to be 3/8 inch thick and tooled when thumbprint hard with a round bar to produce a concave surface well bonded to the masonry at the edges.
  - 6. Joints which are not tight at the time of tooling are to be raked out, pointed with fresh mortar and then re-tooled.

- G. Joining of Work:
  - 1. Where fresh masonry joints masonry that is partially set, the exposed surface of the set masonry shall be cleaned and lightly wetted so as to obtain the best possible bond with the new work. All loose masonry and mortar shall be removed.
  - 2. If it becomes necessary to "Stop Off" a horizontal run of masonry, this shall be done only by racking back in each course and if grout is used, stopping the grout 4" back of the rack. Toothing is not permitted.
  - 3. In grouted construction, when grouting is stopped for 1 hour or longer, the grout pour shall be stopped 1-1/2" below the top of the last course.

# 3.04 REPAIR, POINTING AND CLEANING

- A. Inspection and adjustment:
  - 1. Upon completion of the work of this Section, make a thorough inspection of installed masonry and verify that units have been installed in accordance with the provisions of this Section.
  - 2. Make necessary adjustments.
- B. Remove and replace masonry units which are loose, chipped, broken, stained or otherwise damaged, or if units do not match adjoining units as intended. Provide new units to match adjoining units and install in fresh mortar or grout, pointed to eliminate evidence of replacement.
- C. Pointing: During the tooling of joints, enlarge any voids or holes except weep holes, and completely fill with mortar. Tool joints to a dense, smooth surface.

Unless otherwise shown on the drawings, provide joints of concave pattern throughout. Point-up all joints at corners, openings and adjacent work to provide a neat, uniform appearance, properly prepared for application of caulking or sealant compounds.

- D. Inspection and Adjustment:
  - 1. Upon completion of the work of this Section, make a thorough inspection of installed masonry and verify that units have been installed in accordance with the provisions of this Section.

- 2. Make necessary adjustments, point, or cut out and repaint, if necessary, all hole sand defective joints.
- E. Clean exposed masonry by brushing at the end of each day's work and after final painting to remove mortar spots and droppings. Comply with recommendations in NCMA TEK bulletin No. 28. and CMU manufacturer.

END OF SECTION 04 20 00

## SECTION 05 50 00 METAL FABRICATIONS

### PART 1 - GENERAL

#### 1.01 DESCRIPTION

- A. Work included: Provide miscellaneous metal work as shown on the drawings, as specified herein, and as needed for a complete and proper installation, including but not limited to rough hardware and miscellaneous metal trim, etc.
- B. Related Work:
  - 1. Documents affecting work of this Section include, but are not necessarily limited to General Conditions and Supplementary General Conditions.
  - 2. Section 03 30 00 Cast in Place Concrete Section 08 71 00 - Builders Hardware

#### 1.02 REFERENCES

- A. "Architectural Metal Handbook", published by the National Association of Architectural Metal Manufacturers.
- B. Welding: conform to the provisions of the Code for Welding in Building Construction - AWS D1.0-69 of the American Welding Society, including current addenda.
- C. AISC "Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings", including "Commentary of the AISC Specifications".
- D. AISC "Specifications for the Design of Cold-Formed Steel Structural members".
- E. ASTM A307 Specification for Carbon Steel Bolts and Studs, 50,000 psi Tensile.
- F. ASTM A36 Specification for Structural Steel.
- G. ASTM A283 Specification for Low and Intermediate Tensile Strength Carbon-Silicon Steel Plates for Machine Parts and General Construction.
- H. ASTM A53 Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
- I. ASTM A663 Specification for Steel Bars, Carbon, Merchant Quality, Mechanical Properties.

- J. ASTM A675 Specification for Steel Bars, Carbon, Hot-Wrought, Special Quality, Mechanical Properties.
- K. ASTM A501 Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
- 1.03 QUALITY CONTROL
  - A. Comply with provisions of the General and Supplementary General Conditions.
  - B. Perform shop and/or field welding required in connection with the work of this Section in strict accordance with the recommendations of the American Welding Society.
  - C. Field Measurements: Take field measurements in a timely manner prior to preparation of shop drawings and fabrication, to insure proper fitting of the work. Do not delay job progress; allow for trimming and fitting wherever the taking of field measurements before fabrication might delay the work.
  - D. Shop Assembly: Preassemble items in the shop to the greatest extent possible, so as to minimize field splicing and assembly of units at the project site.
    Disassemble units only to the extent necessary for shipping and handling limitations. Clearly mark units for reassemble and coordinated installation.

## 1.04 SUBMITTALS

- A. Comply with pertinent provisions of Article 5 of the General Conditions and the Supplementary General Conditions.
- B. Product Data:
  - 1. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
  - 2. Manufacturer's recommended installation procedures which, when approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the Work.
  - 3. Shop drawings in sufficient detail to show configurations, fabrication, installation, anchorage and interface of the work of this Section with the work of adjacent trades.

## 1.05 PRODUCT HANDLING

A. Comply with pertinent provisions of the Supplementary General Conditions.

## PART 2 - PRODUCTS

### 2.01 MATERIAL STANDARDS

- A. In fabricating items which will be exposed to view, limit materials to those which are free from surface blemishes, pitting, rolled trade names, and roughness.
  - 1. For exterior use and where built into exterior walls, provide zinc-coated fasteners.
  - 2. Provide fasteners of type, grade, and class required for the particular use.
- B. Comply with following standards, as pertinent:
  - 1. Structural steel, steel plates, shapes, and bars: ASTM A36 or ASTM A663, A675 Grade 65;
  - 2. Steel tubing (hot formed, welded, or seamless): ASTM A501;
  - 3. Cold-finished steel bars: ASTM A108;
  - 4. Cold-rolled carbon steel sheets: ASTM A336;
  - 5. Galvanized carbon steel sheets: ASTM A526, with G90 zinc coating in accordance with ASTM A525;
  - 6. Steel pipe: ASTM A53, grade A, schedule 40;
  - 7. Bolts and nuts: ASTM A307, grade A;
  - 8. Concrete inserts:
    - a. Threaded or wedge type galvanized ferrous castings of malleable iron complying with ASTM A47;
    - b. Provide required bolts, shims, and washers, hot-dip galvanized in accordance with ASTM A153;
  - 9. Lag bolts: Provide square head type complying with Fed Spec FF-B-561;
  - 10. Machine screws: Provide cadmium plated steel type complying with Fed Spec FF-S-111;
  - 11. Washers:

- a. Plain washers: Comply with Fed Spec FF-W-92, round, carbon steel;
- b. Lock washers: Comply with Fed Spec FF-W-84, helical spring type carbon steel;
- 12. Toggle bolts: Provide type, class, and style needed complying with Fed Spec FF-B-588;
- 13. Anchorage devices: Provide expansion shields complying with Fed Spec FF-S-325;
- 14. Non-shrink, non-metallic grout: Pre-mixed, factory-packaged, nonstaining, non-corrosive, non-gaseous grout complying with Corp of Engineers, CE CRD-C621. Provide grout specifically recommended by manufacturer for interior and exterior applications of type specified in this Section.

# 2.02 OTHER MATERIALS

A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

# 2.03 GALVANIZING REPAIR

A. For repair of galvanizing, use a high zinc-dust content paint complying with MIL-P-21035.

# 2.04 FABRICATION

- A. Fabricate in ample time not to delay progress. Make delivery at job at such time as required for proper coordination.
- B. Form work in shop true to detail, with clean, straight, sharply defined profiles conforming to approved shop drawings.
- C. Connections and joints:
  - 1. Weights of connections: Adequate to safely sustain, withstand stresses, strains, to which they will be normally subjected.

- 2. Welded joints: As strong as adjoining sections. Continuously welded joints where exposed to be dressed flush, ground smooth. Exposed spot welded joint to be close fitting in their members.
- 3. Make up threaded connections tightly so that threads will be entirely concealed by fitting.
- 4. Riveting, Bolting, Screwing: Unless otherwise indicated, rivet, bolt, screw heads: flat, countersunk in exposed faces of work of ornamental or finish character, elsewhere as required. Cut off bolts, screws, etc., where exposed flush with nuts or other adjacent metal. Exposed fastenings: same materials, color, finish a metal to which they apply, unless otherwise required.
- D. Anchorage provisions: Work to be built in with masonry or concrete shall be of form required for positive anchorage.
- E. Prior to shop painting or priming, properly clean metal surfaces as required for the applied finish and for the proposed use of the item.
- F. On surfaces inaccessible after assembly or erection, apply two coats of primer meeting requirements of FSTTP-645.
- G. Galvanizing: Provide a zinc coating for those items indicated or specified to be galvanized, as follows:
  - 1. ASTM A153 for galvanizing iron and steel hardware.
  - 2. ASTM A123 for galvanizing rolled, pressed and forged steel shapes, plates, bars and strip 1/8" thick and heavier.

## PART 3 - EXECUTION

## 3.01 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.

## 3.02 INSTALLATION

A. Set miscellaneous metal fabrications accurately in location, alignment and elevation, plumb, level, true and free of rack; measured from established lines and

levels. Brace temporarily or anchor temporarily in formwork where work is to be built into concrete, masonry or similar construction.

- B. Anchor securely as shown or as required for the intended use, using concealed anchors wherever possible.
- C. Fit exposed connections accurately together to form tight hairline joints. Weld connections (comply with AWS code procedures) which are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Grind joints smooth and touch up shop paint coat. Do not weld, cut or abrade the surfaces of exterior units which have been hot-dip galvanized after fabrication, and are intended for bolted or screwed field connections.
- D. Immediately after erection, clean the field welds, bolted connections, and abraded areas of shop priming. Paint the exposed areas with the same material used for shop priming.
- E. For galvanized surfaces, clean field welds, bolted connections and abraded areas and apply galvanizing repair paint to comply with ASTM A780.

END OF SECTION 05 50 00

## SECTION 00 61 00 ROUGH CARPENTRY

### PART 1 - GENERAL

### 1.01 DESCRIPTION

A. Work includes sills, plates, stud walls, blocking, wall and roof sheathing, exterior wall furring, ceiling framing, temporary enclosures and draft stopping, shoring, bracing and rough hardware.

#### 1.02 RELATED WORK

A.	SECTION 06 40 00	ARCHITECTURAL WOODWORK
B.	SECTION 07 30 00	FIBERGLASS ROOFING SHINGLES
C.	SECTION 07 46 10	FIBER CEMENT SIDING & TRIM
D.	SECTION 07 62 00	FLASHING AND SHEET METAL
E.	SECTION 07 92 00	SEALANTS & CAULKING

### 1.03 REFERENCE STANDARDS

- A. American Forest and Paper Association (AFPA): ANSI NDS-1997 "National Design Specification for Wood Construction"
- B. Southern Pine Inspection Bureau (SPIB): SPIB "Grading Rules" (latest edition).
- C. Western Wood Products Association (WWPA): WWPA "Grading Rules for Western Lumber" (latest edition)
- D. National Lumber Grades Authority (NLGA): NLGA "Standard Grading Rules" (latest edition)
- E. American Plywood Association (APA): APA C-20 "Plywood Specification and Grade Guide"
- F. American Wood Preserver's Association (AWPA): LP-2 "Above Ground Use, Pressure Treated with Water-Bourne Preservatives"

### 1.04 SUBMITTALS

A. Submit properly marked samples of materials prior to delivery to site.

1.05 PRODUCT HANDLING

00 61 00-1

A. All wood must be covered and completely weather protected and stored at least twelve (12") inches above grade.

## PART 2 - PRODUCTS

## 2.01 FRAMING LUMBER

- A. All horizontal or sloping framing lumber two by six (2x6), two by eight (2x8), two by ten (2x10), and two by twelve (2x12), shall be #2 Douglas-Fir, having an allowable extreme fiber stress in bending "Fb" of 875 psi for single use and 1000 psi for repetitive member uses, and an "E" value of 1,600,000 psi, unless otherwise shown.
- B. All two by six (2x6) bearing studs, unless otherwise shown, shall be Construction Grade, having an allowable compression parallel to grain "Fc" of 1600 psi, and an "E" value of 1,500,000 psi.
- C. All two by six (2x6) lumber used as horizontal wood sill plates shall be Hem-Fir, No. 2 Grade, having an allowable extreme fiber stress in bending of 850 psi for single member use, and an "E" value of 1,400,000 psi.
- D. All horizontal sills in contact with earth bearing slabs or concrete shall be Pressure-Treated.
- E. Light framing lumber used for studs in non-bearing walls and partitions shall not be less than Stud or Standard grade and shall have a compressive stress parallel to grain "Fc" of not less than 400 psi, Hem-Fir, Spruce, or Hemlock.
- F. Moisture content at delivery shall not exceed 19% for all general framing lumber. "Grade Mark", "Trade Mark" and Mill Identification Mark of Association having jurisdiction shall appear on each member.

### 2.02 WALL SHEATHING

A. APA Rated Sheathing Structural I, exterior glue.

### 2.03 ROOF SHEATHING

A. APA Rated Sheathing Structural I, exterior glue.

### 2.04 ROUGH HARDWARE

A. Nails, bolts, etc., as required. Use galvanized or nonferrous items for locations exposed 00 61 00-2 APRIL 2022

to moisture.

### 2.05 BUILDING PAPER

A. 15# asphalt impregnated felt.

### 2.06 LAMINATED VENEER LUMBER

A. Provide sizes indicated on drawings. Provide extreme fiber stress in bending "Fb" of 2600 psi and an "E" value of 1,900,000 psi. "Micro=Lam" as manufactured by Truss Joist, Inc., Boise, ID or approved equal.

### 2.07 JOIST AND BEAM HANGERS

A. Provide prefabricated metal hangers for framing members which do not bear directly on top of supporting members. Beam hangers shall be top flange bearing. Hangers shall be as manufactured by Simpson Strong-Tie Co., Inc., San Leandro, CA.

### 2.08 WOOD PRESERVATIVE

A. Liquid preservative with fungicide to prevent mildew and rot formation. Equal to Green #10 Cuprinol by Darworth Company, Avon, CT 06001.

## 2.09 OTHER MATERIAL

A. All other material not specifically described but required for a complete and proper installation as indicated, shall be new, suitable for the intended use, and subject to the approval of the Architect.

## PART 3 - EXECUTION

## 3.01 ROUGH HARDWARE

- A. Bolts, screws, nails, etc., as required. All in accordance with Connecticut State Building Code: Table 2305.2, "Fastening Schedule".
- B. All hardware and fasteners in contact with pressure treated lumber shall be hot dipped galvanized.

### 3.02 TEMPORARY ENCLOSURE

A. Provide temporary enclosures, doors and dust barriers as required to protect building from weather and construction damage and to ensure building security. Upon completion, remove all temporary work and repair any damage to permanent finishes
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and installations. Verify requirements with Architect and Owner.

### 3.03 SURFACE CONDITIONS

A. Carefully inspect the installed work of other trades and verify that all such work is complete where this installation may properly commence. Verify that rough carpentry may be performed in strict accordance with the design and all pertinent codes and regulations. In the event of discrepancy, notify Architect. Do not proceed with work until directions are received from Architect.

### 3.04 GENERAL FRAMING

- A. General: All rough carpentry shall produce joints true, tight, and well nailed with all members assembled as indicated. Set all horizontal and sloped members with crown up. Double member's minimum for headers and trimmers.
- B. Selection of Lumber Pieces: Carefully select all members. Select individual pieces so that knots and obvious defects will not interfere with placing bolts or proper nailing or making proper connections. Cut out and discard all defects which will render a piece unable to serve its intended function. Lumber may be rejected by the Architect, whether or not it has been installed, for excessive warp, twist, bow, crook, mildew, fungus, or mold, as well as for improper cutting and fitting.
- C. Bearing: Make all bearings full unless otherwise indicated. Finish all bearing surfaces on which structural members are to rest so as to give sure and even support. Where framing members slope, cut or notch the ends as required to give uniform bearing surface. Minimum bearing one and one-half (1 1/2") inches on wood, four (4") inches on steel.
- D. Shimming: Do not shim any framing components.
- E. Alignment: On all framing members to receive a finished surface, alignment of the finish subsurface to vary not more than one-eighth (1/8") inch from the plane of surfaces of adjacent framing and furring members. Provide "padding" as required to achieve proper surfaces for finish materials.
- F. Holes and Notches: Do not bore holes closer than 2 inches from top or bottom of joists with hole diameter not to exceed one-third (1/3) the depth of member. Do not notch in middle third (1/3) of joist. Depth of notches in top or bottom of joists not to exceed one-sixth (1/6) the member depth. Notched ends not to exceed one-third (1/3) member depth. DO NOT cut holes or notches in truss members. Notches or holes over one (1") inch diameter in two by four (2x4) studs will require metal stud plates equal to Strong Tie SS Stud plates. Include nail stopper at all piping.

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- G. Sills: Set in bed of Portland cement mortar. Secure each member with a minimum of two (2) bolts. Secure sills to bolts with recessed washer and nut.
- H. Preservatives: Treat all wood in contact with concrete or masonry with two (2) coats of, or complete immersion for a minimum of five (5) minutes in, wood preservative. Include ends of door frames, all surfaces of sills, etc.

## 3.05 BLOCKING

A. Install all blocking required to support all items of finish and to cut off all concealed draft openings, both vertical and horizontal, between ceiling and floor areas. Firestop concealed spaces with wood blocking not less than two (2") inches thick unless blocked by other framing members. Provide blocking to support edges of all soffits, flashing, etc. Provide two (2")-inch solid blocking as required for securing edges of gypsum board. Provide continuous blocking for gypsum board ceiling at all edges. Also provide blocking behind all wall or ceiling mounted accessories such as grab bars, cabinets, fans, light fixtures, plumbing lines, electrical panel boards, bathroom accessories, etc. Note that grab bars must be capable of supporting three hundred (300 LB) pounds after installation.

## 3.06 BACKBOARDS

A. Install three-quarter (3/4") inch thick C-D fir plywood backboards for mounting of electrical, telephone panels, etc. Backboards to be painted by Section 09900 prior to installation of equipment.

# 3.07 INSTALLATION OF PLYWOOD SHEATHING OR SOLID SHEATHING

A. Place plywood or solid sheathing with face grain perpendicular to supports and continuously over at least two (2) supports, except where otherwise specifically indicated. Center joints accurately over supports; unless otherwise indicated. Protect all plywood or solid sheath from moisture by use of all required waterproof coverings until the plywood has in turn been covered with the next succeeding component of finish

## 3.08 FASTENING

- A. Rough Hardware: Anchor and nail to comply with Connecticut State Building Code: Table 2305.2, "Fastening Schedule".
- B. Nailing: Use only common wire nails or spikes of the dimensions shown on the Nailing Schedule, except where otherwise specifically noted on the drawings. For 00 61 00-5 APRIL 2022

conditions not covered in the Nailing Schedule, provide penetration into the piece receiving the point of not less than one-half (1/2") inch the length of the nail or spike, provided, however, that 16d nails may be used to connect two (2) pieces of two (2") inch (nominal) thickness. Do all nailing without splitting wood. Prebore as required. Replace all split members.

- C. Bolting: Drill holes one-sixteenth (1/16) inch larger in diameter than the bolts being used. Drill straight and true from one (1) side only. Bolt threads shall not bear on wood. Use washers under head and nut where both bear on wood. Use washers under all nuts.
- D. Screws: For lag screws and wood-screws, prebore holes same diameter as root of threads; enlarge holes to shank diameter for length of shank. Screw, do not drive, all lag-screws and wood-screws.

# 3.09 LAMINATED VENEER LUMBER

A. Provide one-half (1/2") inch diameter at two (2') feet on center thru-bolts top and bottom of multiple units or as indicated on Drawings. Provide top flange hangers where laminated members are supported by trusses or other members.

END OF SECTION 06100

### SECTION 06 40 00 ARCHITECTURAL WOODWORK

## PART 1 - GENERAL

## 1.01 WORK INCLUDED

- A. Provide Interior trim, installation of Doors and hardware, etc. as shown on drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related Work:
  - 1. Documents affecting work of this Section include but are not necessarily limited to, General Conditions and Supplementary General Conditions.
  - Section 06 20 00 Rough Carpentry Section 06 45 05 – Simulated wood trim Section 07 92 00 - Sealants and Caulking Section 08 11 13 – Metal Doors & Frames Section 08 71 00 – Builders Hardware Section 09 90 00 - Painting

## 1.02 QUALITY ASSURANCE

- A. Comply with provisions of the General and Supplementary General Conditions.
- B. In addition to complying with pertinent codes and regulations of governmental agencies having jurisdiction, all material, equipment and workmanship are to comply with procedures and recommendations as specified by AWI Architectural Woodwork Quality Standards, AWI Architectural Casework details, and ANSI 156

## 1.03 SUBMITTALS

- A. Comply with pertinent provisions of Article 5 of the General Conditions and Sections 01340 and 01341 of the Supplementary General Conditions.
- B. Product Data: Contractor will submit manufacturer's specifications and installation instructions for hardware, materials, and finishes used in fabrication of cabinets and as required showing compliance with specifications.

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- C. Shop Drawings: Contractor will submit shop drawings showing location and sizes of cabinets, accessories, materials, finishes, hardware types and locations, fillers, etc. Shop Drawings are to include fully dimensioned plans and elevations and indicate details of anchorage to counter top and to walls.
- D. Samples: Contractor will submit fully finished samples of following items required for countertops:
  - 1. Samples of manufacturer's standard solid surface for color selections.
  - 2. Exposed hardware of each type and finish.

# 1.04 PRODUCT HANDLING & STORAGE

- A. Comply with pertinent provisions of the Supplementary General Conditions.
- B. Protect countertops during storage and handling to prevent damage, soiling and deterioration.
- C. Do not deliver woodwork, until painting, wet work, grinding and similar operations which could damage, soil or deteriorate woodwork have been completed in installation areas. If, due to unforeseen circumstances, woodwork must be stored in other than installation areas, store only in areas meeting requirements specified for installation areas.

# 1.05 PROJECT / SITE CONDITIONS

- A. Installer shall advise Contractor of temperature and humidity requirements for woodwork installation areas. Do not install woodwork until required temperature and relative humidity have been stabilized and will be maintained in installation areas.
- B. Maintain temperature and humidity in installation areas as required to maintain moisture content of installed woodwork within a 1.0 percent tolerance of optimum moisture content, from date of installation through remainder of construction period. The fabricator of woodwork shall determine optimum moisture content and required temperature and humidity conditions.

# PART 2 - PRODUCTS

# 2.01 GENERAL

A. Fabricate Architectural Woodwork to "Custom Grade" standards of the Architectural Woodwork Institute.

# 2.02 OTHER MATERIALS

A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

# PART 3 - EXECUTION

# 3.01 SURFACE CONDITIONS

- A. Coordinate as required with other trades to assure proper and adequate provision in the work of those trades for interface with the work of this Section.
- B. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

# 3.02 PREPARATION

- A. Deliver anchoring devices to be built into substrates well in advance of time substrates are to be built.
- B. Condition woodwork to average prevailing humidity conditions in installation areas prior to installing.
- C. Prior to installation of architectural woodwork, examine shop fabricated work for completion, and complete work as required, including back priming and removal of packing.

# 3.03 FIELD MEASUREMENTS

A. Take measurements in the field to assure proper dimensions for the work in this Section.

## 3.04 INSTALLATION

- A. Install the work of this Section in strict accordance with the approved Shop Drawings and the referenced standards, anchoring all items firmly into position.
- B. Where blocking or backing is required, coordinate as necessary with other trades to assure placement in a timely manner.
- C. Attach Countertops securely to walls. Secure to walls and blocking with countersunk, concealed fasteners and blind nailing as required for a complete installation. Spline and glue joints in countertops; provide concealed mechanical clamping of joint. Provide cutouts for fixtures and appliances as indicated; smooth cut edges and coat with waterproof coating or adhesive.
- D. Caulk with silicone sealant, the joint between the wall and back splashes and countertops and walls throughout the work. Glue down and secure splash plates with tap screws at all four corners. Where the joint requires it, install a back-up rod of closed cell polyethylene.
- E. Rout, drill and otherwise prepare the surfaces as needed, and firmly install all finish hardware and accessories in accordance with the approved design and the manufacturer's recommendations.
- F. Coordinate the time of installation with availability of other trades to make required utility connections.
  - 1. Provide access panels as needed for connection and maintenance of utilities.
  - 2. Test each electrical item through at least five operating cycles, and adjust as needed to achieve optimum operation.
- G. Touch-up scratches and abrasions to be completely invisible to the unaided eye from a distance of five feet.

# 3.04 ADJUSTING, PROTECTION AND CLEANING

- A. Protection: Installer shall advise Contractor of final protection and maintain conditions as necessary to ensure that work will be without damage or deterioration at time of acceptance.
  - 1. Cover completed work with 4-mil polyethylene film protective enclosure, applied in a manner which will allow easy removal, will allow the casework to breath (i.e. not trap humidity), and will not damage the

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casework or adjoining work. Remove cover immediately before time of final acceptance.

- B. Repair damaged and defective casework wherever possible to eliminate defects functionally and visually; where not possible to repair properly, replace casework. Adjust joinery for uniform appearance.
- C. Surfaces of solid surface may be cleaned with a damp cloth or ordinary soap and water.
- D. Harsh abrasive, acidic or caustic cleaners should not be used. Stubborn dirt, greasy fingerprints, or glue spills may be removed with MFG approved cleaner.
- E. Follow precautions listed on all container labels.

END OF SECTION 06 40 00

## SECTION 07 11 13 BITUMINOUS DAMPPROOFING

### PART 1 GENERAL

### 1.01 SUMMARY

- A. Section Includes: Fluid-Applied Dampproofing.
- B. Related Sections:
  - 1. Section  $04\ 20\ 00$  unit masonry

### 1.02 REFERENCES

- A. ASTM International:
  - 1. ASTM C-836 Standard Specification for High Solids Content, Cold Liquid-Applied Elastomeric Waterproofing Membrane for Use with Separate Wearing Course.
  - 2. ASTM D-412 Standard Test Methods for Vulcanized Rubber and Thermoplastic Rubbers and Thermoplastic Elastomers-Tension.
  - 3. ASTM D-1653 Standard Test Methods for Water Vapor Transmission of Organic Coating Films.
  - 4. ASTM D-2939 Standard Test Methods for Emulsified Bitumens Used as Protective Coatings.
  - 5. ASTM D-3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
  - 6. ASTM D-3274 Standard Test Method for Evaluating Degree of Surface Disfigurement of
  - 7. Paint Films by Microbial (Fungal or Algal) Growth or Soil and Dirt Accumulation.
- B. Federal Specifications
  - 1. TT-C-555B Ability to Resist Hydrostatic Pressure Over Non-Structural Cracks.

### 1.03 SUBMITTALS

- A. General: Submit listed submittals in accordance with Conditions of the Contract and Division 1 Submittal Procedures Section.
- B. Product Data: Submit manufacturer's product data and installation instructions.
- C. Quality Assurance/Control Submittals: Submit the following:
  - 1. Certificates: Submit certificate that applicator complies with requirements of this section.

### 1.04 QUALITY ASSURANCE

A. Applicator Qualifications: Utilize an applicator trained and approved by the waterproofing manufacturer.

### 1.05 DELIVERY, STORAGE & HANDLING

A. General: Comply with Division 1 Product Requirement Section.

- B. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- C. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.

## 1.06 PROJECT/SITE CONDITIONS

A. Environmental Requirements: Comply with application temperature range of 0-150°F (-18 - 66° C).

# PART 2 PRODUCTS

# 2.01 DAMPPROOFING

- A. Manufacturer: Applied Technologies, LLC
  - 1. Contact: P. O. Box 18476 Fairfield, OH 45018; Telephone: (877) APPLY-IT, (513) 939-3767; Fax: (513) 939-3787; Web site: www.appliedtechnologies.com
- B. Proprietary Products/Systems. Should be purchased directly from Applied Technologies. Fluid-Applied Dampproofing and related products, including the following:
  - 1. Applied Technologies A-T Sealer Dampproofing & Cavity Wall Coating:
    - a. Material: emulsion asphalt dampproofing
    - b. Color: Black
    - c. Total Solids Average: 63%.
    - d. Application Method: [Spray] [Brush].
    - e. Coverage Rate: 2-gal/100 ft<sup>2</sup> (0.82 L/m2).
    - f. Dry Film Thickness: 20 mil (0.5 mm) min.
    - g. Total Cure Time: 24 hours.
    - h. Weight/Gallon: 7.6 lb (3.4 kg).
    - i. Elongation at 70°F (21°C), Minimum: 180%.
    - j. Tensile Strength (ASTM D-412): 32 psi (220 kPa) min.
    - k. Application Temperature Range: 32 150°F (-18 66°C).
    - Ability to Stay in Place (ASTM C-836): 30 mils.
    - m. Durability and Surface Disfigurement Due To Microbial Growth (ASTM D-3273, ASTM D-3274): None.
    - n. Water Vapor Transmission (ASTM D-1653): 0.42 perms.
    - o. Water Solubility (ASTM D-2939):
      - i. Blistering: None.
      - ii. Re-emulsification: None.
    - p. Ability to Resist Hydrostatic Pressure (Federal Specification TT-C-555B):
      - i. Water Leaks: None
      - ii. Weight Gain: 1.0 oz.

## 2.02 PRODUCT SUBSTITUTIONS

A. Substitutions: per section 01 60 00.

### 2.03 ACCESSORY MATERIALS

- A. Provide proprietary accessory materials, including the following:
  - 1. Mastic:
    - a. Material: Plastic or resin material compatible with the dampproofing material.

## **PART 3 EXECUTION**

### 3.01 MANUFACTURER'S INSTRUCTIONS

A. Comply with the instructions and recommendations of the waterproofing manufacturer.

### 3.02 EXAMINATION

- A. Site Verification of Conditions:
  - 1. Verify that site conditions are acceptable for application of the dampproofing material.
  - 2. Do not proceed with application until unacceptable conditions are corrected.

### **3.03 PREPARATION**

- A. Surface Preparation:
  - 1. Ensure that the surfaces to receive dampproofing are structurally sound and free of moisture, dust, mud, loose mortar, fins, metal projections or any substances that would be detrimental to the bonding of the material to the surface.
  - 2. Patch cracks, voids and holes with nonshrink grout or mastic.

### **3.04 APPLICATION**

- A. Spray apply a uniform coat of dampproofing material to entire wall area. Obtain a seamless coating with a minimum dry film thickness of 20 mil (0.5 mm).
- B. Allow material to cure for 24 hours before placing any backfill against the wall.
- C. Follow the current installation instructions.

## 3.05 CLEANING

A. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

### SECTION 07 30 00 FIBERGLASS ROOF SHINGLES

### PART 1 GENERAL

- 1.01 SECTION INCLUDES
  - A Fiberglass Asphalt roofing shingles.
  - B Leak barrier and roof deck protection.
  - C Metal flashing associated with shingle roofing.

### 1.02 RELATED SECTIONS

- A Section 06 10 04 Rough Carpentry: Framing, wood decking, and roof sheathing.
- B Section 07 62 00 Flashing and Sheet Metal: Sheet metal flashing not associated with shingle roofing; gutters and downspouts.
- 1.03 REFERENCES American Society for Testing and Materials (ASTM) -Annual Book of ASTM Standards
  - ASTM A 653/A 653M Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - 2. ASTM B 209 Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
  - 3. ASTM B 370 Standard Specification for Copper Sheet and Strip for Building Construction.
  - 4. ASTM D 2218 Impact Resistance of Prepared Roof Covering Materials.
  - 5. ASTM D 3018 Standard Specification for Class A Asphalt Shingles Surfaced with Mineral Granules.
  - 6. ASTM D 3161 Standard Test Method for Wind-Resistance of Asphalt Shingles (Fan-Induced Method).
  - ASTM D 3462 Standard Specification for Asphalt Shingles Made From Glass Felt and Surfaced with Mineral Granules.
  - 8. ASTM D 4586 Standard Specification for Asphalt Roof Cement, Asbestos-Free.
  - 9. ASTM D 7158 Standard Test Method for Wind-Resistance of Sealed Asphalt Shingles (Uplift Force/Uplift Resistance Method).
  - 10. UL 790 Tests for Fire Resistance of Roof Covering Materials.
  - 11. UL 997 Wind Resistance of Prepared Roof Covering Materials.
  - B Asphalt Roofing Manufacturers Association (ARMA)

- C National Roofing Contractors Association (NRCA)
- D U.S. Green Building Council (USGBC)
- E Leadership in Energy and Environmental Design (LEED)
- F ENERGY STAR
- G Cool Roof Rating Council (CRRC)
- H Miami Dade County
- 1.04 DEFINITIONS
  - A Roofing Terminology: Refer to ASTM D1079 and the glossary of the National Roofing Contractors Association (NRCA) Roofing and Waterproofing Manual for definitions of roofing terms related to this section.

# 1.05 SUBMITTALS

A Submit copies of product data sheets for each product, detail drawings, installation requirements, samples for each type of roofing product and manufactureres warranty.

## 1.06 QUALITY ASSURANCE

- A Manufacturer Qualifications: Provide all primary roofing products, including shingles, underlayment, leak barrier, and ventilation, by a single manufacturer.
- B Installer Qualifications: Installer must be approved for installation of all roofing products to be installed under this section.

### 1.07 REGULATORY REQUIREMENTS

- A Provide a roofing system achieving an Underwriters Laboratories (UL) Class A fire classification.
- B. Install all roofing products in accordance with all federal, state and local building codes.
- C. All work shall be performed in a manner consistent with current OSHA guidelines.

## 1.08 DELIVERY, STORAGE, AND HANDLING

- A Store all products in manufacturer's unopened, labeled packaging until they are ready for installation.
- B Store products in a covered, ventilated area, at temperature not more than 110 degrees F (43 degrees C); do not store near steam pipes, radiators, or in direct sunlight.
- C Store bundles on a flat surface. Maximum stacking height shall not exceed GAF's recommendations. Store all rolls on end.
- D Store and dispose of solvent-based materials in accordance with all federal, state and local regulations.
- 1.09 WEATHER CONDITIONS

A Proceed with work only when existing and forecasted weather conditions will permit work to be performed in accordance with GAF's recommendations

## 1.10 WARRANTY

- A Provide to the owner a GAF® Golden Pledge Limited Warranty covering:
  - Roofs installed by a Authorized Home Builder, Certified Contractor or Certified GAF® Master Elite<sup>TM</sup> Contractor only.
  - 2. Warranty shall cover entire roofing assembly, including roof shingles and all roof accessory products such as ridge rap shingles, starter strip shingle, underlayment, leak barrier, roof deck protection, ridge vent, pipe flashing, drip edges, etc.
  - 3. Manufacturing and installation defects: 100% coverage for materials and labor for 40 years with the first 20 years non- prorated no dollar limit.
- B Warranted against algae discoloration for 10 years

# PART 2 PRODUCTS

- 2.01 MANUFACTURERS
  - A Product:
    - 1. GAF Materials Corporation, 1361 Alps Rd. Wayne NJ 07470. Tel: 1-973-628-3000.
- 2.02 SHINGLES
  - A Super-heavyweight, granule surfaced, self sealing asphalt shingle with a strong fiberglass reinforced Micro Weave® core and StainGuard® protection, which prevents pronounced discoloration from blue-green algae through formulation/unique blends of granules. Architectural laminate styling provides a wood shake appearance with a 5" or 5 5/8" exposure. Features GAF's patented High Definition® color blends and enhanced shadow effect. UL 790 Class A rated with UL 997 Wind Resistance Label; ASTM D 7158, Class H; ASTM D 3161, Type 1; ASTM D 3018, Type 1; ASTM D 3462; CSA 123.5-98; Dade County Approved, Florida Building Code Approved, Texas Dept of Insurance Approved, ICC Report Approval. **Timberline® Ultra HD** Lifetime High Definition Shingles, by GAF.
    - 1. Color: Charcoal

## 2.03 HIP AND RIDGE SHINGLES

- A High profile self sealing hip and ridge cap shingle matching the color of selected roof shingle. Each bundle covers approx. 20 lineal feet (6.10m). **Timbertex**® Premium Ridge Cap Shingles, by GAF.
- 2.04 STARTER STRIP
  - A Self sealing starter shingle designed for premium roof shingles. Each bundle

covers approx. 100 lineal feet (30.48m) for English and metric shingles or 50 lineal feet (15.24m) for oversized shingles. WeatherBlocker<sup>™</sup> Eave/Rake Starter Strip by GAF.

### 2.05 LEAK BARRIER

A Self-adhering, self sealing, bituminous leak barrier surfaced with fine, skid-resistant granules. Approved by UL, Dade County, ICC, State of Florida and Texas Department of Insurance. Each roll contains approx. 150 sq ft (13.9 sq.m.), 36" X 50' (0.9m x 20.3m) or 200 sq ft (18.6 sq.m.), 36" X 66.7' (0.9m x 20.3m). WeatherWatch® Leak Barrier, by GAF.

### 2.06 ROOFING CEMENT

A Asphalt Plastic Roofing Cement meeting the requirements of ASTM D 4586, Type I or II.

### 2.07 ROOF ACCESSORIES

- A Exterior acrylic rust resistant aerosol roof accessory paint. Each 6 oz can is available in boxes of 6 and in a wide variety of colors to compliment the roof.
  Shingle-Match<sup>™</sup> Roof Accessory Paint by GAF.
- 2.08 ROOF EDGE COMPONENTS
  - A Dip edge Aluminum, F8 open face (0.0145) 6" x 1-1/4". To be used at eaves & rakes. Color to match trim color
- 2.09 NAILS
  - A Standard round wire, zinc-coated steel; 10 to 12 gauge, smooth, barbed or deformed shank, with heads 3/8 inch (9mm) to 7/16 inch (11mm) in diameter. Length must be sufficient to penetrate into solid wood at least 3/4 inch (19mm) or through plywood or oriented strand board by at least 1/8 inch (3.18mm).

### PART 3 EXECUTION

### 3.01 EXAMINATION

- A Do not begin installation until the roof deck has been properly prepared.
- B If roof deck preparation is the responsibility of another installer, notify the architect or building owner of unsatisfactory preparation before proceeding.
- 3.02 PREPARATION Verify that the deck is dry, sound, clean and smooth. It shall be free of any depressions, waves, and projections. Cover with sheet metal, all holes over 1 inch (25mm) in diameter, cracks over 1/2 inch (12mm) in width, loose knots and excessively resinous areas.
  - B Replace damaged deck with new materials.
  - C Clean deck surfaces thoroughly prior to installation of eaves protection membrane and underlayment.
- 3.03 INSTALLATION OF UNDERLAYMENTS General:
  - 1. Install using methods recommended by GAF, in accordance with local

building codes. When local codes and application instructions are in conflict, the more stringent requirements shall take precedence.

- B Eaves:
  - Install eaves edge metal flashing tight with fascia boards; lap joints 2 inches (51mm) and seal with plastic cement or high quality urethane sealant; nail at the top of the flange.
- C Valleys:
  - 1. Install GAF leak barrier membrane at least 36 (914mm) inches wide and centered on the valley. Lap ends 6 inches (152mm) and seal.
- D Ridges:
  - 1. Install GAF leak barrier along entire lengths. If ridge vents are to be installed, position the GAF leak barrier so that the ridge slots will not be covered.
- E Roof Deck:
  - 1. Install one layer of GAF leak barrier protection over the entire roof area. Install sheets horizontally so water sheds and nail in place.
  - 2. Lap ends at least 4 inches (102 mm). Stagger end laps of each layer at least 36 inches (914 mm).
- F Penetrations:
  - 1. Vent pipes: Install a 24 inch (610 mm) square piece of eaves protection membrane lapping over roof GAF leak barrier; seal tightly to pipe.
  - 2. Vertical walls: Install GAF leak barrier membrane extending at least 6 inches (152mm) up the wall and 12 inches (305mm) on to the roof surface. Lap the membrane over the roof deck underlayment.
  - 3. Rake Edges: Install metal edge flashing over eaves protection membrane; set tight to rake boards; lap joints at least 2 inches (51mm) and seal with plastic cement; secure with nails.

### 3.04 INSTALLATION OF SHINGLES

- A General:
  - 1. Install in accordance with GAF's instructions and local building codes. When local codes and application instructions are in conflict, the more stringent requirements shall take precedence.
  - 2. Minimize breakage of shingles by avoiding dropping bundles on edge, by separating shingles carefully (not by "breaking" over ridge or bundles), and by taking extra precautions in temperatures below 40 degrees F (4 degrees C).
  - 3. Handle carefully in hot weather to avoid scuffing the surfacing, or damaging the shingle edges.

- B Placement and Nailing:For maximum wind resistance along rakes & eaves, install any GAF starter strip containing sealant or cement shingles to underlayment and each other in a 4" (102mm) width of asphalt plastic roof cement.
  - 2. Secure with 4, 5, or 6 nails per shingle per GAF's instructions or local codes.
  - 3. Placement of nails varies based on the type of shingle specified. Consult the application instructions for the specified shingle for details.
  - 4. Nails must be driven flush with the shingle surface. Do not overdrive or under drive the nails.
  - 5. Shingle offset varies based on the type of shingle specified. Consult the application instructions for the specified shingle for details.
- C Valleys:Install valleys using the "closed cut valley" method:
  - a Run the first course of shingles from the higher roof slope across the valley at least 12 inches (305mm).
  - Run succeeding courses of shingles from the lower roof slope across the valley at least 12 inches (305mm) and nail not closer than 6 inches (152mm) to center of valley.
  - c Run shingles from the upper roof slope into the valley and trim 2 inches (51mm) from the center line.
- D Penetrations
  - 1. All Penetrations are to be flashed according to GAF, ARMA and NRCA application instructions and construction details.
- E Gable drip edge
  - 1. Install aluminum drip edge flashing tight to rake board and eave trim; lap joints 2 inches.
  - 2. Install asphalt shingles  $\frac{1}{2}$ " beyond outside edge of aluminum drip edge.
- 3.05 PROTECTION
  - A Protect installed products from foot traffic until completion of the project.
  - B Any roof areas that are not completed by the end of the workday are to be protected from moisture and contaminants.

# END OF SECTION

### SECTION 07 46 46 FIBER-CEMENT SIDING

### PART 1 GENERAL

### 1.1 SECTION INCLUDES

A. Factory-finished fiber cement panels, trim, fascia, molding and accessories, James Hardie HZ5 Engineered for Climate Siding.

### 1.2 RELATED SECTIONS

- A. SECTION 00 61 00 ROUGH CARPENTRY
- B. SECTION 07 62 00 FLASHING AND SHEET METAL
- C. SECTION 07 92 00 SEALANTS & CAULKING

## 1.3 REFERENCES

- A. ASTM C1186 Standard Specification for Flat Fiber-Cement Sheets
- B. ASTM D3359 Standard Test Method for Measuring Adhesion by Tape Test, Tool and Tape.
- C. ASTM E136 Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 degrees C.

## 1.4 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.
- C. Shop Drawings: Provide detailed drawings of atypical non-standard applications of cementitious siding materials which are outside the scope of the standard details and specifications provided by the manufacturer.
- D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- E. Verification Samples: For each finish product specified, two samples, minimum size 4 by 6 inches (100 by 150 mm), representing actual product, color, and patterns.

## 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Minimum of 5 years experience with installation of similar products.
- B. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
  - 1. Finish areas designated by Architect.
  - 2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
  - 3. Refinish mock-up area as required to produce acceptable work.

## 1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store siding on edge or lay flat on a smooth level surface. Protect edges and corners from chipping. Store sheets under cover and keep dry prior to installing.
- C. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

## 1.7 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

## 1.8 WARRANTY

- A. Product Warranty: Limited, non-pro-rated product warranties.
  - 1. HardiPanel HZ5 vertical siding for 30 years.
  - 2. HardieSoffit HZ5 panels for 30 years.
- B. Product Warranty: Limited, product warranty.
  - 1. HardieTrim HZ and HZ5 boards for 15 years.
- C. Finish Warranty: Limited product warranty against manufacturing finish defects.
  - 1. When used for its intended purpose, properly installed and maintained according to James Hardie's published installation instructions, James Hardie's ColorPlus finish with ColorPlus Technology, for a period of 15 years from the date of purchase: will not peel; will not crack; and will not chip. Finish warranty includes the coverage for labor and material.

D. Workmanship Warranty: Application limited warranty for 2 years.

## PART 2 PRODUCTS

## 2.1 MANUFACTURERS

A. Acceptable Manufacturer: James Hardie Building Products, Inc., which is located at: 26300 La Alameda Suite 400; Mission Viejo, CA 92691; Toll Free Tel: 866-274-3464; Tel: 949-367-4980; Email: request info (info@jameshardie.com); Web: www.jameshardiecommercial.com

## 2.2 SIDING

- A. HardieSoffit HZ5 panels requirement for Materials:
  - 1. Fiber-cement Siding complies with ASTM C 1186 Type A Grade II.
  - 2. Fiber-cement Siding complies with ASTM E 136 as a noncombustible material.
  - 3. Fiber-cement Siding complies with ASTM E 84 Flame Spread Index = 0, Smoke Developed Index = 5.
  - 4. CAL-FIRE, Fire Engineering Division Building Materials Listing -Wildland Urban Interface (WUI) Listed Product.
  - 5. National Evaluation Report No. NER 405 (BOCA, ICBO, SBCCI, IBC, IRC).
  - 6. City of Los Angeles, Research Report No. 24862.
  - 7. Miami Dade County, Florida Notice of Acceptance 07-0418.04.
  - 8. US Department of Housing and Urban Development Materials Release 1263d.
  - 9. California DSA PA-019.
  - 10. City of New York M EA 223-93-M.
  - 11. Florida State Product Approval FL889.
  - 12. Texas Department of Insurance Product Evaluation EC-23.
- B. Vertical Siding: HardiePanel HZ5 siding as manufactured by James Hardie Building Products, Inc.
  - 1. Type: Sierra 8 inches (203 mm) Vertical siding panel 4 feet by 8 feet (1219 mm by 2438 mm).
- C. Trim:
  - 1. HardieTrim HZ5 boards and HardieTrim HZ boards as manufactured by James Hardie Building Products, Inc.
  - 2. HardieTrim HZ5 Fascia boards as manufactured by James Hardie Building Products, Inc.
  - 3. Artisan HZ5 Accent trim as manufactured by James Hardie Building Products, Inc.

# 2.3 FASTENERS

- A. Wood Framing:
  - 1. Fastening per MFG recommendations.
## 2.4 FINISHES

- A. Factory Primer: Provide factory applied universal primer.
- B. Primer: Factory primed by James Hardie.
- C. Topcoat: Refer to Section 09900 and Exterior Finish Schedule.

## 3.0 EXECUTION

## 3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. If framing preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- C. 20 gauge 6 inch C-Stud 16 inches maximum on center metal framing complying with local building codes, including the use of water-resistive barriers and vapor barriers. Minimum 1-1/2 inches (38 mm) face and straight, true, of uniform dimensions and properly aligned.
  - 1. Install water-resistive barriers and claddings to dry surfaces.
  - 2. Repair any punctures or tears in the water-resistive barrier prior to the installation of the siding.
  - 3. Protect siding from other trades.

## 3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Install a water-resistive barrier is required in accordance with local building code requirements.
- D. The water-resistive barrier must be appropriately installed with penetration and junction flashing in accordance with local building code requirements.
- E. Install Engineered for ClimateTM HardieWrapTM weather barrier in accordance with local building code requirements.
- F. Use HardieWrapTM Seam Tape and joint and laps.
- G. Install HardieWrapTM flashing, and HardieWrapTM Flex Flashing

#### 3.3 INSTALLATION - HARDIEPANEL HZ5 VERTICAL SIDING

- A. Install materials in strict accordance with manufacturer's installation instructions.
- B. Block framing between studs where HardiePanel siding horizontal joints

occur.

- C. Install metal Z flashing and provide a 1/4 inch (6 mm) gap at horizontal panel joints.
- D. Place fasteners no closer than 3/8 inch (9.5 mm) from panel edges and 2 inches (51 mm) from panel corners.
- E. Allow minimum vertical clearance between the edge of siding and any other material in strict accordance with the manufacturer's installation instructions.
- F. Maintain clearance between siding and adjacent finished grade.
- G. Specific framing and fastener requirements refer to Tables 2 and 3 in National Evaluation Service Report No. NER-405.
- H. Factory Finish Touch Up: Apply touch up paint to cut edges in accordance with manufacturer's printed instructions.
  - 1. Touch-up nicks, scrapes, and nail heads in pre-finished siding using the manufacturer's touch-up kit pen.
  - 2. Touch-up of nails shall be performed after application, but before plastic protection wrap is removed to prevent spotting of touch-up finish.
  - 3. Use touch-up paint sparingly. If large areas require touch-up, replace the damaged area with new pre-finished siding. Match touch up color to siding color through use of manufacturer's branded touch-up kits.

## 3.4 INSTALLATION - HARDIETRIM HZ5 BOARDS

- A. Install materials in strict accordance with manufacturer's installation instructions. Install flashing around all wall openings.
- B. Fasten through trim into structural framing or code complying sheathing. Fasteners must penetrate minimum 3/4 inch (19 mm) or full thickness of sheathing. Additional fasteners may be required to ensure adequate security.
- Place fasteners no closer than 3/4 inch (19 mm) and no further than 2 inches (51 mm) from side edge of trim board and no closer than 1 inch (25 mm) from end. Fasten maximum 16 inches (406 mm) on center.
- D. Maintain clearance between trim and adjacent finished grade.
- E. Trim inside corner with a single board trim both side of corner.
- F. Outside Corner Board Attach Trim on both sides of corner with 16 gage corrosion resistant finish nail 1/2 inch (13 mm) from edge spaced 16 inches (406 mm) apart, weather cut each end spaced minimum 12 inches (305 mm) apart.
- G. Allow 1/8 inch gap between trim and siding.

- H. Seal gap with high quality, paint-able caulk.
- I. Shim frieze board as required to align with corner trim..
- J. Fasten through overlapping boards. Do not nail between lap joints.
- K. Overlay siding with single board of outside corner board then align second corner board to outside edge of first corner board. Do not fasten HardieTrim boards to HardieTrim boards.
- L. Shim frieze board as required to align with corner trim.
- M. Install HardieTrim Fascia boards to rafter tails or to sub fascia.

# 3.5 **PROTECTION**

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

# END OF SECTION

## SECTION 07 62 00 FLASHING AND SHEET METAL

## PART 1 - GENERAL

## 1.01 DESCRIPTION

- A. Work included: Provide flashing and sheet metal not specifically described in other Sections of these Specifications but required to prevent penetration of water through the exterior shell of the building. The areas to receive flashing shall be not limited to the following list: door & window heads, skylights, sills, heads, roof penetrations, wall penetrations, between changes of exterior finishes etc.
- B. Related work:
  - 1. Documents affecting work of this Section include, but are not necessarily limited to General Conditions and Supplementary General Conditions.
  - Section 04 20 00 Unit Masonry Section 07 92 00 - Sealants & Caulking Section 08 10 13 - Metal Doors and Frames Section 08 52 13 - Clad Windows

## 1.02 QUALITY ASSURANCE

- A. Comply with provisions of Sections of the Supplementary General Conditions.
- B. In addition to complying with pertinent codes and regulations, comply with pertinent recommendations contained in current edition of "Architectural Sheet Metal Manual" published by the Sheet Metal and Air Conditioning Contractors National Association (SMACNA).
- C. Standard commercial items may be used for flashing, trim, reglets, and similar purposes provided such items meet or exceed the quality standards specified.

# 1.03 SUBMITTALS

- A. Comply with pertinent provisions of Sections of the Supplementary General Conditions.
- B. Product Data:
  - 1. Materials list of items proposed to be provided under this Section;
  - 2. Manufacturer's specification and other data needed to prove compliance with the specified requirements;

- 3. Shop drawings in sufficient detail to show fabrication, installation, anchorage, and interface of the work of this Section with the work of adjacent trades;
- 4. Manufacturer's recommended installation procedures which, when reviewed by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the work.

# 1.04 PRODUCT HANDLING

A. Comply with pertinent provisions of Sections of the Supplementary General Conditions.

# PART 2 - PRODUCTS

- 2.01 MATERIALS AND GAUGES
  - A. Where sheet metal is required, and no material or gauge is indicated on the Drawings, provide the highest quality and gauge commensurate with the referenced standards.

# 2.02 LEAD COATED COPPER FLASHING

- A. Provide ASTM Specification B101, (Type I), Class A, and of weight and temper as hereinafter specified for specific locations, or as shown on drawings.
- 2.03 NAILS, SCREWS, AND FASTENERS
  - A. Use same material as flashing sheet, or other metal as recommended by manufacturer of flashing sheet, for improved corrosion resistance.

# 2.04 OTHER MATERIALS

A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

# PART 3 - EXECUTION

- 3.01 SURFACE CONDITIONS
  - A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

B. Separate dissimilar metals from each other by painting each metal surface in area of contact with a permanent separation as recommended by manufacturers of dissimilar metals.

# 3.02 INSTALLATION - FLASHING

- A. General:
  - 1. Where flashing is shown with substrate contact or other contact on ferrous metal, wood or cementitious materials, apply 15 MIL bituminous coating on substrate or as back coating on flashing, or install polyethylene underlayment.
- B. Form, fabricate, and install sheet metal so as to adequately provide for expansion and contraction in the finished work.
- C. Weatherproofing:
  - 1. Finish watertight and weather tight where so required.
  - 2. Seams shall be lapped min. 8" with epoxy seam sealer or other permanent sealer recommended by flashing manufacturer.
- D. Clean exposed flashing surfaces of every substance which is visible or might cause corrosion of metal or deterioration of finish.

# 3.03 SCHEDULE

- A. Window heads and sills: 16 OZ. LC COPPER
- B. Door heads: 16 OZ. LC COPPER
- E. Precast heads & Sills: 16 OZ. LC COPPER
- F. Roof Coping: 16 OZ. LC COPPER
- G Step flashing: 16 OZ. LC COPPER

# END OF SECTION 07 62 00

## SECTION 07 92 00 SEALANTS AND CAULKING

#### PART 1 - GENERAL

#### 1.01 DESCRIPTION

A. Work included: Throughout the Work, seal and caulk joints where shown on Drawings and elsewhere as required to provide a positive barrier against passage of moisture, air, and sound.

The required applications of exterior and interior sealant work include, but are not necessarily limited to the following general locations:

Joints in masonry unit work
all joints in siding
Partition and ceiling joints
Joints at penetrations of walls, ceilings and floors by piping and other services and equipment
Around all cutouts for lights, cabinets, pipes, plumbing, HVAC ducts, electrical boxes, etc.

- B. Related Work
  - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions and Supplementary General Conditions.
  - Section 04 20 00 Unit Masonry Section 06 10 00 – Rough Carpentry Section 06 40 00 - Architectural Woodwork Section 08 10 13 - Metal Doors and Frames

## 1.02 QUALITY ASSURANCE

- A. Comply with provisions of Section of the Supplementary General Conditions.
- B. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

#### 1.03 SUBMITTALS

A. Comply with pertinent provisions of Sections of the Supplementary General Conditions.

- B. Product Data:
  - 1. Materials list of items proposed to be provided under this Section.
  - 2. Manufacturer's specification and other data needed to prove compliance with the specified requirements.
  - 3. Manufacturer's recommended installation procedures which, when approved by the Architect, will become the basis for accepting or rejecting actual installation procedures used on the work.
  - 4. Sufficient data to demonstrate that all such materials meet or exceed the specified requirements.
- C. Samples: Accompanying the submittal described above, submit samples of each sealant, each backing material, each primer and each bond-breaker proposed to be used.

## 1.04 PRODUCT HANDLING

A. Comply with pertinent provisions of Sections of the Supplementary General Conditions.

B. Do not retain at the job site material which has exceeded the shelf life recommended by its manufacturer.

# 1.05 JOB CONDITIONS

- A. Installer must examine joint surfaces and backing, and their anchorage to the structure, and conditions under which joint sealer work is to be performed, and notify contractor in writing of conditions detrimental to proper completion of the work. Do not proceed with joint sealer work until unsatisfactory conditions have been corrected in a manner acceptable to Installer.
- B. Weather conditions: Do not proceed with installation of sealants under adverse conditions, or when temperatures are below or above manufacturer's recommended temperature range for installation.

# PART 2 - PRODUCTS

# 2.01 SEALANTS

A. Except as specifically otherwise approved by the Architect, use only the types of sealants described in this Article.

- 1. For interior areas: Mildew Resistant Silicone Sealant: One part, TT-S-001543A, TT-S-00230C, Class A and ASTM C920, recommended by manufacturer for use in interior wet areas, Pecora 898 low emitting VOC
- 2. Precompressed Expanding Foam Sealants: manufacturer's standard polymer modified, asphalt impregnated precompressed expanding foam sealant, with movement capability of +/- 25% (total 50%) of its nominal size, without stain, migrating, hardening or other performance failure.
- 4. Exterior use areas: One part, low modulus, elastomeric sealant: Pecora 864 NST Building Sealant
- B. Colors:
  - 1. Colors for each sealant installation will be selected by the Architect from custom colors from the specified manufacturers.
  - 2. In concealed installations, and in partially or fully exposed installations where so approved by the Architect, use standard gray or black sealant.

# 2.02 PRIMERS

A. Use only those primers which are non-staining, have been tested for durability on the surfaces to be sealed, and are specifically recommended for the installation by the manufacturer of the sealant used.

# 2.03 BACK UP MATERIALS

- A. Use only those backup materials which are specifically recommended for this installation by the manufacturer of the sealant used, which are non-absorbent, and which are non-staining.
- B. Acceptable types include:
  - 1. Closed-cell resilient urethane or polyvinyl-chloride foam;
  - 2. Closed-cell polyethylene foam; rod shall be used as a joint backing material for <sup>1</sup>/<sub>2</sub>" openings and smaller; open cell "Denver Rod" or equal for 5/8" openings and larger.
  - 3. Closed-cell sponge of vinyl or rubber.
  - 4. Open-cell "Denver Foam" or equal for openings 5/8 inch and larger.

C. Preformed support strips for ceramic tile control joint and expansion joint work: Use polyisobutylene or polychloroprene rubber.

# 2.04 BOND-PREVENTATIVE MATERIALS

- A. Use only one of the following as best suited for the application, and as recommended by the manufacturer of the sealant used:
  - 1. Polyethylene tape, pressure-sensitive adhesive, with the adhesive required only to hold tape to the construction materials as indicated.
  - 2. Aluminum foil complying with MIL-A-148E.
  - 3. Wax paper complying with Fed Spec UU-P-270.

