PROJECT: **MAIN STREET PUMP STATION**
CABINET RELOCATION & REHABILITATION
43 MAIN STREET
EAST HAVEN, CT

PROJECT NUMBER: **SSF 2014-03**

BID OPENING: **10:00 A.M.**
Thursday
April 16, 2015

GREATER NEW HAVEN
WATER POLLUTION CONTROL AUTHORITY
260 EAST STREET
NEW HAVEN, CT 06511
PHONE: 203.466.5280 FAX: 203.772.2027
WEB: WWW.GNHWPCA.COM
EMAIL: ENGINEERING@GNHWPCA.COM

EMERGENCY NUMBER: 203-466-5260

Greater New Haven Water Pollution Control Authority
MAIN STREET PUMP STATION
CABINET RELOCATION & REHABILITATION
EAST HAVEN, CONNECTICUT
Project No. SSF 2014-03

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GNHWPCA
Protecting the Environment

Greater New Haven
Water Pollution Control Authority

INVITATION

for Constructing

PROJECT: **Main Street Pump Station**
Cabinet Relocation & Rehabilitation
43 Main Street
East Haven, CT
PROJECT NO.: **SSF 2014-03**

Sealed bids will be received at the Office of the Director of Finance and Administration of the Greater New Haven Water Pollution Control Authority (Authority) located at 260 East Street, New Haven, Connecticut 06511 for the above referenced project until **10:00 am on Thursday, April 16, 2015** at which time and place said bids will be opened publicly and read aloud.

A non-mandatory pre-bid meeting will be held at 10:00 am, Wednesday, April 1, 2015 at the Main Street Pump Station located at 43 Main Street, East Haven, Connecticut.

All questions from Bidders must be received by the Authority by fax or via email in writing before 4:00 p.m. on Friday, April 10, 2015 (send emails to: engineering@gnhwpca.com)

The information for Bidders, Proposal, Form of Contract, and Specifications may be examined at the above address. Any one submitting a bid for this project must have in their possession a copy of the Authority's STANDARD SPECIFICATIONS dated September 12, 2006. This document can be obtained upon payment of One Hundred Dollars ($100.00). The plans and a "bid package" containing the Invitation, Proposal, Special Specifications and Notes can be obtained upon a **non-refundable** payment of Fifty Dollars ($50.00).

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 the total bid.

A certified check cannot be substituted for either bond. The Greater New Haven Water Pollution Control Authority 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.

Gabriel Varca
Director of Finance and Administration

BIDDER'S CHECKLIST

The following separate documents shall be completed and submitted with each bid:

1. Itemized Proposal

2. Bid Security/Bond (See Section 102-09 of the Standard Specifications and Invitation To Bid

3. Bidder's Qualifications Form

SECTION 01295

SCHEDULE OF VALUES

PART 1 - GENERAL

1.01 DESCRIPTION

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

1.02 SUBMITTALS

A. Within 10 calendar days after the sate of the Notice to Proceed, the Contractor shall submit a preliminary Schedule of Values for all of the Work to the Engineer for review:

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

2. The Engineer may request and require additional detail or documentation to support the values published on the preliminary schedule of values. This additional documentation may consist of, but is not limited to, executed purchase orders, subcontracts, or other agreements.

3. The Engineer may request and require an additional level of break down to the values published in the preliminary schedule of values.

4. If the value published for any of the items in the preliminary schedule of values are in the opinion of the Engineer, inappropriate, it shall not be accepted.

5. If, in the opinion of the Engineer, the preliminary schedule of values is unbalanced as to provide for overpayment on items of Work to be performed first, it shall not be accepted.

END OF SECTION 01295

SECTION 02225

SELECTIVE DEMOLITION

PART 1 - GENERAL

1.01 DESCRIPTION

A. Perform all site demolition work as indicated herein, as shown on the Project Drawings, or as specified elsewhere in the project Specifications.

B. All selective demolition performed on the site shall be priorly coordinated with the Owner, so as to not disrupt the facility operations, or compromise the security of the facility.

C. The existing control cabinet and all enclosed within shall remain the property of the GNHWPCA. Coordination with the GNHWPCA for receipt of the materials shall be the responsibility of the contractor.

1.02 SUBMITTALS

A. The Contractor shall submit a Waste Management Plan to the Engineer for review within seven (7) calendar days after the date of the Notice to Proceed. The Waste Management Plan shall contain the following:

1. Quantified list of the proposed job site waste to be generated. This list shall include the anticipated rough quantity and primary and backup disposal or recycling facility for each type of waste.

2. The names of the landfills where job waste will be disposed of, as well as a statement of verification that these landfills are licensed for the type of waste to be deposited, and have sufficient capacity to receive waste from this Project.

3. A description of the means of transportation of all job waste materials.

1.03 JOB CONDITIONS

A. Conduct selective demolition work in a manner that will minimize need for disruption of Owner's normal operations. Provide minimum of seven (7) days advance notice to Owner of demolition activities which will impact Owner's normal operations.

B. The Owner assumes no responsibility for actual condition of items or structures to be demolished. Conditions existing at the time of commencement of the Contract will be maintained by the Owner insofar as practicable. However, variations within the structure may occur by Owner's removal and salvage operations prior to start of selective demolition work, if applicable.

C. Items indicated to be removed but of salvageable value to Contractor may be removed from structure as work progresses. Transport salvaged items from the site as they are removed. Storage or sale of removed items on site will not be permitted.

D. Provide temporary barricades and other forms of protection as required to protect Owner's personnel and general public from injury due to selective demolition work.

1. Provide protective measures as required to provide free and safe passage of Owners personnel and general public to and from occupied portions of the facility.

2. Provide interior and exterior shoring, bracing, or support to prevent movement, settlement, or collapse of structure of element to be demolished, and adjacent facilities or work to remain.

3. Protect from damage existing finish work that is to remain in place which will become exposed during demolition operations.

4. Protect floors with suitable coverings when necessary.

5. Remove protections at completion of work.

E. Promptly repair damages caused to adjacent facilities by demolition work at no additional cost to the Owner.

F. Conduct selective demolition operations and debris removal in a manner to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities.

G. Do not close, block or otherwise obstruct roadways, walks or other occupied or used facilities without written permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

H. Use of explosives will not be permitted.

I. Maintain existing utilities, keep in service, and protect against damage during demolition operations.

J. Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to governing authorities.

1.04 REGULATORY REQUIREMENTS

A. Notify and obtain required approvals from all agencies having jurisdiction over demolition prior to starting work including, but not limited to Health, Building, Fire Departments and local, state and federal agencies.

B. Comply with all applicable federal, state, and local safety and health requirements regarding the demolition of structures.

C. Do not close or obstruct roadways, walks, or other facilities without written permission from the Owner.

D. Conform to the appropriate State, Federal, and local procedures if hazardous or contaminated materials are discovered.

PART 2 - PRODUCTS

A. Not Used.

PART 3 - EXECUTION

3.01 INSPECTION

A. Prior to commencement of selective demolition work, inspect areas in which work will be performed. Photograph existing structure surfaces, equipment or surrounding properties which could be misconstrued as being damaged from selective demolition work. File with Engineer prior to starting work.

3.02 PREPARATION

A. Provide interior and exterior shoring, bracing, or support to prevent movement, settlement or collapse of structures to be demolished and adjacent facilities to remain.

1. Cease operations and notify the Owner and the Engineer immediately if safety of structure appears to be endangered. Take precautions to support structure until determination is made for continuing operations.

B. Of specific concern is the torch cutting of any structural steel. If Contractor intends to torch cut painted steel, the lead paint must be removed from the area to be cut with a chemical stripper or other means. Sufficient paint must be removed to prevent volatilization of lead during the heating of the steel.

3.03 SELECTIVE DEMOLITION

A. Perform selective demolition work in a systematic manner. Use such methods as required to complete work indicated on Drawings in accordance with demolition schedule and governing regulations.

1. Locate demolition equipment throughout site and promptly remove debris to avoid imposing excessive loads on concrete or paving.

2. Provide services for effective air and water pollution controls as required by local authorities having jurisdiction.

B. If unanticipated mechanical, electrical or structural elements which conflict with intended function or design are encountered, investigate and measure both nature and extent of the conflict. Submit report to Engineer in written, accurate detail. Pending receipt of directive from Engineer, rearrange selective demolition schedule as necessary to continue overall job progress without delay.

3.04 DISPOSAL OF DEMOLITION MATERIAL

A. Remove debris, rubbish and other materials resulting from demolition operations from site. Transport and legally dispose of materials off-site.

1. If hazardous materials are encountered during demolition operations, comply with applicable regulations, laws, and ordinances concerning removal, handling and protection against exposure or environmental pollution.

2. Burning of removed materials is not permitted off project site.

3.05 CLEAN-UP AND REPAIR

A. Upon completion of demolition work, remove tools, equipment and demolished materials from site. Remove protections and leave interior areas broom clean.

B. Repair demolition performed in excess of that required. Return structures and surfaces to remain to, at a minimum, the condition existing prior to commencement of selective demolition work. Repair adjacent construction or surfaces soiled or damaged by selective demolition work.

END OF SECTION 02225

SECTION 02500

BITUMINOUS CONCRETE PAVEMENT

PART 1 – GENERAL

1.01 DESCRIPTION

A. This section includes all materials, labor, equipment, services, etc., necessary and incidental to the completion of all bituminous concrete pavement installation as shown on the Project Drawings and as specified herein.

1.02 RELATED WORK

A. Item 406 – "Bituminous Concrete"

B. Item 202 – "Excavation and Embankment"

C. Item 209 – "Preparation of Subgrade"

D. Item 304 – "Processed Aggregate Base"

1.03 REFERENCES

A. The Standard Specifications: Requirements of the Standard Specifications for Roads, Bridges, and Incidental Construction, State of Connecticut, Department of Transportation, Form 816, together with all errata, addenda, additions, revisions, and supplemental specifications.

B. When reference is made to a particular section of "Form 816", it will be construed to include all related articles referred to in said section.

1.04 SUBMITTALS

A. Mix designs with laboratory tests certifying conformance with specifications for the paving material.

B. Certification by the paving material plant of conformance with referenced standards.

C. Plant batch slips with each batch of material delivered to site giving information as required by the ENGINEER.

1.05 QUALITY ASSURANCE

A. Permanent pavement shall not be installed when the ambient temperature is less than 40^{o} F, the weather is foggy, or raining. The base must be dry and free of frost.

B. Prior to excavation in paved areas, cut surface of existing pavement with a masonry saw. Pavement to be cut in straight line on both sides of proposed trench for entire length of job.

C. Temporary pavement shall be placed over trenches on a daily basis in paved areas and where directed by ENGINEER. Temporary pavement shall be maintained until permanent pavement is placed.

D. Where operations of CONTRACTOR result in removal of or damage to pavement, sidewalks or curbing, affected portions shall be removed as directed by ENGINEER and replaced with pavement or curbing as specified.

E. Until the expiration of the guarantee period, maintain surfacing placed under this Contract and promptly correct any defect such as cracks, depressions, and holes with materials as specified.

F. Manhole covers, catch basin grates, valve and meter boxes shall be adjusted to finished grade, adequately protected and left in clean condition.

G. Feathering edges between new and existing pavement is not allowed when replacing pavement.

H. Paving plant used for preparation of the bituminous concrete as acceptable to ENGINEER with right to inspect plant and material preparation.

I. Equipment, tools, and machines used in the performance of the cold milling shall be maintained in a satisfactory Work condition. The cold milling machine shall be a self-propelled machine especially designed and built for milling bituminous pavement and capable of milling the pavement to the specified depth and smoothness. The pavement milling machine shall be capable of establishing grade control; shall have means of controlling transverse slope; and shall have effective means of controlling dust produced during the pavement milling operation. The machine shall have the ability to remove all millings or cuttings from the pavement and load them directly into a truck. The milling machine shall not cause damage to any part of the pavement structure that is not to be removed. Variable lacing patterns shall be provided to permit a rough grooved surface on bituminous surfaces left in place. The striations produced shall not be greater than ¾ inch nor less than ¼ inch deep unless otherwise directed.

J. All cleaning equipment shall be suitable for removing and cleaning loose material from the pavement surface. Power brooms shall be used when directed.

K. Milling shall not be performed when there is accumulation of snow or ice on the pavement surface.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Bituminous concrete for temporary pavement and binder course shall conform to the requirements of Article M.04.01 and M.04.02, Form 816, Class 1.

B. Bituminous concrete base course shall conform to the requirements of Article M.04.01 and M.04.02, Form 816, Class 1 or Class 4 as indicated.

C. Bituminous concrete wearing course shall conform to the requirements of Article M.04.01 and M.04.02, Form 816, Class 1 or Class 2 as indicated.

D. Joint filler and sealant shall be bituminous cellular type conforming to AASHTO M213 and hot poured rubber type sealant conforming to AASHTO M173.

PART 3 – EXECUTION

3.01 INSPECTION OF BASE

A. Prior to commencing with paving operations, the installer of this Work shall inspect the base and notify the ENGINEER, in writing, of any condition which will prevent him from the proper execution of the Work and/or will not drain all paved surfaces. Failure of notice shall be deemed as acceptance of the Work.

3.02 MEANS AND METHODS

A. The means and methods employed by the CONTRACTOR in performing the Work and all equipment, tools, machinery and plant used in handling material and executing any part of the Work, shall be subject to the approval of the Engineer before the Work is started and, whenever found unsatisfactory, shall be changed and improved as required by the ENGINEER at no additional cost to the OWNER. All equipment, tools, machinery and plant used must be maintained in a satisfactory working condition.

3.03 TEMPORARY PAVEMENT

A. Prior to placing temporary pavement, backfill shall be compacted as required under "Earth Excavation, Backfill, Fill and Grading", to eliminate settling of backfill. No pavement is to be placed over poorly compacted backfill.

B. Base course shall be installed to proper elevation and dressed so that temporary pavement construction is at required grade. Maintain surfaces of disturbed area until pavement is placed. If there is a time lapse such that the base course has been eroded or disturbed by traffic, restore to acceptable condition before placing paving.

C. Remove and acceptably dispose of all surplus and unsuitable material.

D. Place and maintain temporary pavement of 2 inches compacted bituminous concrete mixture, in safe and reasonably smooth condition until permanent pavement is placed.

D. Temporary pavement shall be installed over all excavated trenches in existing paved area following proper preparation, at the end of each workday.

3.04 INSTALLATION OF BITUMINOUS CONCRETE PAVEMENT

A. The installation of bituminous concrete pavement shall be in accordance with the requirementof Section 4.06.03 of Form 816 and these Specifications.

B. The sequence of the bituminous concrete placing operations shall be as required to secure tight and well-compacted longitudinal joints.

C. Before compaction, the finished surface struck by the machine shall be checked. Depressions shall be filled and drippings shall be removed.

D. In areas where, on account of irregularities or unavoidable obstacles, the use of mechanical spreading and finishing equipment is impracticable, the mixture may be spread and screened by hand, subject to the approval of the ENGINEER.

E. All vertical contact surfaces shall be painted with a uniform coat of hot asphalt cement, just before bituminous concrete is placed against them.

F. The top of the binder course shall be thoroughly cleaned prior to installation of the wearing course. If binder course is over 5 days old the CONTRACTOR shall install a tack coat in accordance with the requirements of article 4.06.05 of the Standard Specifications Form 816.

G. Bituminous concrete shall only be installed when the surface is dry, the atmospheric temperature in the shade is at least 40° F and the weather is not foggy or rainy. The ENGINEER may, however, permit Work of this character to continue when overtaken by sudden storms, up to the amount of which may be in transit from the plant at the time, provided the mixture is within temperature limits specified. Upon arrival, the mixture shall be dumped into the approved mechanical spreader and immediately spread and struck off the full width required and to such appropriate loose depth for each successive course that when the Work is completed the weight of the mixture required per square yard will be secured. The mechanical equipment shall strike off each course. For use in striking off the bottom course, the machine shall be equipped with easily adjustable strike-off plates.

H. The refueling of equipment in such position that fuel might be spilled on a bituminous concrete mixture already placed or to be placed is prohibited.

3.05 COMPACTION

A. After the courses have been screened as specified, each course shall be compacted to a density of at least 92% and no more than 97% of the theoretical void free density. When the course spread has set sufficiently or come to the proper condition, it shall be rolled at such a speed as not to cause undue displacement or shoving.

B. Compaction testing shall be undertaken by the OWNER'S testing laboratory.

C. Rollers used to compact the course shall be power driven rollers weighing not less than ten (10) tons. If only one roller is used, it shall be a tandem roller; a second roller may be of the three-wheel type. The roller wheels shall be wet with only sufficient water to moisten the wheel surface.

D. Rolling shall begin at the sides and progress toward the center, uniformly lapping at least one-half width of the compacting wheel of the roller. Alternate trips of the roller shall be terminated in stops at least three (3) feet in distance from any preceding stop. The ENGINEER may direct

other rolling procedures, as conditions may require. Rolling shall be discontinued if the surface shows signs of cracking and shall be continued later as directed by the ENGINEER.

E. The speed of the roller shall not exceed three (3) miles per hour and shall at all times be slow enough to avoid displacement of the hot mixture. The rollers shall be in good condition. They shall be operated by experienced rollermen and must be kept in continuous operation as nearly as practicable in such manner that all parts of the pavement shall receive substantially equal compaction.