# 2.05 MASKING TAPE

- A. For masking around joints, provide masking tape complying with Fed Spec UU-T-106c.
- 2.06 ADHESIVE AND TOPCOAT
  - A. Manufacturer recommended epoxy adhesive and topcoat used in conjunction with precompressed expanding foam sealant.

# 2.07 OTHER MATERIALS

A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Architect.

# PART 3 - EXECUTION

# 3.01 INSPECTION

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

# 3.02 PREPARATION

A. Concrete surfaces:

- 1. Install only on surfaces which are dry, cured, sound, well brushed, and wiped free from dust.
- 2. At open joints, remove dust by mechanically blown compressed air if so required.
- 3. Use solvent to remove oil and grease, wiping the surfaces with clean rags.
- 4. Where surfaces have been treated, remove the surface treatment by sandblasting or wire brushing.
- 5. Remove laitance and mortar from joint cavities by wire brushing, applying solvent wipe or other means recommended by particular manufacturer.
- 6. Where backstop is required, insert the approved backup material into the joint cavity to the depth needed.
- B. Steel Surfaces:
  - 1. Steel surfaces in contact with sealant:
    - a. Sandblast as required to achieve acceptable surface for bond.
    - b. If sandblasting is not practical, or would damage adjacent finish, scrape the metal or wire brush to remove mill scale.
    - c. Use solvent to remove oil and grease, wiping the surfaces with clean rags.
  - 2. Remove protective coatings on steel by sandblasting or by using a solvent which leaves no residue.
- C. Aluminum Surfaces:
  - 1. Aluminum surfaces in contact with sealant:
    - a. Remove temporary protective coatings, dirt, oil, and grease.
    - b. If sandblasting is not practical, or would damage adjacent finish, scrape the metal or wire brush to remove mill scale.
    - c. Use solvent to remove oil and grease, wiping the surfaces with clean rags.

2. Use only such solvents to remove protective coatings as are recommended for that purpose by the manufacturer of the aluminum work, and which are non-staining.

## 3.03 INSTALLATION OF BACKUP MATERIAL

- A. Use only the backup material recommended by the manufacturer of the sealant used, and approved by the Architect for the particular installation, compressing the backup material 25% to 50% to achieve a positive and secure fit.
- B. When using backup of tube or rod stock, avoid lengthwise stretching of the material. Do not twist or braid hose or rod backup stock.

## 3.04 PRIMING

A. Use only the primer recommended by the manufacturer of the sealant, and approved by the Architect for the particular installation, applying it in strict accordance with the manufacturer's recommendations as approved by the Architect.

#### 3.05 BOND-BREAKER INSTALLATION

A. Provide an approved bond-breaker where recommended by the manufacturer of the sealant, and where directed by the Architect, adhering strictly to the installation recommendations as approved by the Architect.

## 3.06 INSTALLATION OF SEALANTS - GENERAL

- A. All sealant work shall strictly conform to the sealant manufacturer's technical instructions for surface preparation and application procedures to accomplish a weather tight seal.
- B. Prior to start of installation in each joint, verify the joint type according to details on the Drawings, or as otherwise directed by the Architect, and verify that the required proportion of width of joint to depth of joint has been secured.
- C. Equipment:
  - 1. Apply sealant under pressure with power-actuated or hand gun, or by other appropriate means.

- 2. Use guns with nozzle of proper size, and providing sufficient pressure to completely fill the joints as designed.
- D. Thoroughly and completely mask joints where the appearance of sealant on adjacent surfaces would be objectionable.

# 3.07 APPLICATION OF SEALANT

- A. Joints and spaces to be sealed shall be clean, dry and free from dust. Clean metal surfaces as recommended by sealant manufacturer to remove all surface oils; remove traces of existing sealant or caulking as required to assure a tight bond with new sealant.
- B. After cleaning, apply primer if required by the sealant manufacturer, to all joint surfaces, taking care not to stain adjacent surfaces.
- C. Exterior joints shall be backed with joint backing material to eliminate back-bond. Where joint width is less than  $\frac{1}{2}$ ", sealant depth shall be approximately one half its width all in accordance with the manufacturer's instructions.
- D. Extreme care shall be taken to prevent smearing onto adjacent surfaces. Material shall be heated as recommended by the manufacturer. Joints shall have a neat, uniform, slightly concave appearance.
- E. Install sealants to depths as shown or, if not shown, as recommended by sealant manufacturer but within the following general limitations, measured at center (thin) section of bead.
  - 1. For sidewalks, pavements and similar joints subject to traffic and other abrasion and indentation exposures, fill joints to a depth equal to 75% of joint width, and neither more than 5/8" deep nor less than 3/8" deep.
  - 2. For normal moving joints but not subject to traffic, fill joints to a depth equal to 50% of joint width, but no more than  $\frac{1}{2}$ " deep nor less than  $\frac{1}{4}$ " deep.
  - 3. For joints sealed with non-elastomeric sealants and caulking compounds, fill joints to a depth in the rate of 75% to 125% of joint width.
- F. Tool joints within ten (10) minutes of application. Remove masking tape immediately after the joints have been tooled.
- G. After applying the sealant and after a "skin" has formed do not disturb the joint for 48 hours.

H. The sealing compound shall be thoroughly bonded to the joint surfaces and shall be free from voids or entrapped air. Joints that do not meet these requirements, as determined by the Architect shall be corrected by removing the sealing compound, thoroughly cleaning the joints, and satisfactorily resealing or recaulking the joints, at no additional expense to the Owner; material removed from the joints shall not be reused in the work.

## 3.08 APPLICATION OF PRECOMPRESSED EXPANDING FOAM SEALANT

- A. Refer to preparation of concrete surfaces, Section 3.02 A. of this Specification.
- B. Prime both sides of the joint face from slab surface down the full depth of sealant plus  $\frac{1}{2}$ ", with epoxy adhesive, recommended by sealant manufacturer.
- C. Install precompressed sealant flush and level to finish concrete slab surface.
- D. Prime mitered ends of sealant with manufacturer's topcoat to ensure seal integrity between successive lengths.
- E. Apply topcoat along entire length of installed sealants to a thickness of 1/32" minimum. Application by brush to overlap deck 1/4" on each side of sealant.

## 3.09 CURING AND PROTECTION

A. Cure sealants and caulking compound in compliance with manufacturer's instructions and recommendations, to obtain high early bond strength, internal cohesive strength and surface durability.

## 3.10 CLEAN UP:

A. Clean adjacent surfaces free from sealant as the installation progresses, using solvent or cleaning agent recommended by the manufacturer of the sealant used.

# END OF SECTION 07 92 00

## SECTION 08 11 13 METAL DOORS AND FRAMES

#### PART 1 - GENERAL

#### 1.01 WORK INCLUDED

- A. Work included: Provide metal doors and frames, complete in place with finish hardware installed, where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related Work:

Section 04200 Masonry Section 06200 Carpentry Section 07920 Sealant & Caulking Section 08700 Builders Hardware Section 09900 Painting

#### 1.02 REFERENCES

- A. ASTM E 152, Fire tests of door assemblies
- B. ASTM A 525, Specifications for sheet steel, zinc coated (hot-dip galvanized process)
- C. ANSI/SDI-100, Performance specifications for standard steel doors and frames.
- D. ANSI/SDI-119, Performance test procedures for steel door frames and anchors.
- E. NFPA-80, Standard for <u>Fire Doors and Windows</u>.
- F. NFPA-101, Life Safety Code.
- G. ANSI-A151.1, Test procedure and acceptance criteria for physical endurance, steel doors and frames.
- H. ANSI-A224.1, Test procedure and acceptance criteria for prime painted steel surfaces for steel doors and frames.
- I. SDI-107, "Hardware on Steel Doors (reinforcement application)"

## 1.03 QUALITY ASSURANCE

- A. Comply with provisions of Section 01400.
- B. Unless specifically otherwise approved by the Architect, provide all products from a single manufacturer. Fabricate side panels and transom panels to match doors in all respects unless otherwise indicated.
- C. Hollow metal supplier shall be a qualified direct distributor of products to be furnished. In addition, the distributor shall have in its regular employment an AHC and/or CDC or person of equivalent experience who will be available at reasonable times to consult with the Architect, Contractor and Owner regarding any matters affecting the door and frame openings.
- D. Provide doors and frames complying with the Steel Door Institute's "Recommended Specification, Standard Steel Doors and Frames" (SDI-100), and as herein specified.

## 1.04 SUBMITTALS

- A. Comply with the pertinent provisions of Article 5 of the General Conditions and Sections 01340 and 01341 of the Supplementary General Conditions.
- B. Product Data:
  - 1. Materials list of items proposed to be provided under this Section.
  - 2. Manufacturer's specification and other data needed to prove compliance with the specified requirements.
- C. Shop drawings in sufficient detail to show each frame type, door elevation type, conditions at openings, details of construction, location and installation requirements of finish hardware and reinforcements, and details of joints, connections, and anchorage. Interface the work of this Section with the work of adjacent trades.
- D. Manufacturer's recommended installation procedures.

## 1.05 PRODUCT HANDLING

A. Comply with pertinent provisions of Sections 01610 and 01620.

- B. Deliver doors and frames cardboard wrapped, crated palletized and otherwise protected during transit and site storage.
- C. Inspect doors and frames upon delivery for damage. Minor damages may be repaired, provided refinished items are equal in all respects to new work and acceptable to the Architect. Otherwise, remove and replace all damaged items.
- D. Store doors and frames at the building site in a dry and secure place.
  - 1. Place units on a minimum 4 inches high wood blocking.
  - 2. Avoid use of non-vented plastic or canvas shelters which could create a humidity chamber.
  - 3. If cardboard wrapper on door becomes wet, remove carton immediately.
  - 3. Provide 1/4 inch spaces between stacked doors to promote air circulation.

#### 1.06 WARRANTY

- A. Upon completion of this portion of the work, and as a condition to its acceptance, deliver to the Owner two (2) copies of a written warranty agreeing to replace work of this Section which fails due to defective materials or workmanship within one (1) year after the date of Substantial Completion.
- B. Failure due to defective materials or workmanship is deemed to include, but is not limited to:
  - 1. Failures in operation or operating component or components.
  - 2. Leakage or air infiltration in excess of the specified standard.
  - 3. Deterioration of the finish to an extent visible to the unaided eye.
  - 4. Defects which contribute to unsightly appearance, potential safety hazards or potential untimely failure of the work of this Section, or the work as a whole.

## 1.07 SEQUENCE AND SCHEDULING

- A. Deliver all doors and frames to the site in a timely manner so not to delay progress of other trades.
- B. Issue purchase orders to frame, door and other hardware suppliers so not to interfere with normal quoted delivery of materials.

## PART 2 - PRODUCTS

#### 2.01 ACCEPTABLE MANUFACTURERS

- A. The following manufacturers are acceptable:
  - 1. The Philipp Manufacturing Company, 19 Ward Ave., Easthampton, MA 1027 Phone: (413) 527-4444
  - 2. Ceco Corporation, Oakbrook, IL
  - 3. de La Fontaine Inc. : www.delafontaine.com
  - 4. Steelcraft Manufacturing Company, Cincinnati, OH

#### 2.02 MATERIALS

- A. Exterior doors and frames: Comply with ASTM A653, Designation ZF 180 (A60).
- B. Supports and Anchors: Fabricate of not less than 16 gauge sheet steel. Galvanize after fabrication, those units which are to be built into exterior walls, complying with ASTM A 153, Class B.
- C. Coating materials Primer: Use manufacturer's standard rust inhibiting primer conforming to ANSI-A-224.1-1980.
- D. Core Materials:
  - 1. Exterior doors, non-labeled doors or labeled doors, polystyrene foam core self-extinguishing, non-toxic in case of fire.

#### 2.03 FABRICATION/METAL DOORS & FRAMES

- A. Fabricate hollow metal units to be rigid, neat in appearance, and free from defects, wrap or buckle. Accurately form metal to required sizes and profiles. Wherever practicable, fit and assemble units in the manufacturer's plant. Clearly identify work that cannot be permanently factory-assembled before shipment, to assure proper assembly at the project site. Weld exposed joints continuously; grind, dress, and make smooth, flush and invisible. Metallic filler to conceal manufacturing defects is not acceptable.
- B. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat Phillips or Jackson heads for exposed screws and bolts.
- C. Doors:
  - 1. Provide design, in dimensions and types shown on the Drawings, in 16 gauge for all doors, properly reinforced for the finish hardware described

in Section 08700 of these Specifications.

- 2. Physical performance: Level A according to ANSI A250.4.
- 3. Metal thickness: 16-gauge, 1.34 mm (0.053 in).
- 4. Edge construction: Full flush lock seam on full flush seamless with continuously welded edge seam; flush internal edge reinforcements of 16-gauge.
- 5. Fabricate door to be flush with one continuous face free from joints, tool markings and abrasions, and with provision for glass and/or louvers as indicated on Door Schedule and Drawings.
- 6. Steel stiffened core: Continuous vertically formed steel sections, full thickness of the interior space between door faces. Stiffeners shall be 22 gauge, 0.6 mm (0.026 in) minimum thickness, spaced 152 mm (6 in) apart and securely fastened to both face sheets by industrial glue or laser welds [spot welded spaced a maximum of 127 mm (5 in) o. c. vertically]. Spaces between stiffeners shall be filled with polystyrene core Type 1, fire retardant conforming to ASTM C518.
- D. Frames
  - 1. Provide welded frames of the types and dimensions shown on the Drawings, in 14 gauge for all doors, properly reinforced for the finish hardware described in Section 08700 of these Specifications.
- D. Preparation for hardware:
  - 1. Reinforcement: Reinforce components for hardware installation in accordance with S.D.I.-107.
    - All lock, exit device and closer reinforcements shall be "box" type. Reinforcing attached to one door skin only will not be accepted. Lock reinforcement to be minimum of 16 gauge; closer reinforcement to be minimum 14 gauge.
    - b. All hinge reinforcement on doors is to be channel type, minimum 8 gauge, continuous form top to bottom of door, and welded to face sheets.
- E. Finish:
  - 1. All doors and frames to be galvanized (A60)
  - 2. Pre-clean and shop prime each door and frame for finish painting which will be performed at the job site under Section 09900 of these Specifications.

## 2.04 FINISH HARDWARE

- A. Procedures:
  - 1. Perform all machining and reinforcing for finish hardware to doors and frames at the factory, except do not drill or tap for surface mounted units until time of installation at the site.
  - 2. Comply with finish hardware manufacturer's instructions and template requirements.
  - 3. Sound and light seals, specified below, to be fitted to the hinge, lock and head and an automatic door bottom to be installed at the sill of the door leaf. All seals should be continuous with no interference from door hardware such as closures, panic bars, etc.
  - 4. Comply with applicable requirements of ANSI A 115 series specifications for door and frame preparation for hardware.
  - 5. Reinforce hollow metal units to receive surface-applied hardware. Drilling and taping for surface-applied finish hardware may be done at the project site.
  - 6. Use concealed fasteners to the maximum extent practicable.
  - 7. Locate finish hardware as shown on the final shop drawings.

## 2.5 ACCESSORIES

- A. Flush kit
  - a. On non-secure side, provide a full flush, non-removable molding.
  - b. Glazing moldings fabricated from 20-gauge, 0.8 mm (0.032 in) minimum.
  - c. Removable glass stops shall be channel-shaped, 20-gauge, 0.8 mm (0.032 in) minimum thickness, with tight-fitting butt or mitered corners and secured with minimum # 6 corrosion-resistant countersunk sheet metal screws.
  - d. Install screws on non-secure side.
  - e. 18-gauge, 1.1 mm (0.042 in) channel reinforcements on glass size equal to or bigger than half-glass.
  - f. Glazing to be tempered glass

- B. Frame accessories
  - a) Provide dust/mortar box at strike location on masonry frames.
  - b) Provide mortar guards for hinge reinforcements on masonry frames.
  - c) Provide temporary spreaders on welded frames. Provide one (1) bar for frames with less than 178 mm (7 in) jamb depth. Provide two (2) bars for frames with 178 mm (7 in) or greater jamb depth.
  - d) Drill holes for silencers. Single openings: 3 per strike jamb, located at hinge height. Pair openings: 2 per header at approximately 150 mm (6 in) each side of centerline of head stop.

# PART 3 - EXECUTION

# 3.01 INSPECTION

A. Installer must examine substrate and conditions under which steel doors and frames are to be installed and notify the Contractor in writing of any conditions detrimental to proper and timely completion of work. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to the installer.

# 3.02 INSTALLATION

- A. Door installation:
  - Install hollow metal doors in frames using hardware specified in Section 08 70 00 - Builders Hardware.
  - 2. Clearances at edge of doors:
    - a. Between door and frame at head and jambs: 1/8 inch
    - b. At meeting edges of pairs of doors and at mullions: 1/8 inch
    - c. At transom panels, without transom bars: 1/8 inch.
    - d. At sills without thresholds: 5/8 inch maximum above finished floor
    - e. At sill with thresholds: 1/8 inch above threshold
- B. Placing frames:
  - 1. Where practicable, place frames prior to construction of enclosing walls and ceilings.

- 2. Set frames accurately into position, plumbed, aligned and braced securely until permanent anchors are set.
- 3 Grout frames, the frames must coat the inside of the frames in the field with a corrosion resistant coating per ANSI A250.11 Recommended Erection Instructions for Steel Frames.
- 4. After wall construction is completed, remove temporary braces and spreaders, leaving surfaces smooth and undamaged.
- 5. At in-place construction, set frames and secure to adjacent construction with machine screws and suitable anchorage devices. Provide "Z" fillers at each screw location.
- 6. Install at least three (3) wall anchors per jamb at hinge and strike levels. Provide wire anchors set in masonry wall.
- 7. Fit hollow metal doors accurately in their respective frames, within clearances specified in SDI-100.
- 8. Brace the frame or shore to ceiling. Do not brace in the direction of intended wall. Plumb and square the jambs. Set spreader. Attach jambs to floor through floor anchor.
- 9. Installing the frame; Set and plumb frame. Install jamb anchors at hinge levels as wall is laid up. (3 anchors for heights to 7-2 -- one more anchor per jamb for each additional 2 feet of height or fraction thereof.) Grout frame in the area of the anchors. A second spreader should be used at midpoint of opening to maintain the door opening dimension. Continually check plumb and square as wall progresses. CHECK: The difference between diagonals measured from opposite corners should not exceed 1/16".

# 3.03 ADJUST AND CLEAN

# A. Final adjustments:

- 1. Check and readjust operating finish hardware items in hollow metal work just prior to final inspection.
- 2. Leave work in complete and proper operating condition.
- 3. Remove defective work and replace with work complying with the specified requirements.

# END OF SECTION 08 11 13

## Section 08 52 13 Clad Window

# Part 1 General

#### 1.1 Section Includes

A. Aluminum Clad Direct Glaze Polygon window complete with glazing, simulated divided lite and specified anchors, trim, and attachments.

#### 1.2 Related Sections

- A. Section 06 40 00 Architectural Woodwork
- B. Section 07 92 00 Joint Sealant
- C. Section 09 90 00 Painting and Coating:

#### 1.3 References

- A. American Society for Testing Materials (ASTM):
  - 1. E283: Standard Test method for Rate of Air Leakage through Exterior Windows, Curtain Walls and Doors
  - 2. E330: Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls and Door by Uniform Static Air Pressure Difference
  - 3. E547: Standard Test Method for Water Penetration of Exterior Windows, Curtain Walls and Doors by Cyclic Static Air Pressure Differential
  - 4. E2190: Specification for Sealed Insulated Glass Units
  - 5. C1036: Standard Specification for Flat Glass
- B. American Architectural Manufacturer's Association/Window and Door Manufacturer's Association (AAMA/WDMA/CSA):
  - 1. AAMA/WDMA/CSA 101/I.S.2/A440-08, Standard/Specification for Windows, Doors and Skylights
  - 2. AAMA/WDMA/CSA 101/I.S.2/A440-11, Standard/Specification for Windows, Doors and Skylights
- C. WDMA I.S.4: Industry Standard for Water Repellant Preservative Treatment for Millwork
- D. Window and Door Manufacturer's Association (WDMA): 101/I.S.2 WDMA Hallmark Certification Program

- E. Sealed Insulating Glass Manufacturer's Association/Insulating Glass Certification Council (SIGMA/IGCC)
- F. American Architectural Manufacturer's Association (AAMA): 2605: Voluntary Specification for High Performance Organic Coatings on Architectural Extrusions and Panels
- G. National Fenestration rating Council (NFRC):
  - 1. 101: Procedure for Determining Fenestration Product thermal Properties
  - 2. 200: Procedure for Determining Solar Heat Gain Coefficients at Normal Incidence
- H. Window Covering Manufacturer's Association
  - 1. A100.1: Standard for safety of corded window covering products

#### **1.4 System Description**

A.	Design	and	Performance	Rec	uirements:
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Standard Product	Air Tested to psf	Water Tested to psf	Structural Tested to psf	Certification Rating	Design Pressure (DP)	Max Overall Width		Max Overall Height	
1100000						in	mm	in	mm
Aluminum Clad Direct Glaze Polygon	1.57	8.25	75	CW-PG50- FW	50	84	(2134)	97	(2464)

## 1.5 Submittals

- A. Shop Drawings: Submit shop drawings
- B. Product Data: Submit catalog data
- C. Samples:
  - 1. Submit corner section and color sample
  - 2. Include glazing system, quality of construction and specified finish
- 1.6 Quality Control Submittals: Certificates: submit manufacturer's certification indicating compliance with specified performance and design requirement
- 1.7 Quality Assurance
  - A. Requirements: consult local code for IBC [International Building Code adoption year and pertinent revisions.

# 1.8 Delivery

A. Deliver in original packaging and protect from weather

## **1.9 Storage and Handling**

- A. Prime and seal wood surfaces, including to be concealed by wall construction, if more than thirty (30) days will expire between delivery and installation
- B. Store window units in an upright position in a clean and dry storage area above ground to protect from weather under provision of Section 01 66 00

# 1.10 Warranty

Complete and current warranty information is available at marvin.com/warranty. The following summary is subject to the terms, condition, limitations and exclusions set forth in the Marvin Windows and Door Limited Warranty and Products in Coastal Environments Limited Warranty Supplement:

A. Clear insulating glass with stainless steel spacers is warranted against seal failure caused by manufacturing defects and resulting in visible obstruction through the glass for twenty (20) years from the original date of purchase. Glass is warranted against stress cracks caused by manufacturing defects from ten (10) years from the original date of purchase.

- B. Standard exterior aluminum cladding finish is warranted against manufacturing defects resulting in chalk, fade and loss of adhesion (peel) per the American Architectural Manufacturer's Associations (AAMA) Specification 2605-11 Section 8.4 and 8.9 for twenty (20) years from the original date of purchase.
- C. Factory applied interior finish is warranted to be free from finish defects for a period of five (5) years from the original date of purchase.
- D. Hardware and other non-glass components are warranted to be free from manufacturing defects for ten (10) years from the original date of purchase.

# **Part 2 Products**

## 2.1 Manufactured Units

A. Description: Factory-assembled aluminum clad Direct Glaze Polygon window as manufactured by Marvin Windows and Doors, Warroad, Minnesota.

## 2.2 Frame Description

- A. Interior: Non Finger-Jointed Pine or finger-jointed core with non finger-jointed Pine veneer
  - 1. Kiln-dried to moisture content no greater than 12 percent at the time of fabrication
  - 2. Water repellant, preservative treated in accordance with ANSI/WDMA I.S.4.
- B. Polygon frame exterior aluminum clad with 0.055" (1.3mm) thick extruded aluminum
- C. Polygon frame thickness: Full Frame- 1-3/32" (28mm)
- D. Frame depth: Clad Direct Glaze 4 9/16" (116mm)

## 2.3 Glazing

- A. Select quality complying with ASTM C1036. Insulating glass SIGMA/IGCC certified to performance level CBA when tested in accordance with ASTM E2190.
- B. Glazing method: Insulating glass
- C. Glazing seal: Interior: Closed cell foam tape, silicone bedding and closed cell foam tape
- D. Glass Type: Clear, Low E2 with Argon

## 2.4 Finish

- A. Exterior: Aluminum clad. Fluoropolymer modified acrylic topcoat applied over primer. Meets AAMA 2605 requirements.
  - 1. Aluminum clad color options: EBONY
- B. Interior Finish options:
  - 1. Prime: Factory applied enamel primer. Available on Pine product only. Meets WDMA TM-11 requirements.

#### 2.5 Simulated Divided Lites (SDL)

- A. 5/8" (16mm) wide, with internal spacer bar
  - 1. Standard Sticking: Ogee
- B. Exterior muntins: 0.055" (1.4mm) thick extruded aluminum
- C. Interior muntins: Pine
- D. Muntins adhere to glass with closed-cell copolymer acrylic foam tape
- E. Patterns:Custom pattern per Drawings
- F. Finish exterior matched exterior aluminum clad colors, interior matches' interior wood species and color

#### 2.6 Accessories and Trim

- A. Installation Accessories:
  - 1. Factory installed vinyl nailing/drip cap
  - 2. Installation brackets: 6 3/8" (162mm), 9 3/8" (283mm), 15 3/8" (390mm)
  - 3. Masonry brackets: 6" (152mm), 10" (254mm)

## Part 3 Execution

#### 3.1 Examination

- A. Verification of Condition: Before installation, verify openings are plumb, square and of proper dimensions. Report frame defects or unsuitable conditions to the General contractor before proceeding.
- B. Acceptance of Condition: Beginning on installation confirms acceptance of existing conditions.

## 3.2 Installation

- A. Assemble and install window/door unit(s) according to manufacturer's instruction and reviewed shop drawing.
- B. Install sealant and related backing materials at perimeter of unit or assembly in accordance with Section 07 92 00 Joint Sealants. Do not use expansive foam sealant.
- C. Install accessory items as required.
- D. Use finish nails to apply wood trim and mouldings.

## 3.3 Cleaning

- A. Remove visible labels and adhesive residue according to manufacturer's instruction.
- B. Leave windows and glass in a clean condition.

#### **3.4 Protecting Installed Construction**

A. Protecting windows from damage by chemicals, solvents, paint or other construction operations that may cause damage.

End of Section

#### SECTION 08 70 00 BUILDERS HARDWARE

#### PART 1 - GENERAL

#### 1.01 RELATED DOCUMENTS

A. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Sections in Division 1 of these Specifications and are a part of this Section and shall be binding on the Contractor and/or Subcontractor who performs this Work. Note also all Addenda.

#### 1.02 SUMMARY

- A. This Section includes items known commercially as finish or door hardware that are required for swing, sliding, and folding doors, except special types of unique hardware specified in the same sections as the doors and door frames on which they are installed.
- B. This Section includes the following:
  - 1. Hinges.
  - 2. Lock cylinders and keys.
  - 3. Lock and latch sets.
  - 4. Bolts.
  - 5. Push/pull units.
  - 6. Closers.
  - 7. Overhead holders/stops.
  - 8. Miscellaneous door control devices.
  - 9. Door trim units.
  - 10. Protection plates.
  - 11. Weather-stripping for exterior doors.
  - 12. Astragals or meeting seals on pairs of doors.
  - 13. Thresholds.
- C. Related Sections: The following Sections contain requirements that relate to this Section:
  - 1. Section 06 40 00 Architectural Woodwork
  - 2. Section 08 11 13 Metal Doors and Frames
- D. Products furnished but not installed under this Section include:
  - 1. Cylinders required for locks on overhead and rolling counter doors.
- E. Products not furnished under this Section include:
  - 1. Cabinet Hardware is specified in Section 06400 "Architectural Woodwork".

#### 1.03 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification sections.
- B. Product data including manufacturers' technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
- C. Final hardware schedule coordinated with doors, frames, and related work to ensure proper size, thickness, hand function, and finish of door hardware.
  - 1. Final Hardware Schedule Content: Based on hardware indicated, organize schedule into "hardware sets" indicating complete designation of every item required for each door or opening. Include the following information:
    - a. Type, style, function, size, and finish of each hardware item.
    - b. Name and manufacturer of each item.
    - c. Fastenings and other pertinent information.
    - d. Location of each hardware set cross referenced to indications of Drawings both on floor plans and in door and frame schedule.
    - e. Explanation of all abbreviations, symbols, and codes contained in schedule.
    - f. Mounting locations for hardware.
    - g. Door and frame sizes and materials.
    - h. Keying information.
  - 2. Submittal Sequence: Submit final schedule at earliest possible date particularly where acceptance of hardware schedule must precede fabrication of other work that is critical in the Project construction schedule. Include with schedule the product data, samples, shop drawings of other work affected by door hardware, and other information essential to the coordinated review of schedule.
  - 3. Keying Schedule: Submit separate detailed schedule indicating clearly how the Owner's final instructions on keying of locks has been fulfilled.
- D. Templates for doors, frames, and other work specified to be factory prepared for the installation of door hardware. Check shop drawings of other work to confirm that adequate provision are made for locating and installing door hardware to comply with indicated requirements.

#### 1.04 QUALITY ASSURANCE

A. Single Source Responsibility: Obtain each type of hardware (latch and locksets, hinges, closers, etc.) from a single manufacturer.

- B. Supplier Qualifications: A recognized architectural door hardware supplier, with warehousing facilities in the Project's vicinity, and has a record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project. Employs an experienced architectural hardware consultant (AHC) who is available to Owner, architect, and Contractor, at reasonable times during the course of the Work, for consultation.
  - 1. Require supplier to meet with Owner to finalize keying requirements and to obtain final instructions in writing.
- C. Fire-Rated Openings: Provide door hardware for fire-rated openings that complies with NFPA Standard No. 80 and requirements of authorities having jurisdiction. Provide only items of door hardware that are listed and are identical to products tested by UL, Warnock Hersey, and Factory Mutual. Testing and inspecting organization acceptable to authorities having jurisdiction for use on types and sizes of doors indicated in compliance with requirements of fire-rated door and door frame labels.

#### 1.05 PRODUCT HANDLING

- A. Tag each item or package separately with identification related to final hardware schedule, and include basic installation instructions with each item or package.
- B. Packaging of door hardware is responsibility of supplier. Upon receipt of material by hardware supplier from manufacturers, sort and repackage in containers clearly marked with appropriate hardware set number to match set numbers of approved hardware schedule. Two or more identical sets may be packed in same container.
- C. Inventory door hardware jointly with representatives of hardware supplier and hardware installer until each is satisfied that count is correct.
- D. Deliver individually packaged door hardware items promptly to place of installation (shop or Project site).
- E. Provide secure lock-up for door hardware delivered to the Project, but not yet installed. Control handling and installation of hardware items that are not immediately replaceable so that completion of the Work will not be delayed by hardware losses both before and after installation.

#### 1.06 MAINTENANCE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

#### 2.01 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Butts and Hinges:
    - a. Hager Hinge Co.
    - b. Stanley Hardware, Division of Stanley Works.
    - c. McKinney Builders Hardware.
  - 2. Cylinders and Locks:
    - a. Schlage Lock.
    - b. Sargent Lock.
    - c. Best Lock.
  - 3. Flush Bolts ( automatic where required);
    - a. Rockwood Manufacturing.
    - b. H. B. Ives, A Harrow Company.
    - c. Hager Hinge Co.
  - 4. Push/Pull Units:
    - a. Rockwood Manufacturing.
    - b. H.B. Ives, A Harrow Company.
    - c. Hager Hinge Co.
  - 5. Overhead Closers:
    - a. LCN
    - b. Sargent
    - c. Stanley
  - 6. Door Control Devices:
    - a. Rixson-Firemark, Div. Yale Security Inc.
    - b. Sargent Manufacturing Co.
    - c. Glynn Johnson.
  - 7. Kick and Mop Plates:
    - a. Rockwood. Stainless steel satin finish, 8" high x 2" less than door width for kicks and 1" less for mops.
    - b. Hager Hinge Co.
    - c. H. B. Ives, A Harrow Company.
  - 8. Weatherstrip and Seals:
    - a. Pemko Manufacturing Co., Inc, all with stainless steel screws, etc.
    - b. Reese Enterprises, Inc.
    - c. Zero International, Inc.

- 9. Thresholds (full frame width)
  - a. Pemko Manufacturing Co., Inc.
  - b. Reese Enterprises, Inc.
  - c. Zero International, Inc.
- 10. Astragals:
  - a. Pemko Manufacturing Co., Inc.
  - b. Reese Enterprises, Inc.
  - c. Zero International, Inc.
- 11. Wall Stop (at all doors except where noted):
  - a. Rockwood Manufacturing.
  - b. H. B. Ives.
  - c. Hager Hinge Company.

#### 2.02 SCHEDULED HARDWARE

- A. Requirements for each type of finish hardware are indicated on the "Door Schedule", and in the Schedule at the end of this Section. Products are identified by using hardware designation numbers of the following:
  - 1. Manufacturer's Product Designations: The product designation and name of one manufacturer are listed for each hardware type required for the purpose of establishing minimum requirements. Provide either the product designated or, where more than one manufacturer is specified under the Article "Manufacturers" in Part 2 for each hardware type, the comparable product of one of the other manufacturers that complies with requirements.
  - 2. ASNS/BHMA designations used elsewhere in this Section or in schedules to describe hardware items or to define quality or function are derived from the following standards. Provide products complying with these standards and requirements specified elsewhere in this Section.
    - a. Butts and Hinges: ANSI/BHMA A156.1.
    - b. Bored and Pre-assembled Locks and Latches: ANSI/BHMA A156.2.
    - c. Exit Devices: ANSI/BHMA A156.3
    - d. Door Controls Closers: ANSI/BHMA A156.4.
    - e. Auxiliary Locks and Associated Products: ANSI/BHMA A156.5.
    - f. Architectural Door Trim: ANSI/BHMA A156.6.
    - g. Template Hinge Dimensions: ANSI/BHMA A156.7.
    - h. Door Controls Overhead Holders: ANSI/BHMA A156.8.
    - i. Interconnected Locks and Latches: ANSI/BHMA A156.12.
    - j. Mortise Locks and Latches: ANSI/BHMA A156.13.
    - k. Sliding and Folding Door Hardware: ANSI/BHMA A156.14.

- I. Closer Holder Release devices: ANSI/BHMA A156.15.
- m. Auxiliary Hardware: ANSI/BHMA A156.16.
- n. Self-Closing Hinges and Pivots: ANSI/BHMA A156.17.
- o. Materials and Finishes: ANSI/BHMA A156.18.

#### 2.03 MATERIALS AND FABRICATION

- A. Manufacturer's Name Plate: Do not use manufacturers' products that have manufacturer's name or trade name displayed in a visible location (omit removable nameplates) except in conjunction with required fire-rated labels and as otherwise acceptable to Architect.
  - 1. Manufacturer's identification will be permitted on rim of lock cylinders only.
- B. Base Metals: Product hardware units of basic metal and forming methods indicated, using manufacturer's standard metal alloy, composition, temper, and hardness, but in no case of lesser (commercially recognized) quality than specified for applicable hardware units. Product hardware units to be applicable ANSI/BHMA A156 series standards for each type of hardware item, and with ANSI/BHMA A156.18 for finish designations indicated. Do not furnish "optional" materials or forming methods for those indicated, except as otherwise specified.
- C. Fasteners: Provide hardware manufactured to conform to published templates generally prepared for machine screw installation. Do not provide hardware that has been prepared for self-tapping sheet metal screws, except as specifically indicated.
- D. Furnish screws for installation with each hardware item. Provide Phillips flat-head screws except as otherwise indicated. Finish exposed (exposed under any condition) screws to match hardware finish or, if exposed in surfaces of other work, to match finish of this other work as closely as possible including "prepared for paint" surfaces to receive painted finish.
- E. Provide concealed fasteners for hardware units that are exposed when door is closed except to the extent no standard units of type specified area available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work unless their use is the only means of reinforcing the work adequately to fasten the hardware securely. Where thru-bolts are used as a means of reinforcing the work, provide sleeves for each thru-bolt or use sex screw fasteners.

## 2.04 HINGES

- A. Templates: Except for hinges and pivots to be installed entirely (both leaves) into wood doors and frames, provide only template-produced units.
- B. Screws: Provide Phillips flat-head screws complying with the following requirements:
  - 1. For metal doors and frames install machine screws into drilled and tapped holes.

- 2. For wood doors and frames install wood screws.
- 3. For fire-rated wood doors install  $\#12 \times \frac{1}{4}$  inch, threaded-to-the-head steel wood screws.
- 4. Finish screw heads to match surface of hinges or pivots.
- C. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
  - 1. Out-Swing Exterior Doors: Non-removable pins.
  - 2. Out-Swing Corridor Doors with Locks: Non-removable pins.
  - 3. Interior Doors: Non-rising pins.
  - 4. Tips: Flat button and matching plug, finished to match leaves.
- D. Number of Hinges: Provide number of hinges indicated but not less than 3 hinges per door leaf for doors 90 inches or less in height and one additional hinge for each 30inches of additional height.
  - 1. Fire-Rated Doors: Not less than 3 hinges per door leaf for doors 86 inches or less in height with same rule for additional hinges.
- E. SIZE AND WEIGHT OF BUTTS
  - 1. See Hardware Headings for Details.

#### 2.05 LOCK CYLINDERS AND KEYING

- A. Review the keying system with the Owner and provide new key system.
- B. Metals: Construct lock cylinder parts from brass or bronze, stainless steel, or nickel silver.
- C. Comply with Owner's instructions for master keying and, except as otherwise indicated, provide individual change key for each lock that is not designated to be keyed alike with a group of related locks.
- D. Key Material: Provide keys of nickel silver only.
- E. Key Quantity: Furnish 3 change keys for each lock, 5 master keys.
  - 1. Deliver keys to Owner.
- 2.07 LOCKS, LATCHES, AND BOLTS
  - A. Strikes: Provide manufacturer's standard wrought box strike for each latch or lock bolt, with curved lip extended to protect frame, finished to match hardware set, unless otherwise indicated.
    - 1. Provide curved lip strikes for locks with anti-friction latchbolts as recommended by manufacturer.

- 2. Provide recess type top strikes for bolts locking into head frames, unless otherwise indicated.
- 3. Provide dust-proof strikes for foot bolts, except where special threshold construction provides non-recessed strike for bolt.
- 4. Provide roller type strikes where recommended by manufacturer of the latch and lock units.
- B. Lock Throw: Provide ½ inch standard throw of latch on all single and pairs except, provide ¾ inch minimum throw of latch on all pairs of UL doors. Comply with UL requirements for throw of bolts and latch bolts on rated fire openings.
- C. Flush Bolt Heads: Minimum of ½ inch diameter rods of brass, bronze, or stainless steel with minimum 12-inch long rod for doors up to 7'-0" in height. Provide longer rods as necessary for doors exceeding 7'-0" in height.

#### 2.08 CLOSERS AND DOOR CONTROL DEVICES

- A. Size of Units: Except as otherwise specifically indicated, comply with the manufacturer's recommendations for size of door control unit depending on size of door, exposure to weather, and anticipated frequency of use.
  - 1. Where parallel arms are indicated for closers, provide closer unit on size larger than recommended for use with standard arms.
  - 2. Provide parallel arms for all overhead closers, except as otherwise indicated.
  - 3. Closers must operate at 180 degree opening where indicated on plans.
- B. Access-Free Manual Closers: Where manual closers are indicated for doors required to be accessible to the physically handicapped, provide adjustable units complying with ANSI A117.1 provisions for door opening force and delayed action closing.
- C. Combination Door Closers and Holders: Where indicated, provide units designed to hold door in open position under normal usage and to release and close door automatically under fire conditions.
- D. Provide black resilient parts for exposed bumper.

#### 2.09 DOOR TRIM UNITS

- A. Fasteners: Provide manufacturer's standard exposed fasteners for door trim units consisting of either machine screws or self-tapping screws.
- B. Fabricate protection plates not more than 2" inches less than door width on hinge side and not more than 1" inch less than door width on pull side by height indicated.

#### 2.10 WEATHER-STRIPPING
### **Rehabilitation of Grupes Reservoir Dam**

- A. General: provide continuous weather-stripping on exterior doors and smoke, light, or sound seals, including automatic drop seals on interior doors where indicated or scheduled. Provide non-corrosive fasteners for exterior applications and elsewhere as indicated.
- B. Replaceable Seal Strip: Provide only those units where resilient or flexible seal strip is easily replaceable and readily available from stocks maintained by manufacturer.
- C. Weather-stripping at Jambs and Heads: Provide bumper-type resilient insert and metal retainer strips, surface applied unless shown as mortised or semi-mortised, and of following metal, finish, and resilient bumper material:
  - Sponge neoprene conforming to MIL R 6130, Class II (Closed Cell).
    a. Grade A (30 degree F to 150 degree F, oil-resistant and self-extinguishing).
- D. Weather-stripping at Door Bottoms: Provide threshold consisting of contact-type resilient insert and metal housing of design and size shown and of following metal, finish, and resilient seal strip:
  - 1. Extruded aluminum with natural anodized finish, 0.062-inch minimum thickness of main walls and flanges.
  - 2. Solid neoprene wiper or sweep seal complying with MIL R 6855, Class II, and Grade 40.
  - 3. Flexible vinyl wiper or sweep seal strip.
  - 4. Brush pile insert of polypropylene or nylon woven pile and aluminum strip backing complying with AAMA 701.2.

### 2.11 THRESHOLDS

- A. General: Except as otherwise indicated, provide standard metal threshold unit of type, size and profile as shown or scheduled.
- B. Exterior Entrance Doors: Provide adjustable units not less than the width required extending to the edge of entry mat frame.
- C. All Thresholds to be H.C. Accessible

### 2.12 HARDWARE FINISHES

- A. Match items to the manufacturer's standard color and texture finish for the latch and lock sets (or push-pull units if not latch or lock sets), or unless noted otherwise in the specifications or hardware sets.
- B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware.

### **Rehabilitation of Grupes Reservoir Dam**

C. The designations used in schedules and elsewhere to indicate hardware finishes are those listed in ANSI/BHMA A156.18, "Materials and Finishes," including coordination with the traditional U.S. finishes shown by certain manufacturers for their products.

PART 3 - EXECUTION

- 3.01 INSTALLATION
  - A. Installation of Door Hardware is by "General Contractor".

### 3.02 HARDWARE SCHEDULE

A. General: Provide hardware for each door to comply with requirements of Section 08 70 00 "Door Hardware and the following Hardware Sets.

### **Hardware Sets**

### SET #001

Doors: 100

5	Hinges	FBB191 4 1/2 X 4 1/2 NRP	US19	ST
1	Electric Hinge	CEFBB191-54 4 1/2 x 4 ½	US19	ST
2	Flush Bolts	550	US19	RO
1	Lockset	ND96PD RHO 8RO-OUTSIDE	622	SC
1	Electric Strike	1006CLB	BLK	HS
1	Closer/Stop	4040 XP CUSH	693	LC
1	Overhead Door Stop	904S	SPBLK	GL
2	Protection Plate	K1050 8" x 34"	US19	RO
1	Dust Proof Strike	570	US19	RO
1	Latch Protector	320CL	US19	RO
1	Weatherstrip	375 BSPR 84"		PΕ
1	Weatherstrip	305 BSPR 1 x 72" 2 x 84"		ΡE
2	Door Bottom	315 BSPN 36"		ΡE
1	Threshold	171 A 72"		ΡE
	NOTE: Card Reader and	balance of security system by others.		

### END OF SECTION 08 70 00

## SECTION 09 90 00 PAINTING

### PART 1 - GENERAL

### 1.01 WORK INCLUDED

- Paint interior and exterior exposed surfaces listed on the painting schedule in Part
  3 of this Section, as shown on drawings and as needed for a complete and proper installation.
- B. Related Work:
  - 1. Documents affecting the work of this Section include, but are not necessarily limited to General Conditions and Supplementary General Conditions.
  - Section 04 20 00 Unit Masonry Section 06 40 00 – Architectural Woodwork Section 07 46 10 - Fiber cement siding & trim Section 08 11 13 - Metal Doors and Frames
- C. Work Not Included:
  - 1. Unless otherwise indicated, painting is not required on surfaces in concealed and inaccessible areas such as furred spaces, foundation spaces, pipe spaces, and duct shafts.
  - 2. Metal surfaces of anodized aluminum, stainless steel, chromium plate, copper, bronze, and similar finished materials will not require painting under this Section except as may be so specified.
  - 3. Do not paint moving parts of operating units.
  - 4. Do not paint over required labels or equipment identification, performance rating, name or nomenclature plates.

### 1.02 QUALITY ASSURANCE

- A. Comply with provisions of Section of the Supplementary General Conditions.
- B. Unless otherwise approved by the Architect, provide all products of this Section from a single manufacturer.
- C. Use adequate numbers of skilled workmen who are thoroughly trained and

experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

- D. Work practices employed by the contractor in performance of the surface preparation, waste disposal, paint application, etc. must comply with applicable federal, state and local regulations.
- E. Paint Coordination:
  - 1. Provide finish coats which are compatible with the prime coats actually used.
  - 2. Review other Sections of these Specifications as required, verifying the prime coats to be used and assuring compatibility of the total coating system for the various substrata.
  - 3. Upon request, furnish information on the characteristics of the specific finish materials to assure that compatible prime coats are used.
  - 4. Provide barrier coats over noncompatible primers.
  - 5. Notify the Architect in writing of anticipated problems in using the specified coating systems over prime coatings supplied under other Sections.

### 1.03 SUBMITTALS

- A. Product Data:
  - 1. Materials list of items proposed to be provided under this Section.
  - 2. Manufacturer's specifications and other data needed to prove compliance with the specified requirements.
  - 3. Manufacturer's complete designer color selector.
- B. Samples:
  - 1. Following the selection of colors and glosses by the Architect for exterior surfaces and by Owner for interior, submit Samples for review.
    - a. Provide three (3) samples of each color and each gloss for each paint material specified. Except as otherwise directed by the Architect, make Samples approximately 8" x 8" in size.

### **Rehabilitation of Grupes Reservoir Dam**

- b. Submit field samples for Architect's approval during progress of the Work in the form of actual application of the approved materials on actual surfaces to be painted approximately 4'0"x4'0" in size.
- c. Revise each field sample as requested until the required gloss, color, and texture is achieved. Such Samples, when approved, will become standards of color and finish for accepting or rejecting the work of this Section.
- d. Do not commence finish painting until field samples have been finally approved at the job site.

### 1.04 PRODUCT HANDLING

A. Comply with pertinent provisions of Sections of the Supplementary General Conditions.

### 1.05 JOB CONDITIONS

- A. Do not apply solvent-thinned paints when the temperature of surfaces to be painted and the surrounding air temperatures are below 45 degrees F, unless otherwise permitted by the manufacturer's printed instructions as reviewed by the Architect.
- B. Weather Conditions:
  - 1. Do not apply paint in snow, rain, fog, or mist; or when the relative humidity exceeds 85%; or to damp or wet surfaces, unless otherwise permitted by the manufacturer's printed instructions as approved by the Architect.
  - 2. Applications may be continued during inclement weather only within the temperature limits specified by the paint manufacturer as being suitable for use during application and drying periods.

### 1.06 EXTRA STOCK

A. Upon completion of this Section, deliver to the Owner one full gallon of each color, type and gloss of paint used in this work.

### PART 2 - PRODUCTS

## 2.01 PAINT - MATERIALS

## **Rehabilitation of Grupes Reservoir Dam**

- A. Acceptable Manufacturers:
  - 1. The Painting Schedule in Part 3 of this Section is based in general, on products of Benjamin Moore & Company. Equivalent products of the following manufacturers will be acceptable, provided that they meet the performance requirements of this Specification.
    - b. Sherwin Williams
- B. Undercoats and thinners:
  - 1. Provide undercoat paint produced by the same manufacturer as the finish coat.
  - 2. Use only thinners recommended by the paint manufacturer, and use only the recommended limits.
  - 3. insofar as practicable, use undercoat, finish coat, and thinner materials as parts of a unified system of paint finish.

### 2.02 COLORS

- A. Color selections will be made from manufacturer's complete designer color selector.
- B. Colors to be selected by Owner/Architect.
- C. Identify physical hazards according to the color scheme specified in ANSI 253.1-1971, "Safety Color Code for Marking Physical Hazards."

### 2.03 APPLICATION EQUIPMENT

- A. For application of the approved paint, use only such equipment as is recommended for application of the particular paint by the manufacturer of the particular paint.
- B. Prior to use of application equipment, verify that the proposed equipment is actually compatible with the material to be applied, and the integrity of the finish will not be jeopardized by use of the proposed equipment.

### 2.04 OTHER MATERIALS

A. Provide other materials, not specifically described but required for a complete and proper installation.

## PART 3 - EXECUTION

### 3.01 SURFACE CONDITIONS

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

### 3.02 MATERIALS PREPARATION

- A. General:
  - 1. Mix and prepare paint materials in strict accordance with the manufacturer's recommendations as approved by the Architect.
  - 2. When materials are not in use, store in tightly covered containers.
  - 3. Maintain containers used in storage, mixing, and application of paint in a clean condition, free from foreign materials and residue.
- B. Stirring:
  - 1. Stir materials before application, producing a mixture of uniform density.
  - 2. Do not stir into the material any film which may form on the surface, but remove the film and, if necessary, strain the material before using.

### 3.03 SURFACE PREPARATION

- A. General:
  - 1. Perform preparation and cleaning procedures in strict accordance with the paint manufacturers' recommendation.
  - 2. Remove removable items which are in place and are not scheduled to receive paint finish; or provide surface-applied protection prior to surface preparation and painting operations.
  - 3. Following completion of painting in each space or area, reinstall the removed items by using workmen who are skilled in the necessary trades.
  - 4. Clean each surface to be painted prior to applying paint of surface treatment.
  - 5. Remove oil and grease with clean cloths and cleaning solvent of low toxicity and flash point in excess of 200 degrees F, prior to start of mechanical cleaning.

- 6. Schedule the cleaning and painting so that dust and other contaminants from the cleaning process will not fall onto wet, newly painted surfaces.
- 7. Fill all holes, nail holes and surface marks with compatible filler, sand smooth and prime filled spots.
- B. Preparation of ferrous metal and galvanized metal surfaces:
  - 1. Thoroughly clean surfaces until free from dirt, oil and grease.
  - 2. Where shop coat is abraded and rust has developed, remove by sanding and spot prime immediately with paint manufacturer's recommended rust inhibitive primer.
  - 3. On galvanized surfaces, use solvent for the initial cleaning, and then treat the surface thoroughly with phosphoric acid etch. Remove etching solution completely before proceeding.
  - 4. Allow to dry thoroughly before application of paint.
- C. Preparation of Interior & Exterior Masonry surfaces:
  - 8. Surfaces to be coated must be clean, dry, and free of oil, grease, dust, flaky rust, mill scale, salts, loose paint, chalk, mildew, and other foreign matter that could interfere with adhesion. Remove oil, grease, salts and chalk by cleaning with Super Spec HP® Oil and Grease Emulsifier (P83) according to label directions. Glossy existing coatings should be dulled by abrading the surface.

### 3.04 PAINT APPLICATION

- A. General:
  - 1. Touch up shop-applied prime coats which have been damaged, and touch up bare areas prior to start of finish coat application.
  - 2. Slightly vary the color of succeeding coats:
    - a. Do not apply additional coats until the competed coat has been inspected and approved.
    - b. Only the inspected and approved coats of paint will be considered in determining the number of coats applied.

### **Rehabilitation of Grupes Reservoir Dam**

- 3. Sand and dust between coats to remove defects visible to the unaided eye from a distance of five feet.
- 4. On removable panels and hinged panels, paint the back sides to match the exposed sides.
- B. Drying:
  - 1. Allow sufficient drying time between coats, as recommended by the material manufacturer to suit all weather conditions.
- C. Brush Application:
  - 1. Brush out and work the brush coats onto the surface in an even film.
  - 2. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, and other surface imperfections will not be acceptable.
- D. Spray Application:
  - 1. Confine spray application to metal framework and similar surfaces where hand brush work would be inferior.
  - 2. Where spray application is used, apply each coat to provide the hiding equivalent of brush coats.
  - 3. Do not double back with spray equipment to build up film thickness of two coats in one pass.
- E. For completed work, match the approved Samples as to texture, color and coverage. Remove, refinish, or repaint work not in compliance with the specified requirements.
- F. Miscellaneous surfaces and procedures:
  - 1. Exposed mechanical items:
    - a. Finish rooftop mechanical units, electric panels, access doors, conduits, pipe, ducts, grilles, registers, vents, and items of similar nature to match the adjacent wall and ceiling surfaces, or as directed.
    - b. Paint visible duct surfaces behind vents, registers, and grilles with heat resistant, low lustre black paint.
    - c. Wash metal with solvent, prime, and apply two coats of alkyd enamel.

- 2. Hardware: Paint prime coated hardware to match adjacent surfaces, unless specified otherwise.
- 3. Wet areas:
  - a. In toilet rooms and contiguous areas, add a manufacturer approved fungicide to paints.

### 3.05 PAINTING SCHEDULE

A. Metal – P-1 (Doors and frames, Lintels, exposed metal):

1st Coat	Primer: Sherwin Williams Pro-Cryl Primer, B66 Series
2nd Coat	Sherwin-Williams Waterbased Alkyd Urethane Enamel Semi-Gloss, B53-1150
3rd Coat	Sherwin-Williams Waterbased Alkyd Urethane Enamel Semi-Gloss, B53-1150

B. Exterior & interior trim

1st Coat	Sherwin Williams Exterior Alkyd Primer, Y24
2nd Coat	Sherwin-Williams Exterior Superpaint Satin Latex, A89
3rd Coat	Sherwin-Williams Exterior Superpaint Satin Latex, A89

END OF SECTION 09 90 00

# DWSRF RES 2023-02, REHABILATATION OF THE GRUPES RESERVIOR DAM NEW CANAAN, CT

# APPENDIX A

Required Construction Contract Provisions Under the Connecticut Department of Public Health's Drinking Water State Revolving Fund (DWSRF)

- I. Connecticut Department of Public Health Contract Provisions
  - a. Additional Articles
    - b. Governor Thomas J. Meskill Executive Order No. Three
    - c. Guidelines and Rules of State Labor Commissioner Implementing Governor's Executive Order No. Three
    - d. Governor Thomas J. Meskill Executive Order No. Seventeen
    - e. Governor John G. Rowland Executive Order No. Sixteen
    - f. United States Department of Labor, Office of Federal Contract Compliance Programs, Executive Order 11256, As Amended
    - g. Executive Order 12549, 3 C.F.R. Page 189, 1986
    - h. C.G.S. Section 31-53a. Debarment and Suspension
    - i. C.G.S. Section 31-53b. Worker Training Requirements for Public Works Projects
  - j. C.G.S Section 4a-60. Nondiscrimination and affirmative action provisions in awarding agency, municipal public works and quasi-public agency project contracts.
  - k. C.G.S. Sections 22a 482-2 and Section 22a 482-4 of the Regulations of Connecticut State Agencies.
  - I. State of Connecticut, Department of Public Health DWSRF Project Sign Requirements
  - m. Provisions for Reporting and Recovering Archeological Finds in Construction Contracts
  - n. DRS Cert-141 Contractor's Exempt Purchase Certificate
  - o. Davis-Bacon Federal Prevailing Wage Requirements and Construction Contract Language for DWSRF Projects (Revised 10/20/2016).
  - p. United States E.P.A. Memorandum Prohibition on Certain Telecommunication and Video Surveillance Services or Equipment in the SRF Program
- II. Interim Guidance for Minority Business Enterprise and Women's Business Enterprise Requirements
- III. Clean Water Fund Memorandum (2019-003) dated June 19, 2019 MBE/WBE Subcontractor Verification Form MBE/WBE Semi Annual Reporting
- IV. United States Environmental Protection Agency (EPA) American Iron and Steel Requirement Guidance dated May 20, 2014 DWSRF Use of American Iron and Steel De Minimis Waiver On-Going Tracking Form
  - De Minimis Waiver Final Utilization and Certification Form

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# I. ADDITIONAL ARTICLES

1. CTDPH CONSTRUCTION CONTRACT PROVISIONS. "Required Construction Contract Provisions under the Connecticut Department of Public Health Drinking Water Section Drinking Water State Revolving Fund" are included following this page and made a part hereof. Should there appear to be a conflict between these "Provisions" and the intent and purpose of the Contract Documents, the CONTRACTOR shall seek clarification from the Engineer.

Should the CONTRACTOR fail to seek clarification from the Engineer on any matter which seems in conflict or inconsistent with the intent and purpose of the full contract, the CONTRACTOR will have assumed and thus, shall have, full responsibility for all liability, charges and costs for related work, actions and conditions resulting therefrom and CONTRACTOR shall save the OWNER and State of Connecticut harmless from all costs and charges and any manner of claims, liability, lawsuits and other actions. The rights which the OWNER has herein are in addition to each and every other right the OWNER may have under the Contract Documents and by law.

### ADDITIONAL REQUIRED CONTRACT PROVISIONS

### **Construction Safety and Health Standards**

It is a condition of this Contract, and shall be made a condition of each Subcontract entered into pursuant to this Contract, that the CONTRACTOR and any subcontractor shall not require any laborer or mechanic employed in performance of the Contract to work in surroundings or under working conditions which are unsanitary, hazardous, or dangerous to his health or safety, as determined under construction safety and health standards (Title 29, Code of Federal Regulations, Part 1518 - published in the Federal Register on April 17, 1971) promulgated by the United States Secretary of Labor, in accordance with section 107 of the Contract Work Hours and Safety Standards Act (83 Stat. 96).

### Service of Process

The CONTRACTOR, if not a resident or a domestic entity of the State of Connecticut, or, in the case of a partnership, the partners, if not residents, hereby appoints the Secretary of State of the State of Connecticut, and his successors in office as agent for service of process for any action arising out of or as a result of this Contract; such appointment to be evidenced by the appropriate filing with the office of the Secretary of the State of Connecticut and to be in effect throughout the life of this Contract, and six (6) years thereafter.

### **Substitution of Securities for Retainage**

The CONTRACTOR is advised of the provisions of section 3-112a of the General Statutes of the State of Connecticut, which is quoted as follows:

SECTION 3-112a. Substitution of securities for retainages on state contracts. (a) Under any contract made or awarded by the state, or by any public department of official thereof, the CONTRACTOR may, from time to time withdraw the whole or any portion of the amount retained for payments to the

CONTRACTOR pursuant to the terms of the contract, upon depositing with the comptroller (1) United States treasury bonds, United States treasury notes, United States treasury certificates of indebtedness or United States treasury bills, or (2) bonds or notes of the state of Connecticut or (3) bonds of any political subdivision in the state of Connecticut. No amount shall be withdrawn in excess of the market value of the securities at the time of deposit or of the par value of such securities, whichever is lower. (b) The comptroller shall, on a regular basis, collect all interest or income on the obligations so deposited and shall pay the same, when and as collected, to the CONTRACTOR who deposited the obligations. If the deposit is in the form of coupon bonds, the comptroller shall deliver each coupon as it matures to the CONTRACTOR. (c) Any amount deducted by the state, or by any public department or official thereof, pursuant to the terms of the contract, from the retainages due the CONTRACTOR, shall be deducted, first from that portion of the retainage for which no security has been substituted, then from the proceeds of any deposited security. In the latter case, the CONTRACTOR shall be entitled to receive interest, coupons or income only from those securities which remain after such amount has been deducted.

### **Executive Orders of the Governor**

This Contract and all Subcontracts are subject to the provisions of Executive Order No. Three of Governor Thomas J. Meskill, promulgated June 16, 1971, concerning labor employment practices, Executive Order No. Seventeen of Governor Thomas J. Meskill, promulgated February 15, 1973, concerning the listing of employment openings and Executive Order No. Sixteen of Governor John G. Rowland promulgated august 4, 1999, concerning violence in the workplace, all of which are incorporated into and are made a part of this Contract as if they had been fully set forth in it. This provision shall be set forth and incorporated in all Subcontracts.

This contract is also executed subject to the Governor's Executive Order No. 17, a copy of which is attached hereto and is hereby made a part of this Agreement. Governor's Executive Order No. 17 requires, inter alia, that all CONTRACTORs and subcontractors shall list all employment openings with the office of the Connecticut State Employment Service in the area where the work is to be performed or where the services are to be rendered. Failure of the CONTRACTOR to conform with the requirements of the Governor's Executive Order No. 17 and any orders, rules or regulations issued pursuant thereto, shall be a basis for termination of this agreement by the State.

# **EXECUTIVE ORDER NO. THREE**

### STATE OF CONNECTICUT BY HIS EXCELLENCY THOMAS J. MESKILL GOVERNOR EXECUTIVE ORDER NO. THREE

WHEREAS, sections 4-61d (b) and 4-11a of the 1969 supplement to the general statutes require nondiscrimination clauses in state contracts and subcontracts for construction on public buildings, other public works and goods and services and

WHEREAS, section 4-61e (c) of the 1969 supplement to the general statutes requires the labor department to encourage and enforce compliance with this policy by both employers and labor unions, and to promote equal employment opportunities, and

WHEREAS, the government of this state recognizes the duty and desirability of its leadership in providing equal employment opportunity, by implementing these laws.

NOW, THEREFORE, I, THOMAS J. MESKILL, Governor of the State of Connecticut, acting by virtue of the authority vested in me under section twelve of article fourth of the constitution of the state, as supplemented by section 3-1 of the general statutes, <u>do hereby</u> <u>ORDER and DIRECT</u>, as follows, by this Executive Order:

The <u>labor commissioner shall be responsible</u> for the administration of this Order and <u>shall adopt such regulations</u> as he deems necessary and appropriate to achieve the purposes of this Order. Upon the promulgation of this Order, the <u>commissioner of finance and</u> <u>control shall issue a directive forthwith to all state agencies</u>, that henceforth all state con-tracts and subcontracts for construction on public buildings, other public works and goods and services shall contain a pro-vision rendering such contract or subcontract subject to this Order, and that such contract or subcontract may be canceled, terminated or suspended by the labor commissioner for violation of or noncompliance with this Order or state and federal laws concerning nondiscrimination, notwithstanding that the labor commissioner is not a party to such contract or subcontract.

Π

Each contractor having a contracting containing the provisions prescribed in section 4-11a of the 1969 supplement to the general statutes, shall file and shall cause each of his subcontractors to file, <u>compliance reports with the contracting agency or the labor commissioner</u>, as may be directed. Such reports shall be filed within such times and shall contain such information as to employment policies and statistics of the contractor and each subcontractor, and shall be in such form as the labor commissioner may prescribe. Bidders or prospective contractors or subcontractors may be required to state whether they have participated in any previous contract subject to the provisions of this Order of any preceding similar Order, and in that event to submit on behalf of themselves and their proposed subcontractors compliance reports prior to or as an initial part of their bid or negotiation of a contract.

III

Whenever the contractor or subcontractor has a collective bargaining agreement or contract or understanding with a labor organization or employment agency as defined in section 31-122 of the general statutes, the compliance report shall identify the said organization or agency and the contracting agency or the labor commissioner may require a compliance report to be filed with the contracting agency or the labor commissioner, as may be directed, by such organization or agency, signed by an authorized officer or agent of such organization or agency, with supporting information, to the effect that the signer's practices and policies including but not limited to matters concerning personnel, training, apprenticeship, member-ship, grievance and representation, and upgrading, do not discriminate on grounds of race, color, religious creed, age, sex or national origin, or ancestry of any individual, and that the signer will either affirmatively cooperate in the implementation of the policy and provisions of this Order, or that it consents and agrees that recruitment, employment and the terms and conditions of employment under the proposed contract shall be in accordance with the purposes and provisions of the Order.

IV

The labor commissioner may by regulation exempt certain classes of contracts, subcontracts or purchase order from the implementation of this Order, for standard commercial supplies or raw materials, for less than specified amounts of money or numbers of workers or for subcontractors below a specified tier. The labor commissioner may also provide by regulation for the exemption of facilities of a contractor which are in all respect a separate and distinct from activities of the contractor related to the performance of the state contract, provided only that such exemption will not interfere with or impede the implementation of this Order, and provided further, that in the absence of such an exemption, all facilities shall be covered by the provisions of this Order.

V

Each contracting agency shall be primarily responsible for obtaining compliance with the regulations of the labor commissioner with respect to contracts entered into by such agency or its contractors. All contracting agencies shall comply with the regulations of the labor commissioner in discharging their primary responsibility for securing compliance with the provisions of contracts and otherwise with the terms of this Order and of the regulations of the labor commissioner issued pursuant to this Order. They are directed to cooperate with the labor commissioner and to furnish the labor commissioner such information and assistance as he may require in the performance of his functions under this Order. They are furched to appoint or designate from among the personnel of each agency, compliance officers, whose duty shall be to seek compliance with the objectives of this Order by conference, conciliation, mediation, or persuasion.

### VI

The labor commissioner may investigate the employment practices and procedures of any state contractor or sub-contractor and the practices and policies of any labor organization or employment agency hereinabove described, relating to employment under the state contract, as concerns nondiscrimination by such organization or agency as hereinabove described, or the labor commissioner may initiate such investigation by the appropriate contract agency, to determine whether or not the contractual provisions, hereinabove specified or statutes of the state respecting they have been violated. Such investigation shall be conducted in accordance with the procedures established by the labor commissioner and the investigating agency shall report to the labor commissioner any action taken or recommended.

VII

The labor commissioner shall receive and investigate or cause to be investigated complaints by employees or prospective employees of a state contractor or subcontractor or member or applicants for membership or apprenticeship or training in a labor organization or employment agency hereinabove described, which allege discrimination contrary to the contractual provisions specified hereinabove or state statutes requiring nondiscrimination in employment opportunity. If this investigation is conducted for the labor commissioner by a contracting agency, that agency shall report to the labor commissioner what action has been taken or is recommended with regard to such complaints.

### VIII

The <u>labor commissioner shall use his best efforts</u> directly and through contracting agencies, or other interested federal, state and local agencies, contractors and all other available instrumentalities, including the commission on human rights and opportunities, the executive committee on human rights and opportunities, and the apprenticeship council under its mandate to provide advice and counsel to the labor commissioner in <u>providing equal</u> employment opportunities to all apprentices and provide training, employment and upgrading opportunities for disadvantaged workers, in accordance with section 31-51 (d) of the 1969 supplement to the general statutes, <u>to cause any labor organization or any employment agency whose members are engaged</u> in work under government contracts or referring workers or providing or supervising apprentice-ship or training for or in the course of work under a state contract or subcontract to cooperate in the implementation of the purposes of this Order. The labor commissioner shall in appropriate cases notify the commission on human rights and opportunities or other appropriate state or federal agencies whenever it has reason to believe that the practices of any such organization or agency violate equal employment opportunity requirements or state or federal law.

### IX

The labor commissioner or any agency officer or employee in the executive branch designated by regulation of the labor commissioner may hold such hearings, public or private, as the labor commissioner may deem advisable for compliance, enforcement or educational purposes under this Order.

### Х

(a) The labor commissioner may hold or cause to be held hearings, prior to imposing ordering or recommending the imposition or penalties and sanctions under this Order. No order for disbarment or any contractor from further state contracts shall be made without affording the contractor an opportunity for a hearing. In accordance with such regulations as the labor commissioner may adopt, the commissioner or the appropriate contracting agency may

- (1) Publish or cause to be published the names of contractors or labor organizations or employment agencies as hereinabove described which it has concluded have complied or failed to comply with the provisions of this Order or the regulations of the labor commissioner in implementing this Order.
- (2) Recommend to the commission on human rights and opportunities that in cases in which there is substantial or material violation or threat thereof of the contractual provision or related state statutes concerned herein, appropriate proceedings be brought to enforce them, including proceedings by the commission on its own motion under chapter 563 of the general statutes and the enjoining, within the limitations or applicable law, of organizations, individuals or groups who prevent directly or indirectly or seek to prevent directly or indirectly compliance with the provisions of this Order.
- (3) Recommend that criminal proceedings be brought under chapter 939 of the general statutes.
- (4) Cancel, terminate, suspend or cause to be canceled, terminated, or suspended in accordance with law any contract or any portion or portions thereof for failure of the contractor or subcontractor to comply with the nondiscrimination provisions of the contract. Contracts may be canceled, terminated, suspended absolutely or their continuance conditioned upon a pro-gram for future compliance approved by the contracting agency.
- (5) Provide that any contracting agency shall refrain from entering into any further contract or extensions or modifications of existing contracts with any contractor until he has satisfied the labor commissioner that he has established and will carry out personnel and employment policies compliant with this Order.
- (6) Under regulations prescribed by the labor commissioner each contracting agency shall make reasonable efforts within a reasonable period of time to secure compliance with the contract provisions of this Order by methods of convenience, conciliation, mediation or persuasion, before other proceedings shall be instituted under this Order or before a state contract shall be can-celled or terminated in whole or in part for failure of the contractor or subcontractor to com-ply with the contract provisions of state statute and this Order.

(b) Any contracting agency taking any action authorized by this Order, whether on its own motion or as directed by the labor commissioner or pursuant to his regulations shall promptly notify him of such action. Whenever the labor commissioner makes a determination under this order, he shall promptly notify the appropriate contracting agency and other interested federal, state and local agencies of the action recommended. The state and local agency or agencies shall take such action and shall report the results thereof to the labor commissioner within such time as he shall specify.

### XI

If the labor commissioner shall so direct, contracting agencies shall not enter into contracts with any bidder or prospective contractor unless he has satisfactorily complied with the provisions of this Order, or submits a program for compliance acceptable to the labor commissioner, or if the labor commissioner so authorizes, to the contracting agency.

### XII

Whenever a contracting agency cancels or terminates a contract, or a contractor has been disbarred from further government contracts because of noncompliance with the contract provisions with regard to nondiscrimination, the labor com-missioner or the contracting agency shall rescind such disbarrent, upon the satisfaction of the labor commissioner that the contractor has purged himself of such noncompliance and will thenceforth carry out personnel and employment policies of non-discrimination in compliance with the provision of this Order.

### XIII

The labor commissioner may delegate to any officer, agency or employee in the executive branch any function or duty of the labor commissioner under this Order except authority to promulgate regulations of a general nature.

### XIV

This Executive Order supplements the Executive Order issued on September 28, 1967. All regulations, orders, instructions, designations and other directives issued heretofore in these premises, including these issued by the heads of various departments or agencies under or pursuant to prior order or statute, shall remain in full force and effect, unless and until revoked or superseded by appropriate authority, to the extent that they are not inconsistent with this Order.

This Order shall become effective thirty days after the date of this Order.

Dated at Hartford, Connecticut, this 16th day of June, 1971.

### GUIDELINES AND RULES OF STATE LABOR COMMISSIONER IMPLEMENTING GOVERNOR'S EXECUTIVE ORDER NO. THREE

### SEC. 1 PERSONS AND FIRMS SUBJECT TO EXECUTIVE ORDER NO. THREE AND GUIDELINES AND RULES.

a. Every contractor, or subcontractor as defined in Sec. 2 hereof, supplier of goods or services, vendor, bidder and prospective contractor or subcontractor, having ten or more employees as defined in Sec. 3 of these guidelines, having or entering into or bidding to enter into any type of contractual relationship with the State of Connecticut or any of its agencies, boards, commissions, departments or officers, and if the consideration, cost, subject matter or value of the goods or services exceeds \$5,000.00, shall be subject to the Governor's Executive Order No. Three and these Guidelines and Rules.

b. A copy of the Governor's Executive Order No. Three and of these Guidelines and Rules shall be available to each said contractor, subcontractor, supplier, vendor, bidder and prospective contractor and subcontractor, and the said Executive Order No. Three and these Guidelines and Rules shall be incorporate by reference and made a part of the contract, purchase order, agreement or document concerned. A copy of the Executive Order and of these Guidelines and Rules shall be furnished to a contracting party or bidder on request.

c. All persons, partnerships, associations, firms, corporations and other entities having less than ten employees as defined in Sec. 3 at the time of the bid and execution of the contract and continuing through the performance of the contract are exempt from the provisions of the said Executive Order and these Guidelines and Rules. All contracts, subcontracts, purchase orders and agreements wherein the consideration ins \$5,000.00 or less shall be exempt from Executive Order No. Three and from these Guidelines and Rules.

### SEC. 2 SUBCONTRACTORS

As used herein, subcontractors are persons, partnerships, associations, firms or corporations or other entities having contractual relationship with a contractor who in turn has a contract with the State of Connecticut or any of its agencies, board, commissions or departments. Subcontractors below this tier are exempt from the Executive Order and from these Guidelines and Rules.

### SEC. 3 EMPLOYEES

As used herein, employees are persons working full or part-time irrespective of personnel classification whose wages, salaries, or earnings are subject to the Federal Insurance Contribution Act and/or to Federal Withholding Tax as a matter of law (whether in fact or not any actual withholding occurs in a given case), in an employee-employer relationship at the time of bid, contract execution, or offer or acceptance, and/or during any time thereafter during the existence of the performance period of the contract to the conclusion thereof.

### SEC. 4 REPORTS

a. Prior to the execution of the contract or prior to acceptance of a bid, as the case may be, the contractor, subcontractor, bidder or vendor shall file a report with the State Labor Commissioner, which report shall be complete and contain all of the information therein prescribed. The report shall be on Form E.0.3-1, a facsimile of which is attached hereto and made a part hereof, or in lieu thereof the contractor, subcontractor, bidder or vendor shall submit a detailed report containing all of the information required in Form E.O. 3-1.

b. The Labor Commissioner may require the filing of additional reports prior to final payment or prior to any renewal or extension of the contract and during the duration of the contract at such times as the Commissioner may, in his discretion, from time to time deem necessary. The Labor Commissioner may require the filing of additional information or reports, and the contractor, subcontractor, bidder or vendor shall furnish said information or report within the times prescribed by the Labor Commissioner.

c. The Labor Commissioner may, at his discretion, also require timely statistical reports on the number of minority employees employed or to be employed in the performance of the contract, and the Labor Commissioner may de-fine such minority groups or persons.

d. Reports filed pursuant to these Guidelines and Rules in Implementation of Executive Order No. Three are not public records subject to public inspection, but may be inspected only by federal and state officials having jurisdiction and authority to investigate matters of this type. All federal and state agencies empowered by law to investigate matters relating to Executive order No. Three shall have access to these reports for inspection or copying during regular business hours.

e. Any person who willfully, wantonly or through negligence destroys or permits to be destroyed, alters or allows to be altered after filing any reports submitted in compliance herewith shall be subject to penalties as pre-scribed by law.

### SEC. 5. MANDATORY CLAUSES IN DOCUMENTS

a. All contracts shall contain the following provisions verbatim:

This contract is subject in the provisions of Executive Order No. Three of Governor Thomas J. Meskill promulgated June 16, 1971 and, as such, this contract may be canceled, terminated or suspended by the state labor commissioner for violation of or noncompliance with said Executive Order No. Three, or any state or federal law concerning nondiscrimination, notwithstanding that the labor commissioner is not a party to this contract. The parties to this contract, as part of the consideration hereof, agree that said Executive Order No. Three is incorporated herein by reference and made a part hereof. The parties agree to abide by said Executive Order and agree that the state labor commissioner shall have continuing jurisdiction in respect to contract performance in regard to nondiscrimination, until the contract is completed or terminated prior to completion.

The (contractor), (subcontractor), (bidder), (vendor) agrees, as part consideration hereof, that his (order) (contract) is subject to the Guidelines and Rules issued by the state labor commissioner to implement Executive Order No. Three, and that he will not discriminate in his employment practices or policies, will file all reports as required, and will fully cooperate with the State of Connecticut and the state labor commissioner.

These provisions are in addition to and not in lieu of other clauses required by law.\*

- \*N.B. The above paragraphs contain requirements additional to those set forth in July 16, 1971 directive to state agencies.
  - b. Every purchase order or like form submitted by a vendor or bidder, as applicable, shall contain the following clause verbatim:

Vendor agrees, as part of the consideration hereof, that this order is subject to the provisions of Executive Order No. Three and the Guidelines and Rules issued by the Labor Commissioner implementing said Order as to nondiscrimination, and vendor agrees to comply therewith.

Where preprinted contract forms have been prescribed by federal authority and the rules of the federal agency prohibit the alteration thereof, the compliance officer of the State agency concerned shall submit to the Labor Commissioner a suggested short form or addendum acceptable to the federal agency, and such cases, after approval by the Labor Commissioner, said clause may be substituted.

#### SEC. 6. COOPERATION OF STATE AGENCIES, BOARDS AND COMMISSIONS

Every agency, board, commission and departments of the State of Connecticut shall cooperate with the Labor Commissioner in the implantation of Executive Order No. Three and shall furnish such information and assistance as the Labor Commissioner may from time to time request.

#### SEC. 7. INVESTIGATIONS, COMPLAINTS

The Labor Commissioner may initiate an investigation upon receipt of a complaint alleging discrimination. The Labor Commissioner may request that an investigation be conducted by the State agency which is the party to the contract in question. Investigations shall be conducted in accordance with acceptable legal standards, safeguarding the rights of all parties involved, and obtaining all of the relevant facts necessary for a complete determination of the issues. If the Labor Commissioner is not satisfied with the investigation or any part thereof he may order it to continue or to proceed further.

#### SEC. 8. HEARINGS

The Labor Commissioner or officers designed by the heads of the State agencies, boards and commissions may conduct hearings on complaints filed. Hearings shall be held only after a report of the complaint has been filed with the Labor Commissioner and after a hearing on the complaint has been authorized or directed by the Labor Commission-er. Hearings shall

when the Labor Commissioner and after a nearing on the complaint has been authorized or directed by the Labor Commission-er. Hearings s be in accordance with the accepted principles of administrative law. All parties shall be afforded the opportunity to a full, fair, impartial and complete hearing, the opportunity to examine and cross examine witnesses and to be present at all sessions of the hearing. If any party is vulnerable to a charge of a violation of the law, he shall be afforded the opportunity to procure counsel who say be present at the hearing.

### SEC. 9. EQUAL EMPLOYMENT OPPORTUNITIES

All State contracting agencies, employers, and labor unions shall use their best efforts to provide equal employment opportunities to all apprentices and to provide training, employment and upgrading opportunities for disadvantaged workers in accordance with section 31-51 (d) of the General Statutes.

### SEC. 10. DUTIES OF CONTRACTING AGENCIES.

All State contracting agencies shall be responsible for compliance with said Executive Order and with all state and federal laws

relating to equal employment opportunities. All contracting agencies conducting investigations for the Labor Commissioner pursuant to Executive Order No. Three and these Guidelines and Rules shall report to the Labor Commissioner the action taken or recommended with regard to each complaint filed. Each officer of the executive department, every commissioner, and each executive head of each State agency, board and commission in the executive branch of the State government is expected to assume the responsibility of seeing to complete compliance with the Governor's Executive Order No. Three and shall forthwith take steps to assure and guarantee that there shall be no discrimination within their departments, agencies, boards or commissions in the performance of any state contract or subcontract on the basis of race, creed, color, sex, age, national origin or national ancestry, or in any way in violation of any state or federal law relating thereto.

### BY VIRTUE OF THE AUTHORITY VESTED IN ME PURSUANT TO EXECUTIVE ORDER NO. THREE EFFECTIVE JULY 16, 1971, AND THE GENERAL STATUTES OF CONNECTICUT.

Date in Wethersfield, Connecticut this 19th day of Nov., 1971,

Jack Fusari Labor Commissioner This Page Intentionally Left Blank

**EXECUTIVE ORDER NO. SEVENTEEN** 

### STATE OF CONNECTICUT THOMAS J. MESKILL GOVERNOR EXECUTIVE ORDER NO. SEVENTEEN

WHEREAS, Section 31-247 of the General statutes of Connecticut as amended requires the maintaining of the established free services of the Connecticut State Employment Service to both employers and prospective employees and

WHEREAS, Section 31-5 of the General Statutes of Connecticut requires that no compensation or fee shall be charged or received directly or indirectly for the services of the Connecticut State Employment Service and

WHEREAS, large numbers of our citizens who have served in the Armed Forces of our nation are returned to civilian life in our state and seeking employment in civilian occupations and

WHEREAS, we owe a duty as well as gratitude to these returning veterans including the duty to find suitable employment for them and

WHEREAS, many of our handicapped citizens are fully capable of employment and are entitled to be placed in suitable employment and

WHEREAS, many of the citizens of our state who are unemployed are unaware of the job openings and employment opportunities which do in fact exist in our state and

WHEREAS, notwithstanding the free services of the Connecticut State Employment Service, many of our Connecticut employers do not use its free services or do not avail themselves fully of all the services offered.

NOW, THEREFORE, I, Thomas J. Meskill, Governor of the State of Connecticut, acting by virtue of the authority vested in me under the fourth article of the Constitution of the State and in accordance with Section 3-1 of the General Statutes, do hereby ORDER and DIRECT, as follows, by this Executive Order:

The Labor Commissioner shall be responsible for the administration of this Order and shall do all acts necessary and appropriate to achieve its purpose. Upon the promulgation of this Order, the Commissioner of Finance and Control shall issue a directive forthwith to all state agencies that henceforth all state contracts and subcontracts for construction on public buildings, other public works and goods and services shall contain a provision rendering such contract or subcontract subject to this Order, and that such contract or subcontract may be canceled, terminated or suspended by the Labor Commissioner for violation of or noncompliance with this Order, notwithstanding that the Labor Commissioner is not a party to such contract or subcontract.

Every contractor and subcontractor having a contract with the state or any of its agencies, boards, commissions, or departments, every individual partnership, corporation, or business entity having business with the state or who or which seeks to do business in the state, and every bidder or prospective bidder who submits a bid or replies to an invitation

to bid on any state contract shall list all employees openings with the office of the Connecticut State Employment Service in the area where the work is in be performed or where the services are to be rendered.

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All state contracts shall contain a clause which shall be a condition of the contract that the contractor and any subcontractor holding a contract directly under the contractor shall list all employment openings with the Connecticut State Employment Service. The Labor Commissioner may allow exceptions to listings of employment openings which the contractor proposes to fill from within its organization from employees on the rolls of contractor on the date of publication of the invitation to bid or the date on which the public announcement was published or promulgated advising of the program concerned.

Each contracting agency of the state shall be primarily responsible for obtaining compliance with this Executive Order. Each contracting agency shall appoint or designate from amount its personnel one or more persons who shall be responsible for compliance with the objectives of this Order

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The Labor Commissioner shall be an is hereby empowered to inspect the books, records, payroll and personnel data of each individual or business entity subject to this Executive Order and may hold hearings or conference, formal or informal, in pursuance of the duties and responsibilities hereunto delegated to the Labor Commissioner.

VI

VII

The Labor Commissioner or any agency officer or employee in the executive branch designated by regulation of the Labor Commissioner may hold such hearings, public or private, as the Labor Commissioner may deem advisable for compliance, enforcement or educational purposes under this Order.

(a) The Labor Commissioner may hold or cause to be held hearings, prior to imposing, ordering, or recommending the imposition of penalties and sanctions under this Order. In accordance herewith, the Commissioner or the appropriate contracting agency may suspend, cancel, terminate, or cause to be suspended, canceled, or terminated in accordance with law any contract or any portion or portions thereof for failure of the contractor or subcontractor to comply with the listing provisions of the contract. Contracts may be canceled, terminated, suspended absolutely or their continuance conditioned upon a program for future compliance approved by the contracting

(b) Any contracting agency taking any action authorized by this Order, whether on its own motion or as directed by the Labor Commissioner, shall promptly notify him of such action. Whenever the Labor Commissioner makes a determination under this Order, he shall promptly notify the appropriate contracting agency of the action recommended. The agency shall report the results to the Labor Commissioner promptly.

VIII

If the Labor Commissioner shall so direct, contracting agencies shall not enter into contracts with any bidder or prospective contractor unless he has satisfactorily complied with the provisions of this Order.

This Order shall become effective sixty days after the date of this Order.

Dated at Hartford, Connecticut, this 15th day of February, 1973.

agency.

Governor

APPENDIX A - 12

EXECUTIVE ORDER NO. SIXTEEN

### STATE OF CONNECTICUT BY HIS EXCELLENCY JOHN G. ROWLAND GOVERNOR EXECUTIVE ORDER NO. SIXTEEN

WHEREAS, the State of Connecticut recognizes that workplace violence is a growing problem that must be addressed; and

WHEREAS, the State is committed to providing its employees a reasonably safe and healthy working environment, free from intimidation, harassment, threats, and/or violent acts; and

WHEREAS, violence or the threat of violence by or against any employee of the State of Connecticut or member of the public in the workplace is unacceptable and will subject the perpetrator to serious disciplinary action up to and including discharge and criminal penalties.

NOW, THEREFORE, I, John G. Rowland, Governor of the State of Connecticut, acting by virtue of the authority vested in me by the Constitution and by the statutes of this state, do hereby ORDER and DIRECT:

That all state agency personnel, contractors, subcontractors, and vendors comply with the following Violence in the Workplace Prevention Policy:

The State of Connecticut adopts a statewide zero tolerance policy for workplace violence.

Therefore, except as may be required as a condition of employment <sup>3</sup>/<sub>4</sub> No employee shall bring into any state worksite any weapon or dangerous instrument as defined herein. No employee shall use, attempt to use, or threaten to use any such weapon or dangerous instrument in a state worksite. No employee shall cause or threaten to cause death or physical injury to any individual in a state worksite.

Weapon means any firearm, including a BB gun, whether loaded or unloaded, any knife (excluding a small pen or pocket knife), including a switchblade or other knife having an automatic spring release device, a stiletto, and police baton or nightstick or any martial arts weapon or electronic defense weapon.

Dangerous instrument means any instrument, article, or substance that, under the circumstances, is capable of causing death or serious physical injury.

Violation of the above reasonable work rules shall subject the employee to disciplinary action up to and including discharge.

That each agency must prominently post this policy and that all managers and supervisors must clearly communicate this policy to all state employees.

That all manager and supervisors are expected to enforce this policy fairly and uniformly.

That any employee who feels subjected to or witnesses violent, threatening, harassing, or intimidating behavior in the workplace immediately report the incident or statement to their supervisor, manager, or human resources office.

That any employee who believes that there is a serious threat to their safety or the safety of others that requires immediate attention notifies proper law enforcement authorities and his or her manager or supervisor.

That any manager or supervisor receiving such a report shall immediately contact their human resources office to evaluate, investigate and take appropriate action.

That all parties must cooperate fully when questioned regarding violations of this policy.

That all parties be advised that any weapon or dangerous instrument at the worksite will be confiscated and that there is no reasonable expectation of privacy with respect to such items in the workplace.

That this order applies to all state employees in the executive branch.

That each agency will monitor the effective implementation of this policy.

That this order shall take effect immediately.

Dated in Hartford, Connecticut, this fourth day of August, 1999.

/s/John G. Rowland, Governor

# United States Department of Labor

Office of Federal Contract Compliance Programs

# **Executive Order 11246, As Amended**

# **Executive Order 11246 — Equal Employment Opportunity**

SOURCE: The provisions of Executive Order 11246 of Sept. 24, 1965, appear at 30 FR 12319, 12935, 3 CFR, 1964–1965 Comp., p.339, unless otherwise noted.

Under and by virtue of the authority vested in me as President of the United States by the Constitution and statutes of the United States, it is ordered as follows:

# **Part I** — **Nondiscrimination in Government Employment**

[Part I superseded by EO 11478 of Aug. 8, 1969, 34 FR 12985, 3 CFR, 1966–1970 Comp., p. 803]

# Part II - Nondiscrimination in Employment by Government Contractors and Subcontractors

### Subpart A – Duties of the Secretary of Labor

### SEC. 201

The Secretary of Labor shall be responsible for the administration and enforcement of Parts II and III of this Order. The Secretary shall adopt such rules and regulations and issue such orders as are deemed necessary and appropriate to achieve the purposes of Parts II and III of this Order.

[Sec. 201 amended by EO 12086 of Oct. 5, 1978, 43 FR 46501, 3 CFR, I978 Comp., p. 230]

### Subpart B – Contractors' Agreements

### SEC. 202

Except in contracts exempted in accordance with Section 204 of this Order, all Government contracting agencies shall include in every Government contract hereafter entered into the following provisions:

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

- 1. The contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, gender identity, or national origin. The contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, 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 officer setting forth the provisions of this nondiscrimination clause.
- 2. The contractor will, in all solicitations or advancements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, or national origin.

- 3. The contractor will not discharge or in any other manner discriminate against any employee or applicant for employment because such employee or applicant has inquired about, discussed, or disclosed the compensation of the employee or applicant or another employee or applicant. This provision shall not apply to instances in which an employee who has access to the compensation information of other employees or applicants as a part of such employee's essential job functions discloses the compensation of such other employees or applicants to individuals who do not otherwise have access to such information, unless such disclosure is in response to a formal complaint or charge, in furtherance of an investigation, proceeding, hearing, or action, including an investigation conducted by the employer, or is consistent with the contractor's legal duty to furnish information.
- 4. The contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice, to be provided by the agency contracting officer, advising the labor union or workers' representative of the contractor's commitments under Section 202 of Executive Order No. 11246 of September 24, 1965, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
- 5. The contractor will comply with all provisions of Executive Order No. 11246 of Sept. 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.
- 6. The contractor will furnish all information and reports required by Executive Order No. 11246 of September 24, 1965, and by the rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the contracting agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.
- 7. In the event of the contractor's noncompliance with the nondiscrimination clauses of this contract or with any of such rules, regulations, or orders, this contract may be cancelled, terminated, or suspended in whole or in part and the contractor may be declared ineligible for further Government contracts in accordance with procedures authorized in Executive Order No. 11246 of Sept. 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order No. 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.
- 8. The contractor will include the provisions of paragraphs (1) through (8) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order No. 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The contractor will take such action with respect to any subcontract or purchase order as may be directed by the Secretary of Labor as a means of enforcing such provisions including sanctions for noncompliance: Provided, however, that in the event the contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction, the contractor may request the United States to enter into such litigation to protect the interests of the United States. [Sec. 202 amended by EO 11375 of Oct. 13, 1967, 32 FR 14303, 3 CFR, 1966–1970 Comp., p. 684, EO 12086 of Oct. 5, 1978, 43 FR 46501, 3 CFR, 1978 Comp., p. 230, EO 13665 of April 8, 2014, 79 FR 20749, EO 13672 of July 21, 2014, 79 FR 42971]

### SEC. 203

- a. Each contractor having a contract containing the provisions prescribed in Section 202 shall file, and shall cause each of his subcontractors to file, Compliance Reports with the contracting agency or the Secretary of Labor as may be directed. Compliance Reports shall be filed within such times and shall contain such information as to the practices, policies, programs, and employment policies, programs, and employment statistics of the contractor and each subcontractor, and shall be in such form, as the Secretary of Labor may prescribe.
- b. Bidders or prospective contractors or subcontractors may be required to state whether they have participated in any previous contract subject to the provisions of this Order, or any preceding similar Executive order, and in that event to submit, on behalf of themselves and their proposed subcontractors, Compliance Reports prior to or as an initial part of their bid or negotiation of a contract.

- c. Whenever the contractor or subcontractor has a collective bargaining agreement or other contract or understanding with a labor union or an agency referring workers or providing or supervising apprenticeship or training for such workers, the Compliance Report shall include such information as to such labor union's or agency's practices and policies affecting compliance as the Secretary of Labor may prescribe: Provided, that to the extent such information is within the exclusive possession of a labor union or an agency referring workers or providing or supervising apprenticeship or training and such labor union or agency shall refuse to furnish such information to the contractor, the contractor shall so certify to the Secretary of Labor as part of its Compliance Report and shall set forth what efforts he has made to obtain such information.
- d. The Secretary of Labor may direct that any bidder or prospective contractor or subcontractor shall submit, as part of his Compliance Report, a statement in writing, signed by an authorized officer or agent on behalf of any labor union or any agency referring workers or providing or supervising apprenticeship or other training, with which the bidder or prospective contractor deals, with supporting information, to the effect that the signer's practices and policies do not discriminate on the grounds of race, color, religion, sex, sexual orientation, gender identity, or national origin, and that the signer either will affirmatively cooperate in the implementation of the policy and provisions of this Order or that it consents and agrees that recruitment, employment, and the terms and conditions of employment under the proposed contract shall be in accordance with the purposes and provisions of the order. In the event that the union, or the agency shall refuse to execute such a statement and such additional factual material as the Secretary of Labor may require.

[Sec. 203 amended by EO 11375 of Oct. 13, 1967, 32 FR 14303, 3 CFR, 1966–1970 Comp., p. 684; EO 12086 of Oct. 5, 1978, 43 FR 46501, 3 CFR, 1978 Comp., p. 230, EO 13672 of July 21, 2104, 79 FR 42971]

### SEC. 204

- a. The Secretary of Labor may, when the Secretary deems that special circumstances in the national interest so require, exempt a contracting agency from the requirement of including any or all of the provisions of Section 202 of this **Order** in any specific contract, subcontract, or purchase **order**.
- b. The Secretary of Labor may, by rule or regulation, exempt certain classes of contracts, subcontracts, or purchase orders (1) whenever work is to be or has been performed outside the United States and no recruitment of workers within the limits of the United States is involved; (2) for standard commercial supplies or raw materials; (3) involving less than specified amounts of money or specified numbers of workers; or (4) to the extent that they involve subcontracts below a specified tier.
- c. Section 202 of this **Order** shall not apply to a Government contractor or subcontractor that is a religious corporation, association, educational institution, or society, with respect to the employment of individuals of a particular religion to perform work connected with the carrying on by such corporation, association, educational institution, or society of its activities. Such contractors and subcontractors are not exempted or excused from complying with the other requirements contained in this **Order**.
- d. The Secretary of Labor may also provide, by rule, regulation, or order, for the exemption of facilities of a contractor that are in all respects separate and distinct from activities of the contractor related to the performance of the contract: provided, that such an exemption will not interfere with or impede the effectuation of the purposes of this **Order**: and provided further, that in the absence of such an exemption all facilities shall be covered by the provisions of this **Order**.

[Sec. 204 amended by EO 13279 of Dec. 16, 2002, 67 FR 77141, 3 CFR, 2002 Comp., p. 77141 - 77144]

# Subpart C – Powers and Duties of the Secretary of Labor and the Contracting Agencies SEC. 205

The Secretary of Labor shall be responsible for securing compliance by all Government contractors and subcontractors with this Order and any implementing rules or regulations. All contracting agencies shall comply with the terms of this Order and any implementing rules, regulations, or orders of the Secretary of Labor. Contracting agencies shall cooperate with the Secretary of Labor and shall furnish such information and assistance as the Secretary may require.

[Sec. 205 amended by EO 12086 of Oct. 5, 1978, 43 FR 46501, 3 CFR, 1978 Comp., p. 230]

### SEC. 206

- a. The Secretary of Labor may investigate the employment practices of any Government contractor or subcontractor to determine whether or not the contractual provisions specified in Section 202 of this Order have been violated. Such investigation shall be conducted in accordance with the procedures established by the Secretary of Labor.
- b. The Secretary of Labor may receive and investigate complaints by employees or prospective employees of a Government contractor or subcontractor which allege discrimination contrary to the contractual provisions specified in Section 202 of this Order.

[Sec. 206 amended by EO 12086 of Oct. 5, 1978, 43 FR 46501, 3 CFR, 1978 Comp., p. 230]

### SEC. 207

The Secretary of Labor shall use his/her best efforts, directly and through interested Federal, State, and local agencies, contractors, and all other available instrumentalities to cause any labor union engaged in work under Government contracts or any agency referring workers or providing or supervising apprenticeship or training for or in the course of such work to cooperate in the implementation of the purposes of this Order. The Secretary of Labor shall, in appropriate cases, notify the Equal Employment Opportunity Commission, the Department of Justice, or other appropriate Federal agencies whenever it has reason to believe that the practices of any such labor organization or agency violate Title VI or Title VII of the Civil Rights Act of 1964 or other provision of Federal law.

[Sec. 207 amended by EO 12086 of Oct. 5, 1978, 43 FR 46501, 3 CFR, 1978 Comp., p. 230]

### **SEC. 208**

- a. The Secretary of Labor, or any agency, officer, or employee in the executive branch of the Government designated by rule, regulation, or order of the Secretary, may hold such hearings, public or private, as the Secretary may deem advisable for compliance, enforcement, or educational purposes.
- b. The Secretary of Labor may hold, or cause to be held, hearings in accordance with Subsection of this Section prior to imposing, ordering, or recommending the imposition of penalties and sanctions under this Order. No order for debarment of any contractor from further Government contracts under Section 209(6) shall be made without affording the contractor an opportunity for a hearing.

### Subpart D – Sanctions and Penalties

### SEC. 209

In accordance with such rules, regulations, or orders as the Secretary of Labor may issue or adopt, the Secretary may:

- 1. Publish, or cause to be published, the names of contractors or unions which it has concluded have complied or have failed to comply with the provisions of this Order or of the rules, regulations, and orders of the Secretary of Labor.
- 2. Recommend to the Department of Justice that, in cases in which there is substantial or material violation or the threat of substantial or material violation of the contractual provisions set forth in Section 202 of this Order, appropriate proceedings be brought to enforce those provisions, including the enjoining, within the limitations of applicable law, of organizations, individuals, or groups who prevent directly or indirectly, or seek to prevent directly or indirectly, compliance with the provisions of this Order.

- 3. Recommend to the Equal Employment Opportunity Commission or the Department of Justice that appropriate proceedings be instituted under Title VII of the Civil Rights Act of 1964.
- 4. Recommend to the Department of Justice that criminal proceedings be brought for the furnishing of false information to any contracting agency or to the Secretary of Labor as the case may be.
- 5. After consulting with the contracting agency, direct the contracting agency to cancel, terminate, suspend, or cause to be cancelled, terminated, or suspended, any contract, or any portion or portions thereof, for failure of the contractor or subcontractor to comply with equal employment opportunity provisions of the contract. Contracts may be cancelled, terminated, or suspended absolutely or continuance of contracts may be conditioned upon a program for future compliance approved by the Secretary of Labor.
- 6. Provide that any contracting agency shall refrain from entering into further contracts, or extensions or other modifications of existing contracts, with any noncomplying contractor, until such contractor has satisfied the Secretary of Labor that such contractor has established and will carry out personnel and employment policies in compliance with the provisions of this Order.

(b) Pursuant to rules and regulations prescribed by the Secretary of Labor, the Secretary shall make reasonable efforts, within a reasonable time limitation, to secure compliance with the contract provisions of this Order by methods of conference, conciliation, mediation, and persuasion before proceedings shall be instituted under subsection (a)(2) of this Section, or before a contract shall be cancelled or terminated in whole or in part under subsection (a)(5) of this Section.

[Sec. 209 amended by EO 12086 of Oct. 5, 1978, 43 FR 46501, 3 CFR, 1978 Comp., p. 230]

### SEC. 210

Whenever the Secretary of Labor makes a determination under Section 209, the Secretary shall promptly notify the appropriate agency. The agency shall take the action directed by the Secretary and shall report the results of the action it has taken to the Secretary of Labor within such time as the Secretary shall specify. If the contracting agency fails to take the action directed within thirty days, the Secretary may take the action directly.

[Sec. 210 amended by EO 12086 of Oct. 5, 1978, 43 FR 46501, 3 CFR, 1978 Comp., p 230]

### SEC. 211

If the Secretary shall so direct, contracting agencies shall not enter into contracts with any bidder or prospective contractor unless the bidder or prospective contractor has satisfactorily complied with the provisions of this Order or submits a program for compliance acceptable to the Secretary of Labor.

[Sec. 211 amended by EO 12086 of Oct. 5, 1978, 43 FR 46501, 3 CFR, 1978 Comp., p. 230]

### SEC. 212

When a contract has been cancelled or terminated under Section 209(a)(5) or a contractor has been debarred from further Government contracts under Section 209(a)(6) of this Order, because of noncompliance with the contract provisions specified in Section 202 of this Order, the Secretary of Labor shall promptly notify the Comptroller General of the United States.

[Sec. 212 amended by EO 12086 of Oct. 5, 1978, 43 FR 46501, 3 CFR, 1978 Comp., p. 230]

### Subpart E – Certificates of Merit

### SEC. 213

The Secretary of Labor may provide for issuance of a United States Government Certificate of Merit to employers or labor unions, or other agencies which are or may hereafter be engaged in work under Government contracts, if the Secretary is satisfied that the personnel and employment practices of the employer, or that the personnel, training, apprenticeship, membership, grievance and representation, upgrading, and other practices and policies of the labor union or other agency conform to the purposes and provisions of this Order.

### SEC. 214

Any Certificate of Merit may at any time be suspended or revoked by the Secretary of Labor if the holder thereof, in the judgment of the Secretary, has failed to comply with the provisions of this Order.

### SEC. 215

The Secretary of Labor may provide for the exemption of any employer, labor union, or other agency from any reporting requirements imposed under or pursuant to this Order if such employer, labor union, or other agency has been awarded a Certificate of Merit which has not been suspended or revoked.

# Part III – Nondiscrimination Provisions in Federally Assisted Construction Contracts

## SEC. 301

Each executive department and agency, which administers a program involving Federal financial assistance shall require as a condition for the approval of any grant, contract, loan, insurance, or guarantee thereunder, which may involve a construction contract, that the applicant for Federal assistance undertake and agree to incorporate, or cause to be incorporated, into all construction contracts paid for in whole or in part with funds obtained from the Federal Government or borrowed on the credit of the Federal Government pursuant to such grant, contract, loan, insurance, or guarantee, or undertaken pursuant to any Federal program involving such grant, contract, loan, insurance, or guarantee, the provisions prescribed for Government contracts by Section 202 of this Order or such modification thereof, preserving in substance the contractor's obligations thereunder, as may be approved by the Secretary of Labor, together with such additional provisions as the Secretary deems appropriate to establish and protect the interest of the United States in the enforcement of those obligations. Each such applicant shall also undertake and agree (1) to assist and cooperate actively with the Secretary of Labor in obtaining the compliance of contractors and subcontractors with those contract provisions and with the rules, regulations and relevant orders of the Secretary, (2) to obtain and to furnish to the Secretary of Labor such information as the Secretary may require for the supervision of such compliance, (3) to carry out sanctions and penalties for violation of such obligations imposed upon contractors and subcontractors by the Secretary of Labor pursuant to Part II, Subpart D, of this Order, and (4) to refrain from entering into any contract subject to this Order, or extension or other modification of such a contract with a contractor debarred from Government contracts under Part II, Subpart D, of this Order.

[Sec. 301 amended by EO 12086 of Oct. 5, 1978, 43 FR 46501, 3 CFR, 1978 Comp., p. 230]

# SEC. 302

- a. "Construction contract" as used in this Order means any contract for the construction, rehabilitation, alteration, conversion, extension, or repair of buildings, highways, or other improvements to real property.
- b. The provisions of Part II of this Order shall apply to such construction contracts, and for purposes of such application the administering department or agency shall be considered the contracting agency referred to therein.
- c. The term "applicant" as used in this Order means an applicant for Federal assistance or, as determined by agency regulation, other program participant, with respect to whom an application for any grant, contract, loan, insurance, or guarantee is not finally acted upon prior to the effective date of this Part, and it includes such an applicant after he/she becomes a recipient of such Federal assistance.

## **SEC. 303**

a. The Secretary of Labor shall be responsible for obtaining the compliance of such applicants with their undertakings under this Order. Each administering department and agency is directed to cooperate with the Secretary of Labor and to furnish the Secretary such information and assistance as the Secretary may require in the performance of the Secretary's functions under this Order.

- b. In the event an applicant fails and refuses to comply with the applicant's undertakings pursuant to this Order, the Secretary of Labor may, after consulting with the administering department or agency, take any or all of the following actions: (1) direct any administering department or agency to cancel, terminate, or suspend in whole or in part the agreement, contract or other arrangement with such applicant with respect to which the failure or refusal occurred; (2) direct any administering department or agency to refrain from extending any further assistance to the applicant under the program with respect to which the failure or refusal occurred until satisfactory assurance of future compliance has been received by the Secretary of Labor from such applicant; and (3) refer the case to the Department of Justice or the Equal Employment Opportunity Commission for appropriate law enforcement or other proceedings.
- c. In no case shall action be taken with respect to an applicant pursuant to clause (1) or (2) of subsection (b) without notice and opportunity for hearing.

[Sec. 303 amended by EO 12086 of Oct. 5, 1978, 43 FR 46501, 3 CFR, 1978 Comp., p. 230]

# SEC. 304

Any executive department or agency which imposes by rule, regulation, or order requirements of nondiscrimination in employment, other than requirements imposed pursuant to this Order, may delegate to the Secretary of Labor by agreement such responsibilities with respect to compliance standards, reports, and procedures as would tend to bring the administration of such requirements into conformity with the administration of requirements imposed under this Order: Provided, That actions to effect compliance by recipients of Federal financial assistance with requirements imposed pursuant to Title VI of the Civil Rights Act of 1964 shall be taken in conformity with the procedures and limitations prescribed in Section 602 thereof and the regulations of the administering department or agency issued thereunder.

# Part IV – Miscellaneous

# SEC. 401

The Secretary of Labor may delegate to any officer, agency, or employee in the Executive branch of the Government, any function or duty of the Secretary under Parts II and III of this Order.

[Sec. 401 amended by EO 12086 of Oct. 5, I978, 43 FR 46501, 3 CFR, 1978 Comp., p. 230]

# SEC. 402

The Secretary of Labor shall provide administrative support for the execution of the program known as the "Plans for Progress."

# **SEC. 403**

- a. Executive Orders Nos. 10590 (January 19, 1955), 10722 (August 5, 1957), 10925 (March 6, 1961), 11114 (June 22, 1963), and 11162 (July 28, 1964), are hereby superseded and the President's Committee on Equal Employment Opportunity established by Executive Order No. 10925 is hereby abolished. All records and property in the custody of the Committee shall be transferred to the Office of Personnel Management and the Secretary of Labor, as appropriate.
- b. Nothing in this Order shall be deemed to relieve any person of any obligation assumed or imposed under or pursuant to any Executive Order superseded by this Order. All rules, regulations, orders, instructions, designations, and other directives issued by the President's Committee on Equal Employment Opportunity and those issued by the heads of various departments or agencies under or pursuant to any of the Executive orders superseded by this Order, shall, to the extent that they are not inconsistent with this Order, remain in full force and effect unless and until revoked or superseded by appropriate authority. References in such directives to provisions of the superseded orders shall be deemed to be references to the comparable provisions of this Order.

# SEC. 404

The General Services Administration shall take appropriate action to revise the standard Government contract forms to accord with the provisions of this Order and of the rules and regulations of the Secretary of Labor.

# SEC. 405

This Order shall become effective thirty days after the date of this Order.



# **Executive Orders**

## **Executive Order 12549--Debarment and suspension**

**Source:** The provisions of Executive Order 12549 of Feb. 18, 1986, appear at 51 FR 6370, 3 CFR, 1986 Comp., p. 189, unless otherwise noted.

By the authority vested in me as President by the Constitution and laws of the United States of America, and in order to curb fraud, waste, and abuse in Federal programs, increase agency accountability, and ensure consistency among agency regulations concerning debarment and suspension of participants in Federal programs, it is hereby ordered that:

**Section 1.** (a) To the extent permitted by law and subject to the limitations in Section 1(c), Executive departments and agencies shall participate in a system for debarment and suspension from programs and activities involving Federal financial and nonfinancial assistance and benefits. Debarment or suspension of a participant in a program by one agency shall have government-wide effect.

(b) Activities covered by this Order include but are not limited to: grants, cooperative agreements, contracts of assistance, loans, and loan guarantees.

(c) This Order does not cover procurement programs and activities, direct Federal statutory entitlements or mandatory awards, direct awards to foreign governments or public international organizations, benefits to an individual as a personal entitlement, or Federal employment.

**Sec. 2.** To the extent permitted by law, Executive departments and agencies shall: (a) Follow government-wide criteria and government-wide minimum due process procedures when they act to debar or suspend participants in affected programs.

(b) Send to the agency designated pursuant to Section 5 identifying information concerning debarred and suspended participants in affected programs, participants who have agreed to exclusion from participation, and participants declared ineligible under applicable law, including Executive Orders. This information shall be included in the list to be maintained pursuant to Section 5.

(c) Not allow a party to participate in any affected program if any Executive department or agency has debarred, suspended, or otherwise excluded (to the extent specified in the exclusion agreement) that party from participation in an affected program. An agency may grant an exception permitting a debarred, suspended, or excluded party to participate in a particular transaction upon a written determination by the agency head or authorized designee stating the reason(s) for deviating from this Presidential policy. However, I intend that exceptions to this policy should be granted only infrequently.

**Sec. 3.** Executive departments and agencies shall issue regulations governing their implementation of this Order that shall be consistent with the guidelines issued under Section 6. Proposed regulations shall be submitted to the Office of Management and Budget for review within four months of the date of the guidelines issued under Section 6. The Director of the Office of Management and Budget may return for reconsideration proposed regulations that the Director believes are inconsistent with the guidelines. Final regulations shall be published within twelve months of the date of the guidelines.

**Sec. 4.** There is hereby constituted the Interagency Committee on Debarment and Suspension, which shall monitor implementation of this Order. The Committee shall consist of representatives of agencies designated by the Director of the Office of Management and Budget.

**Sec. 5.** The Director of the Office of Management and Budget shall designate a Federal agency to perform the following functions: maintain a current list of all individuals and organizations excluded from program participation under this Order, periodically distribute the list to Federal agencies, and study the feasibility of automating the list; coordinate with the lead agency responsible for government-wide debarment and suspension of contractors; chair the Interagency Committee established by Section 4; and report periodically to the Director on implementation of this Order, with the first report due within two years of the date of the Order.

**Sec. 6.** The Director of the Office of Management and Budget is authorized to issue guidelines to Executive departments and agencies that govern which programs and activities are covered by this Order, prescribe government-wide criteria and government-wide minimum due process procedures, and set forth other related details for the effective administration of the guidelines.

**Sec. 7.** The Director of the Office of Management and Budget shall report to the President within three years of the date of this Order on Federal agency compliance with the Order, including the number of exceptions made under Section 2(c), and shall make recommendations as are appropriate further to curb fraud, waste, and abuse.

The U.S. National Archives and Records Administration 1-86-NARA-NARA or 1-866-272-6272

# Sec. 31-53a. Distribution of accrued payments. Debarment list. Limitation on awarding contracts. Sworn affidavits required of subcontractors. Civil penalty. Right of action.

(a) The State Comptroller or the contracting authority acting pursuant to section 31-53 is hereby authorized and directed to pay to mechanics, laborers and workers from any accrued payments withheld under the terms of a contract terminated pursuant to subsection (b) of said section 31-53 any wages found to be due such mechanics, laborers and workers pursuant to said section 31-53. The Labor Commissioner is further authorized and directed to distribute a list to all departments of the state and political subdivisions of the state giving the names of persons or firms whom the Labor Commissioner has found to have disregarded their obligations under said section 31-53 and section 31-76c to employees and subcontractors on public works projects or to have been barred from federal government contracts in accordance with the provisions of the Davis-Bacon Act, 49 Stat. 1011 (1931), 40 USC 276a-2.

(b) (1) No contract shall be awarded by the state or any of its political subdivisions to the persons or firms appearing on the list distributed by the Labor Commissioner pursuant to subsection (a) of this section or to any firm, corporation, partnership, or association in which such persons or firms have an interest until a period of up to three years, as determined by the Labor Commissioner, has elapsed from the date of publication of the list containing the names of such persons or firms.

(2) No general contractor that enters into a contract with the state or any of its agents, or with any political subdivision of the state or any of its agents, for the construction, remodeling, refinishing, refurbishing, rehabilitation, alteration or repair of any public works project subject to the provisions of section 31-53 or for any state highway project that falls under the provisions of section 31-54, shall award any work under such contract to the persons or firms appearing on the list distributed by the Labor Commissioner pursuant to subsection (a) of this section or to any firm, corporation, partnership or association in which such persons or firms have an interest until a period of up to three years, as determined by the Labor Commissioner, has elapsed from the date of publication of the list containing the names of such persons or firms.

(3) Prior to performing any work under a contract for the construction, remodeling, refinishing, refurbishing, rehabilitation, alteration or repair of any public works project subject to the provisions of section 31-53 or for any state highway project that falls under the provisions of section 31-54, each person, firm, corporation, partnership or association engaged by a general contractor to perform such work shall submit a sworn affidavit to the general contractor attesting that such person, firm, corporation, partnership or association does not hold an interest of ten per cent or greater in a firm appearing on the list distributed by the Labor Commissioner pursuant to subsection (a) of this section. The receipt and retention by a general contractor of such sworn affidavit shall fulfill the general contractor's obligation under subdivision (2) of this subsection.

(4) Any person or firm that appears on the list distributed by the Labor Commissioner pursuant to subsection (a) of this section, for a period of up to three years from the date

of publication of such list, shall be liable to the Labor Department for a civil penalty of one thousand dollars for each day or part of a day in which such person or firm performs any work under any contract with the state or any of its agents, or with any political subdivision of the state or any of its agents, for the construction, remodeling, refinishing, refurbishing, rehabilitation, alteration or repair of any public works project subject to the provisions of section 31-53 or any state highway project that falls under the provisions of section 31-54. The Attorney General, upon complaint of the Labor Commissioner, shall institute a civil action to recover such civil penalty. Any amount recovered shall be deposited in the General Fund and credited to a separate nonlapsing appropriation to the Labor Department, for other current expenses, and may be used by the Labor Department to enforce the provisions of this part. As used in this subdivision, "person or firm" includes any firm, corporation, partnership or association in which a person or firm appearing on the list distributed by the Labor Commissioner pursuant to subsection (a) of this section holds an interest of ten per cent or greater.

(c) If the accrued payments withheld under the terms of a contract terminated pursuant to subsection (b) of section 31-53 are insufficient to reimburse all the mechanics, laborers and workers with respect to whom there has been a failure to pay the wages required pursuant to said section 31-53, such mechanics, laborers and workers shall have the right of action and of intervention against the contractor and the contractor's sureties conferred by law upon persons furnishing labor or materials, and in such proceedings it shall be no defense that such mechanics, laborers and workers accepted or agreed to accept less than the required wages or that such persons voluntarily made refunds.

# (P.A. 73-566, S. 2; P.A. 78-362, S. 1, 3; P.A. 91-74, S. 2; 91-407, S. 40, 42; P.A. 93-392, S. 2; P.A. 97-263, S. 15; P.A. 04-102, S. 1.)

History: P.A. 78-362 required that list distributed by commissioner to departments of the state and to its political subdivisions contain names of those who have been barred from federal government contracts in accordance with provisions of Davis-Bacon Act in Subsec. (a); P.A. 91-74 amended Subsec. (a) by increasing the period of ineligibility from three years to five years; P.A. 91-407 changed effective date of P.A. 91-74 from October 1, 1991, to July 1, 1991; P.A. 93-392 amended Subsec. (a) to add reference to Sec. 31-76c, to require that list distributed by labor commissioner to departments of the state and to its political subdivisions contain names of those who have violated overtime laws of the state on public works projects and to decrease the period of ineligibility from five to a maximum of three years, as determined by the commissioner; P.A. 97-263 incorporated changes to Sec. 31-53 by reference; P.A. 04-102 made technical changes in Subsec. (a), designated portion of said Subsec. as new Subsec. (b) and amended same by designating existing provisions as Subdiv. (1), providing that list referred to in said Subdiv. is debarment list distributed by the Labor Commissioner pursuant to Subsec. (a), and adding Subdivs. (2), (3) and (4) re general contractors' and subcontractors' obligations and potential liability for civil penalties relative to service on public works or state highway projects, and redesignated existing Subsec. (b) as Subsec. (c), making technical changes therein.
## **CONNECTICUT GENERAL STATUTES SECTION 31-53b**

# Worker training requirements for public works projects. Enforcement. Regulations. Exceptions.

(a) Each contract for a public works project entered into on or after July 1, 2009, by the state or any of its agents, or by any political subdivision of the state or any of its agents, described in subsection (h) of section 31-53, shall contain a provision requiring that each contractor furnish proof with the weekly certified payroll form for the first week each employee begins work on such project that any person performing the work of a mechanic, laborer or worker pursuant to the classifications of labor under section 31-53 on such public works project, pursuant to such contract, has completed a course of at least ten hours in duration in construction safety and health approved by the federal Occupational Safety and Health Administration or, has completed a new miner training program approved by the Federal Mine Safety and Health Administration in accordance with 30 CFR 46 or, in the case of telecommunications employees, has completed at least ten hours of training in accordance with 29 CFR 1910.268, and, on or after July 1, 2012, that any plumber or electrician subject to the continuing education requirements of section 20-334d, who has completed a course of at least ten hours in duration in construction safety and health approved by the federal Occupational Safety and Health Administration five or more years prior to the date such electrician or plumber begins work on such public works project, has completed a supplemental refresher training course of at least four hours in duration in construction safety and health taught by a federal Occupational Safety and Health Administration authorized trainer.

(b) Any person required to complete a course or program under subsection (a) of this section who has not completed the course or program shall be subject to removal from the worksite if the person does not provide documentation of having completed such course or program by the fifteenth day after the date the person is found to be in noncompliance. The Labor Commissioner or said commissioner's designee shall enforce this section.