F. In all places inaccessible to a roller, such as adjacent to curbs, headers, gutters, brides, manholes, etc., the required compaction shall be obtained with tamps. Depressions that may develop before the completion of the rolling shall be remedied by adding new material to bring such depressions to a true surface. Should any depressions remain after the final compaction, new material shall be added to form a true and even surface. All high spots, high joints and other defects shall be adjusted as required.

3.06 JOINTS

A. Placing of the courses shall be as nearly continuous as possible and the roller shall pass over the unprotected end of the freshly laid mixture only when the laying of the course is discontinued or interrupted for an appreciable period and joints shall be formed at such joints. Where joints are to be formed, the end of the freshly laid mixture shall be cut "square" with the pavement, slightly set up with the back of a metal lute and rolled at slow speed so as to cause as little feathering as possible. Before new material is laid the joint shall be cut back and a thin coating of hot asphalt paint should be applied to the joint.

3.07 SURFACE TEST OF THE PAVEMENT

A. For the purpose of testing the finished surface, a standard template cut to the true cross section of the road and a ten (10') foot straight edge shall at all times be available on the Work.

B. The CONTRACTOR shall provide or designate an employee whose duty will be to confirm the compacted course thickness and checking all rolled surfaces during the execution of the Work.

C. The finished pavement surface shall be such that it will not vary more than one-quarter (1/4") inch from the template cut to the cross-section of the road or more than one quarter (1/4") inch from a ten (10') foot straight edge applied parallel to the center line of the pavement. Any irregularity of the surface exceeding the above limits shall be corrected.

D. Where the thickness of the bituminous concrete is less than that shown on the Drawings by more than one-quarter (1/4") inch, the CONTRACTOR, with the permission of the ENGINEER, shall place a correction course not less than one (1") inch in depth after compaction. The CONTRACTOR shall reconstruct by cutting back and into the pavement of an acceptable depth to the ENGINEER and place new material to achieve the proper depth, cross-section and profile.

3.08 PROTECTION OF WORK

A. Sections of the newly finished work shall be protected from traffic at least six (6) hours, or until they have become properly hardened by cooling.

3.09 MAINTAINING BITUMINOUS CONCRETE SURFACES

A. Until the expiration of the guarantee period, maintain surfacing placed under this Contact and promptly correct any defect such as cracks, depressions, high points and holes that may occur. Surfacing kept in a safe and satisfactory condition for traffic. If defects occur in surfacing constructed by CONTRACTOR, remove surface material and base course as is necessary to properly correct defects. Replace base course and surface material.

END OF SECTION 02500

SECTION 02900

LAWNS AND GRASSES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Provide all materials, labor, equipment, services, etc., necessary and incidental for the successful establishment of a grass cover.

1.02 RELATED WORK

A. Drawings and general provisions of the Contract, including the Standard Specifications of the Greater New Haven Water Pollution Control Authority, apply to this Section.

1.03 REFERENCE STANDARDS AND DEFINITIONS

A. Reference herein to any technical society, organization, group or body is made in accordance with the following abbreviations. Unless otherwise noted or specified, all work under this Section shall conform to the latest edition, as applicable.

1. ASTM — American Society for Testing and Materials
2. Gravel Base: — Layer placed between the subbase and topsoil to improve drainage.
3. Fill: — Soil materials used to raise existing grades.
4. Subgrade: — Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.
5. Topsoil: — For the purposes of this section: Surface soil layer as stripped and stockpiled that contains organic matter desirable for plant growth.
6. Prepared Topsoil: — For the purposes of this section: Topsoil that has been screened, and amended for the purposes of establishing a seed bed for lawns and grasses.

1.04 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Certification of Grass Seed: From seed vendor for each grass-seed monostand or mixture stating the botanical and common name and percentage by weight of each species and variety, and percentage of purity, germination, and weed seed. Include the year of production and date of packaging.

1. Certification of each seed mixture for turfgrass and low maintenance grass mix, identifying source, including name and telephone number of supplier.

C. Product Certificates: For soil amendments and fertilizers, signed by product manufacturer.

D. Qualification Data: For Landscape Installer.

E. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of lawns and meadows during a calendar year. Submit before expiration of required maintenance periods.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: A qualified landscape installer whose work has resulted in successful lawn and meadow establishment.

1. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when planting is in progress.

B. Preinstallation Inspection: Engineer shall be given ample opportunity to inspect finished topsoil grades and conditions prior to any planting activities. All planting or seeding done without prior approval is subject to rejection and removal at the Contractor's expense.

1.06 DELIVERY, STORAGE, AND HANDLING

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

1.07 SCHEDULING

A. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with maintenance periods to provide required maintenance from date of Substantial Completion.

1. Spring Planting: April 1 to June 15.
2. Fall Planting: September 1 to October 15.

B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit.

1.08 LAWN MAINTENANCE – PERMANENTLY SEEDED AND SODDED AREAS

A. Begin maintenance immediately after each area is planted and continue until acceptable lawn is established, but for not less than the following periods:

1. Seeded and Sodded Lawns & Grasses: 90 days from the time sod and seed is installed or 3 mowings , whichever is greater as designated for these lawns and grasses.

a. When full maintenance period has not elapsed before end of planting season, or if lawn is not fully established, continue maintenance period during next planting season.

B. Maintain and establish lawns & grasses by watering, fertilizing, weeding, mowing, trimming, replanting, and other operations. Roll, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth lawn.

1. In areas where mulch has been disturbed by wind or maintenance operations restore topsoil grades and add new mulch. Anchor as required to prevent displacement.

C. Watering: Provide and maintain temporary piping, hoses, and lawn-watering equipment to convey water from sources and to keep lawn areas uniformly moist to a depth of 4 inches (100 mm).

1. Provide a minimum of ¼" per acre of water per day. Amount of water per day may be adjusted by the Engineer. Watering schedule and amount shall be recorded and reported daily to the Engineer for the first three weeks after and seeding and weekly thereafter.
2. Schedule watering/control irrigation system to prevent wilting, puddling, erosion, and displacement of seed or mulch.

D. Mowing:

1. The area shall be mowed with a reel mower set to a mowing height of 1 1/2". The Reel blades and bed knife shall be kept sharp and evenly matched to provide a clean cut. The mower shall be operated within the manufacture's recommended speed range. The grass shall be mowed once every 5 days commencing 5 days after sod installation.

2. Slope Lawn and Low Maintenance Lawn areas: Mow as required to facilitate overseeding during the maintenance period and once prior to final inspection.

a. Set mowing height of these Low Maintenance and Slope Lawn areas to 3"

3. Other lawn areas: Mow lawn as soon as top growth is tall enough to cut. Repeat mowing to maintain specified height without cutting more than 40 percent of grass height. Remove no more than 40 percent of grass-leaf growth in initial or subsequent mowings. Do not delay mowing until grass blades bend over and become matted. Do not mow when grass is wet. Schedule initial and subsequent mowings to maintain the following grass height:

a. Mow lawns 1-1/2 to 2 inches (38 to 50 mm) high.

E. Fertilization:

1. SEEDLINGS: Fertilize newly seeded areas with a 15-15-15 fertilizer grade two weeks after seeding. Fertilize at a rate of 293 lbs. per acre to supply 44 lbs N, P_2O_5 and K_2O per acre. Apply additional fertilizer applications after the 15-15-15 treatment using IBDU(31-0-0) at 4, 6 and 8 weeks after seeding at a rate of 142 lbs per acre.

F. Weed Control:

1. The Contractor is responsible for the control of weeds that establish into sodded and seeded areas during the maintenance period. The need for and method of weed control will be reviewed with and approved by the Engineer. Any approved Herbicide treatments shall be applied by a licensed State of Connecticut applicator.

G. Documentation

1. The Contractor is responsible for maintaining a log of maintenance activities performed as specified herein, including schedules and quantities of watering, repair, overseeding, fertilization, mowing, weed control activities and observations of seed and sod establishment. Copies of the Log shall be submitted to the Engineer weekly, except as noted for watering immediately after sod installation.

PART 2 - PRODUCTS

2.01 TOPSOIL

A. Clean, fertile, friable, well-draining, natural sandy loam not containing materials harmful to plant life. All topsoil to be free of any subsoil, sod, stones over 1" in any dimension, sticks, roots, weeds, litter, and other deleterious material. Topsoil shall be uniform in quality and texture and contain organic matter and mineral elements necessary for sustaining healthy plant growth as follows:

1. Organic content: 5% - 15%
2. pH: 5.5 to 7
3. Gradation: USDA Soils Textural Classification percentages of sand, silt, and clay for "Sandy Loam" or "Loam" classification.
4. Nutrient Levels: As required by the additions of amendments to the topsoil to meet the optimum nutrient levels specified in the testing laboratory report.

2.02 INORGANIC SOIL AMENDMENTS

A. Lime: ASTM C602, agricultural limestone containing a minimum 80% calcium carbonate equivalent and as follows:

1. Class: Class O, with a minimum 95% passing though the no. 8 (2.36 mm) sieve and a minimum 55% passing through the no. 60 (0.25 mm) sieve.
2. Provide lime in form of dolomitic limestone.

B. Aluminum Sulfate: commercial grade, unadulterated.

C. Perlite: Horticultural perlite, soil amendment grade.

D. Agricultural Gypsum: Finely ground, containing a minimum of 90% calcium sulfate.

E. Sand: Clean, washed, natural or manufactured, free of toxic materials.

2.03 ORGANIC SOIL AMENDMENTS

A. Compost: well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35% to 55% by weight; 100% passing through the ¾" (19 mm) sieve; soluble salt content of 5 to 10 decisiemens/m; not exceeding 0.5% inert contaminants and free of substances toxic to plantings.

B. Peat: Finely divided or granular texture, pH range of 6 to 7.5, containing partially decomposed moss peat, native peat, or reed-sedge peat and having a water absorbing capacity of 1100% to 2000%.

C. Manure: well-rotted, unleached, stable or cattle manure containing not more than 25% by volume of straw, sawdust, or other bedding materials; free of toxic substances, stone, sticks, soil, weed seed, and material harmful to plant growth.

2.04 SEED

A. All seed materials shall be fully clearly labeled according to the Laws and regulations of the state of Connecticut. The Contractor shall retain and produce seed bag labels if requested by the Owner or Architect. An invoice from the seed supplier shall be included certifying that the seed are the cultivars as listed on the labels.

B. Hydroseeding of slope and lawn areas may be permitted upon written approval of the Architect.

C. Permanent Lawns & Turfgrass: Seed of grass species as follows, with not less than 95 percent germination, not less than 85 percent pure seed, and not more than 1 percent weed seed:

1. Standard Seed Mix: Proportioned by weight as follows:
   a. 40 percent Kentucky bluegrass (Poa pratensis).
   b. *40 percent chewings red fescue (Festuca rubra variety).
   c. *20 percent perennial ryegrass (Lolium perenne).
      * High endophyte
   d. Ryegrass varieties shall be selected from varieties showing good wear tolerance and good disease resistance as listed in Rutgers University Cooperative Research & Extension Fact sheet FS546 'Perennial Ryegrass Varieties for New Jersery Sports Fields' James A. Murphy, PhD.
2. Slope Lawn Seed Mix: Proportioned by weight. Seed of grass species as follows, with not less than 95 percent germination, not less than 85 percent pure seed, and not more than 1 percent weed seed:

a. 80% equal mix of the following:
   Sheeps Fescue,
   Dawson Slender Red Fescue,
   SR5210 Creeping Red Fescue,
   SR 5100 Chewings Fescue,
   Jasper Creeping Red Fescue,
   Scaldis Hard Fescue,
   SR 3150 Hard Fescue

b. 20% annual ryegrass

3. Low Maintenance Seed Mix: Proportioned by weight. Seed of grass species as follows, with not less than 95 percent germination, not less than 85 percent pure seed, and not more than 1 percent weed seed: Mix shall be sown at a minimum rate of 5lbs per 1,000sf.

   a. 42% 'Flyer' Creeping Red Fescue
   b. 34% fiesta II perennial Ryegrass
   c. 8% Redtop
   d. 8% Birdsfoot trefoil
   e. 8% Alsike Clover

D. Temporary Vegetative Cover: Seed of grass species as follows, with not less than 95 percent germination, not less than 85 percent pure seed, and not more than 1 percent weed seed:
   1. Temporary Vegetative Cover: Proportioned by weight as follows:

      a. 60 percent annual Ryegrass.
      b. 40 percent perennial Ryegrass.

2.05 ACCESSORIES

A. Selective Herbicides: EPA registered and approved, of type recommended by manufacturer for application as approved by the Engineer.

2.06 FERTILIZER

A. Commercial Fertilizer: Commercial-grade composite fertilizer uniform in composition, dry and free flowing. It shall bear the manufacturer's guaranteed statement of analysis which shall be as indicated by soils testing for original fertilization and 10-6-4 for refertilization with 50% organic nitrogen. Fertilizer shall be derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:

   1. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing agency.

B. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:

1. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.
2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing agency.

2.06 MULCHES

A. Fiber Mulch: Biodegradable, dyed-wood, cellulose-fiber mulch; nontoxic; free of plant-growth or germination inhibitors; with maximum moisture content of 15 percent and a pH range of 4.5 to 6.5.

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

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine areas to receive lawns and grass for compliance with requirements and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by seed operations.

B. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.03 TOPSOIL PREPARATION AND SCREENING

A. All stockpiled topsoil shall be screened prior to placement to meet the specified requirements.

B. Limit lawn subgrade preparation to areas to be planted.

C. Spread topsoil to the minimum depths indicted on the Contract Drawings but not less than required to meet finish grades after light rolling and natural settlement. Do not spread if topsoil or subgrade is frozen, muddy, or excessively wet.

D. Beginning of installation means Contractor acceptance of prepared site conditions

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E. General Seeded Areas:

1. Harrow or rake the topsoil to a depth of 3 inches. Remove all sticks, foreign material and stones 1 1/2 inches or greater in any dimension.

2. Thoroughly blend planting soil mix before spreading or spread topsoil, apply soil amendments and fertilizer on surface, and thoroughly blend planting soil mix using a subsoiler.

    a. Delay mixing fertilizer with planting soil if planting will not proceed within a few days.
    b. Mix lime with dry soil before mixing fertilizer.

3. Unchanged Subgrades: If lawns are to be planted in areas unaltered or undisturbed by excavating, grading, or surface soil stripping operations, prepare surface soil as follows:

    a. Remove existing grass, vegetation and turf. Do not mix into surface soil.
    b. Loosen surface soil to a depth of at least of 6 inches (200 mm). Apply soil amendments and fertilizers according to planting soil mix proportions and mix thoroughly into top 6 inches (150 mm) of soil. Till soil to a homogeneous mixture of fine texture.
    c. Remove stones larger than ¾ inch in any dimension and sticks, roots, trash, and other extraneous matter.
    d. Legally dispose of waste material, including grass, vegetation, and turf, off Owner's property.

4. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade to within plus or minus 1/2 inch (13 mm) of finish elevation as measured with a 10' straight edge. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit fine grading to areas that can be planted in the immediate future.

5. Moisten prepared lawn areas before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

F. Restore areas if eroded or otherwise disturbed after finish grading and before planting.

3.04 SEEDING

A. Permanent Seed: Sow seed with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph (8 km/h). Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.
    1. Do not use wet seed or seed that is moldy or otherwise damaged.
    2. Sow seed at the following rates:
        a. Standard Seed Mix: 5 lbs/1,000 sq. ft.
        b. Slope Lawn Seed Mix: 5 lbs/1,000 sq.ft.
        c. Low Maintenance Seed Mix: 5 lb/1,000 sq. ft.
    3. Rake seed lightly into top 1/8 inch (3 mm) of topsoil, roll lightly, and water with fine spray.

4. Protect seeded areas on slopes in accordance with Division 31 specification 'Erosion Control system'.
5. Apply straw mulch composed of stems of grain after threshing and free of weeds at 2 tons per acre on athletic field areas of the site.

B. Temporary Seeding: Sow seed with spreader, seeding machine or hydroseed.

1. Sow seed evenly at the rate of 10 lb/1000 sq.ft.

3.05 HYDROSEEDING

A. Hydroseeding: Only as approved by the Engineer

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B. Mix specified seed, fertilizer, and fiber mulch in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application.

1. Mix slurry with nonasphaltic tackifier.
2. Apply slurry uniformly to all areas to be seeded in a two-step process. Apply first slurry application at a minimum rate of 500-lb/acre (56.1-kg/92.9 sq. m) dry weight but not less than the rate required to obtain specified seed-sowing rate. Apply slurry cover coat of fiber mulch at a rate of 1000 lb/acre (10.2 kg/92.9 sq. m).
3. Protect seeded areas with slopes exceeding 1:3 with slope stabilization blankets installed and stapled according to manufacturer's written instructions.

3.06 REPAIRS

A. The Contractor shall reseed and repair any areas missed by seeding after proper restoration of the seedbed.

B. The Contractor is responsible for repairing and reestablishing any areas damaged by erosion or settling during the maintenance period.

3.07 SATISFACTORY LAWNS

A. Final acceptance of Lawn areas shall be based upon a uniform grass cover on the seeded areas and no settling occurring that would result in an uneven surface.

1. Seeded Lawn: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 90 percent over any 10 sq. ft. (0.92 sq. m).

B. Reestablish lawns that do not comply with requirements and continue maintenance until lawns are satisfactory.

3.08 CLEANUP AND PROTECTION

A. Promptly remove soil and debris created by lawn work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.

B. Erect barricades and warning signs as required protecting newly planted areas from traffic. Maintain barricades throughout maintenance period and remove after lawn is established.