(c) Not later than January 1, 2012, the Labor Commissioner shall adopt regulations, in accordance with the provisions of chapter 54, to implement the provisions of subsections (a) and (b) of this section. Such regulations shall require that the ten-hour construction safety and health courses required under subsection (a) of this section be conducted in accordance with federal Occupational Safety and Health Administration Training Institute standards, or, in the case of a supplemental refresher training course, shall include, but not be limited to, an update of revised Occupational Safety and Health Administration standards and a review of required construction hazards training, or in accordance with Federal Mine Safety and Health Administration Standards or in accordance with 29 CFR 1910.268, as appropriate. The Labor Commissioner shall accept as sufficient proof of compliance with the provisions of subsection (a) or (b) of this section a student course completion card issued by the federal Occupational Safety and Health Administration Training Institute, or such other proof of compliance said commissioner deems appropriate, dated no earlier than five years before the commencement date of such public works project or, in the case of supplemental refresher training, a student course completion card issued by said Occupational Safety and Health Administration authorized trainer dated not earlier than five years prior to the date such electrician or plumber begins work on such public works project.

(d) This section shall not apply to employees of public service companies, as defined in section 16-1, or drivers of commercial motor vehicles driving the vehicle on the public works project and delivering or picking up cargo from public works projects provided they perform no labor relating to the project other than the loading and unloading of their cargo.

### **CONNECTICUT GENERAL STATUTES**

SECTION 4a-60, (Formerly Sec. 4-114a). Nondiscrimination and affirmative action provisions in awarding agency, municipal public works and quasi-public agency project contracts. (a) Except as provided in section 10a-151i, every contract to which an awarding agency is a party, every quasi-public agency project contract and every municipal public works contract shall contain the following provisions:

(1) The contractor agrees and warrants that in the performance of the contract such contractor will not discriminate or permit discrimination against any person or group of persons on the grounds of race, color, religious creed, age, marital status, national origin, ancestry, sex, gender identity or expression, status as a veteran, intellectual disability, mental disability or physical disability, including, but not limited to, blindness, unless it is shown by such contractor that such disability prevents performance of the work involved, in any manner prohibited by the laws of the United States or of the state of Connecticut; and the contractor further agrees to take affirmative action to ensure that applicants with job-related qualifications are employed and that employees are treated when employed without regard to their race, color, religious creed, age, marital status, national origin, ancestry, sex, gender identity or expression, status as a veteran, intellectual disability, mental disability or physical disability, including, but not limited to, blindness, unless it is shown by such contractor that such disability or expression, status as a veteran, intellectual disability, mental disability or physical disability, including, but not limited to, blindness, unless it is shown by such contractor that such disability prevents performance of the work involved;

(2) The contractor agrees, in all solicitations or advertisements for employees placed by or on behalf of the contractor, to state that it is an "affirmative action-equal opportunity employer" in accordance with regulations adopted by the Commission on Human Rights and Opportunities;

(3) The contractor agrees to provide each labor union or representative of workers with which such contractor has a collective bargaining agreement or other contract or understanding and each vendor with which such contractor has a contract or understanding, a notice to be provided by the Commission on Human Rights and Opportunities advising the labor union or workers' representative of the contractor's commitments under this section, and to post copies of the notice in conspicuous places available to employees and applicants for employment;

(4) The contractor agrees to comply with each provision of this section and sections 46a-68e and 46a-68f and with each regulation or relevant order issued by said commission pursuant to sections 46a-56, 46a-68e, 46a-68f and 46a-86; and

(5) The contractor agrees to provide the Commission on Human Rights and Opportunities with such information requested by the commission, and permit access to pertinent books, records and accounts, concerning the employment practices and procedures of the contractor as relate to the provisions of this section and section 46a-56. This Page Intentionally Left Blank

#### Sec. 22a-482-2. Requirements for funding project agreements

(a) **Types of Projects.** The Commissioner is authorized to award assistance for the following types of projects:

(1) Planning: the preparation of engineering reports;

(2) Design: the preparation of contract plans and specifications; and

(3) Construction: the building of pollution abatement facilities and sewers.

(b) Level of State Assistance. The amount of state funding assistance shall be based on the Commissioner's determination of eligibility and the provisions of sections 22a-475 to 22a-483, inclusive, of the General Statutes.

(c) **Applications for Funding Assistance.** A municipality applying for funding assistance shall file properly executed forms and applications prescribed by the Commissioner. In addition, the following supporting documentation shall be submitted as appropriate:

(1) An Application for Engineering Report Funding Assistance which shall include:

(A) a Plan of Study including:

(i) the proposed planning area;

(ii) an identification of the entity or entities that will be conducting the planning;

(iii) the nature and scope of the proposed planning project and public participation program, including a schedule for the completion of specific tasks; and

(iv) an itemized description of the estimated engineering report costs;

(B) proposed subagreements, or an explanation of the intended method of awarding subagreements, for performance of any substantial portion of the project;

(C) a resolution adopted by the municipality's Water Pollution Control Authority authorizing a specific person to file the application and execute the agreement. The resolution shall be certified and sealed by the Town/City Clerk; and

(D) a cash flow projection.

(2) An Application for Design Funding Assistance which shall include:

(A) an engineering report meeting all the requirements set forth in section 22a-482-3 (a) of the Regulations of Connecticut State Agencies.

(B) proposed subagreements, or an explanation of the intended method of awarding subagreements, for performance of any substantial portion of the project;

(C) a resolution adopted by the municipality's Water Pollution Control Authority authorizing a specific person to file the application and execute the agreement. The resolution must be certified and sealed by the Town or City Clerk;

(D) a value engineering (VE) commitment in compliance with section 22a-482-3 (d) of the Regulations of Connecticut State Agencies for all design funding assistance applications for projects with a projected total building cost of \$10 million or more, including the cost for interceptor and collector sewers. For those projects requiring VE, the municipality may propose, subject to the Commissioner's approval, to exclude interceptor and collector sewers from the scope of the VE analysis;

(E) proposed or executed (as determined appropriate by the Commissioner) intermunicipal agreements necessary for the construction and operation of the proposed pollution abatement facility for any facility serving two or more municipalities;

(F) a schedule for initiation and completion of the project work;

(G) evidence that local authority to construct the facilities has been obtained; and

(H) a cash flow projection.

(3) An Application for Construction Assistance which shall include:

(A) all requirements for design funding assistance as specified in subdivision (c) (2) of this section;

(B) a final legal opinion stating that the acquisition of all sites, easements or rights-ofway necessary to assure undisturbed construction and operation and maintenance of the proposed project have been acquired. The cost of any real property eligible for funding assistance must reflect fair market value as determined by standard recognized appraisal methods;

(C) two copies of contract plans and specifications for the review and approval of the Commissioner;

(D) a schedule for submission of a proper operation and maintenance program including a preliminary plan of operation;

(E) an approved user charge system developed in accordance with the requirements set forth in section 22a-482-3 (e) of the Regulations of Connecticut State Agencies;

(F) a cash flow projection; and

(G) amounts and terms of any other financial assistance.

(d) Terms of Funding Assistance.

(1) No financial assistance shall be made for a pollution abatement facility that would provide capacity for new connections or other developments to be located in environmentally sensitive land such as wetlands, floodplains, prime agricultural lands, or regulated coastal zones. Appropriate and effective funding conditions (e.g. restricting sewer hook-ups) should be used where necessary to protect these resources from new development.

(2) The prime purpose in the award of construction assistance is to solve existing pollution problems and not intended to assist in new development.

(3) For engineering reports and design, no financial assistance will be allowed for any engineering work performed before award without the prior written approval of the Commissioner.

(4) Except as otherwise provided in this subsection, no assistance for construction may be awarded for any construction which is initiated prior to the date of award. Preliminary construction work, such as advance acquisition of major equipment items requiring long lead times, acquisition of an option for the purchase of eligible land, or advance construction of minor portions of a pollution abatement facility, including associated engineering costs, in emergencies or instances where delay could result in significant cost increases, may be approved by the Commissioner after the completion of an environmental review, but only if the municipality submits a written and adequately substantiated request.

(5) The approval of a plan of study, an engineering report, plans and specifications, advance acquisition of equipment or advance construction will not constitute a commitment or approval of assistance for a subsequent phase of the project. In instances where such approval is obtained, the applicant proceeds at its own risk, since payment for such costs cannot be made unless assistance for the project is awarded.

(6) The municipality shall notify the Commissioner that it has complied or will comply

with the applicable procurement provisions of subsections (f), (g) and (h) of 22a-482-4 of the Regulations of Connecticut State Agencies before the award of any assistance.

(7) Within ninety (90) days after receipt of a completed application (excluding suspension periods for submission of supplemental information), the Commissioner will take one of the following actions: (A) approve for award; (B) defer due to lack of funding; or (C) disapprove the application. The applicant shall be promptly notified, in writing, of any deferral or disapproval. A deferral or disapproval of an application shall not preclude its reconsideration or a reapplication.

(8) The Commissioner will transmit the funding agreement to the applicant for execution. The agreement must be executed by the applicant and returned within three (3) calender weeks after receipt. The agreement shall set forth the approved project scope, budget (cash flow analysis), total project costs, and the approved commencement and completion dates for the project or major phases thereof.

(9) The project funding agreement shall set forth the amount of funding assistance. The amount may not exceed the amount of funds available.

(10) The amount and term of funding assistance shall be determined at the time of award. The time period is subject to extension for excusable delay, at the discretion of the Commissioner.

(11) The amount of financial assistance shall not exceed 100% of the cost eligible for grant and loan. Calculation of a grant or loan available shall first include a deduction of financial assistance available from other sources.

(12) The municipality may finance short term debt through the marketplace or from the Clean Water Fund.

(A) Accrued interest on funds borrowed from the marketplace shall be paid at the time of borrowing.

(B) Accrued interest on amounts borrowed from the Clean Water Fund may be either paid at the time of such borrowing or become part of the principal to be repaid over the term of the project and shall be determined by the Commissioner at the time of issuance of the project funding obligation. Short term interest shall be charged at the rate of 2% per year compounded annually for all outstanding loan balances. Interest on short term obligations shall be charged from the basis of a year of 360 days and the number of days elapsed. Interest shall be charged from the date a check is issued from the fund to the municipality.

(13) Grant proceeds shall be disbursed only upon a determination by the Commissioner that satisfactory documentation of eligible grant costs have been received.

(14) The Commissioner shall establish a procedure for disbursement of grant and loan proceeds to the municipalities.

(15) The municipality shall use the proceeds of the project loan and the project grant solely for the purpose of funding the project. The municipality shall promptly disburse to all contractors the proceeds of such project loan and project grant on the same day that it receives proceeds from the state.

(16) The municipality shall agree and covenant in the project funding agreement that it shall, at all times, do and perform all acts and things reasonably requested by the state to insure interest paid on any tax exempt obligations issued by the state to fund the Clean

Water Fund shall, for the purposes of federal income taxation, be excludable from the gross income of the recipients thereof under the Internal Revenue Code of 1986, as amended.

(17) The municipality shall have all project costs, loans, and grants audited by an auditor approved by the Commissioner.

(18) The municipality shall repay to the Clean Water Fund all outstanding loan balances, including principal and interest accrued, within twenty years from the scheduled completion date of the project.

(19) The municipality shall establish a dedicated source of repayment of the loan satisfactory to the Commissioner.

(20) Each project loan obligation shall be paid in substantially equal monthly installments of principal and interest or in monthly installments of principal plus interest which shall be sustantially equal and which shall be arranged such that no principal installment payable in any month shall be less than the amount of any installment payable in any subsequent month.

(21) Payments on long term loans shall begin one year from the scheduled completion date of the project. Should excusable delay cause the actual completion to go beyond scheduled completion the Commissioner and the municipality shall enter into a project funding agreement to cover project cost incurred after the specified date.

(22) The Commissioner shall make loans to the municipalities at an interest rate not to exceed two percent compounded annually.

(23) Interest on the loan shall be computed on the basis of 360 days and the actual number of days elapsed.

(24) The Commissioner may provide short term loans to municipalities for planning and design, as applicable, of an eligible water quality project. The municipalities may not be required to begin repaying its short term loan for planning or design, as applicable, until six months after the date of completion of such planning or design provided the municipality must commence design or construction, as applicable, within six months.

(25) The municipality shall comply with the following federal laws and Executive Orders:

(A) Archeological and Historic Preservation Act of 1974, P.L. 93-291;

- (B) Coastal Barrier Resources Act, 16 U.S.C. 3501 et seq.;
- (C) Coastal Zone Management Act of 1972, P.L. 92-583;
- (D) Endangered Species Act, 16 U.S.C. 1531, et seq.;
- (E) Executive Order 11593, Protection and Enhancement of the Cultural Environment;
- (F) Executive Order 11990, Protection of Wetlands;

(G) Farmland Protection Policy Act, 7 U.S.C. 4201 et. seq.;

(H) Fish and Wildlife Coordination Act, P.L. 85-624;

(I) National Historic Preservation Act of 1966, P.L. 89-665;

(J) Safe Drinking Water Act, section 1424 (e), P.L. 92-523;

(K) Wild and Scenic Rivers Act, P.L. 90-542;

(L) Demonstration Cities and Metropolitan Development Act of 1966, P.L. 89-754;

(M) Section 306 of the Clean Air Act and Section 508 of the Clean Water Act, including Executive Order 11738;

(N) Brooks Murkowski Act, P.L. 100-202;

(Effective March 5, 1992)

<sup>(</sup>O) Age Discrimination Act, P.L. 94-135;

<sup>(</sup>P) Civil Rights Act of 1964, P.L. 88-352;

<sup>(</sup>Q) Section 13 of P.L. 92-500, prohibition against sex discrimination;

<sup>(</sup>R) Executive Order 11246, Equal Employment Opportunity;

<sup>(</sup>S) Executive Orders 11625 and 12138, Women's and Minority Business Enterprise;

<sup>(</sup>T) Rehabilitation Act of 1973, P.L. 93-112, including Executive Orders 11914 and 11250;

<sup>(</sup>U) Uniform Relocation and Real Property Acquisition Policies Act of 1970, P.L. 91-646;

<sup>(</sup>V) Executive Order 12549, Debarment and Suspension;

<sup>(</sup>W) Executive Order 11988, Flood Plain Management; and

<sup>(</sup>X) Clearn Air Act, 42 U.S.C. 7506 (c).

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#### Sec. 22a-482-4. Administrative program elements

(a) Allowable Grant Costs. Those costs associated with the planning, design and construction of pollution abatement facilities eligible for state grant assistance are as follows:

(1) costs of salaries, benefits, and expendable materials the municipality incurs for the project, except as provided for in subdivision (b) (8) of this section;

(2) costs under construction contracts;

(3) professional and consultant services;

(4) engineering report costs directly related to the pollution abatement facility;

(5) sewer system evaluation;

(6) project feasibility and related engineering reports;

(7) costs of complying with the Connecticut Environmental Policy Act, section 22a-1a to 22a-1h of the General Statutes, including costs of public notices and hearings;

(8) preparation of construction drawings, specifications, estimates and construction contract documents;

(9) reasonable landscaping;

(10) materials acquired, consumed, or expended specifically for the project;

(11) shop equipment installed at the pollution abatement facility necessary to the operation of the facility;

(12) a reasonable inventory of laboratory chemicals and supplies necessary to initiate plant operations;

(13) development and preparation of a preliminary and final plan of operation and an operation and maintenance manual;

(14) start-up services for new pollution abatement facilities;

(15) project identification signs;

(16) costs of complying with the procurement requirements of this section;

(17) the costs of technical services for assessing the merits of or negotiating the settlement of a claim by or against the municipality provided;

(A) a formal grant amendment is executed specifically covering the costs before they are incurred;

(B) the costs are not incurred to prepare documentation that should be prepared by the contractor to support a claim against the municipality; and

(C) the Commissioner determines that there is a significant state interest in the issues involved in the claim;

(18) change orders and the costs of meritorious contractor claims for increased costs, provided the costs are not caused by the municipality's mismanagement or vicarious liability for the improper action of others. Settlements, arbitration awards, and court judgments which resolve contractor claims shall be reviewed by the Commissioner and shall be allowable only to the extent they are not caused by municipality mismanagement, are reasonable, and do not attempt to pass on to the State of Connecticut the costs of events that were the responsibility of the municipality, contractor or others;

(19) costs necessary to mitigate only direct, adverse, or physical impacts resulting from the building of the pollution abatement facility;

(20) the cost of groundwater monitoring facilities necessary to determine the possibility

of groundwater deterioration, depletion or modification resulting from the project;

(21) for individual and small community systems, allowable costs which include:

(A) the cost of major rehabilitation, upgrading, enlarging and installing small and onsite systems, but in the case of privately owned systems, only for principal residences;

(B) conveyance pipes from the property line to an offsite treatment unit which serves a cluster of buildings;

(C) treatment and treatment residue disposal portions of toilets with composting tanks, oil flush mechanisms, or similar in-house devices;

(D) treatment or pumping units from the incoming flange, when located on private property, and conveyance pipes, if any, to the collector sewer; and

(E) the cost of restoring individual system building sites to their original condition;

(22) necessary safety equipment applicable to federal, state and local requirements;

(23) a portion of the costs of collection system maintenance equipment, as determined by the Commissioner;

(24) the cost of mobile equipment necessary for the operation of the overall pollution abatement facility, transmission of wastewater or sludge, or for the maintenance of equipment. These items include:

(A) portable stand-by generators;

(B) large portable emergency pumps to provide "pump-around" capability in the event of a pump station failure or pipeline breaks; and

(C) sludge or septic tank trucks, trailers, and other vehicles having as their sole purpose the transportation of liquid or dewatered wastes from the collector point (including individual or on-site systems) to the pollution abatement facility or disposal site;

(25) replacement parts identified and approved in advance by the Commissioner as necessary to assure uninterrupted operation of the pollution abatement facility, provided they are critical parts or major system components which are:

(A) not immediately available or whose procurement involves an extended "lead-time";

(B) identified as critical by the equipment supplier(s); or

(C) critical but not included in the inventory provided by the equipment supplier(s);

(26) allowable costs for infiltration/inflow which include:

(A) the cost of sewer system and pollution abatement facility capacity adequate to transport and treat nonexcessive infiltration/inflow; and

(B) the costs of sewer system rehabilitation necessary to eliminate excessive infiltration/inflow as determined in a sewer system evaluation survey under section 22a-482-3 (g);

(27) the costs of royalties for the use of rights in a patented process or product with the prior approval of the Commissioner;

(28) the cost of legal and engineering services incurred by the municipality in deciding procurement protests and defending their decisions in protest appeals with the prior approval of the Commissioner;

(29) the cost of the services of the prime engineer required under subdivision (p) (10) of this section during the first year following initiation of operation of the pollution abatement facility; and

(30) the costs of municipal employees attending training workshops or seminars that are

necessary to provide instruction in administrative, fiscal or contracting procedures required to complete the construction of the pollution abatement facility, if approved in advance by the Commissioner.

(b) **Unallowable Grant Project Costs.** Costs which are not necessary for the construction of a pollution abatement facility are unallowable. Such costs include, but are not limited to:

(1) basin or areawide planning not directly related to the project;

(2) bonus payments not legally required for completion of construction before a contractual completion date;

(3) personal injury compensation or damage arising out of the project whether determined by arbitration, negotiation, or otherwise;

(4) unallowable costs for small and onsite systems which include:

(A) modification to physical structure of homes or commercial establishments;

(B) conveyance pipes from the house to the treatment unit located on user's property; and

(C) wastewater generating fixtures such as commodes, sinks, tubs and drains;

(5) fines and penalties due to violations of, or failure to comply with, federal, state, or local laws and regulations;

(6) costs outside the scope of the approved project;

(7) approval, preparation, issuance and sale of bonds or other forms of indebtedness required to finance the project, and the interest on them;

(8) ordinary operating expenses of local government, such as salaries and expenses of a mayor, city council members, or city attorney, except as provided in subdivision (h) (13) of this section;

(9) the costs of acquisition (including associated level, administrative, and engineering) of sewer rights-of-way, pollution abatement facility sites (including small systems sites), sanitary landfill sites and sludge disposal sites, except as provided in subsection (c) of this section;

(10) costs for which payment has been or will be received under any federal assistance program;

(11) the cost of vehicles used primarily for transportation, such as pickup trucks;

(12) costs of equipment or materials acquired in violation of the procurement provisions of this section;

(13) the cost of furnishings including draperies, furniture and office equipment;

(14) the cost of ordinary site and building maintenance equipment, such as lawn mowers, snowblowers and vacuum cleaners;

(15) costs of monitoring equipment used by industry for sampling and analysis of industrial discharges to a municipal pollution abatement facility;

(16) construction of privately-owned pollution abatement facilities, including pretreatment facilities, except for individual systems;

(17) preparation of applications, including a plan of study and permits required by federal, state or local laws and regulations;

(18) administrative, engineering and legal activities associated with the establishment of special departments, agencies, commissions, regions, districts or other units of government;

(19) the cost of a pollution abatement facility or any part thereof that would provide capacity for new habitation or other establishments to be located on environmentally sensitive land such as wetlands, floodplains, or prime agricultural lands;

(20) the costs of legal services of defending or negotiating the settlement of a claim by or against the municipality; and

(21) all incremental costs of delay due to the award of any significant subagreements for construction more than 12 months after the construction grant award.

#### (c) Allowable Grant Project Costs, If Approved.

(1) The cost (including associated legal, administrative and engineering costs) of land acquired in fee simple or by lease or easement that will be an integral part of the treatment process or that will be used for the ultimate disposal of residues resulting from such treatment provided the Commissioner approves it in the grant agreement. These costs include:

(A) the cost of a reasonable amount of land, considering irregularities in application patterns, and the need for buffer areas, berms, and dikes;

(B) the cost of land acquired for a soil absorption system for a group of two or more homes:

(C) the cost of land acquired for composting or temporary storage of compost residues which result from wastewater treatment;

(D) the cost of land acquired for storage of treated wastewater in land treatment systems before land application; and

(E) the cost paid by the municipality for eligible land in excess of just compensation based on the appraised value, the municipality's record of negotiation or a condemnation proceeding, as determined by the Commissioner, shall be unallowable.

(2) The cost associated with the preparation of the pollution abatement facility site before, during and, to the extent agreed on in the grant agreement, after building. These costs include:

(A) the cost of demolition of existing structures on the pollution abatement facilities site (including rights-of-way), if building cannot be undertaken without such demolition;

(B) the cost of removal, relocation or replacement of utilities, for which the municipality is legally obligated to pay under section 22a-470 of the General Statutes; and

(C) the cost of restoring streets and rights-of-way to their original condition. The need for such restoration shall result directly from the construction and is generally limited to repaying the width of trench.

(3) The cost of acquiring all or part of existing publicly or privately owned pollution abatement facilities, provided all of the following criteria are met:

(A) the acquisition, in and of itself, considered apart from any upgrade, expansion or rehabilitation, provides new pollution control benefits;

(B) the acquired pollution abatement facility was not built with previous federal or state financial assistance; and

(C) the primary purpose of the acquisition is not the reduction, elimination, or redistribution of public or private debt.

(d) Allowable Loan Project Costs:

(1) all costs allowable for grant participation under subsections (a) and (c) of this section;

(2) all costs necessary to complete the project including land, legal, rights-of-way, interest and claim settlements;

(3) all costs associated with incremental capacity for growth; and

(4) those costs a reasonable business person would incur when operating his or her own business necessary to construct the project.

#### (e) Unallowable Loan Project Costs:

(1) costs associated with improvements to municipal or private property not related to pollution control;

(2) costs associated with the liability of other contractors and subcontractors; and

(3) costs associated with waste, fraud or abuse.

(f) Required Provisions for Architectural/Engineering Contracts.

(1) Subagreement Enforcement.

(A) Commissioner's Authority. At a municipality's request the Commissioner may provide technical and legal assistance in the administration and enforcement of any subagreement related to a pollution abatement facility for which state financial assistance was made and intervene in any civil action involving the enforcement of such subagreements, including subagreement disputes which are the subject of either arbitration or court action. Any assistance to be provided is at the discretion of the Commissioner and in a manner determined by him or her to best serve the public interest. Factors which the Commissioner may consider in determining whether to provide assistance include:

(i) available department resources;

(ii) planned or ongoing enforcement action;

(iii) the municipality's demonstration of good faith in attempting to resolve the contract matters at issue;

(iv) the municipality's adequate documentation of the need for assistance; and

(v) the state's interest in the contract matters at issue.

(B) Municipality Request. The municipality's request for technical or legal assistance should be submitted in writing and be accompanied by documentation adequate to inform the Commissioner of the nature and necessity of the requested assistance.

(C) Privity of Subagreement. The Commissioner's technical or legal involvement in any subagreement dispute will not make the Commissioner a party to any subagreement entered into by the municipality.

(D) Municipality Responsibility. The provision of technical or legal assistance under this section in no way releases the municipality from its obligations under sections 22a-482-1 to 22a-482-4, inclusive, or affects the Commissioner's right to take remedial action against a municipality that fails to carry out those obligations.

(2) Subagreement Provisions.

(A) Each subagreement shall include provisions defining a sound and complete agreement, including the:

(i) nature, scope, and extent of work to be performed;

(ii) time frame for performance;

(iii) total cost of the subagreement; and

(iv) payment provisions.

(B) All subagreements awarded in excess of \$10,000 shall contain provisions requiring compliance with state and federal equal employment opportunity laws and regulations.

(3) Model Subagreement Clauses. Municipalities shall include subparagraphs (A) to (L), inclusive, of this subdivision or their equivalent in all subagreements for architectural or engineering services. (Municipalities may substitute other terms for "municipality" and "engineer" in their subagreements.)

(A) Supersession. The municipality and the engineer agree that this and other appropriate clauses in this section, or their equivalent, apply to the state grant eligible work to be performed under this subagreement and that these clauses supersede any conflicting provisions of this subagreement.

(B) Privity of Subagreement. This subagreement is expected to be funded in part with funds from the State of Connecticut, Department of Environmental Protection (DEP). Neither the state nor any of its departments, agencies, or employees is or will be a party to this subagreement or any lower tier subagreement. This subagreement is subject to sections 22a-482-1 to 22a-482-4 of the Regulations of Connecticut State Agencies in effect on the date of the grant award for the project.

(C) Changes to Subagreement.

(i) The municipality may at any time, by written order, make changes within the general scope of this subagreement in the services or work to be performed. If such changes cause an increase or decrease in the engineer's cost or time required to perform any services under this agreement, whether or not changed by any order, an equitable adjustment shall be made and this subagreement shall be modified in writing. The engineer must assert any claim for adjustment under this clause in writing within 30 days from the date of receipt by the engineer of the notification of change, unless the municipality grants additional time before the date of final payment.

(ii) No services for which additional compensation will be charged by the engineer shall be furnished without the written authorization of the municipality.

(iii) In the event that there is a modification of the Commissioner's requirements relating to the services to be performed under this agreement after the date of execution of this agreement, the increased or decreased cost of performance of the services provided for in the agreement shall be reflected in an appropriate modification of this agreement.

(D) Termination of Subagreement.

(i) This subagreement may be terminated in whole or in part in writing by either party in the event of substantial failure by the other party to fulfill its obligations under this subagreement through no fault of the terminating party. However, no termination may be effected unless the other party is given not less than ten (10) calendar days written notice (delivered by certified mail, return receipt requested) of intent to terminate and an opportunity for consultation with the terminating party prior to termination.

(ii) This subagreement may be terminated in whole or in part in writing by the municipality for its convenience, provided that the engineer is given not less than ten (10) calendar days written notice (delivered by certified mail, return receipt requested) of intent to terminate and an opportunity for consultation with the terminating party prior to termination.

(iii) If termination for default is effected by the municipality, an equitable adjustment in

the price provided for in this subagreement shall be made, but no amount shall be allowed for anticipated profit on unperformed services or other work and any payment due to the engineer at the time of termination may be adjusted to cover any additional costs to the municipality because of the engineer's default. If termination for default is effected by the engineer; or if termination for convenience is effected by the municipality; the equitable adjustment shall include a reasonable profit for services or other work performed. The equitable adjustment for any termination shall provide for payment to the engineer for services rendered and expenses incurred prior to the termination, in addition to termination and settlement costs reasonably incurred by the engineer relating to commitments which had become firm prior to the termination.

(iv) Upon receipt of a termination action pursuant to subparagraphs (D) (i) or (D) (ii) of this subdivision, the engineer shall promptly discontinue all services affected (unless the notice directs otherwise) and deliver or otherwise make available to the municipality all data, drawings, specifications, reports, estimates, summaries and such other information and materials as may have been accumulated by the engineer in performing this subagreement, whether completed or in process.

(v) Upon termination under subparagraphs (D) (i) or (D) (ii) of this subdivision, the municipality may take over the work and may award another party a subagreement to complete the work under this subagreement.

(vi) If, after termination for failure of the engineer to fulfill contractual obligations, it is determined that the engineer had not failed to fulfill contractual obligations, the termination shall be deemed to have been for the convenience of the municipality. In such event, adjustment of the price provided for in this subagreement shall be made as provided in subparagraph (D) (iii) of this subdivision.

(E) Remedies. Except as may be otherwise provided in this subagreement, all claims, counter-claims, disputes, and other matters in question between the municipality and the engineer arising out of or relating to this subagreement, or the breach thereof, will be decided by arbitration, if the parties mutually agree, or in a court of competent jurisdiction within the district in which the municipality is located.

(F) Price Reduction for Defective Cost or Pricing Data (This clause is applicable if the amount of the agreement exceeds \$100,000). The engineer warrants that cost and pricing data submitted for evaluation with respect to negotiation of prices for negotiated subagreements and lower tier subagreements is based on current, accurate, and complete data supported by books and records. If the municipality or Commissioner determines that any price, including profit, negotiated in connection with this subagreement, any lower tier subagreement, or any amendment thereunder was increased by any significant sums because the data provided was incomplete, inaccurate, or not current at the time of submission, then such price, cost or profit shall be reduced accordingly, and the subagreement shall be modified in writing to reflect such reduction.

(NOTE– Since the subagreement is subject to reduction under this clause by reason of defective cost or pricing data submitted in connection with certain subcontractors, the engineer may wish to include a clause in each such subcontract requiring the subcontractor to appropriately indemnify the engineer. It is also expected that any subcontractor subject to such indemnification will generally require substantially similar indemnification for

defective cost or pricing data required to be submitted by lower tier subcontractors.)

(G) Audit; Access to Records.

(i) The engineer shall maintain books, records, documents, and other evidence directly pertinent to performance on grant work under this agreement in accordance with generally accepted accounting principles and practices consistently applied. The engineer shall also maintain the financial information and data used by the engineer in the preparation or support of the cost submission required for any negotiated subagreement or change order in effect on the date of execution of this agreement and a copy of the cost summary shall be submitted to the municipality. The municipality and Commissioner or any of his or her duly authorized representatives shall have access to all such books, records, documents, and other evidence for inspection, audit, and copying during normal business hours. The engineer will provide proper facilities for such access and inspection.

(ii) The engineer agrees to include subparagraphs (G) (i) to (G) (v) of this subdivision, inclusive, in all his contracts and all lower tier subcontracts directly related to project performance that are in excess of 10,000, and to make subparagraphs (G) (i) to (G) (v) of this subdivision, inclusive, applicable to all change orders directly related to project performance.

(iii) Audits conducted under this subparagraph shall be in accordance with generally accepted auditing standards and established procedures and guidelines of the reviewing or audit department and shall meet the requirements of section 7-396a of the General Statutes.

(iv) The engineer agrees to the disclosure of all information and reports resulting from access to records under subparagraphs (G) (i) and (G) (ii) of this subdivision to any of the parties referred to in subparagraph (G) (i) of this subdivision, provided that the engineer is afforded the opportunity for an audit exit conference and an opportunity to comment and submit any supporting documentation on the pertinent portions of the draft audit report and that the final audit report will include written comments of reasonable length, if any, of the engineer.

(v) The engineer shall maintain and make available records under subparagraphs (G) (i) and (G) (ii) of this subdivision during performance on grant funded work under this agreement and until three (3) years from the date of final grant payment for the project. In addition, those records which relate to any dispute appeal arising under a grant agreement, to litigation, to the settlement of claims arising out of such performance, or to costs or items to which an audit exception has been taken, shall be maintained and made available until three (3) years after the date of resolution of such appeal, litigation, claim, or exception.

(H) Covenant Against Contingent Fees. The engineer warrants that no person or selling agency has been employed or retained to solicit or secure this subagreement upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, except bona fide employees or bona fide established commercial or selling agencies maintained by the engineer for the purpose of securing business. For breach or violation of this warranty the municipality shall have the right to annul this agreement without liability or, in its discretion, to deduct from the contract price or consideration, or otherwise recover, the full amount of such commission, percentage, brokerage, or contingent fee.

- (I) Gratuities.
- (i) If the municipality finds after a notice and hearing that the engineer, or any of the

engineer's agents or representatives, offered or gave gratuities (in the form of entertainment, gifts, or otherwise) to any official, employee, or agent of the municipality or the state, in an attempt to secure a subagreement or favorable treatment in awarding, amending, or making any determinations related to the performance of this agreement, the municipality may, by written notice to the engineer, terminate this agreement. The municipality may also pursue other rights and remedies that the law or this subagreement provides. However, the existence of the facts on which the municipality bases such findings shall be in issue and may be reviewed in proceedings under subparagraph (E) of this subdivision.

(ii) In the event this subagreement is terminated as provided in subparagraph (I) (i) of this subdivision the municipality may pursue the same remedies against the engineer as it could pursue in the event of a breach of the subagreement by the engineer and, as a penalty, in addition to any other damages to which it may be entitled by law, may pursue exemplary damages in an amount (as determined by the municipality) which shall be not less than three, nor more than ten times the costs the engineer incurs in providing any such gratuities to any such officer or employee.

(J) Responsibility of the Engineer.

(i) The engineer shall be responsible for the professional quality, technical accuracy, timely completion, and the coordination of all designs, drawings, specifications, reports, and other services furnished by the engineer under this subagreement. The engineer shall, without additional compensation, correct or revise any errors, omissions, or other deficiencies in his designs, drawings, specifications, reports, and other services.

(ii) The engineer shall perform the professional services necessary to accomplish the work required to be performed under this subagreement, in accordance with this subagreement and applicable requirements of the Commissioner in effect on the date of execution of the assistance agreement for this project.

(iii) Approval by the municipality or the Commissioner of drawings, designs, specifications, reports, and incidental work or materials furnished hereunder shall not, in any way, relieve the engineer of responsibility for the technical adequacy of his work. Neither the municipality's nor Commissioner's review, approval, acceptance, or payment for any of the services shall be construed as a waiver of any rights under this subagreement or of any cause of action arising out of the performance of this subagreement.

(iv) The engineer shall be and shall remain liable, in accordance with applicable law, for all damages to the municipality or the state caused by the engineer's negligent performance of any of the services furnished under this subagreement, except for errors, omissions, or other deficiencies to the extent attributable to the municipality, municipality-furnished data, or any third party. The engineer shall not be responsible for any time delays in the project caused by circumstances beyond the engineer's control.

(v) The engineer's obligations under this subparagraph are in addition to the engineer's other expressed or implied warranties under this subagreement or state law and in no way diminish any other rights that the municipality may have against the engineer for faulty materials, equipment, or work.

(K) Payment.

(i) Payment shall be made in accordance with the payment schedule incorporated in this subagreement, as soon as practicable, upon submission of statements requesting payment

by the engineer to the municipality. If no such payment schedule is incorporated in this subagreement, the payment provisions of subparagraph (K) (ii) of this subdivision shall apply.

(ii) The engineer may request monthly progress payments and the municipality shall make them, as soon as practicable, upon submission of statements requesting payment by the engineer to the municipality. When such progress payments are made, the municipality may withhold up to ten (10) percent of the vouchered amount until satisfactory completion by the engineer of work and services within a step called for under this subagreement. When the municipality determines that the work under this subagreement, or any specified task hereunder, is substantially complete and that the amount of retained percentages is in excess of the amount considered by the municipality to be adequate for its protection, it shall release to the engineer such excess amount.

(iii) No payment request made under subparagraph (K) (i) or (K) (ii) of this subdivision shall exceed the estimated amount and value of the work and services performed by the engineer under this subagreement. The engineer shall prepare the estimates of work performed and shall supplement them with such supporting data as the municipality may require.

(iv) Upon satisfactory completion of the work performed under this subagreement, as a condition precedent to final payment under this subagreement or to settlement upon termination of the subagreement, the engineer shall execute and deliver to the municipality a release of all claims against the municipality arising under or by virtue of this subagreement, other than such claims, if any, as may be specifically exempted by the engineer from the operation of the release in stated amounts to be set forth therein.

(L) Copyrights and Rights in Data.

(i) The engineer agrees that any plans, drawings, designs, specifications, computer programs (which are substantially financed by state funds), technical reports, operating manuals, and other work submitted with an engineering report, with a design or for construction with financing assistance, or which are specified to be delivered under this subagreement, or which are developed or produced and paid for under this subagreement (referred to in subparagraph (L) (ii) of this subdivision as "subject data"), and including all raw data obtained or generated by the engineer during the course of his work under this subagreement, are subject to certain rights in the United States. These rights include the right to use, duplicate, and disclose such subject data, in whole or in part, in any manner for any purpose whatsoever, and to have others do so. If the material is copyrightable, the engineer may copyright it, subject to the rights of the state described herein, but the municipality and the state reserve a royalty-free, nonexclusive, and irrevocable license to reproduce, publish, and use such materials, in whole or in part, and to authorize others to do so. The engineer shall include appropriate provisions to achieve the purpose of this condition in all subcontracts expected to produce copyrightable subject data; and

(ii) all such subject data furnished by the engineer pursuant to this subagreement are instruments of his services in respect to the project. It is understood that the engineer does not represent such subject data to be suitable for reuse on any other project or for any other purpose. If the municipality reuses the subject data without the engineer's specific written verification or adaptation, such reuse will be at the risk of the municipality without liability to the engineer. Any such verification or adaptation will entitle the engineer to further compensation at rates agreed upon by the municipality and the engineer.

(g) **Required Provisions for Construction Contracts.** Municipalities must include, when appropriate, subdivisions (1) to (14), inclusive, of this subsection, or their equivalent, in each subagreement and may substitute other terms for "grantee" and "contractor" in their subagreements.

(1) Supersession. The municipality and the contractor agree that the following general provisions, or their equivalent, apply to eligible work to be performed under this contract and that these provisions supersede any conflicting provisions of this contract.

(2) Privity of Contract. This contract is expected to be funded in part by the State of Connecticut. Neither the state, nor any of its departments, agencies, or employees is or will be a party to this contract or any lower tier subcontract. This contract is subject to sections 22a-482-1 to 22a-482-4, inclusive, of the Regulations of Connecticut State Agencies.

(3) Changes for Contracts for Construction.

(A) The municipality may, at any time, without notice to any surety, by written order designated or indicated to be a change order, make any change in the work within the general scope of the subagreement, including but not limited to changes:

- (i) in the specifications (including drawings and designs);
- (ii) in the time, method, or manner of performance of the work;
- (iii) in the municipality-furnished facilities, equipment, materials, services, or site; or
- (iv) directing acceleration in the performance of the work.

(B) A change order shall also be any other written or oral order (including direction, instruction, interpretation or determination) from the municipality which causes any change, provided the contractor gives the municipality written notice stating the date, circumstances, and source of the order and that the contractor regards the order as a change order.

(C) Except as provided in subdivision (3) of this subsection, no order, statement, or conduct of the municipality shall be treated as a change under subdivision (3) of this subsection or entitle the contractor to an equitable adjustment.

(D) If any change under subdivision (3) of this subsection causes an increase or decrease in the contractor's cost or the time required to perform any part of the work under this contract, whether or not changed by any order, an equitable adjustment shall be made and the subagreement modified in writing. However, for claims based on defective specifications, no claim for any change under subparagraph (B) of this subdivision shall be allowed for any costs incurred more than 20 days before the contractor gives written notice as required in subparagraph (B) of this subdivision. In the case of defective specifications for which the municipality is responsible, the equitable adjustment shall include any increased cost reasonably incurred by the contractor in attempting to comply with those defective specifications.

(E) If the contractor intends to assert a claim for an equitable adjustment under this clause, he shall, within thirty (30) days after receipt of a written change order under subparagraph (A) of this subdivision, or the furnishing of a written notice under subparagraph (B) of this subdivision, submit to the grantee a written statement setting forth the general nature and monetary extent of such claim. The municipality may extend the 30-day period. The statement of claim may be included in the notice under subparagraph (B)

of this subdivision.

(F) No claim by the contractor for an equitable adjustment shall be allowed if made after final payment under this contract.

(4) Changes for Contracts for Supplies.

(A) The municipality may at any time, by a written order and without notice to the sureties, make changes within the general scope of this subagreement in any one or more of the following:

(i) drawings, designs, or specifications, where the supplies to be furnished are to be specially manufactured for the municipality;

(ii) method of shipment or packing; and (iii) place of delivery.

(B) If any change causes an increase or decrease in the cost or the time required to perform any part of the work under this subagreement, whether or not changed by any such order, an equitable adjustment shall be made in the subagreement price or delivery schedule, or both, and the subagreement shall be modified in writing. Any claim by the contractor or adjustment under this clause shall be asserted within thirty (30) days from the date of receipt by the contractor of the notification of change. If the municipality decides that the facts justify such action, the municipality may receive and act upon any such claim asserted at any time before final payment under this subagreement. Where the cost of property is made obsolete or excessive as a result of a change is included in the contractor's claim for adjustment, the grantee shall have the right to prescribe the manner of disposition of such property. Nothing in this subdivision shall excuse the contractor from proceeding with the subagreement as changed.

(5) Differing Site Conditions.

(A) The contractor shall promptly, and before such conditions are disturbed, notify the municipality in writing of:

(i) subsurface or latent physical conditions at the site differing materially from those indicated in this subagreement; or

(ii) unknown physical conditions at the site, of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in work of the character provided for in this subagreement. The municipality shall promptly investigate the conditions and, if it finds that conditions are materially different and will cause an increase or decrease in the contractor's cost or the time required to perform any part of the work under this subagreement, whether or not changed as a result of such conditions, an equitable adjustment shall be made and the subagreement modified in writing.

(B) No claim of the contractor under this subdivision shall be allowed unless the contractor has given notice required in subparagraph (A) of this subdivision. However, the municipality may extend the prescribed time.

(C) No claim by the contractor for an equitable adjustment shall be allowed if asserted after final payment under this subagreement.

(6) Suspension of Work.

(A) The municipality may order the contractor, in writing, to suspend, delay, or interrupt all or any part of the work for such period of time as the municipality may determine to be appropriate for the convenience of the municipality.

(B) If the performance of all or any part of the work is suspended, delayed, or interrupted

for an unreasonable period of time by an act of the municipality in administration of the contract, (or if no time is specified, within a reasonable time), an adjustment shall be made for any increase in the cost of performance of this contract (excluding profit) necessarily caused by such unreasonable suspension, delay, or interruption and the contract modified in writing. However, no adjustment shall be made under this subdivision for any suspension, delay, or interruption to the extent that performance would have been so suspended, delayed, or interrupted by any other cause, including the fault or negligence of the contractor, or for which an equitable adjustment is provided for, or excluded, under any other provision of the contract.

(C) No claim under this subdivision shall be allowed for any costs incurred more than twenty (20) days before the contractor notified the municipality in writing of the act or failure to act involved (this requirement does not apply to a claim resulting from a suspension order), and unless the claim, in an amount stated, is asserted in writing as soon as practicable after the termination of such suspension, delay, or interruption, but not later than the date of final payment under the contract.

(7) Termination.

(A) This contract may be terminated in whole or in part in writing by either party in the event of substantial failure by the other party to fulfill its obligations under this subagreement through no fault of the terminating party, provided that no termination may be effected unless the other party is given not less than ten (10) calendar days written notice (delivered by certified mail, return receipt requested) of intent to terminate and an opportunity for consultation with the terminating party prior to termination.

(B) This contract may be terminated in whole or in part in writing by the municipality for its convenience, provided that the contractor is given not less than ten (10) calendar days written notice (delivered by certified mail, return receipt requested) of intent to terminate and an opportunity for consultation with the terminating party prior to termination.

(C) If termination for default is effected by the municipality, an equitable adjustment in the price provided for in this contract shall be made but no amount shall be allowed for anticipated profit on unperformed services or other work, and any payment due to the contractor at the time of termination may be adjusted to cover any additional costs to the municipality because of the contractor's default. If termination for default is effected by the contractor, or if termination for convenience is effected by the municipality, the equitable adjustment shall include a reasonable profit for services or other work performed. The equitable adjustment for any termination shall provide for payment to the contractor for services rendered and expenses incurred prior to the termination in addition to termination settlement costs reasonably incurred by the contractor relating to commitments which had become firm prior to the termination.

(D) Upon receipt of a termination action pursuant to subparagraphs (A) or (B) of this subdivision, the contractor shall promptly discontinue all services affected (unless the notice directs otherwise), and deliver or otherwise make available to the municipality all data, drawings, specifications, reports, estimates, summaries and such other information and materials as may have been accumulated by the contractor in performing this contract whether completed or in process.

(E) Upon termination under subparagraphs (A) or (B) of this subdivision the municipality

may take over the work and may award another party a contract to complete the work under this contract.

(F) If, after termination for failure of the contractor to fulfill contractual obligations, it is determined that the contractor had not failed to fulfill contractual obligations, the termination shall be deemed to have been for the convenience of the municipality. In such event, adjustment of the price provided for in this contract shall be made as provided in subparagraph (C) of this subdivision.

(8) Remedies. Except as may be otherwise provided in this contract, all claims, counterclaims, disputes, and other matters in question between the municipality and the contractor arising out of or relating to this contract or the breach thereof will be decided by arbitration, if the parties mutually agree, or in a court of competent jurisdiction within the district in which the municipality is located.

(9) Price Reduction for Defective Cost or Pricing Data.

NOTE– This subdivision is applicable to any contract negotiated between the municipality and its contractor in excess of \$500,000; negotiated change orders in excess of \$500,000 or 10 percent of the contract, whichever is less, affecting the price of a formally advertised, competitively awarded, fixed price contract; or any lower tier subcontract or purchase order in excess of \$500,000 or 10 percent of the assistance agreement, whichever is less, under a contract other than a formally advertised, competitively awarded, fixed price subagreement. This subdivision is not applicable for contracts to the extent that they are awarded on the basis of effective price competition.

The contractor and subcontractor, where appropriate, warrant that cost and pricing data submitted for evaluation with respect to negotiation of prices for negotiated contracts, lower tier subcontracts and change orders is based on current, accurate, and complete data supported by their books and records. If the municipality or the Commissioner determines that any price (including profit) negotiated in connection with this contract, any lower tier subcontract, or any amendment thereunder was increased by any significant sums because the data provided was incomplete, inaccurate, or not current at the time of submission, then such price, cost, or profit shall be reduced accordingly, and the contract shall be modified in writing to reflect such reduction. Failure to agree on a reduction shall be subject to subdivision (8) of this subsection.

NOTE– Since the contract is subject to reduction under this subdivision by reason of defective cost or pricing data submitted in connection with lower tier subcontracts, the contractor may wish to include a clause in each lower tier subcontract requiring the lower tier subcontractor to appropriately indemnify the contractor. It is also expected that any lower tier subcontractor subject to such indemnification will generally require substantially similar indemnification for defective cost or pricing data required to be submitted by lower tier subcontractors.

(10) Audit; Access to Records.

(A) The contractor shall maintain books, records, documents, and other evidence directly pertinent to performance on grant work under this contract in accordance with generally accepted accounting principles and practices consistently applied. The contractor shall also maintain the financial information and data used by the contractor in the preparation or support of the cost submission required under section 22a-482-4 (i) (6) for any negotiated

contract or change order and a copy of the cost summary submitted to the municipality. The municipality and the Commissioner or any of his or her authorized representatives shall have access to all such books, records, documents, and other evidence for the purpose of inspection, audit and copying during normal business hours. The contractor will provide proper facilities for such access and inspection.

(B) If this is a formally advertised, competitively awarded, fixed price contract, the contractor agrees to make subparagraphs (A) to (F), inclusive, of this subdivision applicable to all negotiated change orders and contract amendments affecting the contract price. In the case of all other types of prime contracts, the contractor agrees to include subparagraphs (A) to (F), inclusive, of this subdivision in all his subcontracts in excess of \$10,000 and to subparagraphs (A) through (F), inclusive, of this subdivision applicable to all change orders directly related to project performance.

(C) Audits conducted under this subdivision shall be in accordance with generally accepted auditing standards and established procedures and guidelines of the reviewing or audit departments and shall meet the requirements of section 7-396a of the General Statutes.

(D) The contractor agrees to disclose all information and reports resulting from access to records under subparagraphs (A) and (B) of this subdivision to any of the parties referred to in subparagraph (A) of this subdivision.

(E) Records under subparagraphs (A) and (B) of this subdivision shall be maintained and made available during performance on assisted work under this contract and until three years from the date of final state payment for the project. In addition, those records which relate to any dispute appeal arising under a grant assistance agreement, to litigation, to the settlement of claims arising out of such performance, or to costs or items to which an audit exception has been taken, shall be maintained and made available until three years after the date of resolution of such appeal, litigation, claim, or exception.

(F) This right of access provision (with respect to financial records) applies to:

(i) negotiated prime subagreements:

(ii) negotiated change orders or contract amendments in excess of \$10,000 affecting the price of any formally advertised, competitively awarded, fixed price contract; and

(iii) subcontracts or purchase orders under any contract other than a formally advertised, competitively awarded, fixed price contract. However, this right of access does not apply to a prime contract, lower tier subcontract, or purchase order awarded after effective price competition, except with respect to records pertaining directly to contract performance, (excluding any financial records of the contractor), if there is any indication that fraud, gross abuse, or corrupt practices may be involved or if the contract is terminated for default or for convenience.

(11) Covenant Against Contingent Fees. The contractor warrants that no person or selling agency has been employed or retained to solicit or secure this contract upon an agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bona fide employees or bona fide established commercial or selling agencies maintained by the contractor for the purpose of securing business. For breach or violation of this warranty the grantee shall have the right to annul this agreement without liability or, at its discretion, to deduct from the contract price or consideration, or otherwise recover the full amount of such commission, percentage, brokerage, or contingent fee.

(12) Gratuities.

(A) If the municipality finds, after a notice and hearing, that the contractor, or any of the contractor's agents or representatives, offered or gave gratuities (in the form of entertainment, gifts, or otherwise) to any official, employee, or agent of the municipality or the state, in an attempt to secure a contract or favorable treatment in awarding, amending, or making any determinations related to the performance of this agreement, the municipality may, by written notice to the contractor, terminate this agreement. The municipality may also pursue other rights and remedies that the law or this agreement provides. However, the existence of the facts on which the municipality bases such findings shall be in issue and may be reviewed in proceedings under subdivision (8) of this subsection.

(B) In the event this contract is terminated, as provided in subparagraph (A) of this subdivision, the municipality may pursue the same remedies against the contractor as it could pursue in the event of a breach of the contract by the contractor and, as a penalty, in addition to any other damages to which it may be entitled by law, may pursue exemplary damages in an amount (as determined by the grantee) which shall be not less than three nor more than ten times the costs the contractor incurs in providing any such gratuities to any such officer or employee.

(13) Responsibility of the Contractor.

(A) The contractor agrees to perform all work under this agreement in accordance with this agreement's designs, drawings, and specifications.

(B) The contractor warrants and guarantees for a period of one (1) year from the date of substantial completion of the system that the completed system is free from all defects due to faulty materials, equipment or workmanship; and the contractor shall promptly make whatever adjustments or corrections necessary to cure such defects, including repairs of any damage to other parts of the system resulting from such defects. The municipality shall give notice to the contractor of observed defects with reasonable promptness. In the event that the contractor fails to make adjustments, repairs, corrections or other work that may be made necessary by such defect, the municipality may do so and charge the contractor the cost incurred. The performance bond shall remain in full force and effect through the guarantee period.

(C) The contractor's obligations under this subdivision are in addition to the contractor's other express or implied warranties under this agreement or state law and in no way diminish any other rights that the municipality may have against the contractor for faulty material, equipment, or work.

(14) Final Payment. Upon satisfactory completion of the work performed under this agreement, as a condition before final payment under this agreement, or as a termination settlement under this agreement, the contractor shall execute and deliver to the municipality a release of all claims against the municipality arising under or by virtue of this agreement, except claims which are specifically exempted by the contractor to be set forth therein. Unless otherwise provided in this agreement or by state law or otherwise expressly agreed to by the parties to this agreement, final payment under this agreement or settlement upon termination of this agreement shall not constitute a waiver of the municipality's claims against the contractor or his sureties under this agreement or applicable performance and payment bonds.

#### (h) Procurement Requirements—General.

(1) Applicability. This subsection defines the responsibilities of the state and the municipality and the minimum procurement standards for each municipality's procurement system.

(2) Municipality Responsibility.

(A) The municipality is responsible for the settlement and satisfactory completion, in accordance with sound business judgment and good administrative practice, of all contractual and administrative issues arising out of subagreements entered into under the assistance agreement. This includes issuance of invitations for bids or requests for proposals, selection of contractors, award of subagreements, settlement of protests, claims, disputes and other related procurement matters.

(B) The municipality shall maintain a subagreement administration system to assure that contractors perform in accordance with the terms, conditions and specifications of their subagreements.

(C) The municipality shall review its proposed procurement actions to avoid purchasing unnecessary or duplicative items.

(D) The municipality shall consider consolidating its procurement or dividing it into parts to obtain a more economical purchase.

(E) Where appropriate, the municipality shall make an analysis of lease versus purchase alternatives in its procurement actions.

(F) A municipality may request technical assistance from the Commissioner for the administration and enforcement of any subagreement awarded under this section. However, such assistance does not relieve the municipality of its responsibilities under this section, 22a-482-4.

(G) A municipality may use innovative procurement methods or procedures only if it receives the Commissioner's prior written approval.

(3) Municipality Reporting Requirements. The municipality shall request, in writing, the Commissioner's authorization to award each construction subagreement which has an aggregate value over \$10,000. The request shall include:

(A) name, address, telephone number and employee identification number of the construction contractor;

(B) amount of the award;

(C) estimated starting and completion dates;

(D) project number, name and site location of the project; and

(E) copy of the tabulations of bids or offers and the name of each bidder or offeror.

(4) Copies of Contract Documents. The municipality shall promptly submit to the Commissioner copies of any prime contract or modification thereof, and revisions to plans and specifications.

(5) Limitations on Subagreement Award.

(A) The municipality shall award subagreements only to responsible contractors that possess the potential ability to perform successfully under the terms and conditions of a proposed procurement. A responsible contractor is one that has:

(i) financial resources, technical qualifications, experience, an organization and facilities adequate to carry out the project, or a demonstrated ability to obtain these;

(ii) resources to meet the completion schedule contained in the subagreement;

(iii) a satisfactory performance record for completion of subagreements;

(iv) accounting and auditing procedures adequate to control property, funds and assets; and

(v) demonstrated compliance or willingness to comply with the civil rights, equal employment opportunity, labor laws and other statutory requirements.

(B) The municipality shall not make awards to contractors who have been suspended or debarred by a Connecticut state agency.

(6) Violations. The municipality shall refer violations of law to the local or state officials having the proper jurisdiction.

(7) Competition.

(A) The municipality shall conduct all procurement transactions in a manner that provides maximum open and free competition.

(B) Procurement practices shall not unduly restrict or eliminate competition. Examples of practices considered to be unduly restrictive include:

(i) noncompetitive practices between firms;

(ii) organizational conflicts of interest;

(iii) unnecessary experience and bonding requirements;

(iv) local laws, ordinances, regulations or procedures which give local bidders or proposers preference over other bidders or proposers in evaluating bids or proposals; and

(v) placing unreasonable requirements on firms in order for them to qualify to do business.

(C) The municipality may use a prequalification list(s) of persons, firms or products if it:

(i) updates its prequalified list(s) at least every six months;

(ii) reviews and acts on each request for prequalification made more than thirty (30) days before the closing date for receipt of proposals or bid opening; and

(iii) gives adequate public notice of its prequalification procedures in accordance with the public notice procedures.

(D) A municipality may not use a prequalified list(s) of persons or firms if the procedure unnecessarily restricts competition.

(8) Profit.

(A) Municipalities shall assure that only fair and reasonable profits are paid to contractors awarded subagreements under state assistance agreements.

(B) The municipality shall negotiate profit as a separate element of price for each subagreement in which there is no price competition or where price is based on cost analysis.

(C) Where the municipality receives two or more bids, profit included in a formally advertised, competitively bid, fixed price subagreement shall be considered reasonable.

(D) Off-the-shelf or catalog supplies are exempt from this subparagraph.

(9) Use of Small, Minority, and Women's Businesses. The municipality shall take affirmative steps to assure that small, minority, and women's businesses are used to the maximum extent practicable. The Commissioner may impose goals as conditions of financial assistance.

(10) Privity of Subagreement. The state shall not be a party to any subagreement nor to

any solicitation or request for proposals.

(11) Documentation.

(A) Procurement records and files for procurements in excess of \$10,000 shall include the following:

(i) the basis for contractor selection;

(ii) written justification for selection of the procurement method;

(iii) written justification for use of any specification which does not provide for maximum free and open competition;

(iv) written justification for the type of subagreement; and

(v) the basis for award cost or price, including a copy of the cost or price analysis made and documentation of negotiations; and

(B) The municipality shall state the reasons in writing for rejecting any or all bids and the justification for procurements on a noncompetitively negotiated basis and make them available for public inspection.

(12) Specifications.

(A) Nonrestrictive Specifications.

(i) No specification for bids or statement of work shall be written in such a manner as to contain proprietary, exclusionary or discriminatory requirements, other than those based upon performance, unless such requirements are necessary to test or demonstrate a specific thing or to provide for necessary interchangeability of parts and equipment, or at least two brand names or trade names of comparable quality or utility are listed and are followed by the words "or equal." If brand or trade names are specified, the municipality shall be prepared to identify to the Commissioner, or in any protest action, the salient requirements (relating to the minimum needs of the project) which shall be met by any offeror. The single base bid method of solicitation for equipment and parts for determination of a low, responsive bidder may not be utilized. With regard to materials, if a single material is specified, the municipality shall be prepared to substantiate the basis for the selection of the material.

(ii) Project specifications shall, to the extent practicable, provide for maximum use of structures, machines, products, materials, construction methods, and equipment which are readily available through competitive procurement or through standard or proven production techniques, methods, and processes.

(B) Sole Source Restriction. A specification shall not require the use of structures, materials, equipment, or processes which are known to be available only from a sole source, unless the Commissioner determines, in advance, that the municipality's engineer has adequately justified, in writing, that the proposed use meets the particular project's minimum needs or the Commissioner determines that use of a single source is necessary to promote innovation.

(C) Experience Clause Restriction. The general use of experience clauses requiring equipment manufacturers to have a record of satisfactory operation for a specified period of time or of bonds or deposits to guarantee replacement in the event of failure is restricted to special cases where the municipality's engineer adequately justifies any such requirement in writing. Where such justification has been made, submission of a bond or deposit shall be permitted instead of a specified experience period. The period of time for which the bond

or deposit is required should not exceed the experience period specified.

(13) Force Account Work.

(A) The municipality shall receive the Commissioner's prior written approval for use of the force account method for any planning, design work or construction work, unless the grant agreement stipulates the force account method.

(B) The Commissioner may approve the force account method upon the municipality's demonstration that it possesses the necessary competence required to accomplish such work and that the work can be accomplished more economically by use of the force account method or emergency circumstances dictate its use.

(C) Use of the force account method for construction work shall generally be limited to minor portions of a project.

(14) Code of Conduct.

(A) The municipality shall maintain a written code or standard of conduct which shall govern the performance of its officers, employees, or agents engaged in the award and administration of subagreements supported by state funds. No employee, officer or agent of the municipality shall participate in the selection, award or administration of a subagreement supported by state funds if a conflict of interest, real or apparent, would be involved.

(B) Such a conflict would arise when:

(i) any employee, officer or agent of the municipality, any member of the immediate families, or their partners, have a financial or other interest in the firm selected for award; or

(ii) an organization which may receive or has been awarded a subagreement employs, or is about to employ, any person under subparagraph (B) (i) of this subdivision.

(C) The municipality's officers, employees or agents shall neither solicit nor accept gratuities, favors or anything of monetary value from contractors, potential contractors or other parties to subagreements.

(D) Municipalities may set minimum rules where the financial interest is not substantial or the gift is an unsolicited item of nominal value.

(E) To the extent permitted by state or local law or regulations, the municipality's code of conduct shall provide for penalties, sanctions or other disciplinary actions for violations of the code by the municipality's officers, employees or agents or by contractors or their agents.

(15) Payment to Consultants.

(A) For all state assistance agreements, the state shall limit its participation in the salary rate (excluding overhead) paid to individual consultants retained by a municipality or by a municipality's contractors or subcontractors to the maximum daily rate for a GS-18 federal employee. (Municipality's may, however, pay contractors and subcontractors more than this amount.) This limitation applies to consultation services of designated individuals with specialized skills who are paid at a daily or hourly rate. The rate does not include transportation and subsistence costs for travel performed; municipalities shall pay these costs in accordance with their normal travel reimbursement practices.

(B) Subagreements with firms for services which are awarded using these procurement requirements are not affected by this limitation.

(16) Cost and Price Considerations.

(A) The municipality shall conduct a cost analysis of all negotiated change orders and all negotiated subagreements estimated to exceed \$10,000.

(B) The municipality shall conduct a price analysis of all formally advertised procurements estimated to exceed \$10,000, if there are fewer than three bidders.

(C) For negotiated procurement, contractors and subcontractors shall submit cost or pricing data in support of their proposals to the municipality.

(17) Small Purchases.

(A) Small Purchase Procurement. If the aggregate amount involved in any one procurement transaction does not exceed \$10,000, including estimated handling and freight charges, overhead and profit, the municipality may use small purchase procedures.

(B) Small Purchase Procedures. Small purchase procedures are relatively simple procurement methods that are sound and appropriate for procurement of services, supplies or other property costing in the aggregate not more than \$10,000.

(C) Requirements for Competition.

(i) Municipalities shall not divide a procurement into smaller parts to avoid the dollar limitation for competitive procurement.

(ii) Municipalities shall obtain price or rate quotations from an adequate number of qualified sources.

(18) Negotiation and Award of Subagreements.

(A) Unless the request for proposals states that an award may be based on initial offers alone, the municipality shall conduct meaningful negotiations with the best qualified offerors with acceptable proposals within the competitive range, and permit revisions to obtain best and final offers. The best qualified offerors shall have equal opportunities to negotiate or revise their proposals. During negotiations, the municipality shall not disclose the identity of competing offerors or any information from competing proposals.

(B) The municipality shall award the subagreement to the responsible offeror whose proposal is determined in writing to be the most advantageous to the municipality, taking into consideration price and other evaluation criteria set forth in the request for proposals.

(C) The municipality shall promptly notify unsuccessful offerors that their proposals were rejected.

(D) The municipality shall document its procurement file to indicate how proposals were evaluated, what factors were used to determine the best qualified offerors within the competitive range, and what factors were used to determine the subagreement award.

(19) Optional Selection Procedure for Negotiation and Award of Subagreements for Architectural and Engineering Services.

(A) The municipality may evaluate and select an architect or engineer using the procedures in this subdivision in place of the procedures in "Negotiation and Award of Subagreements" in subdivision (18) of this subsection.

(B) The municipality may use responses from requests for statements of qualifications to determine the most technically qualified architects or engineers.

(C) After selecting and ranking the most qualified architects or engineers, the municipality shall request technical proposals from those architects or engineers and inform them of the evaluation criteria the municipality will use to rank the proposals.

(D) The municipality shall then select and determine, in writing, the best technical proposal.

(E) After selecting the best proposal, the municipality shall attempt to negotiate fair and reasonable compensation with that offeror.

(F) If the municipality and the offeror of the best proposal cannot agree on the amount of compensation, the municipality shall formally terminate negotiations with that offeror. The municipality shall then negotiate with the offeror with the next best proposal. This process shall continue until the municipality reaches agreement on compensation with an offeror with an acceptable proposal. Once the municipality terminates negotiations with an offeror, the municipality cannot go back and renegotiate with that offeror.

(20) Noncompetitive Negotiation Procurement Method. Noncompetitive negotiation may be used only when the award of a subagreement is not feasible under small purchase, formal advertising, or competitive negotiation procedures. The municipality may award a noncompetitively negotiated subagreement only under the following circumstances:

(A) the item is available only from a single source;

(B) a public exigency or emergency exists and the urgency for the requirement will not permit a delay incident to competitive procurement; or

(C) after solicitation from a number of sources, competition is determined to be inadequate.

(21) Use of the Same Architect or Engineer During Construction.

(A) If the municipality is satisfied with the qualifications and performance of the architect or engineer who provided any or all of the planning or design services for the project, it may wish to retain that firm or individual during construction of the project. The municipality may do so without further public notice and evaluation of qualifications provided that it received financial assistance for the planning and/or design services and selected the architect or engineer in accordance with these procurement regulations.

(B) However, if the municipality uses the procedures in subparagraph (A) of this subdivision to retain an architect or engineer, any construction subagreements between the architect or engineer and the municipality shall meet the procurement provisions of subdivision (i) (5) of this section.

(22) Negotiation of Subagreements.

(A) Formal advertising, with adequate purchase descriptions, sealed bids, and public openings shall be the required method of procurement unless negotiation under subparagraph (B) of this subdivision is necessary to accomplish sound procurement.

(B) All negotiated procurement shall be conducted in a manner to provide to the maximum practicable extent open and free competition appropriate to the type of project work to be performed. The municipality is authorized to negotiate subagreements if any of the following conditions exist:

(i) public exigency will not permit the delay incident to formally advertised procurement (e.g. an emergency procurement); or

(ii) the aggregate amount involved does not exceed \$10,000; or

(iii) the material or service to be procured is available from only one person or entity. If the procurement is expected to aggregate more than \$10,000, the municipality shall document its file with a justification of the need for noncompetitive procurement, and provide such documentation to the Commissioner on request; or

(iv) the procurement is for personal or professional services (including architectural or engineering services) or for any service that a university or other educational institution may render; or

(v) no responsive, responsible bids at acceptable price levels have been received after formal advertising and the Commissioner's prior written approval has been obtained; or

(vi) the procurement is for materials or services where the price is established by law; or

(vii) the procurement is for technical items or equipment requiring standardization and interchangeability of parts with existing equipment; or

(viii) the procurement is for experimental, developmental or research services.

(23) Enforcement. If the Commissioner determines that the municipality has failed to comply with any of the provisions of this subsection, he or she may impose any of the following sanctions:

(A) the grant may be terminated or annulled under subsection (t) of this section; or

(B) project costs directly related to the noncompliance may be disallowed; or

(C) payment otherwise due to the municipality of up to 10 percent may be withheld; or

(D) project work may be suspended under subdivision (g) (6) of this section; or

(E) a noncomplying municipality may be found nonresponsible or ineligible for future state funding assistance or a noncomplying contractor may be found nonresponsible or ineligible for approval for future contract awards under state grants; or

(F) an injunction may be entered or other equitable relief afforded by a court of appropriate jurisdiction; or

(G) such other administrative or judicial action may be instituted if it is legally available and appropriate.

(24) Contract Enforcement and Commissioner Authority. At the request of a municipality, the Commissioner is authorized to provide technical and legal assistance in the administration and enforcement of any contract related to pollution abatement facilities for which a state grant was made and to intervene in any civil action involving the enforcement of such contracts, including contract disputes which are the subject of either arbitration or court action in accordance with the requirements of subdivision (f) (1) of this section.

(i) Architectural/Engineering Procurement Requirements.

(1) Type of Contract (Subagreement).

(A) General. Cost-plus-percentage-of-cost and percentage-of-construction-cost contracts are prohibited. Cost reimbursement, fixed price, or per diem contracts or combinations of these may be negotiated for architectural or engineering services. A fixed price contract is generally used only when the scope and extent of work to be performed is clearly defined. In most other cases, a cost reimbursement type of contract is more appropriate. A per diem contract may be used if no other type of contract is appropriate. An incentive fee may be used if the municipality submits an adequate independent cost estimate and price comparison.

(B) Cost Reimbursement Contract. Each cost reimbursement contract shall clearly establish a cost ceiling which the engineer may not exceed without formally amending the

contract and a fixed dollar profit which may not be increased except in the case of a contract amendment to increase the scope of work.

(C) Fixed Price Contract. An acceptable fixed price contract is one which establishes a guaranteed maximum price which may not be increased unless a contract amendment increases the scope of work.

(D) Compensation Procedures. If, under either a cost reimbursement or fixed price contract, the municipality desires to use a multiplier type of compensation, all of the following must apply:

(i) the multiplier and the portions of the multiplier allocable to overhead and allocable to profit have been specifically negotiated;

(ii) the portion of the multiplier allocable to overhead includes only allowable items of cost under the cost principles;

(iii) the portions of the multiplier allocable to profit and allocable to overhead have been separately identified in the contract; and

(iv) the fixed price contract includes a guaranteed maximum price for completion of the specifically defined scope of work; and the cost reimbursement contract includes a fixed dollar profit which may not be increased except in the case of a contract amendment which increases the scope of work.

(E) Per Diem Contracts. A per diem agreement may be utilized only after a determination that a fixed price or cost reimbursement type contract is not appropriate. Per diem agreements should be used only to a limited extent, e.g., where the first task under the planning agreement involves establishing the scope and cost of succeeding planning tasks or for incidental services such as expert testimony or intermittent professional or testing services. (Resident engineer and resident inspection services should generally be compensated at cost plus fixed fee). Cost and profit included in the per diem rate must be specifically negotiated and displayed separately in the engineer's proposal.

The contract must clearly establish a price ceiling which may not be exceeded without formally amending the contract.

(2) Public Notice. Adequate public notice must be given of the requirement for architectural or engineering services for all subagreements.

(A) Public Announcement. A notice of request for qualifications should be published in professional journals, newspapers, or publications of general circulation over a reasonable area and, in addition, if desired, through posted public notices or written notification directed to interested persons, firms, or professional organizations inviting the submission of statements of qualifications. The announcement must clearly state the deadline and place for submission of qualification statements.

(B) Exceptions. Public notice is not required under the following circumstances:

(i) for design or construction phases of a grant funded project if the municipality is satisfied with the qualifications and performance of any engineer who performed all or any part of the planning or design work and the engineer has the capacity to perform the subsequent steps; and

(ii) the municipality desires the same engineer to provide architectural or engineering services for the subsequent steps or for subsequent segments of design work in one project, if a single pollution abatement facility is segmented into two or more construction projects.

If the design work is accordingly segmented so that the initial contract for preparation of construction drawings and specifications does not cover the entire pollution abatement facility to be built under one grant then the municipality may use the same engineering firm that was selected for the initial segment of design work for subsequent segments.

(3) Evaluation of Qualifications.

(A) The municipality shall review the qualifications of firms which responded to the announcement or were on the prequalified list and shall uniformly evaluate the firms.

(B) Qualifications shall be evaluated through an objective process (e.g., the appointment of a board or committee which, to the extent practicable, should include persons with technical skills).

(C) Criteria which should be considered in the evaluation of candidates for submission of proposals should include:

(i) specialized experience and technical competence of the candidate or firm and its personnel (including a joint venture, association or professional subcontractor) considering the type of services required and the complexity of the project;

(ii) past record of performance on contracts with the municipality, other government agencies or public bodies, and with private industry, including such factors as control of costs, quality of work, and ability to meet schedules;

(iii) the candidate's capacity to perform the work (including any specialized services) within the time limitations, considering the firm's current and planned workload;

- (iv) the candidate's familiarity with the types of problems applicable to the project; and
- (v) avoidance of personal and organizational conflicts of interest.
- (4) Solicitation and Evaluation of Proposals.
- (A) Solicitation of Professional Services Proposals.

(i) Requests for professional services proposals shall be sent to no fewer than three candidates who either responded to the public announcement or were selected from the prequalified list, unless, after good faith effort to solicit qualifications, fewer than three qualified candidates respond, in which case all qualified candidates shall be provided requests for proposals.

(ii) Requests for professional services proposals shall be in writing and must contain the information necessary to enable a prospective offeror to prepare a proposal properly. The request for proposals shall include a solicitation statement and shall inform offerors of the evaluation criteria.

(iii) Submission deadline. Requests for proposals shall clearly state the deadline and place for submission.

(B) Evaluation of Proposals.

(i) All proposals submitted in response to the request for professional services proposals shall be uniformly evaluated. The municipality shall also evaluate the candidates' proposed method of accomplishing the work required.

(ii) Proposals shall be evaluated through an objective process (e.g., the appointment of a board or committee) which, to the extent practicable, should include persons with technical skills. Oral (including telephone) or written interviews should be conducted with top rated proposers and information derived therefrom shall be treated on a confidential basis.

(iii) Municipalities shall base their determinations of qualified offerors and acceptable

proposals solely on the evaluation criteria stated in the request for proposals.

(5) Negotiation.

(A) Municipalities are responsible for negotiation of their contracts for architectural or engineering services. Contract procurement, including negotiation, may be performed by the municipality directly or by another person or firm retained for that purpose. Contract negotiations may include the services of technical, legal, audit, or other specialists to the extent appropriate.

(B) Negotiations may be conducted in accordance with state or local requirements, as long as they meet the minimum requirements as set forth in this subdivision.

(C) The object of negotiations with any candidate shall be to reach agreement on the provisions of the proposed contract. The municipality and the candidate shall discuss, at a minimum:

(i) the scope and extent of work and other essential requirements;

(ii) identification of the personnel and facilities necessary to accomplish the work within the required time including, where needed, employment of additional personnel, subcontracting, joint venture, etc;

(iii) provisions of the required technical services in accordance with regulations and criteria established for the project; and

(iv) a fair and reasonable price for the required work, to be determined in accordance with the cost and profit considerations.

(6) Cost and Price Considerations.

(A) The candidate(s) selected for negotiation shall submit to the municipality for review sufficient cost and pricing data to enable the municipality to ascertain the necessity and reasonableness of costs and amounts proposed and the allowability and eligibility of costs proposed.

(B) The municipality shall submit the following to the Commissioner for review:

(i) documentation of the public notice of need for architectural or engineering services and selection procedures;

(ii) the cost and pricing data the selected engineer submitted;

(iii) a certification of review and acceptance of the selected engineer's cost and price; and

(iv) a copy of the proposed subagreement.

(C) The Commissioner shall review the complete subagreement procurement procedure and approve the municipality's compliance with appropriate procedures before the municipality awards the subagreement.

(D) Cost Review.

(i) The municipality shall review proposed subagreement costs.

(ii) At a minimum, proposed subagreement costs shall be presented on EPA form 5700-41 on which the selected engineer shall certify that the proposed costs reflect complete, current, and accurate cost and pricing data applicable to the date of anticipated subagreement award.

(iii) In addition to the specific elements of cost, the estimated amount of profit shall be set forth separately in the cost summary for fixed price contracts and a maximum total dollar amount of profit shall be set forth separately in the cost summary for cost reimbursement
#### contracts.

(iv) The municipality may require more detailed cost data than the form requires in order to substantiate the reasonableness of proposed subagreement costs. The Commissioner may require more detailed documentation only when the selected engineer is unable to certify that the cost and pricing data used are complete, current, and accurate. The Commissioner may, on a selected basis, perform a pre-award cost analysis on any subagreement. A provisional overhead rate should be agreed upon before contract award.

(v) The engineer shall have an accounting system which accounts for costs in accordance with generally accepted accounting principles. This system shall provide for the identification, accumulation, and segregation of allowable and unallowable project costs among projects. Allowable project costs shall be determined by the Commissioner. The engineer shall propose and account for costs in a manner consistent with his normal accounting procedures.

(vi) Subagreements awarded on the basis of a review of a cost element summary and a certification of complete, current, and accurate cost and pricing data shall be subject to downward renegotiation or recoupment of funds where the Commissioner determines that such certification was not based on complete, current, and accurate cost and pricing data or was not based on allowable costs at the time of award.

(7) Profit. The objective of negotiations shall be the exercise of sound judgment and good administrative practice including the determination of a fair and reasonable profit based on the firm's assumption of risk and input to total performance and not merely the application of a predetermined percentage factor. For the purpose of subagreements under state grants, profit is defined as the net proceeds obtained by deducting all allowable costs (direct and indirect) from the price. (This definition of profit may vary from the firm's definition of profit for other purposes.) Profit on a subagreement and each amendment to a subagreement under a grant should be sufficient to attract engineers who possess the talent and skills necessary for the accomplishment of project objectives and to stimulate efficient and expeditious completion of the project. Where cost review is performed, the municipality should review the estimate of profit as it reviews all other elements of price.

(8) Award of Subagreement.

(A) The municipality shall obtain the written approval of the Commissioner prior to the award of any subagreement or amendment.

(B) The municipality shall promptly notify unsuccessful candidates.

(9) Required Solicitation and Subagreement Provisions.

(A) Required solicitation statement. Requests for qualifications or proposals must include the following statement, as well as the proposed terms of the subagreement.

Any contract awarded under this request for qualifications or professional proposals is expected to be funded in part by the State of Connecticut, Department of Environmental Protection. This procurement will be subject to requirements contained in subsections (h), (i) and (o) of this section. The State of Connecticut will not be a party to this request for qualifications or professional proposals or any resulting contract.

(B) Content of subagreement. Each subagreement shall adequately define the scope and extent of project work; the time for performance and completion of the contract work including, where appropriate, dates for completion of significant project tasks; personnel

and facilities necessary to accomplish the work within the required time; the extent of subcontracting and consultant agreements; and payment provisions. If any of these elements cannot be defined adequately for later tasks or steps at the time of contract execution, the contract should not include the subsequent tasks or steps at that time.

(10) Subagreement Payments. The municipality shall make payment to the engineer in accordance with the payment schedule incorporated in the engineering agreement. Any retainage is at the option of the municipality. No payment request made by the engineer under the agreement may exceed the estimated amount and value of the work and services performed.

(11) Subcontracts under Subagreements. Neither award and execution of subcontracts under a prime contract for architectural or engineering services nor the procurement and negotiation procedures used by the engineer in awarding such subcontracts are required to comply with any of the provisions, selection procedures, policies or principles set forth herein.

(j) **Construction Contract Procurement Requirements.** (This section applies to construction contracts in excess of \$10,000 awarded by municipalities for any construction projects.)

(1) Type of Contract. Each contract shall be a fixed price (lump sum or unit price or a combination of the two) contract, unless the Commissioner gives advance written approval for the municipality to use some other acceptable type of contract. The cost-plus-percentage-of-cost contract shall not be used in any event.

(2) Formal Advertising. Each contract shall be awarded after formal advertising, unless negotitations are permitted in accordance with subdivision (18) of subsection (h) of this section. Formal advertising shall be in accordance with the following:

(A) Adequate Public Notice. The municipality will cause adequate notice to be given of the solicitation by publication in newspapers or journals of general circulation beyond the municipality's locality (statewide, generally), inviting bids on the project work and stating the method by which bidding documents may be obtained or examined. Where the estimated cost of construction is 10 million dollars or more, the municipality shall publish the notice in trade journals of nationwide distribution. The municipality may solicit bids directly from bidders if it maintains a bidders list.

(B) Adequate Time for Preparing Bids. Adequate time, generally not less than 30 days, shall be allowed between the date when public notice is first published and the date by which bids must be submitted. Bidding documents including specifications and drawings shall be available to prospective bidders from the date when such notice is first published.

(C) Adequate Bidding Documents. The municipality shall prepare a reasonable number of bidding documents, invitations for bids and shall furnish them upon request on a firstcome, first-serve basis. The municipality shall maintain a complete set of bidding documents and shall make them available for inspection and copying by any party. The bidding documents shall include:

(i) a complete statement of the work to be performed, including necessary drawings and specifications, and the required completion schedule;

(ii) the terms and conditions of the contract to be awarded;

(iii) a clear explanation of the method of bidding, the method of evaluation of bid prices,

and the basis and method for award of the contract;

(iv) responsibility requirements or criteria which will be employed in evaluating bidders;

(v) the following statement:

Any contract or contracts awarded under this invitation for bids are expected to be funded in part by the State of Connecticut, Department of Environmental Protection. Neither the State of Connecticut nor any of its departments, agencies or employees is or will be a party to this invitation for bids or any resulting contract. This procurement will be subject to the requirements contained in subsections (h), (j) and (o) of this section;

(vi) a copy of subsections (h), (j) and (o) of this section; and

(vii) the prevailing State Wage Determination, as applicable.

(D) Sealed Bids. The municipality shall provide for bidding by sealed bid and for the safeguarding of bids received until public opening.

(E) Addenda to Bidding Documents. If a municipality desires to amend any part of the bidding documents (including drawings and specifications) during the period when bids are being prepared, the addenda shall be communicated in writing to all firms which have obtained bidding documents at least five (5) working days prior to the bid opening.

(F) Bid Modifications. A firm which has submitted a bid shall be allowed to modify or withdraw its bid before the time of bid opening.

(G) Public Opening of Bids. The municipality shall provide for a public opening of bids at the place, date and time announced in the bidding documents.

(H) Award to the Low, Responsive, Responsible Bidder.

(i) After bids are opened, the municipality shall evaluate them in accordance with the methods and criteria set forth in the bidding documents.

(ii) The municipality may reserve the right to reject all bids. Unless all bids are rejected for good cause, award shall be made to the low, responsive, responsible bidder.

(iii) If the municipality intends to make the award to a firm which did not submit the lowest bid, it shall prepare a written statement before any award, explaining why each lower bidder was deemed nonresponsible or nonresponsive. The municipality shall retain such statement in its files and forward a copy to the Commissioner for review.

(iv) Local laws, ordinances, regulations or procedures which are designed or which operate to give local bidders preference over other bidders shall not be employed in evaluating bids.

(v) If an unresolved procurement review issue or a protest relates only to award of a subcontract or procurement of an item under the prime contract and resolution of that issue or protest is unduly delaying performance of the prime contract, the Commissioner may authorize award and performance of the prime contract before resolution of the issue or protest, if the Commissioner determines that resolution of the protest will not affect the placement of the prime contract; and that award of the prime contract is in the state's best interest, will not materially affect the resolution of the protest, and is not barred by state or local law.

(vi) The municipality shall not reject a bid as nonresponsive for failure to list or otherwise indicate the selection of a subcontractor(s) or equipment, unless the municipality has unambiguously stated in the solicitation documents that such failure to list shall render a bid nonresponsive and shall cause rejection of a bid.

#### (k) Negotiation of Contract Amendments (Change Orders).

(1) The municipality is responsible for the negotiation of construction contract change orders. This function may be performed by the municipality directly or, if authorized, by its engineer. During negotiations with the contractor the municipality shall:

(A) make certain that the contractor has a clear understanding of the scope and extent of work and other essential requirements;

(B) assure that the contractor demonstrates that he will make available or will obtain the necessary personnel, equipment and materials to accomplish the work within the required time; and

(C) assure a fair and reasonable price for the required work.

(2) The contract price or time may be changed only by a change order. When negotiations are required, they shall be conducted in accordance with subdivisions (3) and (4) of this subsection as appropriate. The value of any work covered by a change order, or of any claim for increase or decrease in the contract price, shall be determined by the method set forth in subparagraphs (A) to (C) of this subdivision, whichever is most advantageous to the municipality.

(A) Unit prices.

(i) Original bid items. Unit prices previously approved are acceptable for pricing changes of original bid items. However, when changes in quantities exceed 15 percent of the original bid quantity and the total dollar change of that bid item is significant, the municipality shall review the unit price to determine if a new unit price should be negotiated.

(ii) New items. Unit prices of new items shall be negotiated.

(B) Lump Sums shall be negotiated.

(C) Cost reimbursement. The actual cost for labor, direct overhead, materials, supplies, equipment, and other services necessary to complete the work plus an amount to be agreed upon to cover the cost of general overhead and profit to be negotiated.

(3) For each change order not in excess of \$100,000 the contractor shall submit sufficient cost and pricing data to the municipality to enable the municipality to determine the necessity and reasonableness of costs and amounts proposed, and the allowability and eligibility of costs proposed.

(4) For each change order in excess of \$100,000, the contractor shall submit to the municipality for review sufficient cost and pricing data as described in subparagraphs (A) to (E) of this subdivision to enable the municipality to ascertain the necessity and reasonableness of costs and amounts proposed, and the allowability and eligibility of costs proposed.

(A) The contractor shall certify that proposed costs reflect complete, current, and accurate cost and pricing data applicable to the date of the change order.

(B) In addition to the specific elements of cost, the estimated amount of profit shall be set forth separately in the cost summary for fixed price change orders and a specific total dollar amount of profit will be set forth separately in the cost summary for cost reimbursement change orders.

(C) The municipality may require more detailed cost data in order to substantiate the reasonableness of proposed change order costs. The Commissioner may, on a selected basis, perform a detailed cost analysis on any change order.

(D) For costs under cost reimbursement change orders, the contractor shall have an accounting system which accounts for such costs in accordance with generally accepted accounting principles. This system shall provide for the identification, accumulation and segregation of allowable and unallowable change orders. Allowable change order costs shall be determined in accordance with subsections (a), (b), (c), (d) and (e) of this section. The contractor shall propose and account for such costs in a manner consistent with his normal accounting procedures.

(E) Change orders awarded on the basis of review of a cost element summary and a certification of complete, current, and accurate cost and pricing data shall be subject to downward renegotiation and recoupment of funds where a subsequent audit substantiates that such certification was not based on complete, current and accurate cost and pricing data.

(5) Review by Commissioner. The municipality shall submit, before the execution of any change order in excess of \$100,000, to the Commissioner for review and approval:

(A) the cost and pricing data the contractor submitted;

- (B) a certification of review and acceptance of the contractor's cost or price; and
- (C) a copy of the proposed change order.

(6) Profit. The objective of negotiations shall be the exercise of sound business judgment and good administrative practice, including the determination of a fair and reasonable profit based on the contractor's assumption of risk and input to total performance, and not merely the application of a predetermined percentage factor. For the purpose of negotiated change orders to construction contracts profit is defined as the net proceeds obtained by deducting all allowable costs (direct and indirect) from the price. The municipality should review the estimate of profit as it reviews all other elements of price.

(7) Related Work. Related work shall not be split into two amendments or change orders merely to keep it under \$100,000 and thereby avoid the requirements of subdivision (4) of this subsection. For change orders which include both additive and deductive items:

(A) if any single item (additive or deductive) exceeds \$100,000 the requirements of subdivision (4) of this subsection shall be applicable;

(B) if no single additive or deductive item has a value of \$100,000 but the total price of the change order is over \$100,000, the requirements of subdivision (4) of this subsection shall be applicable; and

(C) if the total of additive items of work in the change order exceeds \$100,000, or the total of deductive items of work in the change order exceeds \$100,000, and the net price of the change order is less than \$100,000, the requirements of subdivision (4) of this subsection shall be applicable.

#### (l) Subcontracts under Construction Contracts.

(1) The award or execution of subcontracts by a prime contractor under a construction contract awarded to the prime contractor by the municipality and the procurement and negotiation procedures used by prime contractors in awarding or executing subcontracts are not required to comply with any of the provisions, selection procedures, policies or principles set forth in subsection (h) or (j) of this section, except those specifically stated in this section. In addition, the bid protest procedures in subsection (o) of this section are not available to parties executing subcontracts with prime contractors, except as specifically

provided in subsection (o) of this section.

(2) The award or execution of subcontracts by a prime contractor under a formally advertised, competitively bid, fixed price construction contract awarded to the prime contractor by the municipality, and the procurement and negotiation procedures used by such prime contractors in awarding or executing such subcontracts shall comply with any municipality procurement system, state, small, minority and women's business policy (section 22a-482-4 (h) (9)), negotiation of contract amendments (section 22a-482-4 (k)), and subdivisions (8) and (9) of section 22a-482-4 (g).

#### (m) Progress Payments to Contractors.

(1) Except as state law otherwise provides, municipalities shall make prompt progress payments to prime contractors and prime contractors should make prompt progress payments to subcontractors and suppliers for eligible construction, material, and equipment costs, including those of undelivered, specifically manufactured equipment, incurred under a contract under this program. The Clean Water Fund shall only be obligated to pay the municipality amounts that the municipality is actually going to pay contractors.

(2) Conditions of Progress Payments. For purposes of this subsection, progress payments are defined as follows:

(A) payments for work in place; or

(B) payments for materials or equipment which have been delivered to the construction site, or which are stockpiled in the vicinity of the construction site, in accordance with the terms of the contract, when conditional or final acceptance is made by or for the municipality. The municipality shall assure that items for which progress payments have been made are adequately insured and are protected through appropriate security measures. Costs of such insurance and security are allowable costs; or

(C) payments for undelivered, specifically manufactured items or equipment (excluding off-the-shelf or catalog items) as work on them progresses. Such payments shall be made if provisions therefor are included in the bid and contract documents. Such provisions may be included at the option of the municipality only when all of the following conditions exist:

(i) the equipment is so designated in the project specifications;

(ii) the equipment to be specifically manufactured for the project could not be readily utilized on, nor diverted to, another job; and

(iii) a fabrication period of more than 6 months is anticipated.

(3) Protection of Progress Payments Made for Specifically Manufactured Equipment. The municipality shall assure protection of the state's interest in progress payments made for items or equipment referred to in subparagraph (2) (C) of this subsection. The protection shall be acceptable to the municipality and shall take the form of:

(A) securities negotiable without recourse, condition or restrictions, a progress payment bond, or an irrevocable letter of credit provided to the municipality through the prime contractor by the subcontractor or supplier; and

(B) for items or equipment in excess of \$200,000 in value which are manufactured in a jurisdiction in which the Uniform Commercial Code is applicable, the creation and perfection of a security interest under the Uniform Commercial Code which is reasonably adequate to protect the interests of the municipality.

(4) Limitations on Progress Payments for Specifically Manufactured Equipment.

(A) Progress payments made for specifically manufactured equipment or items shall be limited to the following:

(i) a first payment upon submission by the prime contractor of shop drawings for the equipment or items in an amount not exceeding 15 percent of the contract or item price plus appropriate and allowable higher tier costs; and

(ii) subsequent to the municipality's release or approval for manufacture, additional payments not more frequently than monthly thereafter up to 75 percent of the contract or item price plus appropriate and allowable higher tier costs. However, payment may also be made in accordance with the contract and grant terms and conditions for ancillary onsite work before delivery of the specifically manufactured equipment or items.

(B) In no case may progress payments for undelivered equipment or items under subparagraphs (A) (i) or (A) (ii) of this subdivision be made in an amount greater than 75 percent of the cumulative incurred costs allocable to contract performance with respect to the equipment or items. Submission of a request for any such progress payments shall be accompanied by a certification furnished by the fabricator of the equipment or item that the amount of progress payment claimed constitutes not more than 75 percent of cumulative incurred costs allocable to contract performance and, in addition, in the case of the first progress payment request, a certification that the amount claimed does not exceed 15 percent of the contract or item price quoted by the fabricator.

(C) As used in this subsection, the term "costs allocable to contract performance" with respect to undelivered equipment or items includes all expenses of contract performance which are reasonable, allocable to the contract, consistent with sound and generally accepted accounting principles and practices consistently applied and which are not excluded by the contract.

(5) Enforcement. A subcontractor or supplier which is determined by the Commissioner to have frustrated the intent of the provisions regarding progress payments for major equipment or specifically manufactured equipment through intentional forfeiture of its bond or failure to deliver the equipment may be determined nonresponsible and ineligible for further work under state funded projects.

(6) Contract Provisions. Where applicable, appropriate provisions regarding progress payments shall be included in each contract and subcontract.

(7) Implementation. The foregoing progress payments policy should be implemented in invitations for bids for projects funded by the Clean Water Fund. If provision for progress payments is made after contract award, it shall be for consideration that the municipality deems adequate.

#### (n) Retention from Progress Payments.

(1) The municipality may retain a portion of the amount otherwise due the contractor. The amount the municipality retains shall be limited to the following:

(A) withholding of not more than 5 percent of the payment claimed until work is 50 percent complete;

(B) when work is 50 percent complete, reduction of the withholding to 2 percent of the dollar value of all work satisfactorily completed to date, provided that the contractor is making satisfactory progress and there is no specific cause for greater withholding;

(C) when the work is substantially complete (operational or beneficial occupancy), the

withheld amount shall be further reduced below 2 percent to only that amount necessary to assure completion;

(D) the municipality may reinstate up to 5 percent withholding if the municipality determines, at its discretion, that the contractor is not making satisfactory progress or there is other specific cause for such withholding; and

(E) the municipality may accept securities, negotiable without recourse, condition or restrictions, a release of retainage bond, or an irrevocable letter of credit provided by the contractor instead of all or part of the cash retainage.

(2) The requirements set out in subdivision (1) of this subsection shall be implemented with respect to all construction projects. Appropriate provision to assure compliance with these requirements shall be included in the bid documents for such projects initially or by addendum before the bid submission date and as a special condition in the funding agreement or in an amendment which is issued by the Commissioner.

(3) A municipality which delays disbursement to contractors of funds will be required to credit to the Clean Water Fund all interest earned on those funds and will be responsible for any and all tax law violations which occur as a result of their actions.

#### (o) Protests.

(1) General. A protest based upon an alleged violation of the procurement requirements may be filed against a municipality's procurement action by a party with an adversely affected direct financial interest. Any such protest must be received by the municipality within the time period in subparagraph (2) (A) of this subsection. The municipality is responsible for resolution of the protest before taking the protested action, in accordance with subdivision (4) of this subsection, except as otherwise provided by subdivision (9) of this subsection or subparagraph (j) (2) (H) (v).

(2) Time Limitations.

(A) A protest under subdivision (4) of this subsection should be made as early as possible during the procurement process to avoid disruption of, or unnecessary delay to, the procurement process. A protest authorized by subdivision (4) of this subsection shall be received by the municipality within one week after the basis for the protest is known or should have been known, whichever is earlier.

(i) In the case of an alleged violation of the specification requirements of subdivision (h) (12) of this section (e.g., that a product fails to qualify as an "or equal"), a protest need not be filed prior to the opening of bids. The municipality may resolve the issue before receipt of bids or proposals through a written or other formal determination, after notice and opportunity to comment is afforded to any party with a direct financial interest.

(ii) When an alleged violation of the specification requirements of subdivision (h) (12) of this section first arises subsequent to the receipt of bids or proposals, the municipality shall make a determination on the protest, if the protest was received by the municipality within one week of the time that the municipality's written or other formal notice is first received.

(B) A protest authorized under this subsection shall be filed in a court of competent jurisdiction within the locality of the municipality within one week after the complainant has received the municipality's determination.

(C) If a protest is mailed, the complaining party bears the risk of nondelivery within the

required time period. All documents transmitted in accordance with this section shall be mailed (by certified mail return receipt requested) or otherwise delivered in a manner which will objectively establish the date of receipt. Initiation of protest actions under subdivisions (4) or (5) of this subsection may be made by brief telegraphic notice accompanied by prompt mailing or other delivery of a more detailed statement of the basis for the protest. Telephone protests will not be considered.

(3) Other Initial Requirements.

(A) The initial protest document shall briefly state the basis for the protest and should:

(i) refer to the specific portions of sections 22a-482-1 to 22a-482-4 which allegedly prohibit the procurement action;

(ii) specifically request a determination pursuant to this section;

(iii) identify the specific procurement document(s) or portion(s) of them in issue; and

(iv) include the name, telephone number, and address of the person representing the protesting party.

(B) The party filing the protest shall concurrently transmit a copy of the initial protest document and any attached documentation to all other parties with a direct financial interest which may be adversely affected by the determination of the protest (all bidders or proposers who appear to have a substantial and reasonable prospect of receiving an award if the protest is denied or sustained) and to the Commissioner.

(4) Municipality Determination.

(A) The municipality is responsible for the initial resolution of protests based upon alleged violations of the procurement requirements.

(B) When the municipality receives a timely written protest, it must defer the protested procurement action in accordance with subdivision (7) of this subsection; and:

(i) afford the complaining party and interested parties an opportunity to present arguments in support of their views in writing or at a conference or other suitable meeting (such as a city council meeting);

(ii) inform the complainant and other interested parties of the procedures which the municipality will observe for resolution of the protest;

(iii) obtain an appropriate extension of the period for acceptance of the bid and bid bond(s) of each interested party, where applicable (failure to agree to a suitable extension of such bid and bid bond(s) by the party which initiated the protest shall be cause for summary dismissal of the protest by the municipality or the Commissioner); and

(iv) promptly deliver (by certified mail, return receipt requested, or by personal delivery) its written determination of the protest to the complaining party and to each other participating party.

(C) The municipality's determination shall be accompanied by a legal opinion addressing issues arising under state or local law, if any and, when construction is involved, by an engineering report, if appropriate.

(D) The municipality should decide the protest as promptly as possible, generally within 3 weeks after receipt of a protest, unless extenuating circumstances require a longer period of time for proper resolution of the protest.

(5) Procedures.

(A) Where resolution of an issue properly raised with respect to a procurement

requirement necessitates prior or collateral resolution of a legal issue arising under state or local law and such law is not clearly established in published legal decisions of the state or other relevant jurisdiction, the municipality may rely upon:

(i) an opinion of the municipality's legal counsel adequately addressing the issue; or

(ii) the established or consistent practice of the municipality, to the extent appropriate; or

(iii) the law of other local jurisdictions as established in published legal decisions; or

(iv) if none of the foregoing adequately resolve the issue, published decisions of the Comptroller General of the United States (U.S. General Accounting Office) or of the federal or state courts addressing federal or state requirements comparable to procurement requirements of this section.

(B) A party who submits a document subsequent to initiation of a protest proceeding shall simultaneously furnish each of the other parties with a copy of such document.

(C) The procedures established herein are not intended to preclude informal resolution or voluntary withdrawal of protests. A complainant may withdraw its appeal at any time and the protest proceedings shall thereupon be terminated.

(D) A protest may be dismissed for failure to comply with procedural requirements set forth in this section.

(6) Burden of Proof.

(A) In protest proceedings, if the municipality proposes to award a formally advertised, competitively bid, fixed price contract to a party who has submitted the apparent lowest price, the party initiating the protest will bear the burden of proof.

(B) In protest proceedings:

(i) if the municipality proposes to award a formally advertised, competitively bid, fixed price contract to a bidder other than the bidder which submitted the apparent lowest price, the municipality shall bear the burden of proving that its determination concerning responsiveness is in accordance with Section 22a-482-1 to 22a-482-4; and

(ii) if the basis for the municipality's determination is a finding of nonresponsibility, the municipality shall establish and substantiate the basis for its determination and shall adequately establish that such determination has been made in good faith.

(7) Deferral of Procurement Action. Upon receipt of a protest, the municipality shall defer the protested procurement action (for example, defer the issuance of solicitations, contract award, or issuance of notice to proceed under a contract) until ten days after delivery of its determination to the participating parties. The municipality may receive or open bids at its own risk, if it considers this to be in its best interest. When the Commissioner has received a written protest, he or she shall notify the municipality promptly to defer its protested procurement action until notified of the formal or informal resolution of the protest.

(8) Enforcement. Noncompliance with the procurement provisions by the municipality shall be cause for enforcement action in accordance with one or more of the provisions of subdivision (h) (23) of this section.

(9) Limitation. A protest may not be filed with respect to the following:

(A) issues not arising under the procurement provisions; or

(B) issues relating to the selection of a consulting engineer, provided that a protest may

be filed only with respect to the mandatory procedural requirements of subsection (i) of this section; or

(C) issues primarily determined by local law or ordinance and as to which the Commissioner, upon review, determines that there is no contravening state requirement and that the municipality's action has a rational basis; or

(D) provisions of state regulations applicable to direct state contracts unless such provisions are explicitly referred to or incorporated in section 22a-482; or

(E) basic project design determinations; or

(F) award of subcontracts or issuance of purchase orders under formally advertised, competitively bid, lump sum construction contracts. However, protests may be made to alleged violations of the following:

(i) specification requirements of subdivision (h) (12) of this section; or

(ii) provisions applicable to the procurement procedures, negotiation or award of subcontracts or issuance of purchase orders under subsection (1) of this section.

(p) **Funding Assistance Conditions.** Financing for pollution abatement facilities shall be subject to the following conditions:

(1) Municipality Responsibilities.

(A) Review or approval of engineering reports, plans and specifications or other documents by the Commissioner is for administrative purposes only and does not relieve the municipality of its responsibility to properly plan, design, build and effectively operate and maintain the pollution abatement facilities described in the funding assistance agreement as required under law, regulations, permits, and good management practices. The Commissioner is not responsible for increased building costs resulting from defects in the plans, design drawings and specifications or other subagreement documents.

(B) By its acceptance of financing, the municipality agrees to complete the pollution abatement facilities in accordance with the engineering report, plans and specifications and related documents approved by the Commissioner and to maintain and operate the pollution abatement facilities to meet the enforceable requirements of the permit issued pursuant to section 22a-430 of the Connecticut General Statutes for the design life of the pollution abatement facilities. The Commissioner may seek specific enforcement or recovery of funds from the municipality, or take other appropriate action if he or she determines that the municipality has failed to make good faith efforts to meet its obligations under the grant/loan agreement.

(C) The municipality agrees to pay the non-state costs of the pollution abatement facilities construction associated with the project and commits itself to complete the construction of the operable pollution abatement facilities and the complete pollution abatement facilities of which the project is a part.

(2) Nondiscrimination. All contracts are subject to the Governor's Executive Order No. Three and to the guidelines and rules issued by the State Labor Commission to implement Executive Order No. Three.

(3) Wage Rates. Contracts involving construction work are subject to the appropriate state wage rates issued by the State Labor Commissioner and federal wage rates issued by the United States Department of Labor.

(4) Access. The municipality shall insure that the Commissioner and his or her duly

authorized agents shall have access to the project work whenever it is in preparation or progress. The municipality shall provide proper facilities for access and inspection. The municipality shall allow any authorized agent of the state to have access to any books, documents, plans, reports, papers, and other records of the contractor which are pertinent to the project for the purpose of making audit, examination, excerpts, copies and transcriptions. The municipality shall insure that a party to a subagreement shall provide access to the project work, sites, documents, and records.

(5) Project Changes.

(A) Minor changes in the project work that are consistent with the objectives of the project and within the scope of the funding agreement do not require the execution of a formal amendment before the municipality's implementation of the change. However, if such changes increase the costs of the project, the amount of the funding provided by the funding agreement may only be increased by a formal amendment.

(B) The municipality shall receive from the Commissioner a formal amendment before implementing changes which:

(i) alter the project performance standards; or

(ii) alter the type of treatment facilities provided by the project; or

(iii) delay or accelerate the project schedule; or

(iv) substantially alter the engineering report, design drawings and specifications, or the location, size, capacity, or quality of any major part of the project.

(6) Operation and Maintenance.

(A) The municipality shall make provisions satisfactory to the Commissioner for assuring economical and effective operation and maintenance of the pollution abatement facilities in accordance with a plan of operation approved by the Commissioner.

(B) The Commissioner shall not pay more than 50 percent of the grant share of any project unless the municipality has an approved final plan of operation and shall not pay more than 90 percent of the grant share of any project unless the municipality has an approved operation and maintenance manual.

(7) Adoption of User Charge System and Sewer Use Ordinance.

The municipality shall adopt the sewer use ordinance and implement the user charge system developed under subsections (e) and (f) of 22a-482-3 and approved by the Commissioner before the pollution abatement facilities are placed in operation. Further, the municipality shall implement the user charge system and sewer use ordinance for the useful life of the pollution abatement facilities.

(8) Value Engineering.

The municipality shall comply with the applicable requirements of section 22a-482-3 (d) for value engineering.

(9) Project Initiation and Completion.

(A) The municipality shall expeditiously initiate and complete the project in accordance with the project schedule contained in the funding agreement.

(B) The municipality shall initiate procurement action for building the project promptly after the award of financing. The Commissioner may annul or terminate the funding agreement if the municipality has not awarded the subagreements and issued a notice to proceed, where one is required, for building all significant elements of the project within

twelve (12) months of the closing. Failure to promptly award all subagreement(s) for building the project shall result in a limitation on allowable grant costs.

(10) Municipality Responsibility for Project Performance.

(A) The municipality shall select the engineer or engineering firm principally responsible for either supervising construction or providing architectural and engineering services during construction as the prime engineer to provide the following services during the first year following the initiation of operation:

(i) direct the operation of the project and revise the operation and maintenance manual for the project as necessary to accommodate actual operating experience;

(ii) train or provide for training of operating personnel, including the preparation of curricula and training material for operating personnel; and

(iii) advise the municipality whether the project is capable of meeting the project performance standards.

(B) On the date one year after the initiation of operation of the project the municipality shall certify to the Commissioner whether the project is capable of meeting the project performance standards. If the project does not meet the project performance standards, the municipality shall submit the following:

(i) a corrective action report which includes an analysis of the cause of the project's inability to meet the performance standards (including infiltration/inflow reduction) and estimates of the nature, scope and cost of the corrective action necessary to bring the project into compliance. Such corrective action report shall be prepared at other than state expense;

(ii) the schedule for undertaking, in a timely manner, the corrective action necessary to bring the project into compliance; and

(iii) the scheduled date for certifying to the Commissioner that the project is capable of meeting the project performance standards.

(C) Corrective action necessary to bring a project into compliance with the project performance standards shall be undertaken by the municipality at other than state expense.

(D) Nothing in this section shall be construed to prohibit a municipality from requiring more assurances, guarantees, or indemnity or other contractual requirements from any party performing project work.

(11) Final Inspection. The municipality shall notify the Commissioner of the completion of project construction and the Commissioner shall cause final inspection to be made within 60 days of receipt of the notice. When final inspection is completed and the Commissioner determines that the treatment works have been satisfactorily constructed, in accordance with the funding assistance agreement, the municipality may make a request for final payment under subdivision (s) (5) of this section.

#### (q) Financial Assistance Agreement Amendments.

(1) Agreements may be amended for project changes in accordance with this subsection. No agreement may be amended to increase the amount of assistance unless the funds are available for obligation. A formal amendment shall be effected only by a written amendment to the agreement.

(2) For financial assistance awarded under Sections 22a-482-1 to 22a-482-4, an amendment to increase the amount may be made for:

(A) change orders, claims and arbitration settlements; or

(B) revised bid documents; or

(C) project changes required by the Commissioner; or

(D) increased costs on architectual/engineering agreements.

(r) **Enforcement.** If the Commissioner determines that the municipality has failed to comply with any provision of these regulations, he or she may impose any of the following:

(1) the grant portion of the financing may be withheld under subdivisions (t) (3) or (t) (4) of this section.

(2) grant project costs directly related to the noncompliance may be disallowed; or

(3) project work may be suspended; or

(4) a noncomplying municipality may be found nonresponsible or ineligible for future state assistance; or

(5) an injunction may be entered or other equitable relief afforded by a court of appropriate jurisdiction; or

(6) such other administrative or judicial action may be instituted as is legally available and appropriate.

(s) **Grant and Loan Payments.** The municipality shall be paid the allowable project costs incurred within the scope of an approved project and which are currently due and payable from the municipality (i.e. not including withheld or deferred amounts), up to the amount set forth in the agreement and any amendments thereto. Payments for engineering services shall be made in accordance with subsection (f) of this section and payments for construction contracts shall be made in accordance with subsections (m) and (n) of this section. All allowable costs incurred before initiation of construction of the project shall be claimed in the application for assistance for that project before the award of the assistance or no subsequent payment shall be made for the costs.

(1) Initial Request for Payment. Upon award of financial assistance, the municipality may request payment for the unpaid share of allowable project costs incurred before the award. Payment for such costs shall be made in accordance with the negotiated payment schedule included in the agreement.

(2) Interim Requests for Payment. The municipality may submit requests for payments for allowable costs in accordance with the negotiated payment schedule included in the agreement. Generally, payments shall be made within 13 days after receipt of a request for payment.

(3) Adjustment. At any time before final payment under the agreement, the Commissioner may cause any request(s) for payment to be reviewed or audited and make appropriate adjustment.

(4) Refunds, Rebates, Credits, etc. The state share of any refunds, rebates, credits or other amounts (including any interest) that accrue to or are received by the municipality for the project, and that are properly allocable to costs which the municipality has received funding assistance shall be credited to the current state allotment. Reasonable expenses incurred by the municipality for the purpose of securing such refunds, rebates, credits, or other amounts shall be allowable when approved by the Commissioner.

(5) Final Payment. After completion of final inspection under subdivision (p) (11) of this section, receipt and approval of the request for payment which the municipality designates as the "final payment request," and the municipality is deemed in compliance

with all applicable requirements of the funding agreement, the Commissioner shall pay to the municipality any balance of the share of allowable project costs which has not already been paid. The municipality must submit the final payment request within six (6) months of the scheduled completion.

(6) Assignment and Release. By its acceptance of final payment, the municipality agrees to assign to the state the state share of refunds, rebates, credits or other amounts, including any interest, properly allocable to costs for which the municipality has been paid by the state under the assistance agreement. The municipality thereby also releases and discharges the state, its officers, agents and employees from all liabilities, obligations, and claims arising out of the project work subject only to exceptions previously specified in writing between the Commissioner and the municipality.

(7) Audit Upon Completion of the Project. The municipality shall certify to the state that the project has been completed in accordance with the final plans and specifications approved by the Commissioner. The municipality shall within 90 days of such certification, prepare an audit of the project performed by an independent public accountant meeting the requirements of section 7-394a and 7-396a of the Connecticut General Statutes. Such audit shall be performed in accordance with generally accepted accounting principles and shall identify any expenditures made by the municipality not in conformance with the agreement. The municipality further agrees that the auditors of Public Accounts of the state shall have access to all records and accounts of the municipality concerning the project. To provide such access the municipality agrees that it shall preserve all its records and accounts concerning the project for a period of 3 years after the date such audit is delivered to the state.

#### (t) Administrative Changes.

(1) Transfer of Agreements; Change of Name Agreements. Transfer of an agreement and change of name agreements require the prior written approval of the Commissioner. The municipality may not approve any transfer of an agreement without the concurrence of the Commissioner. The Commissioner shall prepare the necessary transfer documents upon receipt of appropriate information and documents submitted by the municipality.

(2) Suspension of Work (Stop Work Orders). Work on a project or on a portion or phase of a project for which funding assistance has been awarded may be ordered stopped by the Commissioner.

(A) Use of Stop-Work Orders. Work stoppage may be required for good cause such as default by the municipality, failure to comply with the terms and conditions of the funding agreement, realignment of programs, lack of adequate funding, or advancements in the state of the art. Inasmuch as stop-work orders may result in increased costs to the state by reason of standby costs, such orders will be issued only after a review by the Commissioner. Generally, use of a stop-work order shall be limited to those situations where it is advisable to suspend work on the project or a portion or phase of the project for important program or agency considerations and a supplemental agreement providing for such suspension is not feasible. Although a stop-work order may be used pending a decision to terminate by mutual agreement or for other cause, it shall not be used in lieu of the issuance of a termination notice after a decision to terminate has been made.

(B) Contents of stop-work orders should be discussed with the municipality and should

be appropriately modified in light of such discussions. Stop-work orders should include a clear description of the work to be suspended, instructions as to the issuance of further orders by the municipality for materials or services, guidance as to action to be taken on subagreements, and other suggestions to the municipality for minimizing costs.

(C) Issuance of Stop-Work Order. After appropriate review of the proposed action has occurred, the Commissioner may, by written order to the municipality, require the municipality to stop all or any part of the project work for a period of not more than forty-five (45) days after the order is delivered to the municipality, and for any further period to which the parties may agree. The Commissioner shall prepare the necessary documents for the stop-work order. Any such order shall be specifically identified as a stop-work order issued pursuant to this subdivision.

(D) Effect of Stop-Work Order.

(i) Upon receipt of a stop-work order, the municipality shall forthwith comply with its terms and take all reasonable steps to minimize the incurrence of costs allocable to the work covered by the order during the period of work stoppage. Within the suspension period or within any extension of that period to which the parties shall have agreed, the state shall either cancel the stop-work order, in full or in part, terminate the work covered by such order as provided in subdivision (t) (3) of this section or authorize resumption of work.

(ii) If a stop-work order is cancelled or the period of the order or any extension thereof expires, the municipality shall promptly resume the previously suspended work. An equitable adjustment shall be made in the grant period, the project period, the grant amount, the funding assistance amount, or all of these, and the funding assistance instrument shall be amended accordingly if the stop-work order results in an increase in the time required for, or an increase in the municipality's cost properly allocable to, the performance of any part of the project and the municipality asserts a written claim for such adjustment within sixty (60) days after the end of the period of work stoppage.

(iii) If a stop-work order is not cancelled and the grant-related project work covered by such order is within the scope of a subsequently-issued termination order, the reasonable cost resulting from the stop-work order shall be allowed in arriving at the termination settlement.

(iv) Costs incurred by the municipality, its contractors, subcontractors, or representatives, after a stop-work order is delivered, or within any extension of the stop-work period to which the parties shall have agreed, with respect to the project work suspended by such order or agreement which are not authorized by this section or specifically authorized in writing by the Commissioner, shall not be allowable costs.

(3) Termination of Funding Agreements. A funding agreement may be terminated in whole or in part by the Commissioner in circumstances where good cause can be demonstrated.

(A) Termination Agreement. The parties may enter into an agreement to terminate the funding agreement at any time pursuant to terms which are consistent with these regulations. The agreement shall establish the effective date of termination of the project, the basis for settlement of termination costs, the amount and date of payment of any sums due either party, and the schedule of repayment of all sums borrowed from the Clean Water Fund by the municipality. The Commissioner shall prepare the necessary termination documents.

(B) Project Termination by Municipality. A municipality may not unilaterally terminate the project work except for good cause. The municipality shall promptly give written notice to the Commissioner of any complete or partial termination of the project work by the municipality. If the Commissioner determines that there is good cause for the termination of all or any portion of a project, he or she may enter into a termination agreement or unilaterally terminate, effective with the date of cessation of the project work by the municipality. If the Commissioner determines that a municipality has ceased work on the project without good cause, he or she may unilaterally terminate or annual the agreement.

(C) Termination by Commissioner.

(i) Notice of Intent to Terminate. The Commissioner shall give not less than ten (10) days written notice to the municipality of intent to terminate a funding agreement in whole or in part.

(ii) Termination Action. The municipality shall be afforded an opportunity for consultation prior to any termination. After the Commissioner has been informed of any expressed views of the municipality and concurs in the proposed termination, the Commissioner may, in writing, terminate the agreement in whole or in part.

(iii) Basis for Termination. An agreement may be terminated by the Commissioner for good cause subject to negotiation and payment of appropriate termination settlement costs.

(D) Effect of Termination. Upon termination, the municipality shall refund or credit to the state any funds paid or owed to the municipality and allocable to the terminated project work, except such portion thereof as may be required to meet commitments which had become firm prior to the effective date of termination and are otherwise allowable. The municipality shall not make any new commitment without state approval. The municipality shall reduce the amount of outstanding commitments insofar as possible and report to the Commissioner the uncommitted balance of funds awarded under the funding agreement.

(4) Annulment of Agreement.

The Commissioner may annul the funding agreement if he or she determines that there has been no substantial performance of the project work without good cause, there is convincing evidence the funding assistance was obtained by fraud, or there is convincing evidence of gross abuse or corrupt practices in the administration of the project. In addition to such remedies as may be available to the state under state or local law, all funds previously paid to the municipality shall be returned or credited to the state and no further payments shall be made to the municipality.

(5) Deviations. The Commissioner is authorized to approve deviations from requirements of Sections 22a-482-1 to 22a-482-4, when he or she determines that such deviations are essential to effect necessary actions or where special circumstances make such deviations in the best interest of the state.

(A) Request for Deviation. A request for a deviation shall be submitted in writing to the Commissioner as far in advance as the exigencies of the situation will permit. Each request for a deviation shall contain at a minimum:

(i) the name of the municipality, the project identification number, and the dollar value, if appropriate;

(ii) identification of the section of Sections 22a-482-1 to 22a-482-4 from which a deviation is sought;

(iii) an adequate description of the deviation and the circumstances in which it shall be used, including all appropriate justification for the deviation request; and

(iv) a statement as to whether the same or a similiar deviation has been requested previously and, if so, circumstances of the previous request.

(B) Approval of Deviation. Deviations may be approved only by the Commissioner. A copy of each such written approval shall be retained in the official state project file.