C. Remove erosion-control measures after grass establishment period.

END OF SECTION 02900

SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 – GENERAL

1.01 DESCRIPTION

A. This Section includes the furnishment of all labor, materials, and equipment necessary for the installation of cast-in place concrete, as indicated on the Project Drawings or as required to complete the Project work. This includes, but is not limited to, concrete pavement, concrete for bollards, concrete pads, and concrete for miscellaneous structures outside of the building.

1.02 RELATED WORK

A. Related sections.

1. Item 209 “Preparation of Subgrade”
2. Item 304 “Processed Aggregate”
3. Section “02225 “Selective Demolition”

1.03 REFERENCES

A. ACI 301 - Specifications for Structural Concrete for Buildings

B. ACI 318 - Building Code Requirements for Reinforced Concrete

C. ACI 347 - Recommended Practice for Concrete Formwork

D. ASTM C33 - Concrete Aggregates

E. ASTM C94 - Ready-Mixed Concrete

F. ASTM C150 - Portland Cement

G. ASTM C260 - Air-Entraining Admixtures for Concrete

H. ASTM C494 - Chemical Admixtures for Concrete

I. ASTM D994 - Preformed Expansion Joint Filler for Concrete (Bituminous Type)

1.04 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 301 “Specifications for Structural Concrete for Buildings” and ACI 318 “Building Code Requirements for Reinforced Concrete” unless specifically noted otherwise.

B. Material Testing

1. Testing and analysis of concrete will be performed by the OWNER'S testing laboratory.
2. OWNER'S testing laboratory shall take cylinders and perform compression, slump, temperature, and air entrainment tests in accordance with ACI 301.
3. Tests of cement and aggregates will be performed to ensure conformance with requirements stated herein.
4. One additional test cylinder will be taken during cold weather and cured on-site under same conditions as concrete it represents.
5. This cost of concrete testing and analysis services shall be borne by the owner unless a deficiency in material or workmanship is found, in which instance the contractor shall bear the cost of the testing agency's services.

1.05 SUBMITTALS

A. Submit concrete mix designs for each class of concrete to ENGINEER for approval. Include graduation analysis of all aggregates and manufacturer's product information on all cement and admixtures used.

B. Submit reinforcement shop drawings for all reinforcing steel. Comply with ACI SP-66 "Detailing Manual". Show bar schedules, bending diagrams, splices and laps, shapes, dimensions and details of reinforcements and all accessories. * Reproduction of concrete drawings is not acceptable for use as shop drawings.

C. Submit certificates of compliance for reinforcement, cement, aggregates and admixtures.

D. Batch certificates for every batch of concrete discharged and to be used in the Work shall be provided to the ENGINEER.

1.06 JOB CONDITIONS

A. Make provisions for, coordinate with and provide access to all other CONTRACTORS for the installation of required base, sleeves, conduit, etc.

B. Notify the ENGINEER at least 48 hours in advance of all pours. Obtain the ENGINEER'S approval prior to pouring.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Provide cold weather placement and protection in accordance with ACI 306.

B. Provide hot weather placement and protection in accordance with ACI 305.

C. Unless adequate protection is provided, concrete shall not be placed during rain, sleet or snow. Protect concrete from rainwater, maintain concrete water-cement ratio and protect concrete surface from damage by adverse weather conditions

D. All concrete shall be adequately protected after pouring to prevent damage from freezing, by the use of suitable covers and adequate heating equipment. Frozen and damaged concrete must be removed and replaced at the CONTRACTOR'S expense. Do not place concrete on frozen earth.

PART 2 - PRODUCTS

2.01 FORMWORK MATERIALS

A. Steel forms or form liners shall be standard commercially available prefabricated steel forms.

B. Fiberglass forms shall be standard quality.

C. Plywood forms shall be B-B plyform, Class I or Class II, 5/8" minimum thickness, edge sealed.

D. Boards, sheathing and form lumber shall be No. 3, common or better, ¾" minimum thickness.

E. Framing lumber shall be standard or better.

F. Form ties and all other accessories embedded in concrete shall be commercially manufactured type.
Non-fabricated wire ties are not permitted.

G. Form Release Agent: Colorless material which will not stain concrete, absorb moisture, or impair natural bonding or color characteristics of concrete.

2.02 REINFORCEMENT

A. Steel reinforcing bars shall conform to "Specifications for Deformed Billet - Steel Bars for Concrete Reinforcement", ASTM A 615 Grade 60, having a minimum yield strength of 60,000 psi.

B. Tie Wire shall be black annealed wire, 16-gauge minimum.

C. Provide supports for reinforcement as required. Bar supports shall conform to the "Bar Support Specifications" contained in "Manual of Standard Practice" as published by CRSI and WCRSI. Bar supports and accessories within ½" of surface of concrete exposed to weather shall be non-corrosive.

D. Welded Wire Fabric shall be smooth wire fabric conforming to ASTM A185. Welded intersections shall not exceed 6" o.c. Sheet stock only, rolled stock not permitted.

2.03 CONCRETE MATERIALS

A. Cement shall be gray Portland Cement, Type I, or II, conforming to ASTM C150 or ASTM C175 for air-entraining Portland Cement. Use the same cement and supplier for all exposed Work.

B. Water shall be potable, clean and free from impurities affecting the strength of the concrete, in accordance with ACI and ASTM requirements.

C. Concrete aggregates shall conform to ASTM C 33.

1. Fine and coarse aggregates shall be regarded as separate ingredients and each shall conform to the appropriate grading requirements of ASTM C33.

D. Air-Entraining admixtures shall conform to ASTM C260.

E. Water reducing admixture shall conform to ASTM C494, Type A (Low Range) or Type F (High Range).

F. Accelerating admixture shall be non-chloride type and shall conform to ASTM C494, Type C.

G. Retarding admixture shall conform to ASTM C494, Type D.

H. Non-shrinking grout shall be non-metallic, non-staining type achieving a 28-day compressive strength of 5000 psi minimum.

I. Expansion joints shall be ½" thick cane fiber expansion joints, conforming to ASTM D1751.

J. Curing/Sealing compound shall conform to ASTM C309, minimum solids 18%.

2.04 CONCRETE MIX DESIGNS

A. All site concrete shall be normal weight and consist of a proportioned mixture of Portland cement, fine and coarse aggregate, admixtures and water.

B. All concrete mixes shall be proportioned on the basis of field experience and/or trial mixtures in accordance with ACI 318 to achieve the following properties:

Class	28 Day Compressive Strength (PSI)	Maximum Water/ Cement Ratio	Minimum Cement Content (1 lb/cy)
A	4000 psi	0.49	611
B	3000 psi	0.53	517
C	1500 psi	0.69	423

C. Class A and B shall be proportioned for a slump range of 2" minimum to 4" maximum. Class C shall not exceed 6" minimum.

D. Class A and B concrete shall be air entrained with an air content of 6%±1%. Class C shall not be air entrained.

E. Class A concrete shall be used for all concrete sidewalks, curbs, pavements and all exposed flatwork. Class B concrete shall be used for all footings and site structures. Class C concrete shall be used for all lean concrete fills.

F. Class A concrete shall not contain any fly-ash. Blast furnace cement slag may be used.

G. A low range admixture shall be utilized in all concrete.

H. Admixtures to retard or accelerate setting, plasticize or prevent freezing shall not be used without prior approval from the ENGINEER. No admixtures containing calcium chloride will be permitted.

I. All admixtures shall be mixed at the batch plant.

J. Utilize the following maximum aggregate sizes that shall not exceed the tolerance on oversize specified in ASTM C33.

Class A	¾"
Class B	1"
Class C	1 ½"

2.05 PRODUCTION

A. Ready-mixed concrete shall conform to ASTM C94 and the National Ready Concrete Association. Use of non-agitating trucks is not permitted. Delete references for allowing additional water to the batch for insufficient slump. Addition of water to the batch is not permitted.

B. Use of re-tempered concrete is not permitted.

PART 3 - EXECUTION

3.01 INSPECTION

A. Examine the subgrade and the conditions under which site concrete work is to be installed. Installation shall not proceed until all unsatisfactory conditions, if any, have been corrected.

B. Concrete is not to be placed without the prior inspection and approval of the subgrade and forms by the ENGINEER.

3.02 BASE PREPARATION

A. Remove any soft, yielding or loose materials. Replace with crushed stone, compacted gravel or processed aggregate as appropriate for the subject base course. Grade and prepare base to a smooth surface parallel to finish grade and to proper elevation. Proof compact the finished surface.

B. Check elevations and position of all utility structures, manholes, catch basins, valve boxes, etc., that lie within the areas to receive concrete pavements. Make or have made any adjustments required to properly line up and set these elements with regard to the finish work.

C. Moisten the base immediately prior to concrete placement.

D. Notify the ENGINEER following completion of subgrade preparation to allow for inspection and approval prior to concrete placement.

3.03 FORM CONSTRUCTION

A. All forms used for exposed concrete work shall be plywood forms. Reused plywood form, fiberglass forms and standard steel forms may be used for all concealed concrete work, provided that the reused form are cleaned and re-oiled prior to their reinstallation.

B. All exterior corners and edges of exposed concrete shall be chamfered or bullnosed.

C. All forms shall be temporarily braced from lateral loads as required by ACI 301, 318, 347 and other applicable specifications.

D. Set forms to the required grades and lines, rigidly braced and secured. Install sufficient quantity of forms to allow continuous progress of work and so that forms can remain in place at least 24 hours after concrete placement.

E. Check completed formwork for grade and alignment to the following tolerances:
   1. Top of form units: not more than 1/8" in 10 feet.
   2. Vertical face; not more than ¼" in 10 feet on longitudinal axis.

F. Clean forms after each use and coat with form release agent as often as required to ensure separation from concrete without damage.

3.04 REINFORCEMENT

A. Fabrication and placing tolerances of reinforcing bars and welded wire fabric shall conform to the CRSI "Manual of Standard Practice" and ACI 318 Building Code Requirements for reinforced Concrete for Buildings.

B. Reinforcement shall be free from scale, oil, ice and structural defects, and kept in this condition on the job site. Reinforcement shall be stored out of contact with the ground.

C. Appliances: adequate chairs and other devices shall be used to maintain proper elevation of bars and mesh reinforcing at all times. All chairs and other devices shall be galvanized. Continuous mesh reinforcing shall be lapped at least one wire space. All reinforcement and mesh shall be secured at the proper position prior to concrete placement.

D. Reinforcement within the limits of 1 day's pour shall be in place and firmly wired before concrete pouring starts.

E. Field bending of reinforcement by use of heat will not be permitted.

3.05 MIXING AND TRANSPORTING CONCRETE

A. The mixing and transporting of concrete shall comply with ACI 304.

B. Each batch of concrete shall:

1. Be thoroughly mixed so that there is a uniform distribution of materials.
2. Be entirely discharged from the mixers before recharging.
3. Ready-mix concrete shall be mixed and delivered in accordance with the requirements set forth in ASTM C94. The CONTRACTOR shall see that a sufficient number of mixers are provided to rapidly and continuously carry out the work. The OWNER or its representatives shall at all times have free access to the batching plant and transit mix trucks for sampling materials and checking handling methods.
4. Re-tempering of concrete is not permitted.

3.06 CONCRETE PLACEMENT

A. Contractor shall complete pre-placement inspection prior to the arrival of the ENGINEER. Inspect formwork, reinforcing steel and items to be embedded or cast-in.

B. Placement of concrete shall be in accordance with ACI 301 and ACI 304.

C. Hot Weather Placement shall be in accordance with ACI 305.

D. Cold Weather Placement shall be in accordance with ACI 306.

E. Do not place concrete until subgrade and forms have been checked for line and grade. Moisten subgrade to provide a uniformed dampened condition at the time concrete is placed. Do not place concrete around manholes or other structures until they have been brought to the required grade and alignment.

F. Place concrete using methods which prevent segregation of the mix and with as little rehandling as possible. Consolidate concrete along the face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement or side forms. Use only square faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocation of reinforcing dowels and joint devices.

G. Deposit and spread concrete in a continuous operation between joints as far as possible. If interrupted for more than ½ hour, place a construction joint.

3.07 JOINTS

A. Construct expansion, score (weakened plane/contraction) and construction joints as detailed on the drawing and in accordance with the accepted practice of the ACI. The ENGINEER specifically reserves the right to adjust joint locations without additional payment.

B. All joints shall be constructed true to line with face perpendicular to surface of the concrete unless otherwise specified or detailed. Construct transverse joints at right angles to the centerline.

C. Score (weakened plane/contraction) Joints: Provide score joints, sectioning concrete into areas as detailed and as shown on the Drawings. Construction joints ¼" wide by depth as detailed by grooving top portion of fresh concrete with a recommended cutting tool and finishing with a jointer.

D. Construction Joints: Place constructions joints at end of placements except where such placements terminate at expansion joints.

E. Construction joints shall be keyed and doweled. See Contract Drawings for additional details.

F. Expansion joints: Provide and install pre-molded joint filler for expansion joints abutting curbs, inlets, structures, walks, walls, other fixed objects and as shown on the Drawings.

G. Locate expansion joints 24 ft. o.c. maximum, or as detailed.

H. Extend joint fillers full width and depth of joint, and not less than ½" or more than 1" below finished surface. Install joint sealer at all expansion joints as detailed on the Contract Drawings.

I. Furnish joint fillers in one-piece lengths for full width being placed wherever possible. Where more than one length is required, lace or clip joint filler sections together.

J. Protect the top edge of joint filler during concrete placement with wood strip, metal cap or other temporary material. Remove protection after concrete has been placed on both sides of joint.

3.08 CONCRETE PAVEMENTS AND PADS

A. Install base course in one course over previously prepared subgrade. Thoroughly compact base course and moisten.

B. Construct and install forms as required and detailed.

C. Placement of concrete for pavement and pads shall be in accordance with these specifications. Consolidate, screed and finish as detailed.

D. Round all edges with an approved tool. Eliminate tool marks on concrete surfaces.

3.09 CONCRETE FINISHING

A. After striking off and consolidating concrete, smooth surface by screening and floating. Use hand methods only where mechanical floating is not possible. Adjust floating to compact surface and produce uniform texture.

B. After floating, test surface for trueness with a 10 ft., straightedge. Distribute concrete as required to remove surface irregularities, and re-float repaired areas to provide a continuous smooth surface.

C. Work edges of slabs, gutters, back top edge of curb, and formed joints with an edging tool, and round to ½" radius, unless otherwise indicated. Eliminate tool marks on concrete surface.

D. After completion of floating and troweling, when excess moisture or surface sheen has disappeared, complete surface finishing as detailed. Methods defined as follows:

1. Light broom finish: Draw a fine-hair broom across concrete surface in direction as detailed. Repeat operation if required, to provide a fine line texture acceptable to the ENGINEER.
2. Heavy broom finish: Draw a stiff-bristled broom across concrete surface in direction as detailed. Repeat operation if required, to provide a course, non-slip finish, acceptable to the ENGINEER.
3. "Rubbed finish": Rub exposed concrete surfaces with a wood or rubber float to achieve a uniform, gritty texture.
4. "Grout Cleaned Finish": Conform to ACI 301, Section 10.3.2.

E. Do not remove forms for 24 hours after concrete has been placed. After form removal, clean ends of joints and point-up any minor honeycombed areas. Remove and replace areas or sections with major defects as directed by the ENGINEER.

3.10 CURING AND PROTECTION

A. Cure and protect site concrete in strict accordance with ACI 301 procedures.

B. Liquid membrane curing compounds shall be in accordance with the manufacturer's instructions.

C. Prevent the loss of moisture for a period of seven days.

3.11 CONCRETE SURFACE REPAIRS

A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removal of forms when acceptable to the Engineer.

B. Cut out honeycomb, rock pockets and voids over ¼" in any dimension and holes left by tie rod and bolts, down to solid concrete, but in no case to a depth of less than 1 inch. Make edges of cuts perpendicular to the concrete surface. Before placing mortar, coat the area to be patched with a bonding agent.

C. For exposed to view surfaces, blend white Portland cement and standard Portland cement so that when dry, patching mortar will match color surrounding. Provide test areas at inconspicuous locations to verify mixtures and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surfaces.

D. Repair Formed Surfaces: Flush out form tie holes, fill with dry-pack mortar.

E. Repair concealed formed surfaces, where possible, that contain defects that affect the durability of concrete. If defects cannot be repaired, remove and replace concrete.

F. Repaired of Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface plan to tolerances specified for each and finish. Correct low and high areas as herein specified. Text unformed surfaces sloped to drains for trueness of slope, in addition to smoothness, using a template have the required slope and shape.

G. Repair finished unformed surfaces that contain defects that affect the durability of concrete. Surface defects, as such, include crazing, cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through non-reinforced sections regardless of width, spalling, popouts, honeycomb, rock pockets and other objectionable conditions.

H. Correct high areas in unformed surfaces by grinding, after concrete has cured at least 14 days.

I. Correct low areas in unformed surface during or immediately after completion of surface finishing operations by cutting out low areas and replacing with fresh concrete. Finish repaired areas to blend into adjacent concrete. Proprietary patching compounds may be used when acceptable to the Engineer.

J. Repair defective areas, except random cracks and single holes not exceeding 1 inch diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts and expose reinforcing steel with at least ¾" clearance all around. Dampen concrete surfaces in contact with patching concrete and brush with a neat cement grout or apply concrete of same type or class as original concrete. Place, compact and finish blending with adjacent finished concrete. Cure n the same manner as adjacent concrete.

K. Repair isolated random cracks and single holes not over 1 inch diameter by dry-pack method. Groove top of cracks and cut-out holes to sound concrete and clean of dust, dirt and loose particles. Dampen cleaned concrete surfaces and brush with neat cement grout or apply concrete bonding agent. Mix dry-pack, consisting of one part Portland cement to 2 ½ parts fine aggregate passing a no. 16 sieve, using only enough water as required for handling and placing. Install dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for not less than 72 hours.

L. Use epoxy-based mortar, approved by the Engineer, for structural repairs. Structural repairs include, but are not limited to, areas of unsound concrete with a surface area greater than 9 square inches or with a depth greater than 1 ½ inches, areas where reinforcement is exposed or areas with cracks greater than 1/16 inch wide. All areas requiring a structural patch shall be approved by the Engineer.

3.12 PROTECTION

A. Protect concrete from damage until acceptance of the Work. Exclude traffic from pavement for at least 28 days after placement. No construction traffic is permitted.

B. Sweep concrete pavements and wash all concrete surfaces free of stains, discoloration, dirt and other foreign materials just prior to finish inspection.

C. Protection of finished work is the responsibility of the installing CONTRACTOR until final acceptance of all work by the ENGINEER. The installing CONTRACTOR, at no additional cost to the OWNER, shall replace all unprotected damaged Work.

D. Where required and/or directed, backfill sides of sidewalk with suitable materials compacted and finished flush with the top of the walk.

END OF SECTION 03300

SECTION 05100

METAL FABRICATIONS

PART 1 – GENERAL

1.01 DESCRIPTION

A. This section includes, but is not limited to the general requirements for the furnishment and installation of the framing metal fabrications.

1. Miscellaneous structural steel

1.02 RELATED WORK

A. Drawings and general provisions of the Contract, including the Greater New Haven Water Pollution Control Authority Standard Specifications apply to this Section.

B. Section 02200 "Cast-in-Place Concrete" for installing anchor bolts, steel pipe sleeves, slotted-channel inserts, wedge-type inserts, and other items cast into concrete.

1.03 REFERENCES

A.	ASTM A36/A36M-05	Specification for Carbon Structural Steel
B.	ASTM A123/A123M-02	Specification for Zinc (Hot Dip galvanized) Coatings on Iron & Steel Products
C.	ASTM A153/A153M-05	Specification for Zinc Coating (Hop Dip) on Iron and Steel Hardware
D.	ASTM A307-07b	Specifications for Carbon Steel colts and Studs, 60,000 PSI Tensile Strength
E.	ASTM A325-07a	Specification for Structural bolts, Steel, heat Treated, 120/105 KSI Minimum Tensile Strength
F.	ASTM A500-07	Specification for Cold-Formed welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
G.	ASTM A572/A575M-07	Specification for High Strength Low-Alloy Columbium Vanadium Structural Steel
H.	ASTM A780-01 (2006)	Standard Proactive for repair of damaged and uncoated areas of hot dip galvanized coatings
I.	ASTM A992/A992M-06a	Specification for Steel for Structural Shapes for Use in Building Framing.
J.	ASTM F1554-07a	Specification for Anchor Bolts, Steel 36, 55 and 105 KSI Yield Strength
K.	AWS D1.1-2006	American Welding Society, Structural Welding Code Steel

L. Manual of Steel Construction - American Institute of Steel Construction (AISC- 13th edition)

1.04 SUBMITTALS

A. Submit complete shop and erection drawings showing all fabrication, welding, connections, anchor bolt placement, finishes, materials and dimensions. Photo copies of Contract Drawings in whole or in part, will not be accepted as show drawings. Mark numbers painted on the shop assembled pieces of steel shall be the same mark numbers used on the detailed shop and erection drawings.

B. Submit product data where required.

C. Submit field welding equipment data including type, voltage and amperage.

D. 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 accompanies by a current certificate by the welder attesting to the fact that he as been engaged in welding since the date of certification, with no break in welding service greater than 6 months.

E. Qualifications:

1. Steel Fabricator: A written description of ability including facilities, personnel, and a list of similar completed projects.
2. Steel Erector: A written description of ability including equipment, personnel, and a list of similar completed projects.

F. Submit certification from galvanizer that galvanizing is in accordance with Specifications.

1.05 QUALITY ASSURANCE

A. Conform to AISC Specification for the Design, Fabrication and Erection of Structural Steel.

B. Conform to AWS Structural welding Code for all welding operations.

C. Galvanizing facility shall have an ongoing touchup and repair program.

D. All welders shall be certified in accordance with the requirement of the AWSD Structural Welding Code with the following information:
1. Type of welding for which the welder is qualified
2. Welding position for which the welder is qualified
3. Code and procedure for which the welder is qualified
4. Date qualified
5. Name of the firm and person certifying the qualification tests.

1.06 DELIVERY, STORAGE AND HANDLING

A. Coordinate delivery of products.

B. Protect products from damage prior to and after installation.

C. All products shall be stored off the ground and stored/handled in such a manner to prevent soiling, corrosion and/or damage.

D. Remove damaged material from the site.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Structural steel shapes, and plates:

1. Wide Flange beams ("W" shaped) ASTM A992 (Grade 50)
2. Angles and other Shapes - ASTM A36 (Grade 36)
3. Plates - ASTM 572 (Grade 50)

B. Structural Steel Tubing: ASTM A500, Grade B

C. Anchor Rods: ASTM F1554

D. High Strength Bolts, ASTM A325

E. Welding rods : AWS D1l1 (E70XX Electrodes)

F. Finish:

1. Structural Steel: Painted
2. Bolts and Anchor Rods: Hot-Dipped galvanized: ASTM A153.

PART 3 - EXECUTION

3.01 FABRICATION

A. Unless otherwise specified, structural steel shall be fabricated in accordance with the requirements of the 13th Edition of the AISC Specifications for the Design, Fabrication, and erection of structural steel for buildings. All 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. Materials for welding shall be in accordance with the recommendations of the manufacturer of the material to be welded.

B. All holes, angles, supports, and braces shall be provided as required.

C. Except as otherwise indicated on the drawings, gusset plates shall have a minimum thickness of 3/8 inch.

D. Holes shall be made in steel members for attachment of wood blocks, nailers, etc., holes shall be sized to suit the fasteners indicated on the architectural Drawings; where size and spacing are not indicated, holes shall be 9/16 inch diameter, at 3 feet o.c.

E. Sheared and flame cut edges shall be true to line and free from rough corners and projections.

F. Re-entrant cuts/corners shall be filleted to a radius of not less than ½ inch.

G. Holes shall be punched, sub-punched and reamed, or drilled in accordance with AISC "Specifications for structural steel". Holes shall not be made by flame cutting.

H. Holes shall be 1/16 larger than the normal bolt diameter, except holes for cast-in place anchor bolts which shall be 5/16 inch large than the nominal bolt diameter and as otherwise shown on the Drawings.

I. The use of oversize or slotted holes not shown on the Drawings shall be subject to prior review by the Engineer.

J. Bend plate shall be in accordance with AISC "Minimum Radius for Bending:"

K. Column ends bearing upon base and cap plates and beam ends with end plates shall be saw-cut or milled to true surfaces and correct bevels.

L. Column base plate bearing surfaces on plates 2 inches or more in thickness shall be milled to true surfaces except at surfaces to be grouted against.

M. Column caps and base plates and beam end plates shall have full contact when assembled.

N. Welding shall be done in a sequence within minimizes distortion and shrinkage.

O. Fabrication holes, notches, etc., not required by nor shown on the Drawings shall be subject to prior review by the Engineer.

3.02 CONNECTIONS

A. All welding shall conform to AWS D1.1 structural welding code and be performed by a certified welder in accordance with AWS Standards for type, size and position.

B. Welded joints shall comply with the AWS code for procedures, appearance and quality of welds and methods of correcting welding work.

C. All shop connections shall be bolted or welded. All field connections shall be bolted except where welding is specifically called for. Bolts shall be ¾" diameter minimum with open holes 1/6" larger, except for column grout plates which are 3/16" larger and column base plates which are 5/16" larger. Connections not detailed shall be designed for the loads indicated on the Drawings, loads given in the AISC Uniform Load Tables or as indicated in the minimum connection details, whichever is greater.

D. Provide high-strength threaded fasteners for bolted connections. Install high strength fasteners in accordance with AISC "Specifications for Structural Joints using A325 or A490 Bolts".

E. All bolts connections that will be exposed to view shall have bolts for the full depth of the connection member, whether required to support the reaction or not.

F. Continuous members, where indicated on the Drawings, shall require either 1) the member to be furnished as one piece, or 2) if individual pieces are to be provided, then they shall be connected by either welding or bolting to develop the full strength of the continuous member.

3.03 STEEL ERECTION AND INSTALLATION

A. Erection of structural steel shall be in accordance with the AISC Manual of Steel Construction and all other applicable regulator agencies.

B. Columns and base plates shall be set and accurately plumbed and leveled.

C. Column base plates may bear on setting plates, as required by the erector. Setting plates shall conform to the following:
   1. Top surface of plates shall be flat to within 0.025 inches in 12 inches.
   2. Top surface of plates shall be level to within 0.025 inches in 12 inches
   3. Total of both out of level and cut of flatness shall not exceed 0.015 inches in 12 inches.
   4. Plates shall not be thinner than 1/4 inch, or smaller in any horizontal dimension that the base plate supported thereon.

D. Installation of grout for the column setting plates and base plates shall be performed in accordance with Specification Section 03300. No load shall be applied to grout until 5 days after the plate has been grouted.

E. 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.

F. 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.

G. Steel work shall be adequately and safety supported and braced as required to prevent distortion or damage to the frame work due to wind or erection forces until the permanent supports and braces as shown on the Drawings are installed. Temporary lateral braces and support members which may be required during erection have not been designed by the Engineer or indicated on the Drawings. All temporary material and all traces thereof shall be completely removed before acceptance of the work. The Engineer has not designated the order of erection of steel work.

3.04 GALVANIZING

A. Provide galvanizing to all structural steel and hardware as indicated on the Drawings and herein.
B. Blast clean to near white metal in accordance with SSPC-SP10.
C. Hot-Dip galvanize all fabricated items I accordance with ASTM A123 and Hardware items in accordance with ASTM A153.

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 aesthetic appearance of materials.

G. After erection touch-up all damaged galvanized surfaces and field welds as follows:

1. Surfaces to be reconditions 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 effected, surface preparation shall extend into the undamaged galvanized coating.
3. At galvanized surfaces, apply organic zinc repair paint complying with requirements of ASTM A80. 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 electro magnetic gauge.
6. Repair Paint:
   a. ZIRP by Duncan Galvanizing
   b. Tneme- Zinc by Tnemec
   c. Or equal

3.05 SURFACE PREPARATION AND SHOP COATINGS

A. Provide Surface Preparation and Shop Coatings in accordance with Specification Section 09900, except for areas which are 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 top coats as specified in Section 09900. Contractor shall coordinate.

C. After erection touch up all abrasions and field welds with the same material used on shop coating.

END OF SECTION 05100

SECTION 07900

JOINT SEALERS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Provide all materials, labor, equipment, services, etc. necessary and incidental to the completion of the usage of joint sealers, including but not limited to, the preparation of the sealant substrate surfaces and the installation of the sealant and backing.

1.02 RELATED WORK

A. Related Sections:

1. Section 02500 - "Bituminous Concrete Pavement"
2. Section 03300 - "Cast-in-Place Concrete"

1.03 REFERENCES

A. ASTM C790 – Recommended Practices for Use of Latex Sealing Compounds.

B. ASTM C920 – Specification for Elastomeric Joint Sealant.

C. FS-TT-S-227 – Sealing Compound: Elastomeric Type, Multi-Component.

D. FS-TT-S-230 – Sealing Compound: Elastomeric Type, Single-Component.

E. FS-TT-S-001543 – Sealing Compound: Silicone Rubber Base.

F. Sealing and Waterproofers Institute – Sealant and Caulking Guide Specification.

1.04 SUBMITTALS

A. The Contractor shall submit product data as specified in Section 106-07 of the Greater New Haven Water Pollution Control Authority Standard Specifications.

B. Color charts or samples shall be submitted.

C. The Manufacturer's installation instructions shall be submitted.

1.05 QUALITY ASSURANCE

A. Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum ten years experience.

B. Applicator Qualifications: Company specializing in applying the work of this Section with minimum five years experience.

C. Compatibility: Verify sealants used are compatible with joint substrates.

D. Joint Tolerance: Compliance with the manufacturer's limitation is required.

E. Conform to Sealant and Waterproofers Institute requirements for installation.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

B. VOC Standards – All sealants shall be in accordance with all applicable State and Federal VOC standards.

1.07 SEQUENCING AND SCHEDULING

A. Coordinate work in this Section with related sections.

1.08 WARRANTY

A. Installer to provide five year warranty to include coverage of installed sealants, caulking and accessories which fail to achieve air tight and watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 - PRODUCTS

2.01 MATERIALS

A. S-1, Epoxidized Polyurethane Sealant: Multi-component, chemical curing, non-staining, non-bleeding, non-sagging type; color as selected by Engineer; Dymeric 240 as manufactured by Tremco, Sika Corporation or equal.

Durability (Bond and Cohesion)	-25 percent + 40 percent
Shore "A" Hardness Range	25

B. S-2, Polyurethane Sealant: Multi-component, chemical curing, non-staining, non-bleeding, non-sagging type; color as selected by Engineer; Sikaflex 2C as manufactured by Sika Corporation, Tremco or equal.

Durability (Bond and Cohesion)	+/- 50 percent
Service Temperature Range	-40 to 170 degrees F
Shore "A" Hardness Range	25 (40 for self leveling)

C. S-4, Flexible Epoxy Jointing Compound: Multi-component, solvent-free, moisture insensitive epoxy resin, self leveling type; Sikadur 15 as manufactured by Sika Corporation, Tremco or equal.

Tensile Strength	650 psi
Shore "A" Hardness Range	75-80

D. S-6, Polyurethane Sealant: One component, moisture curing, non-staining, non-bleeding, non-sagging type; color as selected by Engineer; Sika-flex 1A as manufactured by Sika Corporation, Tremco or equal.

Durability (Bond and Cohesion)	+/- 25 percent
Service Temperature	-40 to 170 degrees F
Shore "A" Hardness Range	40

2.02 ACCESSORIES

A. Primer: Non-staining type, recommended by sealant manufacturer.

B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.

C. Joint Backing: ASTM D1056; round, closed cell polyethylene foam rod; oversized 30 to 50 percent larger than joint width; as recommended by sealant manufacturer.

D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that surfaces and joint openings are ready to receive work and field measurements are as shown on Drawings and recommended by manufacturer.

B. Beginning of installation means installer accepts existing conditions.

3.02 PREPARATION

A. Clean and prime joints in accordance with manufacturer's instructions.

B. Remove loose materials and foreign matter which might impair adhesion of sealant.

C. Verify that joint backing and release tapes are compatible with sealant.

D. Perform preparation in accordance ASTM C790 for latex base sealants.

E. Protect elements surrounding the work of this Section from damage or disfiguration.

3.03 INSTALLATION

A. Install sealant in strict accordance with manufacturer's instructions.

B. Measure joint dimensions and size materials to achieve required width/depth ratios.

C. Install joint backing to achieve a neck dimension no greater than 1/3 the joint width.

D. Install bond breaker where joint backing is not used.

E. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

F. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.

G. Tool joints concave.

3.04 CLEANING AND REPAIRING

A. Clean work under provisions of Section 104-06 of the Greater New Haven Water Pollution Control Authority Standard Specifications.

B. Clean adjacent soiled surfaces.

C. Repair or replace defaced or disfigured finishes caused by work of this Section.

3.05 PROTECTION OF FINISHED WORK

A. Protect sealants until cured.

END OF SECTION 07900

SECTION 09900

PAINTING

PART 1 - GENERAL

1.01 DESCRIPTION

A. This section includes the application of specified finish coats of paint to pre-primed surfaces and complete finishing systems to unprimed items.

1.02 RELATED WORK

A. Related Sections

1. Section 09905 “Surface Preparation and Shop Coats”
2. Section 11000 “ Equipment - General”
3. Section 15050 “Pipe and Pipe Fittings - General”
4. Section 16000 “Electrical - General”

1.02 REFERENCES

A. ASTM D2247 - Practice for Testing Water Resistance of Coatings in 100 Percent Relative Humidity.

B. ASTM D2794 - Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).

C. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials.

D. Federal Test Method No. 141 - Method 6141, Stain Removal.

E. ANSI A13.1 - Scheme for the Identification of Piping Systems.

F. SSPC- Steel Structures Painting Council.

G. SSPC-PA1, “Standard for Shop, Field, and Maintenance Painting”.

H. SSPC-PA2, “Measurement of Dry Paint Thickness with Magnetic Gauges”.

I. SSPC-SP1, “Solvent Cleaning”.

J. SSPC-SP2, “Hand Tool Cleaning”.

K. SSPC-SP3, “Power Tool Cleaning”.

L. SSPC-SP6, “Commercial Blast Cleaning”.

M. SSPC-SP10 - “Near-White Blast Cleaning”.

N. SSPC-SP13, “Surface Preparation for Concrete”.

O. SSPC-PA Guide 3, Standard “A Guide to Safety in Paint Application”, latest revision.

P. VOC Standards - All coatings shall be in accordance with all applicable State and Federal VOC Standards.

1. OSHA 29 CFR 1925.55 Gases, Vapors, Fumes, Dusts and Mists

1.03 SUBMITTALS

A. Product data shall be submitted a specified in Section 106-07.

B. A minimum of three (3) color charts shall be submitted for color selection by the Engineer.

C. A schedule including a list of items to be coated, the type and manufacturer of shop coating and type of field coating, including primers, details on surface preparation methods, application procedures and dry mil thickness shall be submitted to the Engineer.