(Effective March 5, 1992)

#### DWSRF Project Sign Requirement

Project signage requirements apply to the <u>construction phase</u> of all public water system (PWS) drinking water projects with a total project cost (planning, design and construction) of \$100,000 or more that are receiving funding (wholly or partly) from the Drinking Water State Revolving Fund (DWSRF). This requirement is intended to enhance the public awareness of the DWSRF and the positive impacts and benefits of the funding being provided by the State of Connecticut and the United States Environmental Protection Agency (EPA) to Connecticut's communities for public drinking water improvements. These projects have direct and tangible benefits to Connecticut's residents, businesses and visitors that are often taken for granted or go unnoticed. Awareness of the DWSRF funding is important to help gain public support for the DWSRF and communicate the importance of its role in lowering the overall cost to communities of maintaining safe and reliable public drinking water infrastructure. Connecticut's DWSRF Program has developed these guidelines to clarify these requirements and assist the PWS in complying with them. These guidelines are also consistent with the memorandum that EPA issued to all State Revolving Fund programs (Clean Water and Drinking Water) on June 3, 2015 which outlines project signage expectations for projects funded in whole or in part with federal capitalization grants received by states.

Traditional construction projects typically require that a physical sign (i.e. standard project sign) be erected at, or near, the project site where it can be seen by a broad audience. However, there may be instances where a DWSRF-funded project is located in an area where standard signage is unlikely to be seen by a broad audience, is not cost-effective or presents other unique challenges. Also some projects may be spread across many locations (i.e. water meter replacements) and do not have a defined location. In these instances where the provision of standard signage at the project site is not practical, this guidance provides an alternative option that PWSs can consider to satisfy state and federal signage requirements. **Any alternative that does not involve the erection of a standard project sign at, or near, the project site requires advance approval of the Department of Public Health's (DPH) Drinking Water Section (DWS) prior to implementation. DWSRF funded projects with a total project cost (planning, design and construction) less than \$100,000 are not required to comply with any signage requirements. Costs associated with complying with this signage requirement are eligible for DWSRF funding.** 

#### Executive Order 13166 and EPA Order 1000.32

PWSs must ensure that limited English proficient individuals have meaningful access to activities receiving federal funding, consistent with Presidential Executive Order 13166 and United States Environmental Protection Agency Order 1000.32. In this regard, to increase public awareness of projects serving communities where English is not the predominant language, PWSs are encouraged to translate the language used (excluding logos) into the appropriate non-English language(s). The cost of such translation is eligible for DWSRF funding provided the costs are reasonable.

#### **Option 1: Standard Signage**

In general, large projects with a total construction cost of \$1,000,000 (one million dollars) or more that involve significant expansion or construction of a new or replacement facility are required to publicize through standard signage. Signs should be erected near a major road or thoroughfare to effectively publicize the upgrades. There may be instances where the project is located in a remote area or on a dead end street which would be unlikely to provide the intended exposure of the sign to a broad audience. In these cases, the sign may be located away from the project site if there is another reasonable alternative. For example, a community may elect to place a sign advertising a project located at a remote reservoir (intake or pipeline project) on a major roadway near the treatment plant that will receive water from the new facility.

## Connecticut Department of Public Health Drinking Water State Revolving Fund Project Signage Guidelines

The project sign shall be erected prior to the start of any construction work, and shall be in accordance with the specifications and project sign detail shown in Figure 1. The sign shall be furnished, erected, and maintained by the Contractor at a location designated by the Project Owner's engineer/representative. The names of the Commissioner of the DPH and the Governor of the State of Connecticut as shown on the sign shall be kept current, and shall be revised with 30 days of such notice to the Contractor that a change has occurred, at no cost to the Owner. No additional information shall be placed on the project sign beyond that shown in the project sign detail unless advance approval is obtained from the DWS. If the owner wishes to erect a supplemental sign with additional detail regarding the project or its sponsors, that sign shall be placed in a manner that the project sign is not obscured from public view. The sign shall not be removed until the project is completed.



#### Figure 1 – DWSRF Standard Project Sign

#### Sign Specifications:

Sign: ¾" min. thickness exterior plywood (A-B) or APA high density overlay plywood (HDO)
Sign Dimensions: 4' high x 8' wide
Sign Face Background: White outdoor enamel paint (min. 3 coats)
Lettering Color: Black
Logos/State Seal: EPA logo, DPH logo and CT State seal stickers will be provided by DPH for the sign, placement should be generally in the locations shown in Figure 1. The project owner's utility logo may be included in the remaining open corner.
Sign Positioning: Upright on posts clearly visible to public and project site visitors
Fasteners: Rustproof

If the DWSRF will not fund the entire project, such as when a water main project includes sewer work that is not eligible for DWSRF funding, the sign shall either:

- 1. Not include the non-drinking water portion in the "Project Name/Description"; or
- 2. Above the amount of the loan add the following: "FUNDED IN PART BY A".

After the signage has been erected a <u>Certificate of Compliance – DWSRF Project Signage</u> form must be completed and sent electronically to the DWSRF mailbox to document compliance with this requirement.

#### **Option 2: Signage Posted on Website and Distributed to Customers**

Smaller projects costing more than \$100,000 but less than \$1,000,000, projects located in remote areas, and

projects without a defined project location may need a more cost-effective or practical method of complying with the signage requirement. The following alternative option may be considered in those instances.

PWS can include a single-page pamphlet within water and sewer bills, provide a pamphlet as a separate mailing or hand deliver the pamphlet to customers. The use of a pamphlet should be combined with posting information on the PWS's or municipality's website (if available). This approach would effectively publicize the project to those individuals directly benefitting from the project as well as potentially reach other members of the community that have access to the website. The website information should be posted in an area of the website that receives high traffic volume (Example: "News" section). Pamphlets and website posting shall be performed prior to the start of any construction work and website postings should remain active until the project is completed.

Pamphlets and website postings must minimally include the following information:

- Name of facility, project and community
- State SRF administering the program
- Project is wholly or partially funded with EPA funding
- Brief description of the project
- Brief listing of water quality benefits to be achieved

PWSs are further encouraged to provide details of the interest rate and financial savings that the community achieved by taking advantage of SRF funds as well as the environmental and public health benefits to the community.

The following language is an example of information that a PWS may use for pamphlets and web postings.

#### [Date]

[Name of PWS] Receives Drinking Water State Revolving Fund [add "Subsidized" (if applicable)] Loan

Construction of upgrades and improvements to the [*insert name of facility*] were financed [*insert "in part" or "in whole"*] by the Drinking Water State Revolving Fund (DWSRF) in the amount of [*insert amount of DWSRF funding*]. The DWSRF program is administered by the Department of Public Health (DPH) with joint funding from the U.S. Environmental Protection Agency and the State of Connecticut. This project will [*insert description of project*] and will provide water quality benefits [*insert details specifying environmental and/or public health benefits of the project*] for community residents and businesses in and near [*insert name of town or city and, if appropriate, neighborhood*]. DWSRF programs operate around the country to provide states and communities a low-cost financing alternative to maintain and improve the infrastructure that protects our valuable public drinking water resources nationwide. For more information on the DWSRF please visit the DPH's <u>DWSRF website</u>.

**PWSs that choose this option for signage compliance** <u>must</u> receive advance approval from the DPH Drinking Water Section prior to implementation. Requests for approval may be sent electronically to the DWSRF mailbox at <u>DPH.CTDWSRF@ct.gov</u>. After the signage has been distributed to customers and posted to the PWS's website a <u>Certificate of Compliance – DWSRF Project Signage</u> form must be completed and sent electronically to the DWSRF mailbox to document compliance with this requirement.

#### Department of Public Health Drinking Water Section Drinking Water State Revolving Fund

#### **Certification of Compliance – Project Signage**

PWS Name:		
PWS ID:		
Town:		
DWSRF Project Name:		
DWS Project Number:		

#### Project Signage Details:

The above referenced construction project that received funding from the Drinking Water State Revolving Fund has complied with the Connecticut Department of Public Health – Drinking Water Section's Project Signage Guidelines dated 5/14/2020 in the manner identified below:

*Check all that apply.* Fill in or attach, as appropriate, the applicable requested information.

- □ Option 1: Standard Signage sign erected at or near the project location
  - a. Date sign was erected: \_\_\_\_\_
  - b. Attach photo of sign
  - Option 2: Mail or hand delivery to customers
    - a. Date distributed to customers
      - b. Method of delivery (check all that apply):
        - □ Hand delivery
        - □ Mail delivery
        - Other (specify): \_\_\_\_\_
      - c. Attach copy of pamphlet
- □ Option 2: Signage posted on website
  - a. Date sign was posted:
  - b. URL Address of website:

#### **Certification:**

I hereby certify that the information provided above is true and correct to the best of my knowledge.

Name (please print):	
Title:	
Signature:	
Date:	

# Provisions for Reporting and Recovering Archeological Finds in Construction Contracts

In accordance with Federal and State laws, all construction contracts must contain a provision for reporting and recovering any archeological finds that may occur during the course of a project. This requirement is noted on the Pre-Bid Construction Contract Application Checklist, Table II, Item A. xvii. Below is template language that may be used to satisfy this requirement. Additions or minor revisions to this language are acceptable, as long as they do not change the methods of required reporting or nature of the procedures to be followed, and will be reviewed during the pre-bid phase.

"Should the Contractor or Engineer discover evidence of remains, such as stone masonry building foundations, bones or other items of archaeological significance, Contractor shall report these findings to (1) Owner, (2) Local Historical Society, (3) State Historic Preservation Office (860) 256-2761, and (4) Resident Project Representative, and shall exercise the utmost care to ensure that these areas remain undisturbed. Contractor shall allow recovery of such finds by the authorities, shall not remove such artifacts under penalty of law, and shall prevent constriction or private vehicles from crossing over these areas. In addition, when directed by the Engineer, cover these areas with 1-ft common fill to the limits directed by the Engineer. Be advised that graves and any associated human remains are protected by Connecticut State law (C.G.S. Section 10-388 and 10-390). Any possible human skeletal remains must be reported to the State Archaeologist (860) 486-5248 and the State's Chief Medical Examiner (860) 679-3980 immediately upon discovery. If the State Archaeologist is unavailable, please contact the State Historic Preservation Office at the number above for immediate assistance." This Page Intentionally Left Blank

(Rev. 03/09)

# **CERT-141**

# **Contractor's Exempt Purchase Certificate**

**General Purpose:** Contractors for the repair, alteration, improvement, remodeling, or construction of real property use this certificate to purchase materials and supplies to be installed or placed in a project being performed under contract with an exempt entity. The materials and supplies, including tangible personal property that remains tangible personal property after its installation or placement, must remain in the project after its completion. If the tangible personal property is not used in the manner described above, a contractor who claimed an exemption owes use tax on the total price of the tangible personal property.

Wherever the term contractor is used in this certificate, it includes subcontractors of the contractor performing a contract with an exempt entity.

*Exempt entity* means any person entitled to make purchases of tangible personal property exempt from sales and use taxes under the statutory authority listed in the instructions.

Name of exempt entity	Address	CT Tax Registration Number (If none, explain.)	Federal Employer ID Number
Address of project			
Type of exempt entity (See inst	ructions.)		
Connecticut state governm	Connecticut municipality		
<ul> <li>Charitable or religious organization: Enter the exemption number if any.</li> <li>Other (Explain.)</li> </ul>			Federal government
Name of purchaser	Address	CT Tax Registration Number (If none, explain.)	Federal Employer ID Number
Name of seller	Address	CT Tax Registration Number (If none, explain.)	Federal Employer ID Number
Provide a written description of	f each item purchased. Attach	additional sheets if necessary.	
Check one box: 🗖 Blank	et certificate 🗖 Certificat	te for one purchase only	

**Declaration by Purchaser:** The item(s) described above are tangible personal property to be installed or placed in a project being performed under contract with the exempt entity identified above and will remain in the project after its completion. I declare that the purchaser named above is a contractor under contract with the exempt entity or a subcontractor of the contractor. I acknowledge that the purchaser will be liable for Connecticut use tax, plus applicable penalty and interest as of the date of purchase, on the total purchase price of the property if any of the requirements for the exemption are not present or are not met.

I declare under penalty of law that I have examined this document (including any accompanying schedules and statements) and, to the best of my knowledge and belief, it is true, complete, and correct. I understand the penalty for willfully delivering a false return or document to the Department of Revenue Services (DRS) is a fine of not more than \$5,000 or imprisonment for not more than five years, or both.

Name of purchaser

#### **Statutory and Regulatory Authority**

- Conn. Agencies Regs. §12-426-18;
- Conn. Gen. Stat. §12-412(1) and (2), the United States, the State of Connecticut, or any political subdivisions or agencies of the State of Connecticut; for example state or municipal schools, universities, police, municipal fire departments, and state or municipal libraries. Only Connecticut state agencies have been issued an exemption number that can be entered on this form;
- Conn. Gen. Stat. §12-412(5), nonprofit charitable hospitals, nonprofit nursing homes, nonprofit rest homes and nonprofit residential care homes; and an acute care, for-profit hospital, in operation as of May 12, 2004;
- Conn. Gen. Stat. §12-412(8), Internal Revenue Code §501(c)(3) or (13) organizations exempt from federal income tax. Only charitable or religious organizations that applied to the Department of Revenue Services (DRS) prior to 7/1/95 were issued a Connecticut exemption permit number that can be entered on this form. Other charitable or religious organizations have not been issued a permit number and will leave that space blank;
- Conn. Gen. Stat. § 12-412(84), for purchases with regard to the Connecticut Technology Park;
- Conn. Gen. Stat. § 12-412(90), water companies;
- Conn. Gen. Stat. § 12-412(92), the Connecticut Resources Recovery Authority;
- Conn. Gen. Stat. § 12-412(93), tourism districts;
- Conn. Gen. Stat. § 12-412(95), solid waste-to-energy facilities;
- Conn. Gen. Stat. §7-273mm, municipal or regional resource recovery authorities; and
- Conn. Gen. Stat. § 16-344, the Metropolitan Transportation Authority or subsidiary in connection with the New Haven commuter railroad service.

**Instructions for the Purchaser:** Use this certificate for purchases of tangible personal property to be installed or placed in a project being performed under a contract with an exempt entity that will remain in the project after its completion. To qualify for the exemption from sales and use taxes, you must present this certificate to the retailer at the time of the purchase of the qualifying tangible personal property. For at least six years from the date it is issued, keep a copy of this certificate and records that substantiate the information entered on this certificate and to show the disposition of all materials or supplies purchased.

If you are unable to designate the exact amount of materials or supplies to be installed or placed in a project being performed under contract with an exempt entity, you must estimate the amount of the purchases. You will be held strictly accountable for any use tax due the state on the purchases in the event of any use other than the permanent installation or placement of the purchases in the exempt project identified in this certificate.

Contractors are the consumers of all the tools, supplies, and equipment used in fulfilling a construction contract that are not installed or placed in the exempt job even if they are used up during the job.

**Instructions for the Seller:** Acceptance of this certificate, when properly completed, relieves the seller from the burden of proving that tangible personal property is not subject to sales and use taxes when the tangible personal property will be installed or placed in a project being performed under a contract with an exempt entity and will remain in the project after its completion. The certificate is valid only if taken in good faith from a contractor under contract with an exempt entity. The good faith of the seller will be questioned if the seller knows of, or should know of, facts that suggest the contractor does not intend to install or place the property in a project being performed under contract with an exempt entity.

Keep this certificate and bills or invoices to the purchaser for at least six years from the date of purchase. The bills, invoices, or records covering the purchase made under this certificate must be marked to indicate an exempt purchase was made. The words "Exempt under CERT-141" satisfy the requirement.

This certificate may be used for individual purchases, in which case the box marked "Certificate for One Purchase Only" must be checked. This certificate may also be used for a continuing line of exempt purchases for the project identified in this certificate, in which case the box marked "Blanket Certificate" must be checked. A blanket certificate remains in effect for three years unless the purchaser revokes it in writing before the period expires.

**For More Information:** Call DRS at 1-800-382-9463 (Connecticut calls outside the Greater Hartford calling area only) or 860-297-5962 (from anywhere). **TTY, TDD, and Text Telephone users** only may transmit inquiries anytime by calling 860-297-4911. Visit the DRS website at **www.ct.gov/DRS** to preview and download forms and publications.

# Davis-Bacon Federal Prevailing Wage Requirements and Construction Contract Language for DWSRF Projects (*Revised 10/20/2016*)

# Wage Rate Requirements Under the FY 2016 Appropriations Act

## Preamble

With respect to the Safe Drinking Water State Revolving Funds, EPA provides capitalization grants to each State which in turn provides sub grants or loans to eligible entities within the State.

Typically, the sub recipients are municipal or other local governmental entities that manage the funds. For these types of recipients, the provisions set forth under Roman numeral I, below, shall apply. Although EPA and the State remain responsible for ensuring sub recipients' compliance with the wage rate requirements set forth herein, those sub recipients shall have the primary responsibility to maintain payroll records as described in Section 3(ii)(A), below and for compliance as described in Section I-5.

Occasionally, the sub recipient may be a private for profit or not for profit entity. For these types of recipients, the provisions set forth in Roman Numeral II, below, shall apply. Although EPA and the State remain responsible for ensuring sub recipients' compliance with the wage rate requirements set forth herein, those sub recipients shall have the primary responsibility to maintain payroll records as described in Section II-3(ii)(A), below and for compliance as described in Section II-5.

# I. <u>Requirements Under The Consolidated Appropriations Act, 2016 (P.L. 114-113)</u> For Sub recipients That Are Governmental Entities:

The following terms and conditions specify how recipients will assist EPA in meeting its Davis-Bacon (DB) responsibilities when DB applies to EPA awards of financial assistance under the Consolidated Appropriations Act, 2016 (P.L. 114-113) with respect to State recipients and sub recipients that are governmental entities. If a sub recipient has questions regarding when DB applies, obtaining the correct DB wage determinations, DB provisions, or compliance monitoring, it may contact the State recipient. If a State recipient needs guidance, the recipient may contact **Valerie Marshall** (marshall.valerie@epa.gov or 617-918-1674) of EPA Region 1 for guidance. The recipient or sub recipient may also obtain additional guidance from DOL's web site at http://www.dol.gov/whd/

### 1. Applicability of the Davis-Bacon (DB) prevailing wage requirements.

Under the Consolidated Appropriations Act, 2016, DB prevailing wage requirements apply to the construction, alteration, and repair of treatment works carried out in whole or in part with assistance made available by a State water pollution control revolving fund and to any construction project carried out in whole or in part by assistance made available by a drinking water treatment revolving loan fund. If a sub recipient encounters a unique situation at a site that presents uncertainties regarding DB applicability, the sub recipient must discuss the situation with the recipient State before authorizing work on that site.

# 2. Obtaining Wage Determinations.

- (a) Sub recipients shall obtain the wage determination for the locality in which a covered activity subject to DB will take place prior to issuing requests for bids, proposals, quotes or other methods for soliciting contracts (solicitation) for activities subject to DB. These wage determinations shall be incorporated into solicitations and any subsequent contracts. Prime contracts must contain a provision requiring that subcontractors follow the wage determination incorporated into the prime contract.
  - (i) While the solicitation remains open, the sub recipient shall monitor <u>www.wdol.gov</u> weekly to ensure that the wage determination contained in the solicitation remains current. The sub recipients shall amend the solicitation if DOL issues a modification more than 10 days prior to the closing date (i.e. bid opening) for the solicitation. If DOL modifies or supersedes the applicable wage determination less than 10 days prior to the closing date, the sub recipients may request a finding from the State recipient that there is not a reasonable time to notify interested contractors of the modification of the wage determination. The State recipient will provide a report of its findings to the sub recipient.
  - (ii) If the sub recipient does not award the contract within 90 days of the closure of the solicitation, any modifications or supersedes DOL makes to the wage determination contained in the solicitation shall be effective unless the State recipient, at the request of the sub recipient, obtains an extension of the 90 day period from DOL pursuant to 29 CFR 1.6 (c)(3)(iv). The sub recipient shall monitor www.wdol.gov on a weekly basis if it does not award the contract within 90 days of closure of the solicitation to ensure that wage determinations contained in the solicitation remain current.
- (b) If the sub recipient carries out activity subject to DB by issuing a task order, work assignment or similar instrument to an existing contractor (ordering instrument) rather than by publishing a solicitation, the sub recipient shall insert the appropriate DOL wage determination from www.wdol.gov into the ordering instrument.
- (c) Sub recipients shall review all subcontracts subject to DB entered into by prime contractors to verify that the prime contractor has required its subcontractors to include the applicable wage determinations.
- (d) As provided in 29 CFR 1.6(f), DOL may issue a revised wage determination applicable to a sub recipient's contract after the award of a contract or the issuance of an ordering instrument if DOL determines that the sub recipient has failed to incorporate a wage determination or has used a wage determination that clearly does not apply to the contract or ordering instrument. If this occurs, the sub recipient shall either terminate the contract or ordering instrument and issue a revised solicitation or

ordering instrument or incorporate DOL's wage determination retroactive to the beginning of the contract or ordering instrument by change order. The sub recipient's contractor must be compensated for any increases in wages resulting from the use of DOL's revised wage determination.

# 3. Contract and Subcontract provisions.

- (a) The Recipient shall insure that the sub recipient(s) shall insert in full in any contract in excess of \$2,000 which is entered into for the actual construction, alteration and/or repair, including painting and decorating, of a treatment work under the CWSRF or a construction project under the DWSRF financed in whole or in part from Federal funds or in accordance with guarantees of a Federal agency or financed from funds obtained by pledge of any contract of a Federal agency to make a loan, grant or annual contribution (except where a different meaning is expressly indicated), and which is subject to the labor standards provisions of any of the acts listed in § 5.1 or the Consolidated Appropriations Act, 2016, the following clauses:
- (1) Minimum wages.
  - (i) All laborers and mechanics employed or working upon the site of the work will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (a)(1)(iv) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in

§ 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph (a)(1)(ii) of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the

#### workers.

Sub recipients may obtain wage determinations from the U.S. Department of Labor's web site, <u>www.dol.gov</u>.

- (ii) (A) The sub recipient(s), on behalf of EPA, shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The State award official shall approve a request for an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:
  - (1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and
  - (2) The classification is utilized in the area by the construction industry; and
  - (3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(B) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the sub recipient(s) agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), documentation of the action taken and the request, including the local wage determination shall be sent by the sub recipient (s) to the State award official. The State award official will transmit the request, to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210 and to the EPA DB Regional Coordinator concurrently. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification request within 30 days of receipt and so advise the State award official or will notify the State award official within the 30-day period that additional time is necessary.

(C) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the sub recipient(s) do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the award official shall refer the request and the local wage determination, including the views of all interested parties and the recommendation of the State award official, to the Administrator for determination. The request shall be sent to the EPA DB Regional Coordinator concurrently. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt of the request and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(D) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs (a)(1)(ii)(B) or (C) of this section, shall be paid to all workers

performing work in the classification under this contract from the first day on which work is performed in the classification.

- (iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.
- (iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.
- (2) Withholding. The sub recipient(s), shall upon written request of the EPA Award Official or an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the (Agency) may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.
- (3) Payrolls and basic records.
  - (i) Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is

financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(ii) (A) The contractor shall submit weekly, for each week in which any contract work is performed, a copy of all payrolls to the sub recipient, that is, the entity that receives the sub-grant or loan from the State capitalization grant recipient. Such documentation shall be available on request of the State recipient or EPA. As to each payroll copy received, the sub recipient shall provide written confirmation in a form satisfactory to the State indicating whether or not the project is in compliance with the requirements of 29 CFR 5.5(a)(1) based on the most recent payroll copies for the specified week. The payrolls shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on the weekly payrolls. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at http://www.dol.gov/whd/forms/wh347instr.htm or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the sub recipient(s) for transmission to the State or EPA if requested by EPA, the State, the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the sub recipient(s).

(B) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

- (1) That the payroll for the payroll period contains the information required to be provided under § 5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under § 5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;
- (2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that

no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(C) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph (a)(3)(ii)(B) of this section.

(D) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

- (iii) The contractor or subcontractor shall make the records required under paragraph (a)(3)(i) of this section available for inspection, copying, or transcription by authorized representatives of the State, EPA or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the Federal agency or State may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.
- (4) Apprentices and trainees
  - (i) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less

than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

- (ii) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.
- (iii) Equal employment opportunity. The utilization of apprentices, trainees and

journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended and 29 CFR part 30.

- (5) Compliance with Copeland Act requirements. The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.
- (6) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses contained in 29 CFR 5.5(a)(1) through (10) and such other clauses as the EPA determines may by appropriate, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.
- (7) Contract termination; debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.
- (8) Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.
- (9) Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and sub recipient(s), State, EPA, the U.S. Department of Labor, or the employees or their representatives.

(10) Certification of eligibility.

- (i) By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis- Bacon Act or 29 CFR 5.12(a)(1).
- (ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).
- (iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.
- 4. Contract Provision for Contracts in Excess of \$100,000.

- (a) Contract Work Hours and Safety Standards Act. The sub recipient shall insert the following clauses set forth in paragraphs (a)(1), (2), (3), and (4) of this section in full in any contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by Item 3, above or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.
- (1) Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.
- (2) Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (a)(1) of this section the contractor and any subcontractor responsible therefore shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (a)(1) of this section, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (a)(1) of this section.
- (3) Withholding for unpaid wages and liquidated damages. The sub recipient, upon written request of the EPA Award Official or an authorized representative of the Department of Labor, shall withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (b)(2) of this section.
- (4) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (a)(1) through (4) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (a)(1) through (4) of this section.
- (b) In addition to the clauses contained in Item 3, above, in any contract subject only to
the Contract Work Hours and Safety Standards Act and not to any of the other statutes cited in 29 CFR 5.1, the Sub recipient shall insert a clause requiring that the contractor or subcontractor shall maintain payrolls and basic payroll records during the course of the work and shall preserve them for a period of three years from the completion of the contract for all laborers and mechanics, including guards and watchmen, working on the contract. Such records shall contain the name and address of each such employee, social security number, correct classifications, hourly rates of wages paid, daily and weekly number of hours worked, deductions made, and actual wages paid. Further, the Sub recipient shall insert in any such contract a clause providing hat the records to be maintained under this paragraph shall be made available by the contractor or subcontractor for inspection, copying, or transcription by authorized representatives of the (write the name of agency) and the Department of Labor, and the contractor or subcontractor will permit such representatives to interview employees during working hours on the job.

# 5. Compliance Verification

- (a) The sub recipient shall periodically interview a sufficient number of employees entitled to DB prevailing wages (covered employees) to verify that contractors or subcontractors are paying the appropriate wage rates. As provided in 29 CFR 5.6(a)(6), all interviews must be conducted in confidence. The sub recipient must use Standard Form 1445 (SF 1445) or equivalent documentation to memorialize the interviews. Copies of the SF 1445 are available from EPA on request.
- (b) The sub recipient shall establish and follow an interview schedule based on its assessment of the risks of noncompliance with DB posed by contractors or subcontractors and the duration of the contract or subcontract. Sub recipients must conduct more frequent interviews if the initial interviews or other information indicated that there is a risk that the contractor or subcontractor is not complying with DB. Sub recipients shall immediately conduct interviews in response to an alleged violation of the prevailing wage requirements. All interviews shall be conducted in confidence."
- (c) The sub recipient shall periodically conduct spot checks of a representative sample of weekly payroll data to verify that contractors or subcontractors are paying the appropriate wage rates. The sub recipient shall establish and follow a spot check schedule based on its assessment of the risks of noncompliance with DB posed by contractors or subcontractors and the duration of the contract or subcontract. At a minimum, if practicable, the sub recipient should spot check payroll data within two weeks of each contractor or subcontractor's submission of its initial payroll data and two weeks prior to the completion date the contract or subcontract. Sub recipients must conduct more frequent spot checks if the initial spot check or other information indicates that there is a risk that the contractor or subcontractor is not complying with DB. In addition, during the examinations the sub recipient shall verify evidence of fringe benefit plans and payments there under by contractors and subcontractors who claim credit for fringe benefit contributions.
- (d) The sub recipient shall periodically review contractors and subcontractors use of

apprentices and trainees to verify registration and certification with respect to apprenticeship and training programs approved by either the U.S Department of Labor or a state, as appropriate, and that contractors and subcontractors are not using disproportionate numbers of, laborers, trainees and apprentices. These reviews shall be conducted in accordance with the schedules for spot checks and interviews described in Item 5(b) and (c) above.

(e) Sub recipients must immediately report potential violations of the DB prevailing wage requirements to the EPA DB contact listed above and to the appropriate DOL Wage and Hour District Office listed at <a href="http://www.dol.gov/whd/america2.htm">http://www.dol.gov/whd/america2.htm</a>.

# II. <u>Requirements Under The Consolidated Appropriations Act, 2016 (P.L. 114-113)</u> For Sub recipients That Are Not Governmental Entities:

The following terms and conditions specify how recipients will assist EPA in meeting its DB responsibilities when DB applies to EPA awards of financial assistance under the FY2016 Consolidated Appropriations Act with respect to sub recipients that are not governmental entities. If a sub recipient has questions regarding when DB applies, obtaining the correct DB wage determinations, DB provisions, or compliance monitoring, it may contact the State recipient for guidance. If a State recipient needs guidance, the recipient may contact **Valerie Marshall** (marshall.valerie@epa.gov or 617-918-1674), EPA Grants Management Office for guidance. The recipient or sub recipient may also obtain additional guidance from DOL's web site at <a href="http://www.dol.gov/whd/">http://www.dol.gov/whd/</a>

<u>Under these terms and conditions, the sub recipient must submit its proposed DB</u> wage determinations to the State recipient for approval prior to including the wage determination in any solicitation, contract task orders, work assignments, or similar instruments to existing contractors.</u>

# 1. Applicability of the Davis-Bacon (DB) prevailing wage requirements.

Under the FY2016 Consolidated Appropriations Act, DB prevailing wage requirements apply to the construction, alteration, and repair of treatment works carried out in whole or in part with assistance made available by a State water pollution control revolving fund and to any construction project carried out in whole or in part by assistance made available by a drinking water treatment revolving loan fund. If a sub recipient encounters a unique situation at a site that presents uncertainties regarding DB applicability, the sub recipient must discuss the situation with the recipient State before authorizing work on that site.

# 2. Obtaining Wage Determinations.

(a) Sub recipients must obtain proposed wage determinations for specific localities at <u>www.wdol.gov</u>. After the Sub recipient obtains its proposed wage determination, it must submit the wage determination to the DWSRF Program email at <u>DPH.CTDWSRF@ct.gov</u> for approval and inform your Project Engineer prior to inserting the wage determination into a solicitation, contract or issuing task orders, work assignments or similar instruments to existing contractors (ordering instruments unless subsequently directed otherwise by the State recipient Award Official.)

- (b) Sub recipients shall obtain the wage determination for the locality in which a covered activity subject to DB will take place prior to issuing requests for bids, proposals, quotes or other methods for soliciting contracts (solicitation) for activities subject to DB. These wage determinations shall be incorporated into solicitations and any subsequent contracts. Prime contracts must contain a provision requiring that subcontractors follow the wage determination incorporated into the prime contract.
  - (i) While the solicitation remains open, the sub recipient shall monitor <u>www.wdol.gov</u> on a weekly basis to ensure that the wage determination contained in the solicitation remains current. The sub recipients shall amend the solicitation if DOL issues a modification more than 10 days prior to the closing date (i.e. bid opening) for the solicitation. If DOL modifies or supersedes the applicable wage determination less than 10 days prior to the closing date, the sub recipients may request a finding from the State recipient that there is not a reasonable time to notify interested contractors of the modification of the wage determination. The State recipient will provide a report of its findings to the sub recipient.
  - (ii) If the sub recipient does not award the contract within 90 days of the closure of the solicitation, any modifications or supersedes DOL makes to the wage determination contained in the solicitation shall be effective unless the State recipient, at the request of the sub recipient, obtains an extension of the 90 day period from DOL pursuant to 29 CFR 1.6(c)(3)(iv). The sub recipient shall monitor www.wdol.gov on a weekly basis if it does not award the contract within 90 days of closure of the solicitation to ensure that wage determinations contained in the solicitation remain current.
- (c) If the sub recipient carries out activity subject to DB by issuing a task order, work assignment or similar instrument to an existing contractor (ordering instrument) rather than by publishing a solicitation, the sub recipient shall insert the appropriate DOL wage determination from <a href="http://www.wdol.gov">www.wdol.gov</a> into the ordering instrument.
- (d) Sub recipients shall review all subcontracts subject to DB entered into by prime contractors to verify that the prime contractor has required its subcontractors to include the applicable wage determinations.
- (e) As provided in 29 CFR 1.6(f), DOL may issue a revised wage determination applicable to a sub recipient's contract after the award of a contract or the issuance of an ordering instrument if DOL determines that the sub recipient has failed to incorporate a wage determination or has used a wage determination that clearly does not apply to the contract or ordering instrument. If this occurs, the sub recipient shall either terminate the contract or ordering instrument and issue a revised solicitation or ordering instrument or incorporate DOL's wage determination retroactive to the beginning of the contract or ordering instrument by change order. The sub recipient's contractor must be compensated for any increases in wages resulting from the use of DOL's revised wage determination.

# 3. Contract and Subcontract provisions.

(a) The Recipient shall insure that the sub recipient(s) shall insert in full in any contract in excess of \$2,000 which is entered into for the actual construction, alteration and/or repair, including painting and decorating, of a treatment work under the CWSRF or a construction project under the DWSRF financed in whole or in part from Federal funds or in accordance with guarantees of a Federal agency or financed from funds obtained by pledge of any contract of a Federal agency to make a loan, grant or annual contribution (except where a different meaning is expressly indicated), and which is subject to the labor standards provisions of any of the acts listed in § 5.1 or the FY2016 Consolidated Appropriations Act, the following clauses:

# (1) Minimum wages.

(i) All laborers and mechanics employed or working upon the site of the work, will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics. Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (a)(1)(iv) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in

§ 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph (a)(1)(ii) of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

Sub recipients may obtain wage determinations from the U.S. Department of Labor's web site, <u>www.dol.gov</u>.

(ii) (A) The sub recipient(s), on behalf of EPA, shall require that any class of laborers

or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The State award official shall approve a request for an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

- (1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and
- (2) The classification is utilized in the area by the construction industry; and
- (3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(B) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the sub recipient(s) agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), documentation of the action taken and the request, including the local wage determination shall be sent by the sub recipient(s) to the State award official. The State award official will transmit the report, to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210 and to the EPA DB Regional Coordinator concurrently. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification request within 30 days of receipt and so advise the State award official or will notify the State award official within the 30-day period that additional time is necessary.

(C) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the and the sub recipient(s) do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the award official shall refer the request, and the local wage determination, including the views of all interested parties and the recommendation of the State award official, to the Administrator for determination. The request shall be sent to the EPA Regional Coordinator concurrently. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt of the request and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(D) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs (a)(1)(ii)(B) or (C) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

- (iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.
- (2) Withholding. The sub recipient(s) shall upon written request of the EPA Award Official or an authorized representative of the Department of Labor, withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the (Agency) may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.
- (3) Payrolls and basic records.
  - (i) Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work. Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(ii) (A) The contractor shall submit weekly, for each week in which any contract work is performed, a copy of all payrolls to the sub recipient, that is, the entity that receives the sub-grant or loan from the State capitalization grant recipient. Such documentation shall be available on request of the State recipient or EPA. As to each payroll copy received, the sub recipient shall provide written confirmation in a form satisfactory to the State indicating whether or not the project is in compliance with the requirements of 29 CFR 5.5(a)(1) based on the most recent payroll copies for the specified week. The payrolls shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on the weekly payrolls. Instead the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at http://www.dol.gov/whd/forms/wh347instr.htm or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the sub recipient(s) for transmission to the State or EPA if requested by EPA, the State, the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the sub recipient(s).

(B) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

- (1) That the payroll for the payroll period contains the information required to be provided under § 5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under § 5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;
- (2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;
- (3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination

incorporated into the contract.

(C) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph (a)(3)(ii)(B) of this section.

(D) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

(iii) The contractor or subcontractor shall make the records required under paragraph (a)(3)(i) of this section available for inspection, copying, or transcription by authorized representatives of the State, EPA or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the Federal agency or State may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

# (4) Apprentices and trainees

(i) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractors registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program

- (ii) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.
- (iii) Equal employment opportunity. The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended and 29 CFR part 30.
- (5) Compliance with Copeland Act requirements. The contractor shall comply with

the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

- (6) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses contained in 29 CFR 5.5(a)(1) through (10) and such other clauses as the EPA determines may by appropriate, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.
- (7) Contract termination: debarment. A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.
- (8) Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.
- (9) Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and Sub recipient(s), State, EPA, the U.S. Department of Labor, or the employees or their representatives.

(10) Certification of eligibility.

- (i) By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis- Bacon Act or 29 CFR 5.12(a)(1).
- (ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).
- (iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

# 4. Contract Provision for Contracts in Excess of \$100,000.

(a) Contract Work Hours and Safety Standards Act. The sub recipient shall insert the following clauses set forth in paragraphs (a)(1), (2), (3), and (4) of this section in full in any contract in an amount in excess of \$100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by Item 3, above or 29 CFR 4.6. As used in this paragraph, the terms laborers and mechanics include watchmen and

guards.

- (1) Overtime requirements. No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.
- (2) Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (b)(1) of this section the contractor and any subcontractor responsible therefore shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (b)(1) of this section, in the sum of \$10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (b)(1) of this section.
- (3) Withholding for unpaid wages and liquidated damages. The sub recipient shall upon the request of the EPA Award Official or an authorized representative of the Department of Labor, withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federallyassisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (a)(2) of this section.
- (4) Subcontracts. The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (a)(1) through (4) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (a)(1) through (4) of this section.
- (b) In addition to the clauses contained in Item 3, above, in any contract subject only to the Contract Work Hours and Safety Standards Act and not to any of the other statutes cited in 29 CFR 5.1, the Sub recipient shall insert a clause requiring that the contractor or subcontractor shall maintain payrolls and basic payroll records during the course of the work and shall preserve them for a period of three years from the completion of the contract for all laborers and mechanics, including guards and watchmen, working on the contract. Such records shall contain the name and address of each such

employee, social security number, correct classifications, hourly rates of wages paid, daily and weekly number of hours worked, deductions made, and actual wages paid. Further, the Sub recipient shall insert in any such contract a clause providing that the records to be maintained under this paragraph shall be made available by the contractor or subcontractor for inspection, copying, or transcription by authorized representatives of the (write the name of agency) and the Department of Labor, and the contractor or subcontractor will permit such representatives to interview employees during working hours on the job.

# 5. Compliance Verification

- (a) The sub recipient shall periodically interview a sufficient number of employees entitled to DB prevailing wages (covered employees) to verify that contractors or subcontractors are paying the appropriate wage rates. As provided in 29 CFR 5.6(a)(6), all interviews must be conducted in confidence. The sub recipient must use Standard Form 1445 (SF 1445) or equivalent documentation to memorialize the interviews. Copies of the SF 1445 are available from EPA on request.
- (b) The sub recipient shall establish and follow an interview schedule based on its assessment of the risks of noncompliance with DB posed by contractors or subcontractors and the duration of the contract or subcontract. Sub recipients must conduct more frequent interviews if the initial interviews or other information indicated that there is a risk that the contractor or subcontractor is not complying with DB. Sub recipients shall immediately conduct interviews in response to an alleged violation of the prevailing wage requirements. All interviews shall be conducted in confidence."
- (c) The sub recipient shall periodically conduct spot checks of a representative sample of weekly payroll data to verify that contractors or subcontractors are paying the appropriate wage rates. The sub recipient shall establish and follow a spot check schedule based on its assessment of the risks of noncompliance with DB posed by contractors or subcontractors and the duration of the contract or subcontract. At a minimum, if practicable the sub recipient should spot check payroll data within two weeks of each contractor or subcontractor's submission of its initial payroll data and two weeks prior to the completion date the contract or subcontract. Sub recipients must conduct more frequent spot checks if the initial spot check or other information indicates that there is a risk that the contractor or subcontractor is not complying with DB . In addition, during the examinations the sub recipient shall verify evidence of fringe benefit plans and payments there under by contractors and subcontractors who claim credit for fringe benefit contributions.
- (d) The sub recipient shall periodically review contractors and subcontractors use of apprentices and trainees to verify registration and certification with respect to apprenticeship and training programs approved by either the U.S Department of Labor or a state, as appropriate, and that contractors and subcontractors are not using disproportionate numbers of, laborers, trainees and apprentices. These reviews shall be conducted in accordance with the schedules for spot checks and interviews described in Item 5(b) and (c) above.

(e) Sub recipients must immediately report potential violations of the DB prevailing wage requirements to the EPA DB contact listed above and to the appropriate DOL Wage and Hour District Office listed at <u>http://www.dol.gov/whd/america2.htm</u>.

#### INTERIM GUIDANCE FOR MINORITY BUSINESS ENTERPRISE AND WOMEN'S BUSINESS ENTERPRISE REQUIREMENT OF 40 CFR §33.240

#### I. <u>PURPOSE</u>

This interim guidance is for Regions to assist States, EPA assistance recipients, prime contractors, consultants, minority business owners and women's business owners in complying with EPA's Minority Business Enterprise (MBE) and Women's Business Enterprise (WBE) requirements in the Agency's procurement regulations, 40 C.F.R. Part 33. This guidance provides suggestions for carrying out the affirmative steps required by Office of Management and Budget Circular A-102, Attachment O, section 9 and included in EPA procurement regulations. Also included is a description of activities to be undertaken by EPA or delegated States, as well as suggestions for MBE/WBEs to take in pursuing opportunities for work in EPA-funded projects.

#### II. <u>DEFINITIONS</u>

- A. Minority Business Enterprise (MBE) [same as definition to be in final 40 C.F.R.
  33.005]: A minority business enterprise is a business which is
  - 1. certified as a minority business enterprise by a State or Federal agency, or
  - 2. an independent business concern which is at least 51 percent owned and controlled (as defined below) by minority group member(s). A minority group member is an individual who is a citizen of the United States and one of the following:
    - a. Black American
    - b. Hispanic American (with origins from Puerto Rico, Mexico, Cuba, South of Central America)
    - c. Native American (American Indian, Eskimo, Aleut, native Hawaiian)
    - d. Asian-Pacific American (with origins from Japan, China, the Philippines, Vietnam, Korea, Samoa, Guam, the U.S. Trust Territories of the Pacific, Northern Marianas, Laos, Cambodia, Taiwan or the Indian Subcontinent)
- B. Women's Business Enterprise (WBE) [same as definition to be in final 40 C.F.R. 33.005]: A women's business enterprise is a business which is
  - 1. certified as such by a State or Federal agency; or
  - 2. an independent business concern which is at least 51 percent owned by a woman or women who also control and operate it. Determination of whether a business is at least 51 percent owned by a woman or women shall be made without regard to community property laws. For example, an otherwise qualified WBE which is 51 percent owned by a married woman in a community property state will not be disqualified because her husband has a 50 percent interest in her share. Similarly, a business which is 51 percent owned by a married woman will not become a qualified WBE by virtue of his wife's 50 percent interest in his share of the business.
- C. Ownership and control
  - 1. The minority or woman ownership's interest in the firm must be real, substantial and continuing. Such interest may include:
    - a. risk of loss/share of profit commensurate with the proportional ownership; and

- b. receipt of the customary incidents of ownership, such as salary and/or intangible benefits.
- 2. A minority or woman owner must have and exercise the authority to independently control the business. The minority or woman owner need not be continually present to be deemed in control. Characteristics of control may include:
  - a. authority to sign bids and contracts,
  - b. making decisions in price negotiations,
  - c. incurring liabilities for the firm,
  - d. making final staffing decisions,
  - e. policy-making; and
  - f. making general company management decisions.
- 3. Only those firms performing a useful business function according to custom and practice in the industry are qualified as MBE's or WBE's. A merely as a passive conduit of funds to some other, non-minority firm where such activity is unnecessary to accomplish the project does not constitute a "useful business function according to custom and practice in the industry."
- D. Recipient A party receiving federal financial assistance under an EPA program pursuant to a grant or cooperative agreement.
- E. Project The scope of work from which a cooperative agreement, grant or grant amendment is awarded.
- F. Bidder A party seeking to obtain a contract with a recipient through a competitive, advertise, sealed bid process.
- G. Offeror A party seeking to obtain a contract with a recipient through a negotiated procurement process.

#### IV. <u>EPA RESPONSIBILITIES</u>

- A. Headquarters.
  - 1. The officer in charge of the assistance program (program office) has primary responsibility for implementation of the MBE/WBE program, in cooperation with the Office of Small and Disadvantaged Business Utilization (OSDBU).
  - 2. OSDBU is responsible for serving as the Agency focal point for inquiries on the MBE/WBE program, providing explanation of the program and guidance to MBEs and WBEs interested in working on EPA funded projects.
- B. Regional Responsibilities
  - 1. Provide guidance and advice to recipients as requested.
  - 2. Maintain lists\* of those MBE and WBE firms which have participated in EPA funded projects. The Region may also add MBEs and WBEs requesting to be included on source lists. Such lists are for information purposes only, and shall carry a clear and prominent statement that the firms listed are neither endorsed nor guaranteed by EPA as <u>bona fide</u>, MBE//WBEs. It is not necessary to be on any list in order to qualify as a <u>bona fide</u> MBE/WBE.
  - 3. Monitor recipients for compliance with MBE/WBE requirements and for determining levels of MBE/WBE participation.

\*Lists are available for review at the offices of the Owner, Engineer and DEP.

# V. <u>RECIPIENT RESPONSIBILITIES</u>

- A. The recipient shall take affirmative steps to contract with MBEs and WBEs and ensure that its contractors and consultants take affirmative steps to contract with MBEs and WBEs during all phases of work funded or to be funded under an EPA assistance agreement. The recipient's affirmative steps as defined in EPA procurement regulations are the following:
  - 1. When feasible, dividing the total work to be contracted into smaller tasks in the solicitation documents to permit MBE/WBE participation.
  - 2. Including qualified MBEs and WBEs on solicitation lists by drawing from the source lists of EPA Regional Offices and appropriate minority/women's business associations and agencies.
  - 3. Assuring that MBEs and WBEs are solicited whenever they are potential sources of services and supplies, for example, by:
    - a. Holding pre-bid conferences, with interested MBEs and WBEs in attendance when possible, to highlight the requirements of this program to prospective bidders,
    - b. Including this MBE//WBE interim guidance in request for proposals (RFP) and invitations for bids (IFB),
    - c. Publishing announcements of MBE/WBE opportunities for wok in EPA funded projects,
    - d. Developing a source list of MBE/WBEs and providing its list to prospective bidders/offerors.
      - 1. The recipient may wish to engage an MBE/WBE liaison to compile the list.
      - 2. The recipient may wish to use available lists such as those of the EPA Regional Office, adjacent municipalities, appropriate minority/women associations and agencies, and available industry associations. Names of these agencies with address and phone number should also be included on the recipient source list.
    - e. Providing necessary and appropriate liaison services between MBE/WBEs and prospective bidders/offerors. (Liaison services should not be delegated to consultants where a potential for conflict of interest exists).
  - 4. When project requirements permit, establishing delivery schedules which encourage participation of MBE/WBEs.
  - 5. Using the services and assistance of the Small Business Administration (SBA), the Minority Business Development Agency (MBDA), and other federal, State and local agencies when appropriate.
- B. Unless otherwise provided in the specifications, compliance with the MBE/WBE requirements in the regulations is a matter of bidder/offeror responsibility.
- C. The recipient is responsible for monitoring work in progress to insure that MBE and WBE subcontractors and joint ventures are actually participating in the performance of the subcontract or joint venture contract and to insure that the consultant/contractor is fulfilling its obligations with respect to MBE/WBE requirements under the contract.
- D. As part of the documentation required under 40 C.F.R. 33.250, the recipient shall maintain and update records of MBE/WBE participation and supply data to the Region or delegated State when requested. Such records may include:

- 1. name of MBE/WBEs being utilized;
- 2. work designated to be performed by MBE/WBE;
- 3. dollar value of that work;
- 4. portion of project being performed by MBEs and WBEs

#### VI. BIDDER AND OFFEROR RESPONSIBILITIES

- A. Affirmative Steps: Activities during preparation of bids and offers. Bidders/offerors shall take affirmative steps in compliance with the regulations, prior to submission of bids or closing date for recipient of initial offers, to encourage participation in projects by MBEs and WBEs. Such efforts include:
  - 1. When feasible, segmenting total work requirements to permit maximum MBE/WBE participation.
  - 2. Assuring that MBEs and WBEs are solicited whenever they are potential sources of goods or services. This step may include:
    - a. Sending letters or making other personal contacts with MBEs and WBEs (e.g., those whose names appear on lists prepared by EPA or the recipient and other MBE/WBEs known to the bidder offeror). MBEs and WBEs should be contacted when other potential subcontractors are contacted, within reasonable time prior to bid submission or closing date for receipt of initial offers. Those letters or other contacts should communicate the following:
      - 1. Specific description of the work to be subcontracted,
      - 2. How and where to obtain a copy of plans and specifications or other detailed information needed to prepare a detailed price quotation,
      - 3. date the quotation is due to the bidder/offeror,
      - 4. name, address, and phone number of the person in the bidder/offeror's firm whom the prospective MBE/WBE subcontractor should contract for additional information.
    - b. Sending letters or making other personal contacts with local, State, federal and private agencies and MBE/WBE associations relevant to the project. Such contacts should provide the same information provided in the direct contacts to MBE and WBE firms.
  - 3. Where feasible, establishing delivery schedules which will encourage participation by MBEs and WBEs.
- B. Bidders/offerors must demonstrate compliance with MBE/WBE requirements in order to be deemed responsible. Demonstration of compliance may include the following information, however the recipient may specify other methods of demonstrating compliance:
  - 1. Names, addresses and phone numbers of MBE/WBEs expected to perform work;
  - 2. Work to be performed by the MBE and WBEs;
  - 3. Aggregate dollar amount of work to be performed by MBEs and WBEs, showing aggregate to MBEs and aggregate to WBEs separately;
  - 4. Description of contacts to MBE and WBE organizations, agencies and associations which service MBEs/WBEs, including names of organizations, agencies and associations and dates of contacts;
  - 5. Description of contacts to MBEs and WBEs, including number of contacts, fields, (i.e., equipment or material supplier, excavators,

transport services, electrical subcontractors, plumbers, etc.) and date of contacts.

C. Successful bidders/offerors should take reasonable affirmative steps to subcontract with MBEs and WBEs whenever additional subcontracting opportunities arise during the performance of the contract.

#### VII. <u>MBE AND WBE RESPONSIBILITIES</u>

MBEs and WBEs are responsible for promoting themselves and taking the initiative to obtain contracts and subcontracts, and for encouraging joint venture arrangements. MBEs/WBEs interested in working on EPA funded projects are strongly encouraged to take the following steps:

- A. Submit information to take the recipients to identify status as a MBE/WBE.
- B. Become certified as MBE/WBE under available State or federal agency procedures.
- C. Contact federal, State, and local MBE/WBE liaison offices to obtain information on potential jobs.
- D. Provide capability statements to State agencies, recipients, consulting engineers, and contractors stating type(s) of work performed by the firm, size of job that the firm could handle, bonding information, and nay special skills.
- E. Make every effort to establish contacts and relationships with contractors for potential future business, including attending pre-bid conferences and subscribing to industry and trade journals.
- F. Contact EPA Regional offices or appropriate State offices to obtain information on planned EPA-funded projects.
- G. Respond promptly to solicitation requests.

#### VIII. <u>REMEDIES FOR NONCOMPLIANCE</u>

- A. Protests. A bidder/offeror for EPA funded work or MBE/WBE with an adversely affected direct financial interest may file a bid protest with the recipient pursuant to EPA procurement regulations (40 C.F.R. 33.1106 <u>et</u>. <u>seq</u>.). These procedures are available to protest alleged violation of federal MBE/WBE requirements and may not be used to enforce local or State MBE/WBE requirements.
- B. Upon a finding by EPA that a recipient, bidder/offeror, consultant, contractor or subcontractor has not complied with the MBE/WBE requirements of EPA regulations, EPA my invoke any and all sanctions and remedies specified in EPA regulations.

#### IX. STATE OR LOCAL LAW

Nothing in this program prevents a State or recipient from applying more stringent MBE/WBE requirements or procurement obligations which pertain to bid responsiveness or percentage of MBE and WBE participation.



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#### Clean Water Fund Memorandum (2019-003)

# Disadvantaged Business Enterprise (DBE) Subcontractor Participation on Clean Water Fund (CWF) Projects for Construction Projects

## I. PURPOSE

The municipality, through its prime contractor must make specified good faith efforts to attain the DBE goals as specified in this document in Section III. This is an administrative condition of the U.S. Environmental Protection Agency (EPA) Grant which funds CWF projects.

This memorandum supersedes the Clean Water Fund Memorandum (2016-003)

# **II. GOVERNING STATUTE OR REGULATION**

General Compliance (Federal), 40 CFR, Part 33: The municipality, through its prime contractor must comply with the requirements of EPA's Program for Utilization of DBEs.

## **III. EPA REQUIREMENTS**

The following clause shall be included in all construction contract documents and amendments for goods and services to be funded under the CWF:

The requirement for DBE subcontractor participation, expressed as a percentage of the total eligible contract amount, shall be a minimum of 8.0 percent with the following makeup:

# Minority Business Enterprise (MBE): 3.0 percent Woman Business Enterprise (WBE): 5.0 percent

Failure to meet or exceed the required percentage or submit acceptable documentation of the six good faith efforts may render a bid non-responsive and may cause the bid to be rejected.

# IV. THE SIX GOOD FAITH EFFORTS AS SPECIFICALLY DEFINED BY EPA

The Six Good Faith Efforts are required methods employed by all Connecticut Department of Energy and Environmental Protection (DEEP) CWF recipients to ensure that all DBEs have the opportunity to compete for procurements funded by DEEP financial assistance dollars. The prime contractor is expected to employ the six good faith efforts throughout the entire project to insure that the DBE percentages are maintained or exceeded in the event that one DBE subcontractor needs to be substituted for another.

1. Ensure DBEs are made aware of contracting opportunities to the fullest extent practicable through outreach and recruitment activities. For Indian Tribal, State and Local and Government recipients, this will include placing DBEs on solicitation lists and soliciting them whenever they are potential sources.

- 2. Make information on forthcoming opportunities available to DBEs and arrange time frames for contracts and establish delivery schedules, where the requirements permit, in a way that encourages and facilitates participation by DBEs in the competitive process. This includes, whenever possible, posting solicitations for bids or proposals for a minimum of 30 calendar days before the bid or proposal closing date.
- 3. Consider in the contracting process whether firms competing for large contracts could subcontract with DBEs. For Indian Tribal, State and local Government recipients, this will include dividing total requirements when economically feasible into smaller tasks or quantities to permit maximum participation by DBEs in the competitive process.
- 4. Encourage contracting with a consortium of DBEs when a contract is too large for one of these firms to handle individually.
- 5. Use the services and assistance of the Small Business Administration (SBA) (Federal) and the Minority Business Development Agency of the Department of Commerce.
- 6. If the prime contractor awards subcontracts, require the prime contractor to take the above steps.

The prime contractor's certification as a DBE has no effect on this requirement. Therefore, if the prime contractor is a DBE, the Six Good Faith Efforts defined above must be employed in the procurement of subcontracts to be secured to achieve the MBE 3.0% and WBE 5.0% participation.

# **V. CERTIFICATION**

A DBE must be certified at the time that the subcontract for their services is executed. A business that is pending new certification, recertification, or whose certification has expired **cannot** be counted toward the goals.

In the case where a subcontractor DBE is certified as both a MBE and a WBE (a woman who is also a member of a minority class):

- 1. The prime contractor may count the entire value of the subcontract as either a MBE or a WBE.
- 2. The prime contractor may choose to split the subcontract between the MBE and the WBE categories to fulfill both goals. If the prime contractor chooses this route:
  - a. They must indicate the dollars to be apportioned to the categories either on the face of the copy of the fully executed subcontract submitted to the Connecticut Department of Energy and Environmental Protection (DEEP) or by some other written method.
  - b. The certification submitted to DEEP must indicate that the principal of the subcontractor is both a woman and a minority.
  - c. For a certification that only identifies the subcontractor as a DBE, additional documentation is required as proof of dual status. In the case of Connecticut Department of Transportation (CTDOT), the detailed information page within their online database suffices as proof.

# VI. ACCEPTABLE CERTIFICATION OPTIONS

- 1. **Connecticut Department of Administrative Services (DAS)** DEEP will continue to accept DAS certification until such time as other State entities are identified whose certification processes meet the EPA criteria. DAS will only certify Connecticut based firms that meet the criteria under Connecticut General Statute 4a-60g.
- CTDOT Companies that desire to do business with CTDOT as well as the DEEP should seek CTDOT certification which will be accepted by the DEEP. DBE firms are advised that the certification process can take 90 days to complete. CTDOT will certify both in state as well as out of state firms.

- 3. **EPA** In the event an entity cannot be certified by CTDOT as a DBE, that entity should seek certification with EPA. Such entities must provide EPA with evidence from CTDOT denying certification.
- 4. **SBA** Certification is available to companies under the Woman Owned Small Business (WOSB) program and the SBA 8(a) Business Development Program (www.sba.gov/8abd/) which has a net worth ceiling of \$250,000 for initial applicants.
- 5. Other states certification Prime contractors may utilize certification from other states. Such certification must specify the DBE designation. Where there is no DBE certification option within a state, the instance must be presented to the DEEP Financial Administrator assigned to the project for consideration on a per case basis.

# VII. DBE COMPLIANCE PROCESS

- 1. Within fourteen (14) calendar days after bid opening the prime contractor (apparent low bidder) shall complete and submit two copies of the DEEP Subcontractor Verification Form along with the DBE certification for each subcontractor to the municipality. The municipality must then submit one copy of these documents to DEEP as part of the authorization to award request.
- 2. Once DEEP authorizes the municipality to award the contract, the prime contractor is required to submit two copies of the executed DBE subcontracts to the municipality who submits one copy to the DEEP Financial Administrator.
- 3. No payment requests will be processed by DEEP until the executed copies of the subcontracts and the DBE certifications are on file in the DEEP office.
- 4. Should the prime contractor not meet the goals, documentation of good faith efforts will be required to be submitted to the DEEP Municipal Facilities Wastewater Engineer for consideration that the good faith effort was extensive enough to warrant the acceptance of a lower goal for the specific contract in question.
- 5. In the event that a DBE subcontractor is substituted for another during the project, two copies of the executed subcontract along with the corresponding DBE certification for the substitute are submitted to the municipality who forwards one copy of each to the DEEP Financial Administrator.
- 6. If additional construction costs are approved by DEEP, the prime contractor employs the good faith efforts defined above to meet the goals for the new total eligible contract amount.