D. The color scheme shall be in accordance with schedules provided by the Engineer, and all tinting and matching shall be to the satisfaction of the Engineer.

E. The Contractor shall submit the coating manufacturer’s certification that proposed field coatings are compatible with shop coatings.

F. The Contractor shall submit the coating manufacturer’s certification that the proposed coatings meet all State and Federal VOC regulations.

1.04 DEFINITIONS

A. Definitions are as specified in Section 09905 “Surface Preparation and Shop Coatings”.

1.05 QUALITY ASSURANCE

A. All material used on Work shall be exactly as specified in brand and quality, unless priorly approved by the Engineer.

B. Before purchasing materials for the Work, the Contractor shall submit to the Engineer a list of the products he proposes to use for his review and approval.

C. Materials selected for coating systems for each type of surface shall be the products of a single manufacturer.

D. Include on label of all containers:

1. Manufacturer's name
2. Type of paint
3. Manufacture's stock number
4. Color
5. Instructions for reducing, where applicable.
6. Label analysis
7. Shelf Life dates

E. Field Quality Control:

1. Contractor shall request review by the Engineer, of first finished room, space or item of each color, texture and method of applications, prior to proceeding with additional painting.
2. Use first acceptable room, space or item as the project standard for each color scheme.
3. For spray application, when applicable, paint a surface not smaller than 100 square feet as the project standard.
4. Repainting of materials failing to meet the requirements of the Specifications or drawings, shall be performed by the Contractor, at no additional cost to the Owner.
5. The number of coats and total mil thickness specified in the paint schedule are minimums. If the specified minimum film thickness is not achieved, additional coats shall be applied to achieve the total film thickness specified.

F. Items that consist of copper, bronze, brass, chromium plated, stainless steel, or aluminum metals do not require paint or finish coating unless otherwise specified.

G. All process, mechanical, structural, architectural and electrical work exposed to view, including but not limited to, equipment, piping, electrical panels, electrical conduit, electrical boxes, stanchions and supports shall be painted, unless specified in the respective Section to be pre-finished.

H. Motors, which are pre-finished, shall receive one top coat to provide a color matching the system color indicated in the pipe identifications schedule.

1.06 ENVIRONMENTAL REQUIREMENTS

A. Comply with manufacturer's recommendations as to environmental conditions under which coatings and coating systems shall be applied.

B. Do not apply coatings in areas where dust is being generated.

C. Do not apply coatings when the air or material surface temperature is below 50 degrees Fahrenheit and unless the temperature is at least 5 degrees Fahrenheit above the dew point.

D. Do not apply exterior coatings in frosty, damp or rainy weather or while surfaces are exposed to hot sunlight.

1.07 EXTRA MATERIALS

A. For all material with a shelf life of greater than 12 months, one gallon of each type and each color of touch-up paint shall be provided to the Owner by the Contractor in unopened containers.

PART 2 - PRODUCTS

2.01 MANUFACTURER'S

A. Sherwin Williams

B. Approved equal

2.02 MATERIALS

A. Refer to the paint schedule for specific products and application.

2.03 COMPONENTS

A. All finish coats shall be compatible with shop prime coats.

2.04 MIXING AND TINTING

A. Deliver paints and enamels ready-mixed to project site.

B. Accomplish job mixing and job tinting only when required and no exceptions taken by the Engineer.

C. Mix only in mixing pails placed in suitably sized nonferrous or oxide resistant metal pans.

D. Use only tinting color recommended by the manufacturer for the specific type of finish.

E. Fungicidal agents, when applicable, shall be incorporated into the paints and stains by the manufacturer.

F. Mix and prepare paints in strict accordance with the Manufacturers recommendations.

PART 3 - EXECUTION

3.01 DELIVERY, STORAGE AND HANDLING

A. Deliver coating materials in sealed containers with labels legible an intact.

B. Store only acceptable project materials on the project site.

C. All painting materials shall be stored and mixed in a single location coordinated with the Engineer. The Contractor shall not use any plumbing fixture or pipe for mixing or for disposal of any refuse. The Contractor shall carry all necessary water to the mixing room, and shall dispose of all waste outside of the building in a suitable receptacle.

D. Restrict storage location to paint materials and related equipment and supplies.

E. Keep storage location neat and clean.

F. Remove all soiled and used rags, waste and trash from the storage location and building at the end of each workday.

G. Repair all damage to the storage location, caused by painting materials and equipment at no additional cost to the Owner.

H. Comply with all applicable health and fire codes and regulations including safety precautions recommended by the manufacturer. Storage space shall be provided with a suitable fire extinguisher fully charged at all times.

I. Heat shall be provided in the storage area if paints are to be stored during winter months. The temperature shall be maintained above 40 degrees F at all times.

3.02 INSPECTION

A. Examine surfaces scheduled to receive paint and finishes for conditions that will adversely affect execution, permanence or quality of work and which cannot be put into an acceptable condition through preparatory work as included in Part 3.03 Surface Preparation.

B. Immediately notify the Engineer in writing when a surface to be finished cannot be put into an acceptable condition.

C. Do not proceed with surface preparation or coating application until conditions are suitable.

D. The Contractor shall be responsible for and shall rectify, at no additional cost to the Owner any unsatisfactory finish resulting from the application of coatings on surfaces not in acceptable condition.

3.03 SURFACE PREPARATION

A. Concrete

1. Clean all dust, dirt, oil and efflorescence from surfaces.
2. Fill cracks and irregularities with Portland Cement grout to provide uniform surface texture.
3. Etch dense and smooth concrete, or concrete that has had a hardener applied, with a five percent solution (by weight) of muriatic acid.
4. Allow surfaces to thoroughly dry prior to application of first coat.

B. Ferrous Metal Surfaces (Items not shop primed)

1. All submerged ferrous metals shall be sandblast cleaned in accordance to SSPC-SP10 immediately prior to priming.
2. All other ferrous metals shall be sandblast cleaned in accordance to SSPC-SP6 immediately prior to painting.
3. Remove dirt, oil and grease by washing surfaces with mineral spirits.
4. Surfaces shall be dry and free of dust, oil, grease and other foreign material before priming.
5. Feather edges of sound existing paint by grinding, if necessary.
6. Clean and touch up weathered, worn or damaged shop coats of paint with the specified primer.
7. Restore shop coats of paint with identical materials if removed for welding and fabrication.

C. Galvanized Metal

1. Thoroughly clean surface with mineral spirits to remove oil residue.
2. Dry with clean cloth.
3. Treat surface with copper sulphate or with a compound made for this purpose (Lithoform, Solv-Metallic Coating, etc.,) in accordance with the manufacturer's directions, before applying the primer.

D. Previously Coated Surfaces

1. The areas of the coated surface that are blistered, eroded, brittle or otherwise failed shall be completely removed before beginning the specified surface preparation.
2. The areas where the existing coating is intact shall be sanded to dull the finish.
3. Before applying the new coating over an existing coating, a test section must be done to ensure compatibility of the new and old coatings.
4. Ferrous metals arriving at the job site with shop primers other than the polyamide epoxy or rust inhibitive primers specified shall be provided with an intermediate coat as necessary for compatibility with specified topcoats.
5. Special attention shall be paid to the potential for epoxy shop and intermediate coats to chalk upon exposure to sunlight. The Contractor shall follow the manufacturer's required surface protection/covering and surface preparation recommendations before any intermediate or top coats can be applied over chalked surface.

3.04 APPLICATION

A. Workmanship

1. Employ skilled workmen to insure workmanship of the highest quality.
2. Materials shall be applied only by craftsmen experienced in the use of the specific products involved.

B. General Requirements

1. Apply all coatings under adequate illumination.
2. Perform no work in the rain, dew, or fog, when the temperature is below 50 degrees Fahrenheit, when the temperature is not more than 5 degrees Fahrenheit above the dew point, or before the other coats have thoroughly dried.
3. Do not apply coatings until the material surfaces are thoroughly dry.
4. Apply paints and varnishes with suitable brushes, rollers or spraying equipment.
    a. The rate of application shall not exceed that recommended by the paint manufacturer for the surface involved.
    b. Keep brushes, rollers and spraying equipment clean, dry and free from contaminates and suitable for the finish required.
    c. Apply stain by brush. Cover surfaces with a uniform coat and wipe off if required.
    d. Make each coat a different tint from that of the preceding coat, with final coat tinted to the exact shade selected by the Engineer. Lightly sand surfaces between each coat of gloss and semi-gloss finishes, and wipe clean.
5. Comply with the recommendation of the product manufacturer for drying time between succeeding coats. Contractor shall follow the manufacturer's specific curing requirements for rust inhibitive primer shop coats prior to allowing top coating.
6. Sand and dust between each coat to remove defects visible from a distance of five feet.
7. Finish coats shall be smooth, free of brush marks, streaks, laps or pile up of paints and skipped or missed areas.
8. Inspection:
    a. Do not apply additional coats until the completed coat has been inspected by the Engineer.
    b. Only inspected and reviewed coats will be considered in determining the number of coats applied.
9. Leave all parts of moldings and ornaments clean and true to details with no undue amount of paint in corners and depressions.
10. Make edges of paint adjoining other materials or colors clean and sharp with no overlapping.
11. Refinish entire wall where portion of finish has been damaged or is not acceptable.

3.05 PROTECTION

A. Furnish and lay drop cloths in all rooms and areas where painting and finishing is being done, to adequately protect flooring and other work from damage during the execution of the painting work.

B. Remove all canopies of lighting fixtures, all electric switch plates, and similar equipment, set them carefully away with adequate cover. All unremoved fixtures shall be protected during the painting work. After the completion of the work, all removed canopies, plates, etc. shall be placed to their original location. Any fixtures, canopies, plates, etc. that are damaged shall be replaced in kind by the Contractor at no additional cost to the Owner.

3.06 CLEANING

A. At the completion of the work of this Section, remove all paint spots and oil or grease stains, caused by this work from floors, walls, fixtures, hardware and equipment, leaving their finishes in a satisfactory condition. Remove all materials and debris and leave the site of the work in a clean condition so far as this work is concerned.

3.07 FINAL INSPECTION

A. Protect all painted and finished surfaces against damage until the date of final acceptance of the work. The Engineer will conduct a final inspection of all painters' work. As part of the final inspection the Contractor shall demonstrate compliance with the specified film thickness with appropriate paint gauges. The Contractor shall be required to repaint, refinish, or retouch any areas found which do not comply with the requirements of this Section.

3.08 PAINT SCHEDULE

A. The product model and coatings system numbers listed below are based on products provided by the Sherwin Williams Company and the H&C Concrete Company, and are listed to establish the standard of quality. Equivalent products which meet or exceed the performance of the listed products may be accepted if priorly approved by the Engineer.

SURFACE/ITEM	SURFACE PREPARATION	PRIMER	INTERMEDIATE	FINISH
METALS				
Submerged Ferrous Metals, Piping & Equipment Specified to be Shop Primed in their Respective Sections (see note 3)	SHOP	SHOP PRIME	N/A	SW COR-COTE SC SEWER COTE at 15.0-20.0 mils
Enclosed Ferrous Metals, Piping and equipment Specified to be Shop	SHOP	SHOP PRIME	N/A	SW COR-COTE SC SEWER COTE

Primed in Their Respective Sections				at 15.0- 20.0mils
All other Enclosed Ferrous Metals	SSPC-SP6	SHOP PRIME OR SW Recoatable Epoxy Primer at 4.0 – 6.0 mils	N/A	SW COR-COTE SC SEWER COTE at 15.0- 20.0mils
Exposed electrical conduit, conduit fittings and outlet boxes mounted on painted or finished surfaces			Same color and finish as background surface and/or equipment	Same color and finish as background surface and/or equipment
Non-Ferrous Metals and Galvanized Steel in Contact with or Embedded in Concrete	SSPC-SP1 Solvent Cleaning Followed by SSPC-SP7	SW Recoatable Epoxy Primer at 5.0 – 7.0 mils	Top Coats as noted herein for the surfaces exposed to view	Top Coats as noted herein for the surface exposed to view

SURFACE/ITEM	SURFACE PREPARATION	PRIMER	INTERMEDIATE	FINISH
METALS				
Exhaust Piping and Hot Ferrous Metals	SSPC-SP10 Near White Metal Blast Cleaning	SW Inorganic Zinc-Rich Primer at 3.0 mils	SW Silver-Brite Hi-Heat at 1.0 mil	SW Silver-Brite Hi-Heat at 1.0 mil
Weather Exposed Ferrous Metals, Piping, & Equipment Specified to be Shop Primed in Their Respective Sections	SHOP	SHOP	SW Macropoxy 3.0 – 6.0 mils	SW-Corothane II polyurethene at 3.0 mils
All Other Weather Exposed Ferrous Metals	SSPC-SP6	SW Recoatable Epoxy Primer at 4.0 – 6.0 mils	SW Corothane II Acrylic Urethane at 3.0 - 5.0 mils	SW Corothane II Acrylic Urethane at 3.0 – 5.0 mils
PIPING (other than ferrous metal)				
Insulated Pipe to be Color Coded	Clean & Dry	SW Pro-Mar 200 at 2.0 – 3.0 mils	SW Pro-Mar 200 at 3.0 – 4.0mils	SW Pro-Mar 200 at 3.0 – 4.0 mils
PVC Color Coded Pipe	Cleaned & Dry – Scuffed Up with Medium Grit Sandpaper	SW Sher-Tile at 5.0 - 7.0 mils	N/A	SW Sher-Tile at 5.0 – 7.0 mils
CONCRETE AND MASONRY				
Exterior Concrete and Masonry	SSPC-SP13	N/A	N/A	H&C Concrete and Masonry Water Proofing Sealer
Interior Concrete	SSPC-SP13	N/A	SW H&C Concrete Stain Solid Color Water Based	W H&C Concrete Stain Solid Color Water Based

NOTES:

1. Surface preparation shall be as specified within this section and as noted in the table above.
2. All dry film thicknesses indicated are the minimum required.
3. All epoxy coatings subjected to UV Exposure shall receive an additional Polyurethane topcoat with a minimum dry film thickness of 3 mils. No epoxy coating shall be left exposed to UV light. This shall include all equipment drives, motors gear reducers etc.
4. All ferrous metals, piping and equipment delivered to the site with shop primers other than the specified primer shall receive an intermediate coat as necessary for compatibility with the indicated topcoats.
5. All ferrous, nonferrous and galvanized metals in contact with concrete or masonry shall receive a POLYAMIDE epoxy primer with a minimum dry film thickness of 4 mils applied to the contact area.
6. Galvanized surfaces shall be treated as required by the manufacturer to be compatible with the primer and topcoats specified.

7. If the polyurethane topcoats are not compatible with the manufacturer's alkyd primer apply a polyamide epoxy as the intermediate coat.
8. The hollow metal doors and frames shall receive the primer indicated above, applied over the manufacturer's shop coatings.
9. Painting of the piping system shall include all ferrous valves, levers, valve handles, fittings stands, supports, hangers, sumps and appurtenances.
10. Paint motors for color coordination.
11. Epoxy primers and intermediate coats that have been in place for more than 45 days shall be prepared as indicated under the "Surface Preparation" section of this Specification.
12. Steel-seam FT 910 shall be used as required for filling pits and transitioning sharp edges, weld seams, etc., on steel.

3.09 PIPING, EQUIPMENT AND VALVE IDENTIFICATION SCHEDULE

A. All pipes, whether concealed or exposed to view shall be painted as specified in the pipe identification schedule. For insulated pipes only the insulation shall be painted.

PIPE IDENTIFICATION SCHEDULE

SYSTEM NAME	LEGEND	PIPE COLOR (2) DESIGNATIONS	MATERIAL
Drains	D	Black	PVC
Sewer	S	Gray	CLD I
Forcemain	FM	Gray	CLD I
City water	CW	Blue	Copper
Vent	V	Exterior	To match shingles
		Interior	To be selected by Owner
Gas	G	Yellow	
Walls & Ceiling		White	Concrete
Floors		Gray	Concrete
Railings, Ladder, Mezzanine Framing & Exterior Bollards		Safety Yellow	Galvanized Steel

(1) YB = Yellow Background with Black Letters
GW = Green Background with White Letters
RW = Red Background with White Letters
BW = Blue Background with White Letters

(2) Stainless steel piping shall not be color coded, but shall receive the markings indicated.

B. Markers shall be corrosion resistant laminated plastic bound to the pipes with nylon fasteners. Pipes with diameters less than 1-1/4 inch shall have marker hung from pipe with nylon fasteners.

C. Lettering size shall be in accordance with the following:

SIZE OF LEGEND LETTERS

Outside Diameter of Pipe or Covering	Minimum Length of Marker	Size of Letters
In.	In.	In.
Up to 1-1/4	8	½
1-1/2 to 2	8	¾
2-1/2 to 6	12	1-1/4
8 to 10	24	2-1/2
over 10	32	3-1/2

D. Adjacent to each marker there shall be an arrow indicating flow direction.

E. Marker location shall be in accordance with the American National Standard Institute Scheme for Identification of Piping Systems (ANSI A13.1). Markers shall be placed adjacent to all valves and/or flanges; adjacent to all changes in direction on all pipe branches; and where all pipes pass through walls or floors on each side of wall/floor. On straight runs of piping, markers shall be placed at not less than 10-foot intervals. Where pipes are located above or below the normal line of vision, the lettering shall be placed below or above (as appropriate) the horizontal centerline of the pipe.

F. All valves, pumps and other equipment shall be assigned an identification number and shall be marked with the identification number with 3-inch (76.2 mm) diameter tags.

1. The tags shall be rugged plastic with metal eyelets.
2. The tags shall be tied with nylon fasteners.

G. Valve status indicator alignment arrows shall be provided on the indicator and scale sides of all interior handwheel, chain and lever operated valves. Arrow heads shall appear aligned when the valve is in the full-open position. Arrow heads shall be painted on with stencils, of a color contrasting with the color of the valve. Arrow Heads shall be a minimum of ¾" in smallest dimensions. Valve position indicators shall be aligned to be visible from normal working levels.

H. Manufacturer – To establish a standard of quality, design and function, markers, bands and tags have been based on Seton Name Plate Corporation, New Haven Connecticut or an equal.

I. Pipe supports consisting of pipe rings, clamps, clevises, U bolts, pipe rollers, saddles, etc., shall be painted with the same color as that of the pipe.

J. Wall supported pipe hangers consisting of brackets, standoffs, etc. shall be painted with the same color as that of the wall.

K. Ceiling/roof supported pipe hangers consisting of thread rods, beam clamps etc., shall be painted with the same color as that of the ceiling.

L. Floor supported pipes consisting of stanchions shall be painted with the same color as that of the pipe.

M. Miscellaneous items to be painted:

1. Exposed electrical and instrumentation conduit.
2. Pipe Bollards.
3. Generator exhaust piping.
4. Vent piping.
5. Structural Steel.

N. Contractor to coordinate color selection with the Owner for all miscellaneous items to be painted.

END OF SECTION 09900

SECTION 09905

SURFACE PREPARATION AND SHOP COATINGS

PART 1 - GENERAL

1.01 DESCRIPTION

A. The work described in this Section is the surface preparation and application of shop coatings on material, equipment, and piping indicated in the various specification sections relating thereto, and as specified herein, including primers and top coats for materials, equipment and piping that are finished at the point of manufacturer or fabrication.

1.02 RELATED WORK

A. Related Sections

1. Section 09900 “Painting”
2. Section 1100 “ Equipment –General”
3. Section 15050 “Pipe and Pipe Fittings , General”
4. Section 15100 “Valves and Specialties”

1.03 REFERENCES

A. ASTM D2247 - Practice for Testing Water Resistance of Coatings in 100 Percent Relative Humidity.

B. ASTM D2794 - Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).

C. ASTM E84 - Test method for Surface Burning Characteristics of Building Materials.

D. Federal Test Method No. 141 - Method 6141, Stain Removal.

E. SSPC- Steel Structures Painting Council.

F. SSPC-PA1, “Standard for Shop, Field, and Maintenance Painting”.

G. SSPC-PA2, “Measurement of Dry Paint Thickness with Magnetic Gauges”.

H. SSPC-SP1, “Solvent Cleaning”.

I. SSPC-SP6, “Commercial Blast Cleaning”.

J. SSPC-SP10 - “Near-White Blast Cleaning”.

K. SSPC-PA Guide 3, Standard “A Guide to Safety in Paint Application”, latest revision.

1.04 SUBMITTALS

A. Product data shall be submitted as specified in Section 106-07.

B. At a minimum, the following shall be included it the submittal package for all items, products, material or equipment, as specified.

1. Data on the proposed shop coatings, details on surface preparation methods, application procedures and dry mil thickness.
2. A minimum of three (3) color charts for all factory top coats for color selection by Engineer.
3. Coating manufacturer's certification that proposed shop coatings are compatible with field coatings.

1.05 DEFINITIONS

A. Submerged surfaces are defined as follows:

1. Those surfaces which are below the maximum water surface level as indicated on the drawings, and /or extend 3'-0" above the maximum water surface for uncovered tanks.
2. All surfaces contained within covered tanks.
3. The full height of all partially submerged items such as sluice gates, slide gates, weir gates, piping, etc.
4. All surfaces contained within underground structures, vaults and manholes such as valve pits, drywells, etc.

B. Enclosed surfaces are those non-submerged surfaces enclosed and/or protected within a building in such a manner that it cannot be exposed to UV light or weather conditions.

C. Weather exposed surfaces are all other conditions, including buried items, which do not fall into the definition of submerged or enclosed surfaces, as noted above.

PART 2 - PRODUCTS

2.01 GENERAL

A. All Shop Coatings shall meet the requirements of the materials section, and shall be guaranteed by the manufacturer to be compatible with the field coatings, as specified in Section 09900 "Painting". The Contractor shall coordinate this requirement during the Shop Drawing Phase.

B. All Shop Coatings shall meet all Federal and State regulations pertaining to Volatile Organic Compounds (VOC) compliance.

C. Copper, bronze, brass, chromium plate, nickel, stainless steel, aluminum or monel metals, except surfaces in contact with or embedded within concrete or masonry, do not require paint or finish, unless otherwise specified elsewhere.

2.02 MATERIALS

A. Refer to Part 3 - Execution for specific products and applications.

PART 3 - EXECUTION

3.01 SURFACE PREPARATION

A. Ferrous Metal

1. Remove dirt, oil and grease by washing surfaces with solvent cleaning per SSPC-SP1.
2. All submerged ferrous metals shall be sandblast cleaned in accordance to SSPC-SP10, near white, immediately prior to priming. Blast clean all surfaces using a sharp, angular abrasive for optimum surface profile. (2-3 mils). Remove all weld spatter and round all sharp edges. Any bare metal must be primed the same day as it is cleaned or before flash rusting occurs.
3. Enclosed and weather exposed ferrous metal surfaces shall be sandblast cleaned in accordance to SSPC-SP6 commercial grade or SSPC-SP10, immediately prior to priming.
4. Surfaces shall be dry and free of dust, oil, grease, and other foreign material before priming.

B. Non-Ferrous Metals

1. Remove dirt, oil and grease by washing surfaces with mineral spirits.
2. Surfaces in contact with or embedded within concrete or masonry that are to be primed, shall be cleaned in accordance to SSPC-SP-1, Solvent Clean, immediately prior to priming.
3. Surfaces shall be dry and free of dust, oil, grease and other foreign material before priming.

C. Galvanized Metals

1. Thoroughly clean surface with mineral spirits to remove oily residue.
2. Dry with clean cloth.
3. Treat surface with copper sulphate, or with a compound made for this purpose (Lithoform, Solfo Metallic Coatings, etc.) in accordance with the manufacturer's direction, before applying the primer.

3.02 APPLICATION

A. Equipment

1. Motors, speed reducers and similar parts shall have a surface preparation in accordance with the manufacturer standard coating requirements and suitable for weather exposed use.
2. Items customarily finished at the point of manufacture (shop primed and painted) shall receive manufacturer's standard corrosion resistant coating of baked enamel or powder epoxy, suitable for the intended service.
3. All equipment casing openings requiring protection shall have a water repellent tape and vapor phase inhibitor treated paper.
4. All other ferrous surfaces shall be factory primed in accordance with Section 3.02C, except ferrous surfaces obviously not to be painted (such as gears, exposed machined or bearing surfaces, enclosed machined or bearing surfaces, lubricated contact surfaces moving under load, thread connections to be field connected and other similar items) which shall be given a heavy shop coat of grease or other suitable rust resistant coating per manufacturer's recommendations.
5. All coating shall be maintained as necessary by the Contractor to prevent corrosion during all periods of storage and erection, until final acceptance by the Owner.

B. Pipe, Fittings and Valves

1. The following surfaces shall be prepared in accordance with the manufacturer's recommendations and shall receive a shop coat of asphaltum varnish meeting Federal Specifications TT-C-494A or fusion bonded epoxy coating:
   a. Interior surfaces of all hydrants, ductile iron pipe, fittings and valves except for air piping lines and air valves which shall be completely unlined.
   b. The exterior surfaces of buried valves and miscellaneous piping appurtenances.
2. The exterior surfaces of all ductile iron pipe and fittings buried shall receive the standard factory applied asphaltus coating (in accordance with AWWA C151), unless otherwise recommended by the manufacturer.
3. The exterior surfaces of ductile iron pipe, fittings and valves submerged, enclosed or weather exposed shall receive a factory applied shop primer in accordance with Section 3.02C unless otherwise recommended by the manufacturer.
4. Machined surfaces shall be cleaned and coated immediately after being machined, with a suitable rust resistant coating per manufacturer's recommendations.
5. All of the ferrous surfaces shall be factory primed in accordance with Section 3.02C, unless otherwise recommended by the manufacturer, except ferrous surfaces obviously not to be painted which shall receive a heavy shop coat of grease or other suitable rust resistant coating per manufacturer's recommendations.
6. These coatings shall be maintained as necessary to prevent corrosion during all periods of storage and erection until final acceptance by the owner.

C. Schedule

The product model and coatings system number listed below are based on products by the Sherwin Williams Company. The prior review and approval by the Engineer of products by other manufacturers shall be required.

SURFACE/ITEM	SURFACE PREPARATION	Sherwin Williams SHOP PRIME
METALS		
Submerged Ferrous Metals, Piping, Fittings, Valves and Equipment specified to be shop primed in their respective sections.	SSPC-SP10 Near White Metal Blast Cleaning	Copoxy Shop Primer 4 to 6 mils
Weather Exposed Ferrous metals, Piping, Fittings, Valves and Equipment specified to be shop Primed in their respective sections.	SSPC-SP6 Commercial Blast Cleaning	Recoatable Epoxy Primer 4 to 6 mils
Non-Ferrous and Galvanized Metals in contact with or embedded in concrete.	SSPC-SP1 Solvent Wiping	Recoatable Epoxy Primer 4 to 6 mils
Ferrous Metals in contact.	SSPC-SP6 Commercial Blast Cleaning	Recoatable Epoxy Primer 4 to 6 mils
All Other Weather Exposed and Enclosed Ferrous Metals.	SSPC-SP6 Commercial Blast Cleaning	Recoatable Epoxy Primer 4 to 6 mils

Notes:

1. Surface preparation specified within this section and as noted in the table above are minimums. Surface preparation shall be in accordance with the manufacturer's written recommendations.
2. All dry film thickness indicated are the minimum required.
3. All epoxy coatings subjected to UV Exposure shall receive an additional Polyurethane top coat with a minimum dry film thickness of 3 mils. No epoxy coating shall be left exposed to UV light. This shall include all equipment drives, motors, gear reducers, etc.
4. All ferrous metals and equipment delivered to the site with shop primers other than polyamide epoxy or alkyd primer indicated above, shall receive an intermediate coat as necessary for compatibility with epoxy top coats.
5. All ferrous, nonferrous and galvanized metals in contact with concrete or masonry shall receive a polyamide epoxy primer with a minimum dry film thickness of 4 mils applied to the contact area.
6. Galvanized surfaces shall be treated as required by manufacturer to be compatible with the primer and top coats specified.
7. Steel-seam FT 910 shall be used as required for filling pits and transitioning sharp edges, weld seams, etc., on steel.

END OF SECTION 09905

SECTION 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 AND NO CENTS ($500.00) 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 of the contract time of completion of the work as provided for elsewhere in the Specifications.

2. SCOPE OF WORK

The Main Street Pump Station Cabinet Relocation & Rehabilitation project consists of, but is not limited to, the following items of work:

A. The obtainment of a building permit through the Town of East Haven Building Department.

B. Installation of New Pump Station Controls, including but not limited to:

1) Installation of new support structure for electrical enclosures.
2) Installation of new electrical enclosures for: electric company meter, primary service disconnect, manual transfer switch for portable generator connection, duplex pump controls.
3) Installation of new underground primary service from utility company.
4) Installation of new cables from new control panel to existing pumps in wetwell.
5) Installation of new concrete pads as necessary for new hatch (2) installation.
6) Removal of existing mounted equipment and pole.
7) Stage work as necessary to maintain flows during construction.

C. Replacement of submersible pumps in wetwell and valves in valve pit.

3. COORDINATION WITH OWNER'S OPERATIONS

A. Coordinate all activities and/or scheduling outages with both the Authority's Engineering and Operations Departments Calls must be made to all of the following:
1) Operations front desk: (203) 466-5280
2) Charlie Biggs, Maintenance Administrator: (203) 410-3488
3) Tom Sgroi, Director of Engineering (or as assigned): (203) 466-5280

B. This project is being constructed to accommodate State Project 0043-0128 "Rehabilitation of Bridge No. 01665 and Intersection Realignment of Route 100 at U.S. Route 1". It is likely the State's contractor will be working within the boundaries of the pump station area included within the contract documents throughout the duration of this contract. It is the contractor's responsibility to coordinate its operations with the State contractor personnel assigned to their project. A copy of the State Project 0043-0128 is available for viewing at the Engineering office at 260 East Street of on-line through the GNHWPCA Website Contractor Portal (www.gnhwpca.com).

4. INFORMATION AVAILABLE TO BIDDERS

The following items are available for review by the prospective bidder, and are included as part of the bid package:

A. The plan set entitled "Main Street Pump Station Cabinet Relocation & Rehabilitation, 43 Main Street, East Haven, Connecticut", Dated: March 2015 and prepared by Criscuolo Engineering, LLC

B. It is the responsibility of the bidder, before submitting a bid, to thoroughly review the Contract Documents, Specifications, and other information provided by the Authority, as indicated above, as well as to visit the site to determine any extraneous conditions which may affect the cost, progression, and/or performance of the Work.

5. LABOR AND EMPLOYMENT REGULATIONS

Wage rates for the Main Street Pump Station Cabinet Relocation & Rehabilitation Project as determined by the State of Connecticut Department of Labor to be the "Prevailing Wages Rates", as published in Appendix C of these specifications.

6. PROJECT INSURANCE REQUIREMENTS

The GNHWPCA & Criscuolo Engineering LLC shall be included under "Additional Insured" on all insurance policies required, and as specified in the specifications, for all policies except Workers Compensation.

7. MODIFICATION OF GENERAL PROVISIONS

A. Section §107-06 Insurance

1) The insurance limits set forth in Section 107-06 are hereby modified as follows:

a. Workers' Compensation and Employer's Liability insurance:
- Workers' compensation - statutory limits
- Employer's Liability each accident $ 250,000
- Employer's Liability disease - each employee $ 250,000
- Employer's Liability disease - policy limit $1,000,000

b. Commercial General Liability:
- Each occurrence $ 1,000,000
- Aggregate $ 2,000,000

c. Business Automobile Liability:
- Each accident - combined single limit $ 1,000,000

d. Owner's and Contractor's Protective Liability insurance in the name of the Greater New Haven Water Pollution Control Authority: N/A

e. Contractor's Protective Liability and Public Liability and Property Damage Liability Insurance:
- Each occurrence $ 2,500,000
- General Aggregate $ 2,000,000

f. Railroad Protective Public Liability and Property Damage Liability Insurance: N/A

g. Umbrella Excess Liability:
- Each occurrence $ 2,000,000

h. Equipment Installation Floater: N/A

2) Section §107-06.10, Termination or Change of Insurance, is replaced with the following:

Each insurance policy shall be endorsed to provide that the insurance company shall notify the Authority by certified mail at least thirty (30) days in advance of any cancellation or material change. Such notice provision shall be absolute and unequivocal. The words "endeavor to" and "but failure to mail such notice shall impose no obligation or any liability of any kind upon the company, its agents or representatives" shall be deleted from the certificate form's cancellation provision.

3) The following sections shall be added:

§107-06.18 The period of completed operations coverage for purposes of Commercial General Liability and Excess Umbrella Liability coverage shall be two (2) years after completion and acceptance of the entirety of the work.

§107-06.19 No deductible for any policy shall exceed the sum of $ 25,000 without the prior approval of the Authority.

§107-06.20 Certificates of Insurance that are to be provided by the Contractor shall fully evidence compliance with the insurance requirements specified in the Standard Specifications, and as noted hereon.

B. Section §109-01 Estimates and Payment

1) The second paragraph shall be modified to read as follows: "In computing amounts in estimates or Work done, the unit prices published in the Schedule of Values that has been accepted by the Engineer shall be used."

8. MODIFICATION OF TECHNICAL SPECIFICATIONS

Item 516 Sanitary Sewer Flow Control and Bypass Pumping

In addition to the requirements of Technical Specification, Item 516, the bypass pumping system shall have sufficient capacity to pump a peak flow of 90 gallons per minute. Average daily flow to the Main Street Pump Station is approximately 22,000 gallons per day. Contractor shall submit by-pass pumping plan to the GNHWPCA for approval.

The Contractor shall have adequate standby equipment available and ready for immediate operation and use in the event of an emergency or breakdown. One standby pump for each size pump utilized

shall be installed at the mainline flow bypassing location, ready for use in the event of primary pump failure. Also, a backup power supply source shall be provided.

The maintenance and protection of vehicular and pedestrian access to the adjacent property must be maintained at all times. Temporary ramps, etc. must be provided to maintain access over any bypass piping that may cross the adjacent driveway.