# VIII. DAS PREQUALIFICATION CERTIFICATION FOR DBE SUBCONTRACTORS

At time that the prime contractor submits copies of the executed DBE subcontracts to the municipality, two copies of the current DAS Prequalification Certificate for each DBE subcontractor whose subcontract value is equal to or greater than \$500,000 must also be submitted. In turn, the municipality is required to submit one copy of each DBE Prequalification Certification to the DEEP Financial Administrator. Suppliers of material or products who do not do installation or construction work are not subject to the DAS Construction Contractor prequalification requirement.

## IX. SUBMISSION OF THIS FORM

This form is to be signed by the contractor or the contractor's authorized representative. The form is then submitted to the municipality's representative for signature. The municipality includes the form as part of the authorization to award request to DEEP.

I hereby verify that I have read and understand the DBE requirements in this memorandum and will procure subcontracts whose percentages will meet or exceed the minimums listed above.						
Contract Name						
Name of Prime Contractor						
Name and Title of Authorized Officer						
Authorized Signature	Date					
Town Official and Title						
Authorized Signature	Date					

#### X. DEFINITIONS

CGS: Connecticut General Statutes

CTDOT: Connecticut Department of Transportation

CWF: Clean Water Fund

DAS: Connecticut Department of Administrative Services

DBE: Disadvantaged Business Enterprise

**DEEP:** Connecticut Department of Energy and Environmental Protection

EPA: Environmental Protection Agency (Federal)

MBE: Minority Business Enterprise

SBA: Small Business Administration (Federal)

WBE: Woman Business Enterprise

WOSE: Woman Owned Small Business (Federal program - SBA)

June 19, 2019 Date

Unz

Denise Ruzicka, Director Water Planning and Management Division Bureau of Water Protection & Land Reuse



Disadvantage Business Enterprise (DBE)

# Subcontractor Verification Form

Prime Contractor Company Name: \_\_\_\_\_

Contract Name/Number: \_\_\_\_\_\_

Contract Bid Amount: \$\_\_\_\_\_

Note to prime contractor: You are required to complete this form listing each DBE (MBE or WBE) subcontractor to be employed in work eligible for the Drinking Water State Revolving Fund within the table below. Please submit an original of this completed form, along with each subcontractor's current, valid DBE certificate, to the municipality within 14 days of bid opening.

Name of proposed subcontractor/vendor	Type (MBE or WBE)	Type of Product or Service * (see below)	Contact Nam Subcont	e, Address, Phone # of ractor or Vendor	f	Dollar amount of proposed subcontract	MBE % of Contract towards goal	WBE % of Contract towards goal
* Type of Product or Serv	vice:	1 - Const	ruction	2 - Supplies		3 - Services	4 - Eaui	pment

The completion and submission of this form does not constitute a contractual agreement between the general contractor and the named subcontractor, but is solely for documenting proposed compliance with DBE participation under the Department of Public Health's (DPH) Drinking Water State Revolving Fund (DWSRF).

Prime Contractor Authorized Signature

Date

Drinking Water State Revolving Fund (DWSRF) loan recipients are required, as a condition of funding, to make good faith efforts to utilize MBE and WBE firms. This is achieved by the prime contractor making good faith efforts to utilize MBE and WBE subcontractors whenever procuring construction, equipment, services, and supplies. The MBE and WBE Fair Share Goals are periodically adjusted and are set by the Department of Energy and Environmental Protection (DEEP; formerly the Department of Environmental Protection – DEP). As a reminder, only first-tier subcontracts to a prime contract may be counted towards the MBE/WBE goals.

A loan recipient must report all MBE and WBE procurements to the Department of Public Health (DPH) in order for DPH to process payment requests. The DPH has developed a form to make it easier to report this information. These instructions are intended to help DWSRF loan recipients complete the "MBE/WBE Semi-Annual Reporting Form".

The form must be completed and submitted to DPH every 6 months, at the intervals noted below, regardless of whether there is any MBE or WBE procurement or not. If there were no MBE or WBE procurements to report during a particular semi-annual period, there is space available to indicate that on the form.

Semi-annual reporting periods & due dates to submit completed form:

October – March is due by April 12<sup>th</sup> April – September is due by October 12<sup>th</sup>

- I. Definitions
  - 1. <u>**Procurement**</u>: is the acquisition through contract, order, purchase, lease, or barter of supplies, equipment, construction or services needed to accomplish the project for which you are receiving DWSRF funding.
  - 2. <u>Contract</u>: is a written agreement between a sub-recipient and another party (also considered "prime contracts") and any lower tier agreement (also considered "subcontracts") for equipment, services, supplies, or construction necessary to complete the project. This definition excludes written agreements with another public agency. This definition includes personal and professional services, agreements with consultants, and purchase orders. For purposes of MBE/WBE utilization, only subcontracts may be counted towards the goal.
  - 3. <u>Minority Business Enterprise (MBE)</u>: is a business concern that is (1) at least 51 percent owned by one or more minority individuals, or, in the case of a publicly owned business, at least 51 percent of the stock is owned by one or more minority individuals; and (2) whose daily business operations are managed and directed by one or more of the minority owners. In order to qualify and participate as an MBE subcontractor for loan recipients, an entity must be properly certified.

U.S. citizenship is required. Recipients shall presume that minority individuals include Black Americans, Hispanic Americans, Native Americans, Asian Pacific Americans, or other groups whose members are found to be disadvantaged by the Small Business Act or by the Secretary of Commerce under section 5 of Executive order 11625. The reporting contact at EPA can provide additional information.

4. <u>Woman Business Enterprise (WBE)</u>: is a business concern that is, (1) at least 51 percent owned by one or more women, or, in the case of a publicly owned business, at least 51 percent of the stock is owned by one or more women and (2) whose daily business operations

are managed and directed by one or more of the women owners. In order to qualify and participate as a WBE subcontractor for loan recipients, an entity must be properly certified. Business firms which are 51 percent owned by minorities or women, but are in fact managed and operated by non-minority individuals do not qualify for meeting MBE/WBE procurement goals. U.S. Citizenship is required.

#### 5. Good Faith Efforts:

A loan recipient is required to make the following good faith efforts whenever procuring construction, equipment, services, and supplies under a loan agreement. These good faith efforts for utilizing MBEs and WBEs must be documented. Such documentation is subject to review upon request:

- a. Include of MBEs/WBEs on solicitation lists.
- b. Assure that MBEs/WBEs are solicited once they are identified.
- c. Divide total requirements into smaller tasks to permit maximum MBE/WBE participation, where feasible.
- d. Establish delivery schedules which will encourage MBE/WBE participation, where feasible.
- e. A loan recipient is encouraged to use of the services of the U.S. Department of Commerce's Minority Business Development Agency (MBDA) and the U.S. Small Business Administration to identify MBEs/WBEs.

More detailed information on these Good Faith Efforts can be found by visiting the EPA Disadvantaged Business Enterprise (DBE) website: <u>http://www.epa.gov/osbp/dbe\_team.htm</u>

- II. Instructions for completing the form
  - 1. Reporting Period please check the appropriate box for the time period that is being reported. Year please note the calendar year corresponding to the end date of the reporting period (September or March). Example: for the October 2011 to March 2012 reporting period, the year is 2012.

Indicate if this is the final report for the project by checking the box.

Please note the due dates for each reporting period.

- 2. If making a revision to a previously submitted report, check "yes" and describe the revision.
- 3. Include the name, title, and contact phone number of the person completing the form.
- 4. If there were no MBE/WBE accomplishments this reporting period, please briefly explain what specific steps you are taking to achieve the MBE/WBE goals specified in the terms and conditions of the Loan Agreement.
- 5. MBE/WBE procurements made during this reporting period (If more space is needed, please use an additional sheet).
  - A. Type MBE or WBE: Indicate whether the subcontractor is an MBE or WBE. If a firm is both an MBE and WBE, the recipient may choose to count the entire procurement towards EITHER its MBE or WBE accomplishments. The recipient may also divide the total amount of the procurement (using any ratio it so chooses) and count those divided amounts toward its MBE and WBE accomplishments. If the recipient chooses to divide the procurement amount and count portions toward its MBE and WBE accomplishments, please split into two entries. The combined MBE and WBE amounts for that MBE/WBE contractor must not exceed the total value of the contract.

- B. Dollar value of the procurement.
- C. Date of procurement, shown as month, day, year. Date of procurement is defined as the date the contract or procurement was awarded, **not** the date the contractor received payment under the awarded contract or procurement, unless payment occurred on the date of award. (Where direct purchasing is the procurement method, the date of procurement is the date the purchase was made).
- D. Using codes at the bottom of the form, identify type of product or service acquired through this procurement (e.g., enter 1 if construction, 2 if supplies, etc.).
- E. Name, address, and telephone number of MBE/WBE firm.
- F. Indicate whether or not (by Yes or No) a copy of the contract or purchase order has been submitted to DPH. If No, a copy must be submitted with this form. As a condition of the Loan Agreement, an executed copy of each MBE and WBE sub-agreement must be submitted.
- G. Indicate whether or not (by Yes or No) the procurement identified on this form is part of a change order to the prime contract. If Yes, note the number of the executed Change Order.
- 6. Name and title of official administrator or designated reporting official.
- 7. Signature, month, day, and year report submitted.

Please do not write in the shaded area.

**Please note:** Loan Agreement Exhibit XII – <u>Disadvantaged Business Enterprise Payment Report-Contractor/Consultant</u>, which summarizes actual payments made, must still be submitted following completion of the project, in addition to the semi-annual reporting.

Submit completed reports to:

Connecticut Department of Public Health Drinking Water Section Capacity Development Unit, DWSRF Program 410 Capitol Avenue, MS# 51WAT P.O. Box 340308 Hartford, CT 06134-0308

Or by email to: <u>DPH.CTDWSRF@ct.gov</u>

Semi-annual reporting periods & due dates to submit completed form:

October – March is due by April 12<sup>th</sup> April – September is due by October 12<sup>th</sup>

If you have any questions, please contact the Drinking Water Section at (860) 509-7333 and ask to speak with a DWSRF Program representative.

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PWS Name:		PWSID:					
Loan Agreement #:	Project name:						
1. Reporting Period: Final Check box only if filing FINAL report for	Year: project	October - March Due by April 12th	April - September Due by October 12th				
2. Is this a revision of a prior report:    Yes    No    If Yes:    Reporting Period:    Year:      Describe the revision:    October - March    April - September							
3. Loan Recipient MBE/WBE Reporting Contact Perso Name:	n: Title:	Phone:					
4. Comments: (If no MBE or WBE procurements were accomplished during this reporting period state reason and please explain what steps you are taking to achieve the MBE/WBE Program requirements)							
5. MBE/WBE Procurements Made During This Reporting Period (can only count subcontracts and/or purchases made by the prime contractor). See instructions for definition of "Procurement".							

A Type (MBE	, B Ś Value of	C Date of	D Type of	F Name Address & Phone # of	E Has a Copy of the	G. Is this
		Draguramant	Draduat ar	Cubcontractor or Vandor	Contract or Durchase	Procurement nart
OF WBE)	Procurement	Procurement	Product or	Subcontractor of vendor	Conract or Purchase	of a Change
		(MM/DD/YY)	Service *		Order been Submitted	of a Change
			(see below)		to DPH? (Y/N) If No,	Order? (Y/N) If Y,
					submit with this form.	Note CO#.
* Type of Product or Service: 1 - Construction		ction	2 - Supplies 3 - Se	ervices 4 - I	Equipment	

6. Name of Loan Recipient's Authorized Representative:				
			Title:	
7. Signature of Loan Recipient's Authorized Representative:				
			Date:	
DWS Use Only	FFY Reporting Year:	Period:	IUP Year:	Applicable EPA Assistance Agreement # for Reporting:

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#### UNITED STATES ENVIRONMENTAL PROTECTION AGENCY WASHINGTON, D.C. 20460

# MAR 2 0 2014

OFFICE OF WATER

#### **MEMORANDUM**

- SUBJECT: Implementation of American Iron and Steel provisions of P.L. 113-76, Consolidated Appropriations Act, 2014
- FROM: For Andrew D. Sawyers, Director Office of Wastewater Management (4201M)

Peter C. Grevatt, Director Office of Ground Water and Drinking Water (4601M)

TO:

Water Management Division Directors Regions I - X

P.L. 113-76, Consolidated Appropriations Act, 2014 (Act), includes an "American Iron and Steel (AIS)" requirement in section 436 that requires Clean Water State Revolving Loan Fund (CWSRF) and Drinking Water State Revolving Loan Fund (DWSRF) assistance recipients to use iron and steel products that are produced in the United States for projects for the construction, alteration, maintenance, or repair of a public water system or treatment works if the project is funded through an assistance agreement executed beginning January 17, 2014 (enactment of the Act), through the end of Federal Fiscal Year 2014.

Section 436 also sets forth certain circumstances under which EPA may waive the AIS requirement. Furthermore, the Act specifically exempts projects where engineering plans and specifications were approved by a State agency prior to January 17, 2014.

The approach described below explains how EPA will implement the AIS requirement. The first section is in the form of questions and answers that address the types of projects that must comply with the AIS requirement, the types of products covered by the AIS requirement, and compliance. The second section is a step-by-step process for requesting waivers and the circumstances under which waivers may be granted.

#### Implementation

The Act states:

Sec. 436. (a)(1) None of the funds made available by a State water pollution control revolving fund as authorized by title VI of the Federal Water Pollution Control Act (33 U.S.C. 1381 et seq.) or made available by a drinking water treatment revolving loan fund as authorized by section 1452 of the Safe Drinking Water Act (42 U.S.C. 300j–12) shall be used for a project for the construction, alteration, maintenance, or repair of a public water system or treatment works unless all of the iron and steel products used in the project are produced in the United States.

(2) In this section, the term ''iron and steel products'' means the following products made primarily of iron or steel: lined or unlined pipes and fittings, manhole covers and other municipal castings, hydrants, tanks, flanges, pipe clamps and restraints, valves, structural steel, reinforced precast concrete, and construction materials.

(b) Subsection (a) shall not apply in any case or category of cases in which the Administrator of the Environmental Protection Agency (in this section referred to as the "Administrator") finds that—

(1) applying subsection (a) would be inconsistent with the public interest;

(2) iron and steel products are not produced in the United States in sufficient and reasonably available quantities and of a satisfactory quality; or

(3) inclusion of iron and steel products produced in the United States will increase the cost of the overall project by more than 25 percent.

(c) If the Administrator receives a request for a waiver under this section, the Administrator shall make available to the public on an informal basis a copy of the request and information available to the Administrator concerning the request, and shall allow for informal public input on the request for at least 15 days prior to making a finding based on the request. The Administrator shall make the request and accompanying information available by electronic means, including on the official public Internet Web site of the Environmental Protection Agency.

(d) This section shall be applied in a manner consistent with United States obligations under international agreements.

(e) The Administrator may retain up to 0.25 percent of the funds appropriated in this Act for the Clean and Drinking Water State Revolving Funds for carrying out the provisions described in subsection (a)(1) for management and oversight of the requirements of this section.

(f) This section does not apply with respect to a project if a State agency approves the engineering plans and specifications for the project, in that agency's capacity to approve such plans and specifications prior to a project requesting bids, prior to the date of the enactment of this Act.

The following questions and answers provide guidance for implementing and complying with the AIS requirements:

# Project Coverage

# 1) What classes of projects are covered by the AIS requirement?

All treatment works projects funded by a CWSRF assistance agreement, and all public water system projects funded by a DWSRF assistance agreement, from the date of enactment through the end of Federal Fiscal Year 2014, are covered. The AIS requirements apply to the entirety of the project, no matter when construction begins or ends. Additionally, the AIS requirements apply to all parts of the project, no matter the source of funding.

# 2) Does the AIS requirement apply to nonpoint source projects or national estuary projects?

No. Congress did not include an AIS requirement for nonpoint source and national estuary projects unless the project can also be classified as a 'treatment works' as defined by section 212 of the Clean Water Act.

# 3) Are any projects for the construction, alteration, maintenance, or repair of a public water system or treatment works excluded from the AIS requirement?

Any project, whether a treatment works project or a public water system project, for which engineering plans and specifications were approved by the responsible state agency prior to January 17, 2014, is excluded from the AIS requirements.

# 4) What if the project does not have approved engineering plans and specifications but has signed an assistance agreement with a CWSRF or DWSRF program prior to January 17, 2014?

The AIS requirements do not apply to any project for which an assistance agreement was signed prior to January 17, 2014.

# 5) What if the project does not have approved engineering plans and specifications, but bids were advertised prior to January 17, 2014 and an assistance agreement was signed after January 17, 2014?

If the project does not require approved engineering plans and specifications, the bid advertisement date will count in lieu of the approval date for purposes of the exemption in section 436(f).

# 6) What if the assistance agreement that was signed prior to January 17, 2014, only funded a part of the overall project, where the remainder of the project will be funded later with another SRF loan?

If the original assistance agreement funded any construction of the project, the date of the original assistance agreement counts for purposes of the exemption. If the original assistance agreement was only for planning and design, the date of that assistance agreement will count for purposes of the exemption only if there is a written commitment or expectation on the part of the assistance recipient to fund the remainder of the project with SRF funds.

# 7) What if the assistance agreement that was signed prior to January 17, 2014, funded the first phase of a multi-phase project, where the remaining phases will be funded by SRF assistance in the future?

In such a case, the phases of the project will be considered a single project if all construction necessary to complete the building or work, regardless of the number of contracts or assistance agreements involved, are closely related in purpose, time and place. However, there are many situations in which major construction activities are clearly undertaken in phases that are distinct in purpose, time, or place. In the case of distinct phases, projects with engineering plans and specifications approval or assistance agreements signed prior to January 17, 2014 would be excluded from AIS requirements while those approved/signed on January 17, 2014, or later would be covered by the AIS requirements.

# 8) What if a project has split funding from a non-SRF source?

Many States intend to fund projects with "split" funding, from the SRF program and from State or other programs. Based on the Act language in section 436, which requires that American iron and steel products be used in any project for the construction, alteration, maintenance, or repair of a public water system or treatment works receiving SRF funding between and including January 17, 2014 and September 30, 2014, any project that is funded in whole or in part with such funds must comply with the AIS requirement. A "project" consists of all construction necessary to complete the building or work regardless of the number of contracts or assistance agreements involved so long as all contracts and assistance agreements awarded are closely related in purpose, time and place. This precludes the intentional splitting of SRF projects into separate and smaller contracts or assistance agreements to avoid AIS coverage on some portion of a larger

project, particularly where the activities are integrally and proximately related to the whole. However, there are many situations in which major construction activities are clearly undertaken in separate phases that are distinct in purpose, time, or place, in which case, separate contracts or assistance agreement for SRF and State or other funding would carry separate requirements.

# 9) What about refinancing?

If a project began construction, financed from a non-SRF source, prior to January 17, 2014, but is refinanced through an SRF assistance agreement executed on or after January 17, 2014 and prior to October 1, 2014, AIS requirements will apply to all construction that occurs on or after January 17, 2014, through completion of construction, unless, as is likely, engineering plans and specifications were approved by a responsible state agency prior to January 17, 2014. There is no retroactive application of the AIS requirements where a refinancing occurs for a project that has completed construction prior to January 17, 2014.

# 10) Do the AIS requirements apply to any other EPA programs, besides the SRF program, such as the Tribal Set-aside grants or grants to the Territories and DC?

No, the AIS requirement only applies to funds made available by a State water pollution control revolving fund as authorized by title VI of the Federal Water Pollution Control Act (33 U.S.C. 1381 et seq.) or made available by a drinking water treatment revolving loan fund as authorized by section 1452 of the Safe Drinking Water Act (42 U.S.C. 300j–12)

# **Covered Iron and Steel Products**

## 11) What is an iron or steel product?

For purposes of the CWSRF and DWSRF projects that must comply with the AIS requirement, an iron or steel product is one of the following made primarily of iron or steel that is permanently incorporated into the public water system or treatment works:

Lined or unlined pipes or fittings; Manhole Covers; Municipal Castings (defined in more detail below); Hydrants; Tanks; Flanges; Pipe clamps and restraints; Valves; Structural steel (defined in more detail below); Reinforced precast concrete; and Construction materials (defined in more detail below).

#### 12) What does the term 'primarily iron or steel' mean?

'Primarily iron or steel' places constraints on the list of products above. For one of the listed products to be considered subject to the AIS requirements, it must be made of greater than 50% iron or steel, measured by cost. The cost should be based on the material costs.

#### 13) Can you provide an example of how to perform a cost determination?

For example, the iron portion of a fire hydrant would likely be the bonnet, body and shoe, and the cost then would include the pouring and casting to create those components. The other material costs would include non-iron and steel internal workings of the fire hydrant (i.e., stem, coupling, valve, seals, etc). However, the assembly of the internal workings into the hydrant body would not be included in this cost calculation. If one of the listed products is not made primarily of iron or steel, United States (US) provenance is not required. An exception to this definition is reinforced precast concrete, which is addressed in a later question.

# 14) If a product is composed of more than 50% iron or steel, but is not listed in the above list of items, must the item be produced in the US? Alternatively, must the iron or steel in such a product be produced in the US?

The answer to both question is no. Only items on the above list must be produced in the US. Additionally, the iron or steel in a non-listed item can be sourced from outside the US.

## 15) What is the definition of steel?

Steel means an alloy that includes at least 50 percent iron, between .02 and 2 percent carbon, and may include other elements. Metallic elements such as chromium, nickel, molybdenum, manganese, and silicon may be added during the melting of steel for the purpose of enhancing properties such as corrosion resistance, hardness, or strength. The definition of steel covers carbon steel, alloy steel, stainless steel, tool steel and other specialty steels.

## 16) What does 'produced in the United States' mean?

Production in the United States of the iron or steel products used in the project requires that all manufacturing processes, including application of coatings, must take place in the United States, with the exception of metallurgical processes involving refinement of steel additives. All manufacturing processes includes processes such as melting, refining, forming, rolling, drawing, finishing, fabricating and coating. Further, if a domestic iron and steel product is taken out of the US for any part of the manufacturing process, it becomes foreign source material. However, raw materials such as iron ore, limestone and iron and steel scrap are not covered by the AIS requirement, and the
material(s), if any, being applied as a coating are similarly not covered. Non-iron or steel components of an iron and steel product may come from non-US sources. For example, for products such as valves and hydrants, the individual non-iron and steel components do not have to be of domestic origin.

# 17) Are the raw materials used in the production of iron or steel required to come from US sources?

No. Raw materials, such as iron ore, limestone, scrap iron, and scrap steel, can come from non-US sources.

# **18**) If an above listed item is primarily made of iron or steel, but is only at the construction site temporarily, must such an item be produced in the US?

No. Only the above listed products made primarily of iron or steel, permanently incorporated into the project must be produced in the US. For example trench boxes, scaffolding or equipment, which are removed from the project site upon completion of the project, are not required to be made of U.S. Iron or Steel.

#### 19) What is the definition of 'municipal castings'?

Municipal castings are cast iron or steel infrastructure products that are melted and cast. They typically provide access, protection, or housing for components incorporated into utility owned drinking water, storm water, wastewater, and surface infrastructure. They are typically made of grey or ductile iron, or steel. Examples of municipal castings are:

> Access Hatches; Ballast Screen: Benches (Iron or Steel); Bollards; Cast Bases: Cast Iron Hinged Hatches, Square and Rectangular; Cast Iron Riser Rings; Catch Basin Inlet; Cleanout/Monument Boxes: Construction Covers and Frames; Curb and Corner Guards; Curb Openings; Detectable Warning Plates; Downspout Shoes (Boot, Inlet); Drainage Grates, Frames and Curb Inlets; Inlets; Junction Boxes; Lampposts; Manhole Covers, Rings and Frames, Risers;

Meter Boxes; Service Boxes; Steel Hinged Hatches, Square and Rectangular; Steel Riser Rings; Trash receptacles; Tree Grates; Tree Guards; Trench Grates; and Valve Boxes, Covers and Risers.

#### 20) What is 'structural steel'?

Structural steel is rolled flanged shapes, having at least one dimension of their cross-section three inches or greater, which are used in the construction of bridges, buildings, ships, railroad rolling stock, and for numerous other constructional purposes. Such shapes are designated as wide-flange shapes, standard I-beams, channels, angles, tees and zees. Other shapes include H-piles, sheet piling, tie plates, cross ties, and those for other special purposes.

#### 21) What is a 'construction material' for purposes of the AIS requirement?

Construction materials are those articles, materials, or supplies made primarily of iron and steel, that are permanently incorporated into the project, not including mechanical and/or electrical components, equipment and systems. Some of these products may overlap with what is also considered "structural steel". This includes, but is not limited to, the following products: wire rod, bar, angles, concrete reinforcing bar, wire, wire cloth, wire rope and cables, tubing, framing, joists, trusses, fasteners (i.e., nuts and bolts), welding rods, decking, grating, railings, stairs, access ramps, fire escapes, ladders, wall panels, dome structures, roofing, ductwork, surface drains, cable hanging systems, manhole steps, fencing and fence tubing, guardrails, doors, and stationary screens.

### 22) What is not considered a 'construction material' for purposes of the AIS requirement?

Mechanical and electrical components, equipment and systems are not considered construction materials. Mechanical equipment is typically that which has motorized parts and/or is powered by a motor. Electrical equipment is typically any machine powered by electricity and includes components that are part of the electrical distribution system.

The following examples (including their appurtenances necessary for their intended use and operation) are NOT considered construction materials: pumps, motors, gear reducers, drives (including variable frequency drives (VFDs)), electric/pneumatic/manual accessories used to operate valves (such as electric valve actuators), mixers, gates, motorized screens (such as traveling screens), blowers/aeration equipment, compressors, meters, sensors, controls and switches, supervisory control and

data acquisition (SCADA), membrane bioreactor systems, membrane filtration systems, filters, clarifiers and clarifier mechanisms, rakes, grinders, disinfection systems, presses (including belt presses), conveyors, cranes, HVAC (excluding ductwork), water heaters, heat exchangers, generators, cabinetry and housings (such as electrical boxes/enclosures), lighting fixtures, electrical conduit, emergency life systems, metal office furniture, shelving, laboratory equipment, analytical instrumentation, and dewatering equipment.

# 23) If the iron or steel is produced in the US, may other steps in the manufacturing process take place outside of the US, such as assembly?

No. Production in the US of the iron or steel used in a listed product requires that all manufacturing processes must take place in the United States, except metallurgical processes involving refinement of steel additives.

# 24) What processes must occur in the US to be compliant with the AIS requirement for reinforced precast concrete?

While reinforced precast concrete may not be at least 50% iron or steel, in this particular case, the reinforcing bar and wire must be produced in the US and meet the same standards as for any other iron or steel product. Additionally, the casting of the concrete product must take place in the US. The cement and other raw materials used in concrete production are not required to be of domestic origin.

If the reinforced concrete is cast at the construction site, the reinforcing bar and wire are considered to be a construction material and must be produced in the US.

#### **Compliance**

# 25) How should an assistance recipient document compliance with the AIS requirement?

In order to ensure compliance with the AIS requirement, specific AIS contract language must be included in each contract, starting with the assistance agreement, all the way down to the purchase agreements. Sample language for assistance agreements and contracts can be found in Appendix 3 and 4.

EPA recommends the use of a step certification process, similar to one used by the Federal Highway Administration. The step certification process is a method to ensure that producers adhere to the AIS requirement and assistance recipients can verify that products comply with the AIS requirement. The process also establishes accountability and better enables States to take enforcement actions against violators.

Step certification creates a paper trail which documents the location of the manufacturing process involved with the production of steel and iron materials. A step certification is a process under which each handler (supplier, fabricator, manufacturer,

processor, etc) of the iron and steel products certifies that their step in the process was domestically performed. Each time a step in the manufacturing process takes place, the manufacturer delivers its work along with a certification of its origin. A certification can be quite simple. Typically, it includes the name of the manufacturer, the location of the manufacturing facility where the product or process took place (not its headquarters), a description of the product or item being delivered, and a signature by a manufacturer's responsible party. Attached, as Appendix 5, are sample certifications. These certifications should be collected and maintained by assistance recipients.

Alternatively, the final manufacturer that delivers the iron or steel product to the worksite, vendor, or contractor, may provide a certification asserting that all manufacturing processes occurred in the US. While this type of certification may be acceptable, it may not provide the same degree of assurance. Additional documentation may be needed if the certification is lacking important information. Step certification is the best practice.

# 26) How should a State ensure assistance recipients are complying with the AIS requirement?

In order to ensure compliance with the AIS requirement, States SRF programs must include specific AIS contract language in the assistance agreement. Sample language for assistance agreements can be found in Appendix 3.

States should also, as a best practice, conduct site visits of projects during construction and review documentation demonstrating proof of compliance which the assistance recipient has gathered.

# 27) What happens if a State or EPA finds a non-compliant iron and/or steel product permanently incorporated in the project?

If a potentially non-compliant product is identified, the State should notify the assistance recipient of the apparent unauthorized use of the non-domestic component, including a proposed corrective action, and should be given the opportunity to reply. If unauthorized use is confirmed, the State can take one or more of the following actions: request a waiver where appropriate; require the removal of the non-domestic item; or withhold payment for all or part of the project. Only EPA can issue waivers to authorize the use of a non-domestic item. EPA may use remedies available to it under the Clean Water Act, the Safe Drinking Water Act, and 40 CFR part 31 grant regulations, in the event of a violation of a grant term and condition.

It is recommended that the State work collaboratively with EPA to determine the appropriate corrective action, especially in cases where the State is the one who identifies the item in noncompliance or there is a disagreement with the assistance recipient.

If fraud, waste, abuse, or any violation of the law is suspected, the Office of Inspector General (OIG) should be contacted immediately. The OIG can be reached at 1-

888-546-8740 or OIG\_Hotline@epa.gov. More information can be found at this website: http://www.epa.gov/oig/hotline.htm.

# 28) How do international trade agreements affect the implementation of the AIS requirements?

The AIS provision applies in a manner consistent with United States obligations under international agreements. Typically, these obligations only apply to direct procurement by the entities that are signatories to such agreements. In general, SRF assistance recipients are not signatories to such agreements, so these agreements have no impact on this AIS provision. In the few instances where such an agreement applies to a municipality, that municipality is under the obligation to determine its applicability and requirements and document the actions taken to comply for the State.

#### Waiver Process

The statute permits EPA to issue waivers for a case or category of cases where EPA finds (1) that applying these requirements would be inconsistent with the public interest; (2) iron and steel products are not produced in the US in sufficient and reasonably available quantities and of a satisfactory quality; or (3) inclusion of iron and steel products produced in the US will increase the cost of the overall project by more than 25 percent.

In order to implement the AIS requirements, EPA has developed an approach to allow for effective and efficient implementation of the waiver process to allow projects to proceed in a timely manner. The framework described below will allow States, on behalf of the assistance recipients, to apply for waivers of the AIS requirement directly to EPA Headquarters. Only waiver requests received from states will be considered. Pursuant to the Act, EPA has the responsibility to make findings as to the issuance of waivers to the AIS requirements.

#### Definitions

The following terms are critical to the interpretation and implementation of the AIS requirements and apply to the process described in this memorandum:

<u>Reasonably Available Quantity</u>: The quantity of iron or steel products is available or will be available at the time needed and place needed, and in the proper form or specification as specified in the project plans and design.

<u>Satisfactory Quality</u>: The quality of iron or steel products, as specified in the project plans and designs.

<u>Assistance Recipient:</u> A borrower or grantee that receives funding from a State CWSRF or DWSRF program.

#### **Step-By-Step Waiver Process**

#### Application by Assistance Recipient

Each local entity that receives SRF water infrastructure financial assistance is required by section 436 of the Act to use American made iron and steel products in the construction of its project. However, the recipient may request a waiver. Until a waiver is granted by EPA, the AIS requirement stands, except as noted above with respect to municipalities covered by international agreements.

The waiver process begins with the SRF assistance recipient. In order to fulfill the AIS requirement, the assistance recipient must in good faith design the project (where applicable) and solicit bids for construction with American made iron and steel products. It is essential that the assistance recipient include the AIS terms in any request for proposals or solicitations for bids, and in all contracts (see Appendix 3 for sample construction contract language). The assistance recipient may receive a waiver at any point before, during, or after the bid process, if one or more of three conditions is met:

- 1. Applying the American Iron and Steel requirements of the Act would be inconsistent with the public interest;
- 2. Iron and steel products are not produced in the United States in sufficient and reasonably available quantities and of a satisfactory quality; or
- 3. Inclusion of iron and steel products produced in the United States will increase the cost of the overall project by more than 25 percent.

Proper and sufficient documentation must be provided by the assistance recipient. A checklist detailing the types of information required for a waiver to be processed is attached as Appendix 1.

Additionally, it is strongly encouraged that assistance recipients hold pre-bid conferences with potential bidders. A pre-bid conference can help to identify iron and steel products needed to complete the project as described in the plans and specifications that may not be available from domestic sources. It may also identify the need to seek a waiver prior to bid, and can help inform the recipient on compliance options.

In order to apply for a project waiver, the assistance recipient should email the request in the form of a Word document (.doc) to the State SRF program. It is strongly recommended that the State designate a single person for all AIS communications. The State SRF designee will review the application for the waiver and determine whether the necessary information has been included. Once the waiver application is complete, the State designee will forward the application to either of two email addresses. For CWSRF waiver requests, please send the application to: <a href="mailto:cwsrfwaiver@epa.gov">cwsrfwaiver@epa.gov</a>. For DWSRF waiver requests, please send the application to: <a href="mailto:dwsrfwaiver@epa.gov">dwsrfwaiver@epa.gov</a>.

#### Evaluation by EPA

After receiving an application for waiver of the AIS requirements, EPA Headquarters will publish the request on its website for 15 days and receive informal comment. EPA Headquarters will then use the checklist in Appendix 2 to determine whether the application properly and adequately documents and justifies the statutory basis cited for the waiver – that it is quantitatively and qualitatively sufficient – and to determine whether or not to grant the waiver.

In the event that EPA finds that adequate documentation and justification has been submitted, the Administrator may grant a waiver to the assistance recipient. EPA will notify the State designee that a waiver request has been approved or denied as soon as such a decision has been made. Granting such a waiver is a three-step process:

1. Posting – After receiving an application for a waiver, EPA is required to publish the application and all material submitted with the application on EPA's website for 15 days. During that period, the public will have the opportunity to review the request and provide informal comment to EPA. The website can be found at: <u>http://water.epa.gov/grants\_funding/aisrequirement.cfm</u>

2. Evaluation – After receiving an application for waiver of the AIS requirements, EPA Headquarters will use the checklist in Appendix 2 to determine whether the application properly and adequately documents and justifies the statutory basis cited for the waiver – that it is quantitatively and qualitatively sufficient – and to determine whether or not to grant the waiver.

3. Signature of waiver approval by the Administrator or another agency official with delegated authority – As soon as the waiver is signed and dated, EPA will notify the State SRF program, and post the signed waiver on our website. The assistance recipient should keep a copy of the signed waiver in its project files.

#### Public Interest Waivers

EPA has the authority to issue public interest waivers. Evaluation of a public interest waiver request may be more complicated than that of other waiver requests so they may take more time than other waiver requests for a decision to be made. An example of a public interest waiver that might be issued could be for a community that has standardized on a particular type or manufacturer of a valve because of its performance to meet their specifications. Switching to an alternative valve may require staff to be trained on the new equipment and additional spare parts would need to be purchased and stocked, existing valves may need to be unnecessarily replaced, and portions of the system may need to be redesigned. Therefore, requiring the community to install an alternative valve would be inconsistent with public interest.

EPA also has the authority to issue a public interest waiver that covers categories of products that might apply to all projects.

EPA reserves the right to issue national waivers that may apply to particular classes of assistance recipients, particular classes of projects, or particular categories of iron or steel products. EPA may develop national or (US geographic) regional categorical waivers through the identification of similar circumstances in the detailed justifications presented to EPA in a waiver request or requests. EPA may issue a national waiver based on policy decisions regarding the public's interest or a determination that a particular item is not produced domestically in reasonably available quantities or of a sufficient quality. In such cases, EPA may determine it is necessary to issue a national waiver.

If you have any questions concerning the contents of this memorandum, you may contact us, or have your staff contact Jordan Dorfman, Attorney-Advisor, State Revolving Fund Branch, Municipal Support Division, at dorfman.jordan@epa.gov or (202) 564-0614 or Kiri Anderer, Environmental Engineer, Infrastructure Branch, Drinking Water Protection Division, at anderer.kirsten@epa.gov or (202) 564-3134.

Attachments

#### **Appendix 1: Information Checklist for Waiver Request**

The purpose of this checklist is to help ensure that all appropriate and necessary information is submitted to EPA. EPA recommends that States review this checklist carefully and provide all appropriate information to EPA. This checklist is for informational purposes only and does not need to be included as part of a waiver application.

Items	✓	Notes
General		
Waiver request includes the following information:		
<ul> <li>Description of the foreign and domestic construction materials</li> </ul>		
<ul> <li>Unit of measure</li> </ul>		
- Quantity		
- Price		
<ul> <li>Time of delivery or availability</li> </ul>		
<ul> <li>Location of the construction project</li> </ul>		
<ul> <li>Name and address of the proposed supplier</li> </ul>		
<ul> <li>A detailed justification for the use of foreign construction materials</li> </ul>		
<ul> <li>Waiver request was submitted according to the instructions in the memorandum</li> </ul>		
Assistance recipient made a good faith effort to solicit bids for domestic iron and steel products, as demonstrated by language in		
requests for proposals, contracts, and communications with the prime contractor		
Cost Waiver Requests		
Waiver request includes the following information:		
<ul> <li>Comparison of overall cost of project with domestic iron and steel products to overall cost of project with foreign iron and</li> </ul>		
steel products		
<ul> <li>Relevant excerpts from the bid documents used by the contractors to complete the comparison</li> </ul>		
<ul> <li>Supporting documentation indicating that the contractor made a reasonable survey of the market, such as a description of the</li> </ul>		
process for identifying suppliers and a list of contacted suppliers		
Availability Waiver Requests		
• Waiver request includes the following supporting documentation necessary to demonstrate the availability, quantity, and/or quality of		
the materials for which the waiver is requested:		
<ul> <li>Supplier information or pricing information from a reasonable number of domestic suppliers indicating availability/delivery</li> </ul>		
date for construction materials		
<ul> <li>Documentation of the assistance recipient's efforts to find available domestic sources, such as a description of the process</li> </ul>		
for identifying suppliers and a list of contacted suppliers.		
<ul> <li>Project schedule</li> </ul>		
<ul> <li>Relevant excerpts from project plans, specifications, and permits indicating the required quantity and quality of construction</li> </ul>		
materials		
• Waiver request includes a statement from the prime contractor and/or supplier confirming the non-availability of the domestic		
construction materials for which the waiver is sought		
<ul> <li>Has the State received other waiver requests for the materials described in this waiver request, for comparable projects?</li> </ul>		

#### **Appendix 2: HQ Review Checklist for Waiver Request**

Instructions: To be completed by EPA. Review all waiver requests using the questions in the checklist, and mark the appropriate box as Yes, No or N/A. Marks that fall inside the shaded boxes may be grounds for denying the waiver. If none of your review markings fall into a shaded box, the waiver is eligible for approval if it indicates that one or more of the following conditions applies to the domestic product for which the waiver is sought:

- 1. The iron and/or steel products are not produced in the United States in sufficient and reasonably available quantities and of a satisfactory quality.
- 2. The inclusion of iron and/or steel products produced in the United States will increase the cost of the overall project by more than 25 percent.

Review Items	Yes	No	N/A	Comments
Cost Waiver Requests				
• Does the waiver request include the following information?				
- Comparison of overall cost of project with domestic iron and steel products to overall cost of project with foreign iron and				
steel products				
<ul> <li>Relevant excerpts from the bid documents used by the contractors to complete the comparison</li> </ul>				
- A sufficient number of bid documents or pricing information from domestic sources to constitute a reasonable survey of				
the market				
• Does the Total Domestic Project exceed the Total Foreign Project Cost by more than 25%?				
Availability Waiver Requests				
• Does the waiver request include supporting documentation sufficient to show the availability, quantity, and/or quality of the				
iron and/or steel product for which the waiver is requested?				
<ul> <li>Supplier information or other documentation indicating availability/delivery date for materials</li> </ul>				
<ul> <li>Project schedule</li> </ul>				
- Relevant excerpts from project plans, specifications, and permits indicating the required quantity and quality of materials				
• Does supporting documentation provide sufficient evidence that the contractors made a reasonable effort to locate domestic				
suppliers of materials, such as a description of the process for identifying suppliers and a list of contacted suppliers?				
• Based on the materials delivery/availability date indicated in the supporting documentation, will the materials be unavailable				
when they are needed according to the project schedule? (By item, list schedule date and domestic delivery quote date or other				
relevant information)				
• Is EPA aware of any other evidence indicating the non-availability of the materials for which the waiver is requested?				
Examples include:				
<ul> <li>Multiple waiver requests for the materials described in this waiver request, for comparable projects in the same State</li> </ul>				
<ul> <li>Multiple waiver requests for the materials described in this waiver request, for comparable projects in other States</li> </ul>				
<ul> <li>Correspondence with construction trade associations indicating the non-availability of the materials</li> </ul>				
• Are the available domestic materials indicated in the bid documents of inadequate quality compared those required by the				
project plans, specifications, and/or permits?				

#### **Appendix 3: Example Loan Agreement Language**

ALL ASSISTANCE AGREEMENT MUST HAVE A CLAUSE REQUIRING COMPLIANCE WITH THE AIS REQUIREMENT. THIS IS AN EXAMPLE OF WHAT COULD BE INCLUDED IN SRF ASSISTANCE AGREEMENTS. EPA MAKES NO CLAIMS REGARDING THE LEGALITY OF THIS CLAUSE WITH RESPECT TO STATE LAW:

Comply with all federal requirements applicable to the Loan (including those imposed by the 2014 Appropriations Act and related SRF Policy Guidelines) which the Participant understands includes, among other, requirements that all of the iron and steel products used in the Project are to be produced in the United States ("American Iron and Steel Requirement") unless (i) the Participant has requested and obtained a waiver from the Agency pertaining to the Project or (ii) the Finance Authority has otherwise advised the Participant in writing that the American Iron and Steel Requirement is not applicable to the Project.

Comply with all record keeping and reporting requirements under the Clean Water Act/Safe Drinking Water Act, including any reports required by a Federal agency or the Finance Authority such as performance indicators of program deliverables, information on costs and project progress. The Participant understands that (i) each contract and subcontract related to the Project is subject to audit by appropriate federal and state entities and (ii) failure to comply with the Clean Water Act/Safe Drinking Water Act and this Agreement may be a default hereunder that results in a repayment of the Loan in advance of the maturity of the Bonds and/or other remedial actions.

#### **Appendix 4: Sample Construction Contract Language**

ALL CONTRACTS MUST HAVE A CLAUSE REQUIRING COMPLIANCE WITH THE AIS REQUIREMENT. THIS IS AN EXAMPLE OF WHAT COULD BE INCLUDED IN ALL CONTRACTS IN PROJECTS THAT USE SRF FUNDS. EPA MAKES NO CLAIMS REGARDING THE LEGALITY OF THIS CLAUSE WITH RESPECT TO STATE OR LOCAL LAW:

The Contractor acknowledges to and for the benefit of the City of ("Purchaser") and the (the "State") that it understands the goods and services under this Agreement are being funded with monies made available by the Clean Water State Revolving Fund and/or Drinking Water State Revolving Fund that have statutory requirements commonly known as "American Iron and Steel;" that requires all of the iron and steel products used in the project to be produced in the United States ("American Iron and Steel Requirement") including iron and steel products provided by the Contactor pursuant to this Agreement. The Contractor hereby represents and warrants to and for the benefit of the Purchaser and the State that (a) the Contractor has reviewed and understands the American Iron and Steel Requirement, (b) all of the iron and steel products used in the project will be and/or have been produced in the United States in a manner that complies with the American Iron and Steel Requirement, unless a waiver of the requirement is approved, and (c) the Contractor will provide any further verified information, certification or assurance of compliance with this paragraph, or information necessary to support a waiver of the American Iron and Steel Requirement, as may be requested by the Purchaser or the State. Notwithstanding any other provision of this Agreement, any failure to comply with this paragraph by the Contractor shall permit the Purchaser or State to recover as damages against the Contractor any loss, expense, or cost (including without limitation attorney's fees) incurred by the Purchaser or State resulting from any such failure (including without limitation any impairment or loss of funding, whether in whole or in part, from the State or any damages owed to the State by the Purchaser). While the Contractor has no direct contractual privity with the State, as a lender to the Purchaser for the funding of its project, the Purchaser and the Contractor agree that the State is a third-party beneficiary and neither this paragraph (nor any other provision of this Agreement necessary to give this paragraph force or effect) shall be amended or waived without the prior written consent of the State.

#### **Appendix 5: Sample Certifications**

The following information is provided as a sample letter of <u>step</u> certification for AIS compliance. Documentation must be provided on company letterhead.

Date

Company Name

Company Address

City, State Zip

Subject: American Iron and Steel Step Certification for Project (XXXXXXXXX)

I, (company representative), certify that the (melting, bending, coating, galvanizing, cutting, etc.) process for (manufacturing or fabricating) the following products and/or materials shipped or provided for the subject project is in full compliance with the American Iron and Steel requirement as mandated in EPA's State Revolving Fund Programs.

Item, Products and/or Materials:

- 1. Xxxx
- 2. Xxxx
- 3. Xxxx

Such process took place at the following location:

If any of the above compliance statements change while providing material to this project we will immediately notify the prime contractor and the engineer.

Signed by company representative

The following information is provided as a sample letter of certification for AIS compliance. Documentation must be provided on company letterhead.

Date

Company Name

Company Address

City, State Zip

Subject: American Iron and Steel Certification for Project (XXXXXXXXX)

I, (company representative), certify that the following products and/or materials shipped/provided to the subject project are in full compliance with the American Iron and Steel requirement as mandated in EPA's State Revolving Fund Programs.

Item, Products and/or Materials:

- 1. Xxxx
- 2. Xxxx
- 3. Xxxx

Such process took place at the following location:

Signed by company representative

If any of the above compliance statements change while providing material to this project we will immediately notify the prime contractor and the engineer.

#### Connecticut Drinking Water State Revolving Fund Use of American Iron and Steel - De Minimis Waiver On-Going Tracking Form

The Consolidated Appropriations Act of 2014 (P.L. 113-76) Section 436 requires the Use of American Iron & Steel in DWSRF-funded projects. Under the authority of Section 436(b)(1), the EPA has issued a public interest waiver for De Minimis incidental components. The assistance recipient wishing to use this waiver should consult with their contractor(s) to maintain an itemized list of components covered under the De Minimis waiver.

THIS VERSION OF THE "DE MINIMIS WAIVER FORM" IS TO BE USED TO TRACK ITEMS AS THE PROJECT PROGRESSES. THE FINAL
REPORTED AMOUNT MUST BE ON THE "FINAL UTILIZATION AND CERTIFICATION FORM".

**PWS Name:** 

PWSID:

Project Name:

Loan agrmnt #:

NOTE: The De Minimis waiver is only applicable to the cost of materials for the entire project. Do not include other project costs (labor, installation costs, etc.) in the "Total Cost of Materials". The cost of a material must include delivery to the site and any applicable tax. Must have sufficient documentation to support all costs included in this calculation.

Funds used for de minimis incidental components cumulatively may comprise no more than a total of 5 percent of the total cost of the materials used in and incorporated into a project; the cost of an individual item may not exceed 1 percent of the total cost of the materials used in and incorporated into a project.

Total Cost of Materials:		5% Limit:		1% limit:	
Manufacturer & Component Description	Part/Model #	Quantity (if applicable)	Cost per Unit (if applicable)	Component's Total Cost	How is Cost Documented?

Use additional sheets as necessary

**Total De Minimis Cost of Components:** 

If approaching the 5% or 1% limits, contact DWS immediately

For final reporting, use the "Final Utilization and Certification" Form. APPENDIX A - 149

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### Connecticut Drinking Water State Revolving Fund Jse of American Iron and Steel - De Minimis Waiver Final Utilization and Certification Form

Use of American Iron ar	nd Steel - De Mir	nimis Waive	er Final Utiliza	ation and Certifica	ation Form
The Consolidated Appropriations Acc projects. Under the authority of components. The assistance recipier of components covered under the D in the assistance recipient's proje strongly recommended that you ma	t of 2014 (P.L. 113-76 of Section 436(b)(1), t nt wishing to use this De Minimis waiver. At ct files and a copy pro <b>intain a list as the pr</b>	b) Section 436 r the EPA has iss waiver should the conclusion ovided to the E coject progress or type.	requires the Use o ued a public inter consult with their n of the project, th Department of Pub res (see the "On-G	of American Iron & Stee est waiver for De Minin contractor(s) to maint his form must be compl plic Health-Drinking Wa <b>Going Tracking Form")</b> .	l in DWSRF-funded nis incidental ain an itemized list eted and retained ter Section. <b>It is</b> Please print clearly
PWS Name:			PWSID:		
Project Name:			Loan Agrmt #:		
NOTE: The De Minimis waiver is only installation costs, etc.) in the "Total Cos have suf Funds used for de minimis incidental materials used in and incorporated	applicable to the cost st of Materials". The c ficient documentation components cumulati d into a project; the co	of materials fo ost of a materia to support all <b>ively may comp</b> ost of an individ	r the entire project al must include deli costs included in th prise no more than lual item may not	t. Do not include other p ivery to the site and any his calculation. a total of 5 percent of t exceed 1 percent of the	roject costs (labor, applicable tax. Must he total cost of the total cost of the
Total Cost of Materials:	materials used ir	and incorpora 5% Limit:	ated into a project	1% limit:	
Manufacturer & Component Description	Part/Model #	Quantity (if applicable)	Cost per Unit (if applicable)	Component's Total Cost	How is Cost Documented?*

Use additional sheets as necessary	Total De	Minimis Cost	of Components:		If approaching the	
* Documentation must demonstrate co	onfirmation of the com	ponents' actua	costs (invoice, etc	c.).	contact DWS	
Completed by:					immediately	
Name:			Title:		_	

Date:

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# Provisions for Implementing 2 CFR 200.216 in Construction Contracts: Prohibition on Certain Telecommunications and Video Surveillance Services or Equipment.

In accordance with Federal law, all construction contracts must contain a provision for implementing 2 CFR 200.216. This requirement is noted on the Pre-Bid Construction Contract Application Checklist on Page 5 Table II Section B.viii. Below is template language that may be used to satisfy this requirement. Additions or minor revisions to this language must be approved by the DPH in advance of bidding.

#### "Prohibition on Certain Telecommunications and Video Surveillance Services or Equipment

This term and condition implements 2 CFR 200.216 and is effective for obligations and expenditures of EPA financial assistance funding on or after 8/13/2020. As required by 2 CFR 200.216, EPA recipients and subrecipients, including borrowers under EPA funded revolving loan fund programs, are prohibited from obligating or expending loan or grant funds to procure or obtain; extend or renew a contract to procure or obtain; or enter into a contract (or extend or renew a contract) to procure or obtain equipment, services, or systems that use covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology as part of any system. As described in Public Law 115-232, section 889, covered telecommunications equipment is telecommunications equipment produced by Huawei Technologies Company or ZTE Corporation (or any subsidiary or affiliate of such entities). Recipients, subrecipients, and borrowers also may not use EPA funds to purchase: a. For the purpose of public safety, security of government facilities, physical security surveillance of critical Page 4 of 29 infrastructure, and other national security purposes, video surveillance and telecommunications equipment produced by Hytera Communications Corporation, Hangzhou Hikvision Digital Technology Company, or Dahua Technology Company (or any subsidiary or affiliate of such entities). b. Telecommunications or video surveillance services provided by such entities or using such equipment. c. Telecommunications or video surveillance equipment or services produced or provided by an entity that the Secretary of Defense, in consultation with the Director of the National Intelligence or the Director of the Federal Bureau of Investigation, reasonably believes to be an entity owned or controlled by, or otherwise connected to, the government of a covered foreign country. Consistent with 2 CFR 200.471, costs incurred for telecommunications and video surveillance services or equipment such as phones, internet, video surveillance, and cloud servers are allowable except for the following circumstances: a. Obligating or expending EPA funds for covered telecommunications and video surveillance services or equipment or services as described in 2 CFR 200.216 to: (1) Procure or obtain, extend or renew a contract to procure or obtain; (2) Enter into a contract (or extend or renew a contract) to procure; or (3) Obtain the equipment, services, or systems. Certain prohibited equipment, systems, or services, including equipment, systems, or services produced or provided by entities identified in section 889, are recorded in the System for Award Management exclusion list."