The maximum allowable time that will be allowed from the time the temporary bypass pumping system is installed until startup of the proposed pumping system, and generator system, shall be 90 calendar days, between Sept. 15th and March 15th.

SPECIAL SPECIFICATIONS

The following special specifications are hereby incorporated and made a part of the Greater New Haven Water Pollution Control Authority Standard Specifications:

Special Specifications for the Main Street Pump Station Improvements Project

Section Number	Description
01295	Schedule of Values
02225	Selective Demolition
02500	Bituminous Concrete Pavement
02900	Lawns and Grasses
03300	Cast-In-Place Concrete
05100	Metal Fabrications
07900	Joint Sealers
09900	Painting
09905	Surface Preparation & Shop Coatings
11000	Equipment – General
11310	Wastewater Pumping System
13420	Instrumentation
15050	Pipe & Pipe Fittings – General
15060	Hangers and Supports for Plumbing Piping and Equipment
15062	Ductile Iron Pipe & Fittings
15110	Valves and Specialties

Electrical Sections

16005	Summary of the Electrical Work
16010	Electrical Demolition and Removals
16111	Electrical Raceways
16123	Building Wire and Cable
16124	Instrument & Control Wire and Cable
16130	Junction, Splice and Pull Boxes
16160	Cabinets and Enclosures
16170	Grounding and Bonding
16195	Electrical Identification
16425	Service Entrance Equipment
16441	Enclosed Safety Switches
16490	Process Instrumentation and Control

SECTION 11000

EQUIPMENT - GENERAL

PART 1 - GENERAL

1.01 DESCRIPTION

A. This section provides the general requirements for the furnishment, installation and testing of equipment included elsewhere in the Specifications, and as specified in the Project Drawings.

1.02 RELATED WORK

A. Related Sections

1. Section 16000 - " Electrical - General"

1.03 SUBMITTALS

A. Shop Drawings

1. Shop drawings shall be submitted to the Engineer for review and approval for all equipment specified in the Project Drawings, or elsewhere in these specifications.
2. The manufacturer shall integrate all required shop drawings for each equipment system proposed.
3. The manufacturer's literature and illustrations for all equipment shall be submitted. This literature shall include dimensions, construction details, shop painting details, and materials by generic name.
4. The manufacturers operation and maintenance manuals including installation and storage requirements shall be submitted for each item of equipment.
5. All requirements for the equipment's interface with controls and/ or other equipment shall be submitted, including wiring diagrams that accurately depict all of the interface requirements, to ensure the proper operation of each system or item of equipment

B. Certifications and Warranties

1. The Contractor shall submit a certification from the individual manufacturer of each item of equipment that states that the equipment manufacturer or supplier has reviewed the project drawings and specifications relating to the item of equipment or equipment system, the intended installation, and intended functional and operational conditions and has determined that all conditions are acceptable and found no conditions which would cause the warranty to be void, the equipment to function improperly, or the equipment to not meet the performance requirements.

2. Certification shall be provided from the manufacturer of each item or system of equipment that states that the equipment, accessories, and shop painting that they would provide would meet or exceed the Specification requirements. Should the proposed equipment not comply with all of the specification requirements, all deviations from the specification requirements shall be listed.
3. The Contractor shall submit the manufacturers warranty and service agreement for each item of equipment or equipment system for review. Equipment that is to function as a complete and integrated system shall be warranted accordingly.

PART 2 - PRODUCTS

2.01 MATERIALS

A. General

1. Attention is directed to the fact that the Project Drawings and Specifications may be based upon items of equipment or equipment systems from a particular manufacturer. If the Contractor proposes equipment that differs from that which is specified, the prior review and approval of the Engineer shall be required. Any costs incurred from any changes deemed necessary by the Engineer to the Project Drawings, Specifications, or design of the proposed work resulting from the usage of alternate equipment or equipment systems shall be the responsibility of the Contractor and at no additional cost to the Owner.
2. All parts and components of mechanical equipment shall be designed for satisfactory service under continuous duty without undo wear under the specified operating conditions.
3. All equipment and machinery furnished under this Contract shall be the latest improved design suitable for the service specified. All equipment and machinery shall be designed and constructed to operate efficiently, continuously and quietly under the specified requirements with a minimum of maintenance, renewals and repairs. The design and construction of all equipment and machinery shall be such as to permit operation with minimum wear, vibration and noise when properly installed.
4. Ample room for erecting, repairing, inspecting and adjusting of all equipment and machinery shall be provided. The design, construction and installation of all equipment and machinery shall conform to and comply with the latest safety codes and regulations.
5. All equipment of identical size, type and service shall be the product of the same manufacturer.
6. All equipment selected shall suit the general arrangement of the space in which it is to be installed.
7. Suitable provisions shall be made for easy access for service and replacement parts.

PART 3 - EXECUTION

3.01 DELIVERY, STORAGE AND HANDLING

A. All equipment shall be delivered in the manufacturer's original, unopened, and undamaged packages. Unless otherwise specified, all storage and demurrage charges from suppliers and transportation companies shall be the responsibility of the Contractor.

B. It shall be the responsibility of the Contractor to ensure that all equipment is stored, and maintained in strict accordance with the manufacturers' written short and long term storage requirements.

C. The Contractor shall be responsible for the protection, loss of, or damage to materials and equipment furnished until the final completion and acceptance of the Work by the Owner and Engineer.

D. Defective material and equipment shall be removed immediately from the site of the Work, at no additional cost to the Owner.

3.02 INSTALLATION

A. All equipment shall be installed in strict accordance with the manufacturer's requirements.

B. Equipment shall not be installed until all defects or inadequacies have been corrected to meet the Specifications, and to the satisfaction of the engineer.

C. Equipment shall be erected and lubricated in strict accordance with the manufacturer's instructions.

D. Installation shall include all oil and grease required for proper operation.

3.03 ERECTION OF EQUIPMENT

A. Bolts, Anchor Bolts and Nuts

1. All necessary bolts, anchor bolts, nuts washers, lock washers or locking nuts, plates and bolt sleeves shall be furnished in accordance herewith and in accordance with the manufacturer's recommendations. Anchor bolts shall have suitable washers, lock washers and, where so required, their nuts shall be hexagonal.
2. All bolts, anchor bolts, nuts, washers, lock washers, plates and bolt sleeves shall be galvanized unless otherwise indicated below or as specified elsewhere.
   a. Stainless steel hardware (minimum of Type 304, unless otherwise indicated) is required in all corrosive atmospheres and exterior areas.
3. Unless otherwise specified, bolts, anchor bolts, nuts, washers, and lock washers specified to be galvanized, shall be zinc coated, after being threaded, by the hot-dip

process in conformity with the ASTM Standard Specification for Zinc (Hot-Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars, and Strip Designation A123, latest revision or the ASTM Standard Specifications for Zinc Coating (Hot Dip) on Iron and Steel Hardware, Designation A153, latest revision as is appropriate.

4. Unless otherwise specified, expansion bolts shall have malleable iron and lead composition elements of the required number of units and size.
5. Unless otherwise specified, stud, tap, and machine bolts shall be of the best-quality refined bar iron. Hexagonal nuts of the same quality of metal as the bolts shall be used. All threads shall be clean cut and shall conform to AN Standard B 1.1-1974 for Unified Inch Screw Threads (UN and UNR Thread Form).
6. Anchor bolts and expansion bolts shall be set accurately. If anchor bolts are set before the concrete has been placed, they shall be carefully held in suitable templates of acceptable design. Where indicated on the Drawings, specified, or required, anchor bolts shall be provided with square plates at least 4 in. by 4 in. by 3/8 in., or shall have square heads and washers and be set in the concrete forms with suitable pipe sleeves, or both. If anchor or expansion bolts are set after the concrete has been placed. All necessary drilling and grouting or caulking shall be done by the Contractor and care shall be taken not to damage the structure or finish by cracking, chipping, spalling, or otherwise during the drilling and caulking.
7. All bolts shall be suitable size for the intended purposed, and in accordance with the manufacturer's recommendation.
8. Assembly hardware shall be provided in accordance with the complete parts list of the manufacturer.

B. Foundations and Grouting

1. The Contractor shall furnish the necessary materials and construct suitable concrete foundations for all equipment installed by him, even though such foundations may not be indicated on the Drawings. Foundation sizes and elevations may be determined in the field by the Engineer. The tops of foundations shall be at such elevations as will permit grouting as specified above.
2. All such equipment shall be installed by skilled mechanics and in accordance with the instructions of the manufacturer.
3. In setting pumps, motors, and other items of equipment customarily grouted, the Contractor shall make an allowance of at least 1 in. for grout under the equipment bases. Shims used to level and adjust the bases shall be steel. Shims may be left embedded in the grout, in which case they shall be installed neatly and so as to be as inconspicuous as possible in the completed work. Unless otherwise specified, all grout shall be an approved non-metallic non-shrink grout.
4. Grout shall be mixed and placed in accordance with the recommendations of the manufacturer. Where practicable, the grout shall be placed through the grout holes in the base and worked outward and under the edges of the base and across the rough top of the concrete foundation to a peripheral form so constructed as to provide a suitable chamfer around the top edge of the finished foundation.

5. Where such procedure is impracticable, the method of placing grout shall be as permitted by the Engineer. After the grout has hardened sufficiently, all forms, hoppers, and excess grout shall be removed, and all exposed grout surfaces shall be patched in an approved manner, if necessary. All foundation and grout exposed surfaces shall be given a burlap-rubbed finish, and painted with at least two coasts of epoxy based paint specified for concrete.
6. If threaded rod with lower support nuts are used to secure the equipment in place temporarily during concrete equipment pad placement, the support nuts shall be removed prior to grouting so that the threaded rod anchor bolts are not supporting the equipment and the top nuts can be tightened to secure the equipment directly to the large bedding surface provided by the non-shrink grout and concrete equipment pad. Equipment foundations shall be designed to absorb equipment vibration and transmit forces to building structure or ground.

3.04 START- UP AND APPLICATION

A. The Contractor shall arrange and provide for a qualified service representative from each company manufacturing or supplying equipment to perform the Work herein described:

1. After installation of the equipment has been completed and the equipment is presumably ready for operation, but before it is operated by others, the representative shall inspect, operate, test, and adjust the equipment. The inspection shall include, but shall not be limited to, the following points as applicable:

   a. Soundness (without cracked or otherwise damaged parts).
   b. Completeness in all details, as specified.
   c. Correctness of setting, alignment, and relative arrangement of various parts.
   d. Adequacy and correctness of packing, sealing and lubricants, etc.

2. The operation, testing, and adjustment shall be as required to prove that the equipment is left in proper condition for satisfactory operation under the conditions specified.

3. Upon completion of his work, the manufacturer's or supplier's representative shall submit in triplicate to the Engineer a complete, signed report of the results of his inspection, operation, adjustments, and tests. The report shall include detailed descriptions of the points inspected, tests and adjustments made, quantitative results obtained if such are specified, and suggestions for precautions to be taken to ensure proper maintenance. The report shall certify that the equipment (1) has been satisfactorily installed and conforms to the contract requirements; (2) is in accurate alignment; (3) is free from any undue stress imposed by connecting piping, supports or anchor bolts; (4) has been operated under full load and operates satisfactorily; and (5) that nothing in the installation will render the manufacturer's warranty null and void.
4. After the Engineer has reviewed the reports from the manufacturer's representatives, make arrangements to have the manufacturer's representatives present when the field acceptance tests are made.

B. Final documentation shall be provided in both bound paper copies (3 sets submitted to Engineer) and electronic compact disk (CD) (3 copies submitted to Engineer).

1. Provide three paper sets of manuals a minimum of 120 days prior to the Contract Completion Date. Each copy shall be in a separate, bound manual. Manuals shall include:

   a. Clear and concise instructions for the operation, adjustment, lubrication, and maintenance of the equipment.
   b. Listing of all parts for the equipment with the manufacturer and manufacturer's identification number for each part and other data necessary for ordering replacement parts.
   c. Information applicable only to the model of the equipment specifically furnished. References to other size and types or similar models shall be deleted. Information on where to obtain parts and services shall be provided.
   d. Any revisions completed during start-up, testing, and training shall be documented in three final paper sets and three CD copies of manuals. Final copies shall be furnished prior to the Contract Completion Date.

C. Operator Training

1. Upon satisfactory completion of the start-up and calibration, a representative of the manufacturer shall be provided by the Contractor to instruct the Owner's personnel in the proper operation and maintenance of the equipment. This separate period of on-site training shall be provided independent of start-up and testing services.
2. The manufacturer's representative who will be providing the instruction shall have prior operation, maintenance and instructing experience that is acceptable to the Engineer.
3. The Contractor shall submit the individual's name and qualifications to the Engineer for approval at least one week prior to the scheduled operating and maintenance instruction sessions.

D. Each piece of equipment shall be provided with a substantial nameplate of non-corrodible metal, securely fastened in place and clearly and permanently inscribed with the manufacturer's name, model or type designation.

E. All equipment driven by open shafts, belts, chains, or gears shall be provided with approved all-metal guards enclosing the drive mechanism. Guards shall be constructed of galvanized sheet steel or galvanized l-inch screen (woven wire or expanded metal) set in a frame of galvanized steel numbers. Guards shall be secured in position by steel braces or straps which will permit easy removal for servicing the equipment. Equipment guards shall conform to all applicable OSHA requirements.

F. Electrolysis - Where dissimilar metals are used in conjunction with each other, suitable installation shall be provided between adjoining surfaces so as to eliminate direct contact and any resultant electrolysis. The insulation shall be bituminous impregnated felt, heavy bituminous coating, non-metallic separators or washers, or other approved materials.

G. Fabrication, manufacture, painting or testing work may be inspected by the engineer before shipment. Notice shall be given to the Engineer of the place and time where such fabrication, manufacture, testing, or shipping is to be done. Such notice shall be in writing and delivered to the Engineer in ample time so that the necessary arrangements for the inspection can be made.

END OF SECTION 11000

SECTION 11310

WASTEWATER PUMPING SYSTEM

PART 1 - GENERAL

1.01 DESCRIPTION

A. This section includes the furnishment of all labor, materials and pumping equipment with their motors, shafts, and appurtenances as indicated on the Project Drawings or as specified herein.

1.02 RELATED WORK

A. Related Sections

1. Section 11000 - "Equipment – General"
2. Section 15050 - "Pipe and Pipe Fittings – General"
3. Section 16000 - "Electrical – General"

1.03 REFERENCES

A. AFBMA (Anti-Friction Bearing Manufacturer Association)

B. ANSI (American National Standards Institute)

1. ANSI B16.1 – Cast Iron Flanges and Flanged Fittings

C. ASTM (American Society of Testing and Materials)

1. ASTM A48 – Standard Specification for Gray Iron Castings
2. ASTM B43 – Standard Specifications for Standard Seamless Copper Pipe

D. HIS (Hydraulic Institute Standards – 1990)

E. ISO (International Organization for Standardization)

F. National Electric Code

G. Underwriters Laboratories (UL)

1.04 SUBMITTALS

A. General

1. The Contractor shall provide submittals in accordance with Section 01100 "Equipment – General".

B. Shop Drawings – Equipment Data

1. The Contractor shall submit shop drawings and equipment data for the review and approval of the Engineer for the pumping systems. The information to be submitted includes but is not limited to, the following:

   a. The manufacturer's rating curves showing pump characteristics of discharge, head, capacity, brake horsepower, required net positive suction head, and efficiency.
   b. Literature and drawings describing the equipment in sufficient detail, including parts list and materials of construction, and the total pumping unit weight. This information shall be prepared specifically for the pumps proposed. Catalog sheets showing a family of curves will not be acceptable.
   c. Details of fabrication, erection and adjoining equipment interfaces for all equipment furnished under this section, along with dimensional drawings of each item of equipment and auxiliary apparatus to be furnished.
   d. Manufacturer's electrical requirements for pumps, motors, and appurtenances (including ladder-type wiring diagrams for interlock and control wiring) which indicate the required field connections.
   e. Operation and maintenance manuals shall be submitted.

C. Factory Test Data and Reports

1. The Contractor shall submit certified factory test data, performed in accordance with Hydraulic Institute Standards, including performance curves for each of the proposed pumps from shut-off to maximum capacity, showing total dynamic head, hydraulic and overall efficiency and brake horsepower.

   a. A minimum of six points, including shutoff, shall be taken for each test. At least one point of the six shall be taken as near as possible to each specified condition. Pumps shall by hydrostatically tested for a pressure equal to two times the shut-off head. Results of the performance tests, including data and test points, shall be certified by a Registered Professional Engineer and submitted for approval by the Engineer before final shipment.

2. Factory certified motor test data shall be submitted to the Engineer for review and approval.

D. Certifications and Warranties

1. The Contractor shall provide a "Letter of Compliance" from the Manufacturer stating that the characteristics of each pump (specifically naming the respective pumps) are such that they will not overload the specified motor horsepower under any head condition when operating at the specified maximum speed.

2. Certificates from the pump manufacturer and pump controller manufacturer stating that the installation of the pumping system is satisfactory, that the equipment is ready for operation, and that the operating personnel have been suitably instructed in the operation, lubrication and care of each unit shall be submitted.

3. The Contractor shall submit the manufacturers warranty and service agreement that would cover the entire pumping system to the Engineer for review. The minimum acceptable warranty period for the repair or replacement of any defective materials or workmanship shall be five (5) years. The warranty period shall not begin until after the final testing and acceptance of the pumping system by the Engineer.