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DWSRF RES 2023-02, REHABILATATION OF THE GRUPES RESERVIOR DAM, NEW CANNAN, CT

# **APPENDIX B**

- 1. CONNECTICUT PROJECT SPECIFIC PREVAILING WAGE RATES
- 2. DAVIS-BACON WAGE DETERMINATIONS

County	Town	Classification	Hourly Rate	Hourly Benefit
Fairfield	New Canaan	1) Boilermaker	\$46.21	29.35
Fairfield	New Canaan	1a) Bricklayer, Cement Masons, Cement Finishers, Plasterers, Stone	\$41.63	34.50
Fairfield	New Canaan	2) Carpenters, Piledrivermen	\$39.54	28.68
Fairfield	New Canaan	2a) Diver Tenders	\$39.54	28.68
Fairfield	New Canaan	3) Divers	\$48.00	28.68
Fairfield	New Canaan	03a) Millwrights	\$40.56	28.87
Fairfield	New Canaan	4) Painters: (Bridge Construction) Brush, Roller, Blasting (Sand, Water,	\$57.85	25.95
Fairfield	New Canaan	etc.), Spray 4a) Painters: Brush and Roller	\$38.07	25.80
Fairfield	New Canaan	4b) Painters: Spray Only	\$41.07	25.80
Fairfield	New Canaan	4c) Painters: Steel Only	\$40.07	25.80
Fairfield	New Canaan	4d) Painters: Blast and Spray	\$41.07	25.80
Fairfield	New Canaan	4e) Painters: Tanks, Tower and Swing	\$40.07	25.80
Fairfield	New Canaan	4f) Elevated Tanks (60 feet and above)	\$47.07	25.80
Fairfield	New Canaan	5) Electrician (Trade License required: E-1,2 L-5,6 C-5,6 T-1,2 L-1,2 V-	\$44.00	42.745
Fairfield	New Canaan	6) Ironworkers: Ornamental, Reinforcing, Structural, and Precast Concrete	\$45.25	41.27 + a
Fairfield	New Canaan	7) Plumbers (Trade License required: (P-1,2,6,7,8,9 J-1,2,3,4 SP-1,2) and Pipefitters (Including HVAC Work) (Trade License required: S- 1,2,3,4,5,6,7,8 B-1,2,3,4 D-1,2,3,4 G-1, G-2, G-8, G-9)	\$49.58	36.15

County	Town	Classification	Hourly Rate	Hourly Benefit
Fairfield	New Canaan	LABORERS		
Fairfield	New Canaan	8) Group 1: General Laborers and concrete specialist	\$34.50	27.26
Fairfield	New Canaan	8) Group 1a: Acetylene Burners (Hours worked with a torch)	\$35.50	27.26
Fairfield	New Canaan	9) Group 2: Chain saw operators, fence and guard rail erectors, pneumatic tool operators, powdermen	\$34.75	27.26
Fairfield	New Canaan	10) Group 3: Pipelayers	\$35.00	27.26
Fairfield	New Canaan	11) Group 4: Jackhammer/Pavement breaker (handheld); mason tenders (cement/concrete), catch basin builders, asphalt rakers, air track operators,	\$35.00	27.26
Fairfield	New Canaan	block paver, curb setter and forklift operators 12) Group 5: Toxic waste removal (non-mechanical systems)	\$36.50	27.26
Fairfield	New Canaan	13) Group 6: Blasters	\$36.25	27.26
Fairfield	New Canaan	Group 7: Asbestos/lead removal, non-mechanical systems (does not	\$37.50	27.26
Fairfield	New Canaan	Group 8: Traffic control signalmen	\$20.70	27.26
Fairfield	New Canaan	Group 9: Hydraulic Drills	\$35.25	27.26
Fairfield	New Canaan	Group 10: Toxic Waste Removers A or B With PPE	\$37.50	27.26
Fairfield	New Canaan	LABORERS (TUNNEL CONSTRUCTION, FREE AIR). Shield Drive and Liner Plate Tunnels in Free Air		
Fairfield	New Canaan	13a) Miners, Motormen, Mucking Machine Operators, Nozzle Men, Grout Men, Shaft & Tunnel Steel & Rodmen, Shield & Erector, Arm Operator, Cable Tenders	\$36.73	27.26 + a
Fairfield	New Canaan	13b) Brakemen, Trackmen, Miners' Helpers and all other men	\$35.76	27.26 + a
Fairfield	New Canaan	CLEANING, CONCRETE AND CAULKING TUNNEL		
Fairfield	New Canaan	14) Concrete Workers, Form Movers, and Strippers	\$35.76	27.26 + a
Fairfield	New Canaan	15) Form Erectors	\$36.09	27.26 + a
Fairfield	New Canaan	ROCK SHAFT LINING, CONCRETE, LINING OF SAME AND TUNNEL IN FREE AIR:		

County	Town	Classification	Hourly Rate	Hourly Benefit
Fairfield	New Canaan	16) Brakemen, Trackmen, Tunnel Laborers, Shaft Laborers, Miners Helpers	\$35.76	27.26 + a
Fairfield	New Canaan	17) Laborers Topside, Cage Tenders, Bellman	\$35.65	27.26 + a
Fairfield	New Canaan	18) Miners	\$36.73	27.26 + a
Fairfield	New Canaan	TUNNELS, CAISSON AND CYLINDER WORK IN COMPRESSED AIR: -		
Fairfield	New Canaan	18a) Blaster	\$43.22	27.26 + a
Fairfield	New Canaan	19) Brakemen, Trackmen, Groutman, Laborers, Outside Lock Tender,	\$43.02	27.26 + a
Fairfield	New Canaan	20) Change House Attendants, Powder Watchmen, Top on Iron Bolts	\$41.04	27.26 + a
Fairfield	New Canaan	21) Mucking Machine Operator, Grout Boss, Track Boss	\$43.81	27.26 + a
Fairfield	New Canaan	TRUCK DRIVERS(*see note below)		
Fairfield	New Canaan	Two Axle Trucks, Helpers	\$33.16	32.36 + a
Fairfield	New Canaan	Three Axle Trucks; Two Axle Ready Mix	\$33.27	32.36 + a
Fairfield	New Canaan	Three Axle Ready Mix	\$33.33	32.36 + a
Fairfield	New Canaan	Four Axle Trucks	\$33.39	32.36 + a
Fairfield	New Canaan	Four Axle Ready-Mix	\$33.44	32.36 + a
Fairfield	New Canaan	Heavy Duty Trailer (40 tons and over)	\$35.66	32.36 + a
Fairfield	New Canaan	Specialized earth moving equipment other than conventional type on-the	\$33.44	32.36 + a
Fairfield	New Canaan	Heavy Duty Trailer (up to 40 tons)	\$34.39	32.36 + a
Fairfield	New Canaan	Snorkle Truck	\$33.54	32.36 + a
Fairfield	New Canaan	POWER EQUIPMENT OPERATORS		
Fairfield	New Canaan	Group 1: Crane Handling or Erecting Structural Steel or Stone, Hoisting Engineer (2 drums or over). (Trade License Required)	\$55.42	28.80 + a

County	Town	Classification	Hourly Rate	Hourly Benefit
Fairfield	New Canaan	Group 1a: Front End Loader (7 cubic yards or over); Work Boat 26 ft. and over.	\$50.79	28.80 + a
Fairfield	New Canaan	Group 2: Cranes (100 ton rate capacity and over); Bauer Drill/Caisson. (Trade License Required)	\$55.03	28.80 + a
Fairfield	New Canaan	Group 2a: Cranes (under 100 ton rated capacity).	\$54.09	28.80 + a
Fairfield	New Canaan	Group 2b: Excavator over 2 cubic yards; Pile Driver (\$3.00 premium when operator controls hammer).	\$50.40	28.80 + a
Fairfield	New Canaan	Group 3: Excavator; Gradall; Master Mechanic; Hoisting Engineer (all types of equipment where a drum and cable are used to hoist or drag material regardless of motive power of operation), Rubber Tire Excavator (Drott-1085 or similar);Grader Operator; Bulldozer Fine Grade (slopes, shaping, laser or GPS, etc.). (Trade License Required)	\$49.45	28.80 + a
Fairfield	New Canaan	Group 4: Trenching Machines; Lighter Derrick; CMI Machine or Similar; Koehring Loader (Skooper).	\$48.97	28.80 + a
Fairfield	New Canaan	Group 5: Specialty Railroad Equipment; Asphalt Paver; Asphalt Spreader; Asphalt Reclaiming Machine; Line Grinder; Concrete Pumps; Drills with Self Contained Power Units; Boring Machine; Post Hole Digger; Auger; Pounder; Well Digger; Milling Machine (over 24" mandrel)	\$48.22	28.80 + a
Fairfield	New Canaan	Group 5 continued: Side Boom; Combination Hoe and Loader; Directional Driller.	\$48.22	28.80 + a
Fairfield	New Canaan	Group 6: Front End Loader (3 up to 7 cubic yards); Bulldozer (rough grade dozer).	\$47.83	28.80 + a
Fairfield	New Canaan	Group 7: Asphalt Roller; Concrete Saws and Cutters (ride on types); Vermeer Concrete Cutter; Stump Grinder; Scraper; Snooper; Skidder; Milling Machine (24" and under Mandrel)	\$47.40	28.80 + a
Fairfield	New Canaan	Group 8: Mechanic, Grease Truck Operator, Hydroblaster, Barrier Mover, Power Stone Spreader; Welder; Work Boat under 26 ft.; Transfer Machine.	\$46.90	28.80 + a
Fairfield	New Canaan	Group 9: Front End Loader (under 3 cubic yards), Skid Steer Loader regardless of attachments (Bobcat or Similar); Fork Lift, Power Chipper; Landscape Equipment (including hydroseeder), Vacuum Excavation Truck and Hydrovac Excavation Truck (27 HG pressure or greater).	\$46.35	28.80 + a
Fairfield	New Canaan	Group 10: Vibratory Hammer, Ice Machine, Diesel and Air Hammer, etc.	\$43.77	28.80 + a
Fairfield	New Canaan	Group 11: Conveyor, Earth Roller; Power Pavement Breaker (whiphammer), Robot Demolition Equipment.	\$43.77	28.80 + a

County	Town	Classification	Hourly Rate	Hourly Benefit
Fairfield	New Canaan	Group 12: Wellpoint Operator.	\$43.69	28.80 + a
Fairfield	New Canaan	Group 13: Compressor Battery Operator.	\$42.97	28.80 + a
Fairfield	New Canaan	Group 14: Elevator Operator; Tow Motor Operator (Solid Tire No Rough Terrain).	\$41.52	28.80 + a
Fairfield	New Canaan	Group 15: Generator Operator; Compressor Operator; Pump Operator; Welding Machine Operator: Heater Operator.	\$41.01	28.80 + a
Fairfield	New Canaan	Group 16: Maintenance Engineer.	\$40.19	28.80 + a
Fairfield	New Canaan	Group 17: Portable Asphalt Plant Operator; Portable Crusher Plant Operator; Portable Concrete Plant Operator., Portable Grout Plant Operator, Portable Water Filtration Plant Operator	\$45.63	28.80 + a
Fairfield	New Canaan	Group 18: Power Safety Boat; Vacuum Truck; Zim Mixer; Sweeper; (minimum for any job requiring CDL license)	\$42.57	28.80 + a
Fairfield	New Canaan	Surveyor: Chief of Party	\$45.87	28.80 + a
Fairfield	New Canaan	Surveyor: Assistant Chief of Party	\$42.30	28.80 + a
Fairfield	New Canaan	Surveyor: Instrument Man	\$40.70	28.80 + a
Fairfield	New Canaan	Surveyor: Rodman or Chairman	\$35.03	28.80 + a
Fairfield	New Canaan	**NOTE: SEE BELOW		
Fairfield	New Canaan	LINE CONSTRUCTION(Railroad Construction and Maintenance)		
Fairfield	New Canaan	20) Lineman, Cable Splicer, Technician	\$48.84	18.07
Fairfield	New Canaan	21) Heavy Equipment Operator	\$42.26	6.5% + 19.88
Fairfield	New Canaan	22) Equipment Operator, Tractor Trailer Driver, Material Men	\$40.96	6.5% + 19.21
Fairfield	New Canaan	23) Driver Groundmen	\$26.50	6.5% + 9.00
Fairfield	New Canaan	23a) Truck Driver	\$40.96	6.5% + 17.76
Fairfield	New Canaan	LINE CONSTRUCTION		
Fairfield	New Canaan	24) Driver Groundmen	\$30.92	6.5% + 9.70

County	Town	Classification	Hourly Rate	Hourly Benefit
Fairfield	New Canaan	25) Groundmen	\$22.67	6.5% + 6.20
Fairfield	New Canaan	26) Heavy Equipment Operators	\$37.10	6.5% + 10.70
Fairfield	New Canaan	27) Linemen, Cable Splicers, Dynamite Men	\$41.22	6.5% + 12.20
Fairfield	New Canaan	28) Material Men, Tractor Trailer Drivers, Equipment Operators	\$35.04	6.5% + 10.45

"General Decision Number: CT20250013 06/06/2025

Superseded General Decision Number: CT20240013

State: Connecticut

Construction Type: Heavy

County: Fairfield County in Connecticut.

HEAVY CONSTRUCTION PROJECTS

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(1).

<pre>If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:</pre>	<ul> <li>Executive Order 14026 generally applies to the contract.</li> <li>The contractor must pay all covered workers at least \$17.75 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2025.</li> </ul>
If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:	<ul> <li>Executive Order 13658 generally applies to the contract.</li> <li>The contractor must pay all covered workers at least \$13.30 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2025.</li> </ul>

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at http://www.dol.gov/whd/govcontracts.

Modification	Number	Publication	Date
0		01/03/2025	
1		01/17/2025	
2		04/25/2025	

3	05/09/2025
4	05/30/2025
5	06/06/2025

BRCT0001-011 01/06/2025

	Rates	Fringes
BRICKLAYER	.\$ 43.14	34.74
BRCT0001-012 01/06/2025		
	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER	.\$ 43.14	34.74
CARP0326-019 05/05/2025		
	Rates	Fringes
CARPENTER		
CARPENTER, PILEDRIVER	.\$ 42.03	29.19
DIVER TENDER	.\$ 42.03	29.19
DIVER	.\$ 50.00	29.19
CARP1121-006 01/06/2025		
	Rates	Fringes
MILLWRIGHT	.\$ 43.25	29.13
ELEC0003-004 04/18/2024		
Darien, Greenwich, New Canaan, S Norwalk lying West of Five Mile	tamford and River	d the portion of
	Rates	Fringes
	¢ 44 00	CO 17% 12 21
ELECTRICIAN	• 44.00	69.17%+12.31
* ELEC0488-006 06/01/2025		
Bethel, Bridgeport, Brookfield, Monroe, New Fairfield, Newtown, Shelton, Sherman, Stratford, Tru Wilton Townships	Danbury, Ea Norwalk, Re mball, West	aston, Fairfield, edding, Ridgefield, ton, Westport and
	Rates	Fringes
ELECTRICIAN	.\$ 47.40	3%+35.32
ENGI0478-001 04/06/2025		
	Rates	Fringes
Device continuent contract		
rower equipment operators:	¢ 50 10	20 80
GROUP 2	.\$ 57.78	29.80
GROUP 3	.\$ 56.79	29.80
GROUP 4	.\$ 51.92	29.80
GROUP 5	.\$ 50.63	29.80
GROUP 6	.\$ 50.22	29.80
	.⊅ 49.25	29.80

GROUP	8\$ 49.25	29.80
GROUP	9\$ 48.67	29.80
GROUP	10\$ 45.96	29.80
GROUP	11\$ 45.96	29.80
GROUP	12\$ 45.87	29.80
GROUP	13\$ 47.91	29.80
GROUP	14\$ 45.12	29.80
GROUP	15\$ 44.70	29.80
GROUP	16\$ 43.60	29.80
GROUP	17\$ 43.06	29.80
GROUP	18\$ 42.20	29.80
GROUP	19\$ 53.33	29.80
GROUP	20\$ 52.92	29.80
GROUP	21\$ 51.92	29.80

Hazardous waste premium \$3.00 per hour over classified rate.

Crane with boom, including jib, 150 feet - \$1.50 extra. Crane with boom, including jib, 200 feet - \$2.50 extra. Crane with boom, including jib, 250 feet - \$5.00 extra. Crane with boom, including jib, 300 feet - \$7.00 extra. Crane with boom, including jib, 400 feet - \$10.00 extra

1) Crane handling or erecting structural steel or stone, hoisting engineer(2 drums or over)

2) Cranes(100 ton rated capacity and over) Bauer Drill/Caisson

3) Cranes(under 100 ton rated capacity)

a. PAID HOLIDAYS: New Year's Day, Good Friday, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day, provided the employee works 3 days during the week in which the holiday falls, if scheduled, and if scheduled, the working day before and the working day after the holiday.

#### POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: Crane handling or erecting structural steel or stone, hoisting engineer (2 drums or over)

GROUP 2: Cranes (100 ton capacity & over) Bauer Drill/Caisson

GROUP 3: Cranes (under 100 ton rated capacity)

GROUP 4: Trenching machines, lighter derrick, concrete finishing machine, CMI machine or similar, Koehring Loader (skooper).

GROUP 5: Specialty railroad equipment, asphalt spreader, asphalt reclaiming machine, line grider, concrete pumps, drills with self contained power units, boring machine, post hole digger, auger, pounder, well digger, milling machine (over 24' mandrel), side boom, combination hoe and loader, directional driller

GROUP 6: Front end loader (3 cu. yds. up to 7 cu. yards), bulldozer (Rough grade dozer) .

GROUP 7: Asphalt roller, concrete saws and cutters (ride on types), Vermeer concrete cutter, stump grinder, scraper, snooper, skidder, milling machine (24"" and under Mandrel).

GROUP 8: Mechanic, grease truck operator, hydoblaster, barrier mover, power stone spreader, welder, work boat under 26 ft. transfer machine.

GROUP 9: Front end loader (under 3 cubic yards), skid steer loader (regardless of attachments), bobcat or similar, forklift, power chipper, landscape equipment (including hydroseeder), Vacuum Exacavation Truck and Hydrovac Excavation Truck (27 HG pressure or greater). GROUP 10: Vibratory hammer, ice machine, diesel & air, hammer, etc. GROUP 11: Conveyor, earth roller, power pavement breaker (whiphammer), robot demolition equipment. GROUP 12: Wellpoint operator. GROUP 13: Portable asphalt plant operator, portable concrete plant operator, portable crusher plant operator, portable grout plant operator, portable water filtration plant operator. GROUP 14: Compressor battery operator. GROUP 15: Power Safety boat, Vacuum truck, Zim mixer, Sweeper; (Minimum for any job requiring a CDL license) . GROUP 16: Elevator operator, tow motor operator (solid tire no rough terrain). GROUP 17: Generator operator, compressor operator, pump operator, welding machine operator; Heater operator. GROUP 18: Maintenance engineer. GROUP 19: Front end loader(7 cubic yards or over); work boat 26 ft. and over. GROUP 20: Excavator over 2 cubic yards; pile driver(\$3.00 premium when operator controls hammer). GROUP 21: Excavator, gradall, master mechanic, hoisting engineer (all types of equipment where a drum and cable are used to hoist or drag material regardless of motive power or operaing), rubber tire excavator (drott 1085 similar), grader operator, bulldozer finegrade (slopes shaping, laser or GPS, ect.) \_\_\_\_\_ ENGI0478-007 04/06/2025 Rates Fringes POWER EQUIPMENT OPERATOR: Asphalt Paver.....\$ 50.63 29.80 Asphalt Roller.....\$ 49.77 29.80 Asphalt Spreader.....\$ 50.63 29.80 Backhoe/Excavator 2 cubic yards and over.....\$ 52.92 29.80 Backhoe/Excavator under 2 cubic yards.....\$ 51.42 29.80 Bulldozer (Rough Grade Dozer).....\$ 50.22 29.80 Bulldozer Fine

Grade(includes slopes,

shaping, laser or gps)\$ 51.92	29.80
structural steel or stone\$ 58.19	29.80
Cranes (100 ton capacity &	
over)\$ 57.78	29.80
Cranes (under 100 ton	
rated capacity)\$ 56.79	29.80
Drills with self contained	
power units; Directional	
driller\$ 50.63	29.80
Earth Roller\$ 45.96	29.80
Forklift\$ 48.67	29.80
Front End Loader (3 cubic	
vards up to 7 cubic vards)\$ 50.22	29.80
Front End Loader (7 cubic	
vards or over)\$ 53.33	29.80
Front End Loader (under 3	
cubic vards)	29.80
Grader/Blade\$ 51.92	29.80
Maintenance Engineer/Oiler \$ 42 20	29 80
Mechanic $\$$ $49.77$	29 80
Rubher Tire	27.00
$Backhoe/Excavator \qquad \qquad \$ 51.92$	20 80
	22.00

a. PAID HOLIDAYS: New Year's Day, Good Friday, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day, provided the employee works 3 days during the week in which the holiday falls, if scheduled, and if scheduled, the working day before and the working day after the holiday.

b. Crane with boom, including jib, 150 feet - \$1.50 extra. Crane with boom, including jib, 200 feet - \$2.50 extra. Crane with boom, including jib, 250 feet - \$5.00 extra. Crane with boom, including jib, 300 feet - \$7.00 extra. Crane with boom, including jib, 400 feet - \$10.00 extra.

 Crane handling or erecting structural steel or stone, hoisting engineer(2 drums or over)
 Cranes(100 ton rated capacity and over) Bauer Drill/Caisson

3) Cranes(under 100 ton rated capacity)

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IRON0015-005 06/03/2024

Rates Fringes

IRONWORKER, REINFORCING......\$ 45.25 41.27

a. PAID HOLIDAY: Labor Day provided employee has been on the payroll for the 5 consecutive work days prior to Labor Day.

LAB00146-002 04/06/2025

Rates	Fringes

Laborers: (TUNNEL	
CONSTRUCTION)	
CLEANING, CONCRETE AND	
CAULKING TUNNEL:	
Concrete Workers, Form	
Movers and Strippers\$ 36.96	28.85
Form Erectors\$ 37.29	28.85

ROCK SHAFT, CONCRETE, LINING OF SAME AND TUNNEL IN FREE AIR: Brakemen, Trackmen, Tunnel Laborers, Shaft Laborers.....\$ 36.96 28.85 Laborers Topside, Cage Tenders, Bellman.....\$ 36.85 28.85 Miners.....\$ 37.93 28.85 SHIELD DRIVE AND LINER PLATE TUNNELS IN FREE AIR: Brakemen and Trackmen.....\$ 36.96 28.85 Miners, Motormen, Mucking Machine Operators, Nozzlemen, Grout Men, Shaft and Tunnel, Steel and Rodmen, Shield and Erector, Arm Operator, Cable Tenders.....\$ 37.93 28.85 TUNNELS, CAISSON AND CYLINDER WORK IN COMPRESSED AIR: Blaster.....\$ 44.42 28.85 Brakemen, Trackmen, Groutman, Laborers, Outside Lock Tender, Gauge Tenders.....\$ 44.22 28.85 Change House Attendants, Powder Watchmen, Top on Iron Bolt.....\$ 42.24 28.85 Mucking Machine Operator...\$ 45.01 28.85

a. PAID HOLIDAYS: On tunnel work only: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day.

No employee shall be eligible for holiday pay when he fails, without cause, to work the regular work day preceding the holiday or the regular work day following the holiday.

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#### LABO0146-003 04/06/2025

	F	Rates	Fringes
LABORERS			
GROUP	1\$	35.70	28.85
GROUP	2\$	35.95	28.85
GROUP	3\$	36.20	28.85
GROUP	4\$	38.70	28.85
GROUP	5\$	37.45	28.85
GROUP	6\$	37.70	28.85
GROUP	7\$	21.42	28.85
GROUP	8:\$	36.70	28.85
GROUP	9\$	38.70	28.85

#### LABORERS CLASSIFICATIONS

GROUP 1: Laborers (Unskilled), concrete specialist

GROUP 2: Chain saw operators, fence and guard rail erectors, pneumatic tool operators and powdermen.

GROUP 3: Pipelayers, Jackhammer/Pavement breaker (handheld), mason

tenders/catch basin builders, as operators, block paver and curb	phalt rakers, air setter	track			
GROUP 4: Asbestos/lead removal					
GROUP 5: Blasters					
GROUP 6: Toxic waste remover					
GROUP 7: Traffic control signalman					
GROUP 8: Acetylene burner (Hours w	orked with a torc	h)			
GROUP 9: Toxic Waste Removers A or With PPE	В				
(On a site designated as a Super Corps of Engineers and is deemed applies to employees required to even if the PPE is not worn.)	Fund Site by the a HAZ-MAT site, wear OSHA leval .	U.S. Army and A or B			
FAINOOII-013 00/01/2021	Rates Er	inges			
PAINTER Brush and Roller\$ Spray Only\$ Steel Only\$	36.42 39.42 38.42	22.90 22.90 22.90			
TEAM0064-001 04/07/2024					
	Rates Fr	inges			
<pre>Truck drivers: 2 Axle Ready Mix\$ 2 Axle\$ 3 Axle Ready Mix\$ 3 Axle\$ 4 Axle Ready Mix\$ 4 Axle\$ Heavy Duty Trailer 40 tons and over\$ Heavy Duty Trailer up to 40 tons\$ Snorkle Truck\$ Specialized (Earth moving equipment other than conventional type on-the- road trucks and semi- trailers, including Euclids)\$</pre>	33.27 33.16 33.33 33.27 33.44 33.39 35.66 34.39 33.54	32.36 32.36 32.36 32.36 32.36 32.36 32.36 32.36 32.36 32.36			
Hazardous waste removal work rec hour.	eives additional	\$1.25 per			
a. PAID HOLIDAYS: New Year's Dav	. Memorial Dav. I	ndependence			

a. PAID HOLIDAYS: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Christmas Day and Good Friday, provided the employee has at least 31 calendar days of service and works the last scheduled day before and the first scheduled day after the holiday, unless excused.

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TRUCK DRIVER: 4 Axle Truck.....\$ 33.39 32.36

Hazardous waste removal work receives additional \$1.25 per hour.

a. PAID HOLIDAYS: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Christmas Day and Good Friday, provided the employee has at least 31 calendar days of service and works the last scheduled day before and the first scheduled day after the holiday, unless excused.

SUCT2002-008 12/16/2008

Rates Fringes

IRONWORKER, STRUCTURAL......\$ 28.62 10.84

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at

https://www.dol.gov/agencies/whd/government-contracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (iii)).

The body of each wage determination lists the classifications and wage rates that have been found to be prevailing for the type(s) of construction and geographic area covered by the wage determination. The classifications are listed in alphabetical order under rate identifiers indicating whether the particular rate is a union rate (current union negotiated rate), a survey rate, a weighted union average rate, a state adopted rate, or a supplemental classification rate.

Union Rate Identifiers

A four-letter identifier beginning with characters other than ""SU"", ""UAVG"", ?SA?, or ?SC? denotes that a union rate was prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2024. PLUM is an identifier of the union whose collectively bargained rate prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. The date, 07/01/2024 in the example, is the effective date of the most current negotiated rate.

Union prevailing wage rates are updated to reflect all changes over time that are reported to WHD in the rates in the collective bargaining agreement (CBA) governing the classification.

#### Union Average Rate Identifiers

The UAVG identifier indicates that no single rate prevailed for those classifications, but that 100% of the data reported for the classifications reflected union rates. EXAMPLE: UAVG-OH-0010 01/01/2024. UAVG indicates that the rate is a weighted union average rate. OH indicates the State of Ohio. The next number, 0010 in the example, is an internal number used in producing the wage determination. The date, 01/01/2024 in the example, indicates the date the wage determination was updated to reflect the most current union average rate.

A UAVG rate will be updated once a year, usually in January, to reflect a weighted average of the current rates in the collective bargaining agreements on which the rate is based.

Survey Rate Identifiers

The ""SU"" identifier indicates that either a single non-union rate prevailed (as defined in 29 CFR 1.2) for this classification in the survey or that the rate was derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As a weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SUFL2022-007 6/27/2024. SU indicates the rate is a single non-union prevailing rate or a weighted average of survey data for that classification. FL indicates the State of Florida. 2022 is the year of the survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 6/27/2024 in the example, indicates the survey completion date for the classifications and rates under that identifier.

?SU? wage rates typically remain in effect until a new survey is conducted. However, the Wage and Hour Division (WHD) has the discretion to update such rates under 29 CFR 1.6(c)(1).

#### State Adopted Rate Identifiers

The ""SA"" identifier indicates that the classifications and prevailing wage rates set by a state (or local) government were adopted under 29 C.F.R 1.3(g)-(h). Example: SAME2023-007 01/03/2024. SA reflects that the rates are state adopted. ME refers to the State of Maine. 2023 is the year during which the state completed the survey on which the listed classifications and rates are based. The next number, 007 in the example, is an
internal number used in producing the wage determination. The date, 01/03/2024 in the example, reflects the date on which the classifications and rates under the ?SA? identifier took effect under state law in the state from which the rates were adopted.

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#### WAGE DETERMINATION APPEALS PROCESS

1) Has there been an initial decision in the matter? This can be:

a) a survey underlying a wage determination
b) an existing published wage determination
c) an initial WHD letter setting forth a position on
a wage determination matter
d) an initial conformance (additional classification and rate) determination

On survey related matters, initial contact, including requests for summaries of surveys, should be directed to the WHD Branch of Wage Surveys. Requests can be submitted via email to davisbaconinfo@dol.gov or by mail to:

> Branch of Wage Surveys Wage and Hour Division U.S. Department of Labor 200 Constitution Avenue, N.W. Washington, DC 20210

Regarding any other wage determination matter such as conformance decisions, requests for initial decisions should be directed to the WHD Branch of Construction Wage Determinations. Requests can be submitted via email to BCWD-Office@dol.gov or by mail to:

> Branch of Construction Wage Determinations Wage and Hour Division U.S. Department of Labor 200 Constitution Avenue, N.W. Washington, DC 20210

2) If an initial decision has been issued, then any interested party (those affected by the action) that disagrees with the decision can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Requests for review and reconsideration can be submitted via email to dba.reconsideration@dol.gov or by mail to:

> Wage and Hour Administrator U.S. Department of Labor 200 Constitution Avenue, N.W. Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

U.S. Department of Labor 200 Constitution Avenue, N.W. Washington, DC 20210.

END OF GENERAL DECISION"

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PROJECT:

DWSRF RES 2023-02, REHABILATATION OF THE GRUPES RESERVIOR DAM, NEW CANNAN, CT

# APPENDIX C

1. STATE OF CONNECTICUT, DEPARTMENTOF PUBLIC HEALTH, DRINKING WATER SECTION, WATER MAIN DESIGN AND CONSTRUCTION GUIDELINES"

## WATER MAIN DESIGN AND CONSTRUCTION GUIDELINES

### Effective Date: October 1, 2006

The following guidance is provided in the interest of facilitating the approval process for federally or state funded projects such as Drinking Water State Revolving Fund and STEAP grant projects that may include water main replacements or installations. Discretion in the application of these guidelines is allowable except as required by regulation. For routine distribution water main installations that do not require approval from the Department prior to construction, it is recommended that the following guidelines be utilized during design and construction except as required by regulation.

#### Sizing and Layout

(1) Section 19-13-B102(p) of the Regulations of Connecticut State Agencies (RCSA) requires transmission facilities to be sized to provide flows in excess of the maximum flows experienced in the community water system or service area. In addition, Section 19-13-B102(f)(1) of the RCSA requires that all service connections have a minimum water pressure at the main of 25 psi under normal operating conditions which in these guidelines includes normal peak demands but excludes fire flow demands. Whenever feasible, it is recommended that the minimum water pressure be 35 psi. Positive pressure (20 psi minimum recommended) should be maintained under all flow conditions, including fire flows if fire protection is provided, at all points in the distribution system. Pressure reducing devices should be installed where static pressures will exceed 100 psi. Pressure reducing devices conforming to section 604.7 of the current State of Connecticut Plumbing Code should be installed on individual service lines where static pressures entering the building are greater than 80 psi. If fire protection is to be provided, the system design should be such that fire flows, minimum fire flow pressures, hydrant spacing, etc. are in accordance with the requirements of the local fire protection regulatory authority.

(2) Water mains should be sized, whenever possible, to achieve a balance between hydraulic requirements and water quality maintenance. Excessive retention time (less than 5 to 7 days of retention time recommended) may result in low flow areas which may lead to water quality deterioration during normal operating conditions. If excess capacity is required for fire flow or future demands, flushing devices or equivalent should be installed in low flow areas and an operational plan should be implemented to routinely flush low flow areas. The use of smaller diameter parallel water mains in lieu of single larger mains should be considered whenever possible.

(3) Water mains should be looped and dead-end water mains avoided whenever possible. If deadend mains are unavoidable, flushing devices should be installed at the termini of the dead-end water mains and an operational plan should be implemented to routinely flush the dead-end mains. If water mains will be separated by a closed valve thereby creating static conditions (as in the case of pressure zone boundaries for example), flushing devices should be installed on both sides of the closed valve.

### Materials

(1) Pipes, fittings, valves, meters, fire hydrants, and other appurtenances should, at a minimum, conform to the most current applicable AWWA standards if available. In the absence of applicable

## WATER MAIN DESIGN AND CONSTRUCTION GUIDELINES

AWWA standards, materials and products should conform to other applicable recognized industry performance standards, if available, to ensure integrity and performance during service.

(2) Water service lines should conform to sections 603 and 605 of the current State of Connecticut Plumbing Code.

(3) Materials and products should not cause the water delivered to the customers to become nonpotable, produce aesthetic problems such as taste and odors, or promote bacterial growth after being placed into active service. All pipe materials and products including, but not limited to, paints, linings, coatings, adhesives, and lubricants in direct contact with potable water should be certified to NSF/ANSI Standard 61. All materials and products in contact with potable water should be compatible with the water quality characteristics.

(4) Materials should be capable of withstanding internal and external forces to which they may be subjected while in service.

(5) Metallic materials should be protected against internal and external corrosion.

(6) The use of non-metallic buried water pipe should include a tracer wire, underground utility detection tape, or equivalent means for pipe location.

(7) Non-permeable materials, including joint gaskets, should be used in areas where organic contamination is reasonably known to exist or encountered during construction.

## Appurtenances

(1) Shut-off valves should be installed at intervals and locations as determined by the public water system (PWS) to minimize interruptions of service to customers during repairs or maintenance.

(2) At high points in water mains where air may accumulate and cause pipe restrictions, provisions should be made to remove the air by air release valves or equivalent means. Air release valves should be located and installed to prevent the entry of rainwater and vermin and under no circumstance should they be subject to being submerged.

(3) Blow-offs or equivalent appurtenances should be installed at low points of the water main installation, depending on flow rate and pipe profile, where sediment may accumulate.

(4) Chambers, pits, or manholes containing distribution system appurtenances should be located, to the extent feasible, to prevent flooding or adequately drained to keep the structure dry. If gravity drainage is not practical and a sump pump or other mechanical means are employed to drain the water to a storm sewer or other drainage system, a check valve should be installed on the pump discharge line and the discharge should be located above the normal flow elevation in the receiving chamber or pipe. In no instance should a drain be connected directly to any sanitary or combined sewer.

## WATER MAIN DESIGN AND CONSTRUCTION GUIDELINES

(5) Flushing devices should be installed at intervals and locations as determined by the PWS to allow for adequate flushing of the entire water main.

(6) The drain ports for dry-barrel fire hydrants should be provided with a gravel pocket or equivalent for drainage and should not be connected to any sewer. Hydrant drains should be located at least 10 feet from sanitary sewer force mains and any part of a subsurface sewage disposal system. Hydrant drains should be located a minimum of 18 inches from gravity sanitary and storm sewers (10 feet recommended whenever possible). If the water table in the area is known to be high, the drain ports should be plugged watertight and an operational plan should be implemented to pump the hydrant barrels dry during freezing weather.

(7) Fire hydrants should not be installed on water mains that are not sized for fire protection and should not be connected to a PWS which does not have adequate flows/capacity to meet fire flows.

(8) Flushing devices should not be directly connected to any sewer.

(9) Flushing devices should be capable of providing a minimum flushing velocity of 2.5 feet per second.

(10) Appurtenances should be installed in accordance with the most current applicable AWWA standards/manuals if available. If manufacturer's instructions are more stringent than AWWA standards, appurtenances should be installed in accordance with manufacturer's instructions. In the absence of applicable AWWA standards, appurtenances should be installed in accordance with the more stringent of manufacturer's instructions or other applicable recognized industry standards if available. At a minimum, appurtenances should be firmly supported to prevent excessive settlement.

#### Service Connections

(1) Domestic service pipes should have a minimum diameter of <sup>3</sup>/<sub>4</sub> inch.

(2) Domestic service pipes should be sufficiently flexible to prevent fracture from expansion, contraction, and differential settlement.

(3) Domestic service pipes should be connected to a single-service corporation stop at the water main and should be installed with a shut-off valve and curb box.

- (4) Domestic service connections should be individually metered.
- (5) Means should be provided to flush dedicated fire service lines to remove stagnant water.

#### Installation

(1) Installation of water pipe should be in accordance with the most current applicable AWWA standards/manuals if available. If manufacturer's instructions are more stringent than AWWA

## WATER MAIN DESIGN AND CONSTRUCTION GUIDELINES

standards, water pipe should be installed in accordance with manufacturer's instructions. In the absence of applicable AWWA standards, water pipe should be installed in accordance with the more stringent of manufacturer's instructions or other applicable recognized industry standards if available. At a minimum, continuous uniform and stable support, free of unsuitable materials, should be provided such that the water pipe is fully and firmly supported along its entire length. Proper embedment and backfill, free of unsuitable materials, should be provided and sufficiently compacted to ensure that the water pipe is adequately supported, stabilized, and protected. Special care should be taken when making pipe joints to ensure water tightness.

(2) All materials should be kept as clean as possible during construction. The use of plugs or equivalent on the open ends of the pipe is recommended to prevent contamination of pipe at the job site. Joints should be cleaned of any grit and other foreign material which may promote leakage.

(3) All buried water pipe should be placed at such a depth below finished ground level, four feet minimum, that will prevent freezing during the coldest weather experienced. Service connections that will not be used during freezing weather and will be drained during such time may be exempt from this recommendation. In special situations, excluding ledge, where it may not be feasible to bury the water pipe below the frost line, the use of adequate insulation or equal may be permissible to prevent freezing of the water pipe. Consideration should also be made for insulating water pipe that is installed four feet or greater below finished ground level but passes above or below a structure that may be a cold air source such as a culvert.

(4) Thrust blocks and/or restrained joints should be used on all tees, bends, caps, plugs, reducers, valves, hydrants, etc. to prevent joint separation. If a combined thrust block/restrained joint system is used, either the thrust block or restrained joint system should be designed to provide full thrust restraint independent of the other system.

(5) The water main should be adequately protected by the use of flexible joints, preferably ball and socket joints, or equivalent in critical areas of water main stress such as piping through rigid walls or structures and/or where differential settlement may occur.

(6) Separating Distances from Sources of Pollution:

(A) Parallel installations: water mains should be laid at least 10 feet horizontally, measured edge to edge, from any existing or proposed sewer (sanitary, building/house, and storm) whenever possible. If the 10-foot horizontal separating distance cannot be physically achieved, the water main may be installed closer provided that is located in a separate trench or on an undisturbed shelf and at least 12 inches horizontally (18 inches recommended), measured edge to edge, and 18 inches above the top of the sewer, measured from crown to invert. There should be no reduction in the 10-foot horizontal separating distance for a sanitary sewer force main. No water main should come in contact with any part of a sewer manhole.

(B) Crossings: at sewer crossings, a minimum vertical clearance of 18 inches, measured from crown to invert, should be maintained between the water main and sewer with the preferred location

## WATER MAIN DESIGN AND CONSTRUCTION GUIDELINES

of the water main above the sewer whenever possible. The water main should be centered at the sewer crossing such that the water main joints are spaced as far as possible from the sewer. If the water main will cross above the sewer and will be centered above the sewer such that the water main joints are spaced as far as possible from the sewer, the vertical separation distance may be reduced to 12 inches. There should be no reduction in the vertical separation distance of 18 inches for sanitary sewer force main crossings. If the water main will cross under a sewer, special consideration should be given to the structural support of the sewer to prevent settling or deflection of the sewer which may damage the water main.

(C) If the separating distance requirements stated in Sections (A) and (B) above cannot be achieved, the design engineer should evaluate alternatives so that the water main will be protected from potential contamination. The following alternatives may be considered acceptable:

(i) The sewer in conflict should be made of materials and have watertight joints equivalent to water main pipe, constructed in accordance with water main standards of construction, and pressure tested to ensure water tightness.

(ii) The use of pipe joint repair clamps or equivalent on the water main to ensure watertight pipe joints in addition to sufficient pipe wall thickness.

Additional alternatives not listed above may also be acceptable if adequately supported and documented.

(D) There should be a minimum separating distance of 10 feet between water mains/service lines and any part of a subsurface sewage disposal system.

(E) Separation of water service lines and building sewers should be in accordance with section 603.2 of the current State of Connecticut Plumbing Code.

(7) Bridge/Surface Water Crossings:

(A) For bridge crossings the water pipe should be adequately supported, protected from damage, and insulated to protect the pipe from freezing. Expansion or flexible joints should be installed as necessary. Shut-off valves should be installed on both sides of the bridge crossing.

(B) For underwater crossings shut-off valves should be installed on both sides of the crossing.

## **Cross Connections**

(1) Section 19-13-B37 of the RCSA requires that no physical connection be made between the distribution system of a PWS and any customer with a private well or existing PWS well unless such well is physically disconnected from the customer's plumbing. In addition, if the well is known to be contaminated, the customer shall also install a reduced pressure principle backflow prevention device (RPD) on the service line from the PWS.

## WATER MAIN DESIGN AND CONSTRUCTION GUIDELINES

#### Hydrostatic Testing and Disinfection

(1) After construction is completed all new water pipe and appurtenances should be subjected to hydrostatic pressure and leakage testing to ensure water tightness and integrity of construction in accordance with the most current applicable AWWA standards/manuals if available. If manufacturer's instructions are more stringent than AWWA standards, water pipe should be hydrostatic tested in accordance with manufacturer's instructions. In the absence of applicable AWWA standards, water pipe should be hydrostatic tested in accordance with the more stringent of manufacturer's instructions or other applicable recognized industry standards if available.

(2) Section 19-13-B47 of the RCSA requires that after construction is completed all new water pipe and appurtenances be disinfected and flushed. Disinfection should be done in accordance with the most current version of AWWA Standard C651. Chemicals used in the disinfection process should be certified to NSF/ANSI Standard 60.

(3) After disinfection and flushing but prior to placing the water main into active service, water sample(s) representative of the new construction should be collected in accordance with the most current version of AWWA Standard C651. Samples should be analyzed, at a minimum, for total coliform bacteria, HPC, total and free chlorine residual, and physical parameters. Test results, with the exception of chlorine, should meet the water quality standards shown in Table 1 prior to placing the water main into active service.

Parameter	Standard
Total Coliform Bacteria	0 or absent
HPC	< 100 organisms/mL
Color	< 15 CU
Turbidity	< 5 NTU
Odor	< 2
PH	range 6.4 – 10

Table 1 – Water Quality Standards

DWSRF RES 2023-02, REHABILATATION OF THE GRUPES RESERVIOR DAM, NEW CANNAN, CT

# APPENDIX D

1. CONNECTICUT DEPARTMENT OF ENERGY & ENVIRONMENTAL CONSENT ORDER NO. DSCO-2025-1055V



STATE OF CONNECTICUT

v.

### FIRST TAXING DISTRCT WATER DEPARTMENT

#### CONSENT ORDER NO. DSCO-2025-1055V 5/16/2025 DATE ISSUED: \_\_\_\_\_\_

- A. With the agreement of the First Taxing District Water Department, ("Respondent"), the Commissioner of Energy and Environmental Protection ("Commissioner") finds:
  - 1. Respondent is the owner of the Grupes Reservoir Dam (DEEP ID #9003) ("the Dam") located in New Canaan, Connecticut on the Silvermine River.
  - 2. The Grupes Reservoir is the southernmost of four reservoirs along the Silvermine River and has been continually operating as a reservoir for public water supply since it was constructed. The Grupes Reservoir currently serves over 42,000 customers in the City of Norwalk and the Town of New Canaan. The Grupes Reservoir property is approximately 54 acres, located at 1100 Valley Road in New Canaan. It is bordered on the west by a limited number of residential properties and on the east by property of Respondent.
  - 3. The Dam was originally constructed in 1871. The Dam was classified as a Class C, high hazard dam by the Department. As a high hazard Class C dam under Regulations of Connecticut State Agencies ("RCSA") § 22a-409-2(a)(1)(E), the failure of the Dam could result in possible loss of life and major damage to downstream property.
  - 4. In 1980, the Commissioner issued an order to Respondent to conduct certain remedial actions after an inspection was conducted by the U.S. Army Corps of Engineers. Such actions included hiring an engineer to further investigate the condition of the Dam and submitting a report to the Commissioner. As part of the report, Respondent was to include an Operation and Maintenance Guide and an Emergency Operation Plan in addition to conducting specific repair work at the direction of the U.S. Army Corps of Engineers within one year.
  - 5. In May 2014, GZA GeoEnvironmental, Inc. ("GZA") completed an inspection of the Dam and determined the Dam to be in poor condition. In 2015, GZA conducted a spillway analysis and provided a report to Respondent and the Department of Energy and Environmental Protection ("the Department" or "DEEP") that noted the poor condition of the Dam and outlined deficiencies that needed to be addressed, including the results of a spillway analysis. In December 2015, consistent with the inspection report and spillway analysis and pursuant to its jurisdiction over dams, the Department provided a number of recommendations to Respondent to make repairs or alterations to the Dam to improve its poor condition and prevent the development of further structural deficiencies. In addition, the Department recommended Respondent submit a dam safety permit application pursuant to Connecticut General Statutes ("CGS") § 22a-403(b) for work necessary to correct the Dam's deficiencies.



- 6. The Department issued Notice of Violation No. DS-2017-1034V to Respondent on November 21, 2017, for Respondent's failure to prepare an Emergency Action Plan ("EAP") in accordance with CGS § 22a-411a and RCSA § 22a-411a-1 and 2. The Department received an EAP for the Dam from the Respondent on March 1, 2018 and subsequently notified the Respondent that the EAP was compliant with regulatory requirements on October 5, 2018.
- 7. Respondent filed a dam safety permit application with the Department on November 7, 2018 to allow for the repair of the existing Dam structure. The primary objectives of the permit application were to address dam safety deficiencies through activities that included stabilizing the stone masonry of the Dam and mitigating observed seepage/leakage, increasing spillway capacity to safely pass the ½ Probable Maximum Flood ("PMF") storm—consistent with regulatory design standards, providing operational upgrades and structural repairs to the gatehouse, and managing ½ PMF flood waters by holding the waters in the Grupes Reservoir and routing them over the dam spillway to prevent offsite and downstream flooding and the undermining of the Dam by flood waters. The application proposed addressing flooding on the east side of the Grupes Reservoir with a partial wall with elevated natural terrain and a berm to hold flood waters in the Grupes Reservoir and channel them over the spillway of the Dam to the existing downstream channel of the Silvermine River, preventing downstream flooding and undermining of the Dam.
- 8. In reviewing a dam safety application, DEEP considered both the specific requirements of CGS § 22a-403(b), and also the requirements of the Inland Wetlands and Watercourses Act ("the Act"), CGS §§ 22a-36 to 22a-45. According to the information provided by Respondent when applying for the permit, the activities would impact approximately 4,856 square feet ("sq.ft.") (0.11 acres) of wetlands. Of those impacts to wetlands, 3,340 sq.ft. of wetlands would be temporarily impacted by construction and repair work, and such wetlands would be restored following the work. 1,524 sq.ft. of wetlands would be permanently impacted, but such impacts would primarily be to wetlands areas that have already been altered during previous construction at the site.
- 9. The Department issued a Notice of Tentative Determination to approve the application with a draft permit on February 26, 2020. Subsequently, a hearing was held after the Department's Office of Adjudications received a petition for hearing.
- 10. In May 2021, during the pendency of adjudication of the dam safety permit, GZA completed another inspection of the Dam at the request of Respondent for the purpose of maintaining regulatory compliance with dam safety inspections in accordance with RCSA § 22a-409-2.
- 11. A proposed final decision was ultimately adopted by the Commissioner on September 9, 2021. The Department issued a Dam Safety Permit No. DS-201814638 ("Permit") to Respondent on November 1, 2021. A Water Quality Certification No. WQC-201814641 was issued along with the Permit. Such Water Quality Certification shall expire upon expiration of the U.S. Army Corps of Engineers Section 404 permit for the same activity.
- 12. In accordance with the Permit, Respondent was authorized to undertake the following activities to modify the Dam:
  - a. Raise the top of the Dam by 4 feet with a cast-in-place concrete cap and regrade dam abutments;
  - b. Install post-tensioned anchors at the Dam;
  - c. Repoint downstream face of the Dam;

- d. Grout stone masonry;
- e. Replace existing footbridge over spillway and catwalk to gatehouse;
- f. Construct earthen embankment and retaining walls along east side of Grupes Reservoir;
- g. Regrade existing high ground and access road;
- h. Demolish existing gatehouse and construct a new one;
- i. Install three new slide gates at the gatehouse;
- j. Re-line the existing 24-inch diameter low-level outlet pipe;
- k. Install a new 24-inch water main to existing distribution system;
- 1. Replace existing culverts at the end of auxiliary spillway discharge channel with articulated block crossing;
- m. Install articulated concrete block at auxiliary spillway invert;
- n. Remove trees and boulders that could potentially obstruct discharge channel during storms.
- 13. The Permit was issued for a three-year term. If construction of any structures or facilities authorized by the permit was not completed within three years of issuance or if any activity authorized by the permit was not commenced within three years of issuance, the permit would expire three years after issuance.
- 14. Since the date the Permit was issued, Respondent has not undertaken any work to place the Dam in a safe condition.
- B. With the agreement of Respondent, the Commissioner, acting under Sections 22a-6 and 22a-402 of the Connecticut General Statutes, orders Respondent as follows:
  - 1. Conduct the activities specified in subparagraphs A.12 to repair the Dam and place it in a safe condition.
  - 2. All activities shall be conducted in accordance with plans entitled: "Rehabilitation of Grupes Reservoir Dam, New Canaan, Connecticut", dated October 2017, prepared and stamped by Peter H. Baril, P.E. and John G. Delano, P.E. on October 29, 2018, submitted as part of the permit application. These shall be the approved plans and specifications as referenced in this consent order.
  - 3. The existing capacity of the Grupes Reservoir will remain the same and will continue to meet the safe yield for drinking water supply.
  - 4. Any discharges that result from the activities specified in subparagraphs A.12 will comply with applicable provisions of sections 301, 302, 303, 306 and 307 of the Federal Clean Water Act (33 USC 1311, 1312, 1313, 1316 and 1317, respectively) and will not violate Connecticut's Water Quality Standards at RCSA § 22a-426-1 *et seq.*
  - 5. Notification of Project Initiation.
    - a. Respondent shall notify the Commissioner in writing no less than 7 days prior to commencement of activities and no less than 7 days following completion of activities.
    - b. Respondent shall, pursuant to RCSA § 22a-377(b)-1(a)(16)(C), notify the Commissioner and any potentially affected water company in writing at least 7 days prior to lowering of Grupes Reservoir for the purpose of undertaking activities.

- c. The Department shall be notified at least 48 hours prior to drawdown of the impoundment, in accordance with CGS § 26-138. Such notification shall be made to the Inland Fisheries Division, 79 Elm Street, Hartford, CT 06106-5127, and telephone no. 860-424-3474.
- 6. <u>De Minimis Alteration</u>. Respondent is directed to perform only the activities specified in paragraph B.1. of this order, pursuant to the plans specified in paragraph B.2. of this order, and may not make any alterations, except de minimis alterations, to such plans. A de minimis alteration means a change in the design, construction or operation authorized under this consent order that does not increase environmental impacts or substantively alter the construction of the project as authorized in this consent order.
- 7. <u>In-Water Work</u>. Confinement of a work area by cofferdam techniques using sand bag placement, sheet pile installation (vibratory method only), portadam, or similar confinement devices is allowed any time of the year unless specifically prohibited by a condition of the consent order. The removal of such confinement devices is allowed any time of the year unless specifically prohibited by a condition of the consent order. The removal of such consent order. Once a work area has been confined, in-water work within the confined area is allowed any time of the year. The confinement technique used shall completely isolate and protect the confined area from all flowing water. The use of silt boom/curtain or similar technique as a means for confinement is prohibited.
- 8. <u>Maintenance of Structures</u>. All structures, facilities, or activities constructed, maintained, or conducted pursuant hereto shall be consistent with the terms and conditions of this consent order, and any structure, facility or activity not specifically authorized by this consent order, or exempted pursuant to CGS § 22a-377 or RCSA § 22a-377(b)-1, or otherwise exempt pursuant to other Connecticut General Statutes, shall constitute a violation hereof which may result in the institution of other legal proceedings to enforce its terms and conditions.
- 9. <u>Best Management Practices & Notification of Adverse Impact</u>. In constructing or maintaining any structure or facility or conducting any activity authorized herein, Respondent shall employ best management practices to control storm water discharges, to prevent erosion and sedimentation, and to otherwise prevent pollution of wetlands and other waters of the State. Best management practices include, but are not limited to, practices identified in the *Connecticut Guidelines for Soil Erosion and Sediment Control* as revised, 2004 Connecticut Stormwater Quality Manual, Department of Transportation's ConnDOT Drainage Manual as revised, and the Department of Transportation Standard Specifications as revised.

Respondent shall immediately inform the Commissioner of any adverse impact or hazard to the environment which occurs or is likely to occur as the direct result of the construction, maintenance, or conduct of structures, facilities, or activities authorized herein.

Drawdown of Grupes Reservoir shall be limited in extent and duration to that necessary to complete the authorized activities.

- 10. <u>Reporting of Violations</u>. No later than 48 hours after Respondent learns of a violation of this consent order, Respondent shall report such violation in writing to the Commissioner. Such report shall contain the following information:
  - a. the provision(s) of this consent order that has been violated;

- b. the date and time the violation(s) was first observed and by whom;
- c. the cause of the violation(s), if known
- d. if the violation(s) has ceased, the duration of the violation(s) and the exact date(s) and times(s) it was corrected;
- e. if the violation(s) has not ceased, the anticipated date when it will be corrected;
- f. steps taken and steps planned to prevent a reoccurrence of the violation(s) and the date(s) such steps were implemented or will be implemented;
- g. the signatures of Respondent and of the individual(s) responsible for actually preparing such report, each of whom shall certify said report in accordance with subparagraph B.20 of this consent order.
- 11. <u>Material Storage in the Floodplain</u>. The storage of any materials at the site which are buoyant, hazardous, flammable, explosive, soluble, expansive, radioactive, or which could in the event of a flood be injurious to human, animal or plant life, below the elevation of the 500-year flood is prohibited. Any other material or equipment stored at the site below the 500-year flood elevation by Respondent or Respondent's contractor must be firmly anchored, restrained or enclosed to prevent flotation. The quantity of fuel stored below such elevation for equipment used at the site shall not exceed the quantity of fuel that is expected to be used by such equipment in one day.
- 12. <u>Contractor Notification</u>. Respondent shall give a copy of this consent order to the contractor(s) who will be carrying out the activities authorized herein prior to the start of construction and shall receive a written receipt for such copy, signed and dated by such contractor(s). Respondent's contractor(s) shall conduct all operations at the site in full compliance with this consent order and, to the extent provided by law, may be held liable for any violation of the terms and conditions of this consent order.
- 13. <u>Full compliance</u>. Respondent shall not be considered in full compliance with this consent order until all actions required by this consent order have been completed as approved and to the Commissioner's satisfaction.
- 14. Dam Safety Conditions.
  - a. This consent order and a copy of the approved plans and specifications shall be kept at the project site and made available to the Commissioner at any time during the construction of authorized activities.
  - b. Authorized activities shall be performed under the supervision of an engineer who is licensed to practice in the State of Connecticut and who is familiar with dam construction. Said engineer shall, upon completion of the permitted activities, certify to the Commissioner in writing that the authorized activities have been completed according to the approved plans and specifications.
  - c. Within 30 days of completion of the authorized activities, Respondent shall submit to the Commissioner record drawings depicting the dam construction as completed, including any deviations from the approved plans and specifications. Said drawings shall be prepared and sealed by the engineer who oversaw the construction. In addition, Respondent shall arrange for submission of an electronic copy of the final record drawings in Adobe Acrobat "pdf" format.
  - d. "Nothing in this chapter, and no order, approval or advice of the Commissioner, shall relieve any owner or operator of [a dam] from his legal duties, obligations and liabilities resulting

from such ownership or operation. No action for damages sustained through the partial or total failure of any structure or its maintenance shall be brought or maintained against the state, the Commissioner of Energy and Environmental Protection, or [her] employees or agents." CGS § 22a-406.

- e. If during the process of construction, unforeseen conditions are found on the site and Respondent and their engineer determine that it would be appropriate to modify the design, then Respondent shall notify DEEP within 24 hours of any potential design changes to determine if the design modifications will be an activity that can be categorized as a de minimis activity when compared to the approved design. No work shall take place which was not included as part of the approved design until DEEP responds to this determination request.
- 15. <u>Civil penalty</u>. Failure of Respondent to complete the specified activities within five years of the issuance of this consent order shall result in a civil penalty of \$50,000. Payment shall be made in accordance with the provisions of paragraph B.16.
- 16. <u>Payment of penalties</u>. Payment of penalties under paragraph B.15 of this consent order shall be mailed or personally delivered to the Department of Energy and Environmental Protection, Bureau of Financial and Support Services, Accounts Receivable Office, 79 Elm Street, Hartford, CT 06106-5127, and shall be by certified or bank check payable to "Connecticut Department of Energy and Environmental Protection." The check shall state in the memo notation, "Bureau of Water Protection and Land Reuse, Water Planning and Management Division civil penalty, consent order DSCO-2025-1055V".
- 17. <u>Approvals</u>. Respondent shall use best efforts to submit to the Commissioner all documents required by this consent order in a complete and approvable form. If the Commissioner notifies Respondent that any document or other action is deficient, and does not approve it with conditions or modifications, it is deemed disapproved, and Respondent shall correct the deficiencies and resubmit it within the time specified by the Commissioner or, if no time is specified by the Commissioner, within 30 days of the Commissioner's notice of deficiencies. In approving any document or other action under this consent order, the Commissioner may approve the document or other action as submitted or performed or with such conditions or modifications as the Commissioner deems necessary to carry out the purposes of this consent order. Nothing in this paragraph shall excuse noncompliance or delay.
- 18. <u>Definitions</u>. As used in this consent order, "Commissioner" means the Commissioner or a representative of the Commissioner.
- 19. <u>Dates</u>. The date of "issuance" of this consent order is the date the consent order is deposited in the U.S. mail or personally delivered, whichever is earlier. The date of submission to the Commissioner of any document required by this consent order shall be the date such document is received by the Commissioner. The date of any notice by the Commissioner under this consent order, including but not limited to notice of approval or disapproval of any document or other action, shall be the date such notice is deposited in the U.S. mail or is personally delivered, whichever is earlier. Except as otherwise specified in this consent order, the word "day" as used in this consent order means calendar day. Any document or action which is required by this consent order to be submitted or performed by a date which falls on a Saturday, Sunday or a Connecticut or federal holiday shall be submitted or performed by the next day which is not a Saturday, Sunday or Connecticut or federal holiday.

20. <u>Certification of documents</u>. Any document, including but not limited to any notice, which is required to be submitted to the Commissioner under this consent order shall be signed by Respondent or, if Respondent is not an individual, by Respondent's chief executive officer or a duly authorized representative of such officer, as those terms are defined in RCSA § 22a-430-3(b)(2), and by the individual(s) responsible for actually preparing such document, and each such individual shall certify in writing as follows:

"I have personally examined and am familiar with the information submitted in this document and all attachments thereto, and I certify, based on reasonable investigation, including my inquiry of those individuals responsible for obtaining the information, that the submitted information is true, accurate and complete to the best of my knowledge and belief. I understand that any false statement made in the submitted information may be punishable as a criminal offense under § 53a-157b of the Connecticut General Statutes and any other applicable law."

- 21. <u>Noncompliance</u>. This consent order is a final order of the Commissioner with respect to the matters addressed herein and is nonappealable and immediately enforceable. Failure to comply with this consent order may subject Respondent to an injunction and penalties.
- 22. <u>False statements</u>. Any false statement in any information submitted pursuant to this consent order may be punishable as a criminal offense under CGS § 53a-157b and any other applicable law.
- 23. <u>Notice of transfer; liability of Respondent</u>. Until Respondent has fully complied with this consent order, Respondent shall notify the Commissioner in writing no later than 15 days after transferring all or any portion of the facility, the operations, the site, or the business which is the subject of this consent order or after obtaining a new mailing or location address. Respondent's obligations under this consent order shall not be affected by the passage of title to any property to any other person or municipality.
- 24. <u>Commissioner's powers</u>. Except as provided hereinabove with respect to payment of civil penalties, nothing in this consent order shall affect the Commissioner's authority to institute any proceeding or take any other action to prevent or abate violations of law, prevent or abate pollution, recover costs and natural resource damages, and to impose penalties for past, present, or future violations of law not otherwise addressed by this consent order. If at any time the Commissioner determines that the actions taken by Respondent pursuant to this consent order have not successfully corrected all violations, fully characterized the extent or degree of any pollution, or successfully abated or prevented pollution, the Commissioner may institute any proceeding to require Respondent to undertake further investigation or further action to prevent or abate violations or pollution.
- 25. <u>Respondent's obligations under law</u>. Nothing in this consent order shall relieve Respondent of other obligations under applicable federal, state and local law.
- 26. <u>No assurance by Commissioner</u>. No provision of this consent order and no action or inaction by the Commissioner shall be construed to constitute an assurance by the Commissioner that the actions taken by Respondent pursuant to this consent order will result in compliance or prevent or abate pollution.
- 27. <u>Access to site</u>. Any representative of the Department of Energy and Environmental Protection may enter the site without prior notice for the purposes of monitoring and enforcing the actions required or allowed by this consent order.

- 28. <u>No effect on rights of other persons</u>. This consent order neither creates nor affects any rights of persons or municipalities that are not parties to this consent order.
- 29. <u>Notice to Commissioner of changes</u>. Within 15 days of the date Respondent becomes aware of a change in any information submitted to the Commissioner under this consent order, or that any such information was inaccurate or misleading or that any relevant information was omitted, Respondent shall submit the correct or omitted information to the Commissioner.
- 30. <u>Notification of noncompliance</u>. In the event that Respondent becomes aware that they did not or may not comply, or did not or may not comply on time, with any requirement of this consent order or of any document required hereunder, Respondent shall immediately notify by telephone or email the individual identified in the next paragraph and shall take all reasonable steps to ensure that any noncompliance or delay is avoided or, if unavoidable, is minimized to the greatest extent possible. Within five days of the initial notice, Respondent shall submit in writing the date, time, and duration of the noncompliance and the reasons for the noncompliance or delay and propose, for the review and written approval of the Commissioner, dates by which compliance will be achieved, and Respondent shall comply with any dates which may be approved in writing by the Commissioner. Notification by Respondent shall not excuse noncompliance or delay unless specifically so stated by the Commissioner in writing.
- 31. <u>Submission of documents</u>. Any document required to be submitted to the Commissioner under this consent order shall, unless otherwise specified in this consent order or in writing by the Commissioner, be directed to:

Anna Laskin, Supervising Civil Engineer Bureau of Water Protection and Land Resources Water Planning & Management Division Department of Energy and Environmental Protection 79 Elm Street Hartford, Connecticut 06106-5127

Email Address: <u>Anna.Laskin@ct.gov</u> Telephone Number: (860) 424-3522

[remainder of page intentionally left blank; signature page follows]

Respondent consents to the issuance of this consent order without further notice. The undersigned certifies that he/she is fully authorized to enter into this consent order and to legally bind Respondent to the terms and conditions of the consent order.

District Water Company
DocuSigned by:
Eleanor Militana
(Signature of the individual with authority to bind Respondent to terms of consent order)
Eleanor Militana
Name (typed)
General Manager
Title
5/16/2025
Date

Issued as a final order of the Commissioner of Energy and Environmental Protection.

-Signed by: 1D46FF81817649B

5/16/2025

Emma Cimino Deputy Commissioner Date

CONSENT ORDER NO. DSCO-2025-1055V