E. Field Testing

1. The contractor shall perform testing of new installed pumps and shall provide the GNHWPCA with a full report of the performance results including vibration testing.

PART 2 - PRODUCTS

2.01 General

A. Attention is drawn to the fact that the Project Drawings and Specifications are based on pumping units manufactured by Homa Pump Technology, Inc. If the Contractor wishes to propose pumping units from a different manufacturer, the prior review and approval of the Engineer shall be required. The Contractor shall also prepare and submit for review, along with the require shop drawings, a specific listing of the material, design and construction differences between the specified equipment, including the electrical and control systems. Any costs incurred from any changes deemed necessary by the Engineer to the Project Drawings, Specifications, or design of the proposed work resulting from the usage of alternate equipment or equipment systems shall be the responsibility of the Contractor and at no additional cost to the Owner.

B. The listing of a specific pump model herein in no way relieves the pump supplier from complying with all other requirements of this specification.

C. All pumping units designed for a certain function shall be supplied by the same manufacturer. All pumping units shall include pumps, motors, accessories, appurtenances and all ancillary equipment. All of these items shall be furnished by the pump manufacturer to insure compatibility and integrity of the individual components.

D. The pumping units to be furnished shall be the product of a reputable manufacturer who has had at least ten (10) years of experience in the manufacturing of similar pumping units that are presently successful, and reliably in service in other pumping stations. The pumping units shall be designed, constructed, and installed in accordance with the best practice and methods and the Hydraulic Institute Standards. If an alternate pump manufacturer is proposed by the Contractor, it shall be demonstrated to the satisfaction of the Engineer that the quality of the alternate is equal to that which is made by the manufacturer specifically named herein.

E. These specifications are intended to direct attention to certain features of the pumping units, and may not cover all the details of their design. The Contractor shall provide, as part of the pumping unit, all necessary appurtenances, accessories, finishes, etc. as recommended by the Manufacturer for the intended design and usage.

F. All parts and components of the pumping units shall be designed for satisfactory service under continuous duty without undo wear under the specified operating conditions.

G. The new pumps shall be installed and coordinated with the new pumping control and starter equipment. The new pump seal failure probe relays and thermal overload signals will need to be integrated into the new controls.

2.02 WASTEWATER PUMPS

A. General:

1. Furnish and install 2 Electric Submersible Wastewater Pump(s), each consisting of a single stage, non-clog centrifugal pump, close-coupled to a squirrel cage induction type electric motor assembled in a single-body, watertight aggregate, capable of maintaining its watertight integrity submerged under 80 feet of water, complete with autocoupling base and adapter flange, and stainless steel slide rails and brackets for automatic operation in a wet well. The Pump Discharge connection shall be 4 inch ANSI Class 125 Cast Iron.

B. Manufacturers

1. Homa Pump Technology, Inc. A Series, Non-clog Submersible Horizontal Pump, Model No. AMX434-155 2,9 T/C.
2. Approved equal.

C. Performance Guarantee

1. The pump shall be designed to handle raw, unscreened sewage, stormwater, sludge or similar contaminated liquid at an operating point of 90 GPM at 20.5 FT TDH with a Hydraulic Efficiency of at least 60%±. As this pump will be utilized for solids handling, it must be capable of repeatably passing spherical solids up to 3 inch in diameter.

D. Design

1. Material of Construction

   a. Major Castings: ASTM A48 Class 40B Cast Iron
   b. Wear Ring: ASTM B144 Bronze
   c. Shaft: AISI 430F Stainless Steel
   d. Fasteners: AISI 304 Stainless Steel
   e. Cooling Jacket: AISI 304L Stainless Steel
   f. O-Rings: Nitrite Rubber
   g. Shaft Seals: Silicon Carbide Silicon Carbide (impeller and motor side)
   h. Cable Jacket: Neoprene
   i. Cable Entry: elastomer grommet, stainless steel washers
   j. Protective Coatings; High solids epoxy

2. Impeller - Impeller will be cast as one piece and shall be torque-flow (vortex), statically and dynamically balanced, to assure that vibration amplitudes, measured at the level of the upper bearing while operating in a vertical position, remain within the limits specified by the Hydraulic Institute Standards.

3. Volute - Volute will be cast in one piece, with smooth internal contours and surfaces, providing obstruction-free passageways with low friction losses. A stationary Wear Ring, made of bronze, shall maintain close tolerances between the rotating Impeller and the stationary Volute.

4. Stationary Cutter Plate – Pump shall be provided with a stationary cutter blade, hardened to minimum 55HRC. Cutter blade shall be mounted on a cast iron support plate. Stationary cuter assembly shall be field adjustable to provide property clearance.

5. Shaft - Pump shaft must have generous shoulder fillet radii to minimize stress concentration and fatigue. Deflection at the Shaft seal within the operating range shall not be more than 0002 inch.

6. Bearings - Pump shaft shall be supported by anti-friction bearings, designed for minimum 50,0000 hours B-10 life at the pumps Best Efficiency Point, and shall be factory pre-lubricated. The lower impeller-side bearing will be double-row, deep groove ball bearing, axially retained, to sustain both axial and radial loads. The upper motor-end bearing is a single-row, deep groove ball bearings axially floating, to sustain radial loads only.

7. Watertight Integrity - The watertight integrity of the single-body pump-motor assembly shall be assured. Each Cable Entry Assembly shall contain an elastomer grommet, flanked by two washers, closely fitted to the cable O.D. motor cap. The cable entry gland threads down to a positive slop, thereby tightly compressing the grommet around the cable. The gland will provide a strain-relieving, anti-kink feature, functioning independently from the separate sealing action. The cable inlet flange shall

contain an o-ring groove on the bottom side of the flange to allow for watertight integrity of the bolt-on cable entry assembly when bolted into the entry holes in the motor cap. For pumps above 10 horsepower an isolate Junction Box containing the terminal board, and sealed from the motor compartment by a watertight isolation plate will provide a secondary barrier against water or moisture penetration. Each pump shall be supplied with 30 feet of SO Type power cable.

8. Seals - Motor Compartment shall be isolated from the Liquid End by single Mechanical shaft seals in tandem arrangement (dual-independent, both oriented to resist pressure from the impeller). The upper motor side seal shall run in an Oil Chamber, which separates the Motor Compartment from the Liquid End and provides permanent lubrication and cooling. The lower impeller side seal will also get lubrication from the Oil Chamber. Each seal will have a stationary portion and a positively driven rotary portion. Springs must be protected from the pumped liquid; and under no circumstances can solid particles accumulate on the external sprig and hamper its effectiveness. Seals must not require repeated checking or re-adjustment, except periodic inspection of the oil chamber. At the interfaces of major castings, sealing shall be accomplished by resilient Buna-N O-rings, confined within closely fitted, high surface quality rabbet joints, compressed only to the prescribed dimension by metal-to-metal contact, allowing radial movement and preventing permanent set. Flat gaskets and seal rings, which may be squeezed unevenly or beyond the permanent deformation limit, are not allowed.

9. Seal Probe - Two conductive seal probes shall be provided with pump. First probe shall be mounted into the mechanical seal chamber and when interlocked wit control panel, probe shall indicate the presence of contaminants within the mechanical seal chamber. The second probe shall be mounted within the lower end of the motor. Pump supplier shall be responsible for supplying seal probe interface module that will be coordinated with the control panel.

10. Electric Motor - Each pump shall be driven by a submersible Squirrel Cage Induction Motor in accordance with NEMA MG I section IV Part 30, rated at 3.0 HP, 1750 RPM, 230 volts, 3-phase. Motor shall be NEMA Design B for continuous duty, capable of sustaining 15 starts per hour. The pump and motor shall be produced by one manufacturer and shall be of the air-filled, watertight design.

    All stator windings and leads shall be insulated with moisture-resistant Class F Insulation, capable of withstanding 155°C Max. temperature, dipped and based three times. Upon assembly the stator shall be het-shrink-fitted into the stator housing: the use of bolts, pins or other fastening devices, which would require penetration of the stator housing, shall not be acceptable.

    In each phase winding there shall be embedded a bi-metallic temperature sensor, wired in series and interlocked with the motor overload protection in the Control Panel. Any of these thermal sensors shall cut out electric power if the temperature in its winding exceeds 140°C, but shall automatically reset when the winding temperature returns to normal. The motor shall be non-overloading through the selected performance curve and have a Service Factor of 1.15.

When the application requires, motor shall be approved for use in Hazardous (Classified) areas. Pumps shall be suitable for operation in Class 1, division 1, Groups C & D Areas and shall be approved by Factory Mutual (FM) for use in area classified indicated.

11. Installation Mode – An autocoupling assembly shall be employed to eliminate the need for entering the wet well to service pumps. The system shall allow the lowering of the pump unit(s) into the well along rigid guide pipes, resulting in a self-engaging, firm leak proof coupling of the volute outlet to a receiving Base anchored to the floor which forms the discharge pipe connection. To assure a leak proof junction between movable and stationary components, a resilient seal ring shall be employed which is easily replaceable as part of the pump assembly, is axially and evenly compressed upon contact. Metal-to-metal contact faces shall not be allowed. Once seated, the pump shall be entirely supported by the Autocoupling Base without any reliance on additional supports.

END OF SECTION 11310

SECTION 13420

INSTRUMENTATION

PART 1 – GENERAL

1.01 SECTION INCLUDES

A. Float Switches

B. Installation and startup of instrumentation furnished under this section.

1.02 RELATED SECTIONS

A. Refer to Division 11 for equipment furnished by other sections but requiring wiring diagrams developed under this section to reflect complete integration of the systems, instrumentation, interlocking, interfacing and installation under this section.

B. Refer to Division 16, Electrical for wiring standards and practices.

1.03 QUALITY ASSURANCE

A. Manufacturer's Qualifications - Firms regularly engaged in the manufacture of instrumentation systems (the "System Supplier"), whose products have functioned satisfactorily in similar service, and has demonstrated proficiency and extensive experience with current technology.

B. Installer's Qualifications - Firms regularly engaged in the installation, calibration and adjustment of instrumentation systems, with a minimum of five years of experience, whose systems have functioned satisfactorily in similar service and have demonstrated proficiency and extensive experience with current technology.

1.04 SUBMITTALS

A. Provide complete equipment specifications, details of connections, wiring, range and dimensions. Submittals consisting of only general sales literature will not be acceptable. Shop drawings shall be bound in separate three ring binders with an index and section, sub-section, etc., dividers. The dividers shall be arranged so its individual tabs can locate each item being referenced.

B. Submit detailed information for each instrument or control device, including manufacturer's descriptive literature and a specific data sheet for each device which shall include as a minimum:

1. Product (item) name used herein.
2. Manufacturers complete model number.

3. Location of the device
4. Input - output characteristics
5. Range, size and graduations.
6. Physical size with dimensions, enclosure NEMA classification and mounting details.
7. Materials of construction of all components.

C. Exceptions to the Specifications or Drawings shall be clearly defined by the system supplier. Data shall contain sufficient details so the Engineer may make a proper evaluation.

1.05 PRODUCT HANDLING

A. Identification

1. Each component shall be tagged per the users standard numbering system or as defined herein and in the contract drawings. To identify its location, tag number and function in the system. Identification shall be prominently displayed on the outside of the package.

2. A permanent stainless steel tag firmly attached and permanently and indelibly marked with the instrument tag number, as given in the tabulations, shall be provided on each piece of equipment supplied under this section. In the case where any supplied instrument is too small or of such a material as to make a stainless steel tag impossible to attach, a method of indelible marking, demonstrating the intent of this paragraph shall be submitted to the Engineer for approval.

B. Storage

1. Equipment shall not be stored out-of-doors. Equipment shall be stored in dry permanent shelters including in-line equipment, and shall be adequately protected against mechanical injury. If any apparatus has been damaged, the System Supplier at his own cost and expense shall repair such damage. If any apparatus has been subject to possible injury by water, it shall be thoroughly dried out and put through such tests as directed by the Engineer. This shall be at the cost and expense of the System Supplier, or the System Supplier at this own expense shall replace the apparatus.

1.06 INSTRUMENTATION GENERAL

A. Type

1. Instrumentation supplied shall be of the manufacturer's latest design and shall produce or be activated by signals that are established standards for the water and wastewater industries.
2. Electronic instrumentation shall be of the solid-state type. Analog control signals shall be linear and be industry standard currents of 4 to 20 mA DC (milliampere direct current), however, signals between instruments within the same panel or cabinet may be 1-5 VDC (Volts direct current), or the like. No zero based signals shall be allowed.
3. Outputs of equipment that are not of the standard signals as outlined, shall have the output immediately raised and/or converted to compatible standard signals for remote transmission.

4. Instruments shall be provided with stainless steel mounting hardware and/or galvanized steel floor stands, wall brackets, or instruments racks as appropriate for each location.
5. Equipment installed in a hazardous area shall meet Class, Group, and Division as shown on the Contract Electrical Drawings, to comply with the National Electrical Code.
6. Indicators and recorder readouts shall be linear in the process units.
7. Transmitters shall be provided with either integral indicators or conduit mounted indicators in process units, accurate to ±percent.
8. Electronic equipment shall be of the manufacturer's latest design. Circuit boards and associated components shall have suitable conformal coating to prevent contamination by dust, moisture and fungus. Solid-state components shall be conservatively rated for their purpose to assure optimum long-term performance and dependability over normally anticipated atmospheric conditions of temperature, pressure and humidity. The field-mounted equipment and system components shall be designed for installation industry, humid, and slightly corrosive service conditions.
9. Equipment, cabinets and devices furnished hereunder shall be heavy-duty type, designed for continuous industrial service. The system shall contain products of a single manufacturer, insofar as possible, and shall consist of equipment models that are currently in production. All equipment provided shall be of modular construction and shall be capable of field expansion.

1.07 ELECTRICAL

A. Equipment shall be designed to operate on a 60 Hertz alternating current power source at a nominal 110 volts, plus or minus 10 percent except where specifically noted. Regulators and power supplies required for compliance with the above shall be provided between power supply and interconnected instrument loop. Where equipment requires voltage regulation, constant voltage transformers shall be supplied.

B. Analog transmitter and controller outputs shall be 4-20 milliamps into a minimum load range of 0-750 ohms, unless specifically noted otherwise.

C. Switches shall have double-pole, double throw contacts rated at a minimum of 600 VA unless specifically noted otherwise.

D. Materials and equipment used shall be U.L. approved wherever such approved equipment and materials are available.

E. Equipment shall be designed and constructed so that in the event of a power interruption, the equipment specified hereunder shall resume normal operation upon manual resetting when power is restored.

PART 2 - PRODUCTS

2.01 FLOAT SWITCHES

A. Type - Cord suspended type float switches

B. Contact rating - 8 amps

C. Cable - Length as required, PVC covered

D. Manufacturers

1. Flygt ENH-10
2. Magnetek
3. Kari
4. Or approved equal

2.02 SUBMERSIBLE PRESSURE LEVEL TRANSDUCER

A. The level transducer shall be of the submersible pressure type that will be used to measure the level of fluid in the wet well.

B. Wetted materials: 316 stainless steel

C. Range – 0-15 psi

D. Accuracy: +/- 0.25%

E. Temperature range: 0 to 176 degrees F

F. Power requirement: 10 to 28 VDC

G. Output signal: 4 to 20 mA DC, two wire

H. Response time: 50 msec

I. Loop resistance: 900 ohms

J. Agency approvals: CE and UL listed

K. Manufacturers:

1. Mercoid: - PBLTX
2. Dwyer
3. or approval equal

L. Provide a spare submersible pressure transducer

PART 3 - EXECUTION

3.01 GENERAL INSTALLATION

A. Instrumentation and accessory equipment shall be installed in accordance with the manufacturer's instructions. The location of equipment, transmitters, alarms and similar devices shown on the Drawings are approximate only. Exact locations shall be as approved by the Engineer during construction. Obtain in the field all information relevant to the placing of process control work and in case of any interference with other work, proceed as

requested by the Engineer. Furnish all labor and materials necessary to complete the work in an approved manner.

B. The System Supplier shall make all necessary mechanical changes to install new instrumentation equipment provided under this Contract. This work includes all fittings, fabrications, supports, guides, restraints, bolting, gaskets, and accessories. All work shall be done in a workmanlike manner.

C. The instrumentation drawings indicate the intent of the interconnections between the individual instruments. Amy exceptions should be noted.

D. Work shall be executed in full accordance with codes and local rulings. Should any work be performed contrary to said rulings, ordinances, and regulations, the System supplier shall bear full responsibility for such violations and assume all costs arising there from.

E. Equipment used in areas designated as hazardous shall be designed for the Class, Group and Division as required on the Electrical Drawings for the locations. All installations shall be in strict accordance with codes.

F. Instrument cabinets located outdoors or in unheated locations shall be provided with heating and/or cooling devices as necessary to maintain all instruments and/or electronics installed in those cabinets within their design temperature limits.

G. Brackets and hangers required for equipment mounting shall be provided. They shall be installed in a workmanlike manner and not interfere with any other equipment.

H. The system Supplier shall investigate, and make any field modifications to the allocated space for each cabinet, enclosure, and panel to ensure proper space and access (front, rear, side).

I. The shield on each process instrumentation cable shall be continuous from source to destination and be grounded as directed by the manufacturer of the instrumentation equipment, but in no case shall more than one ground point be employed for each shield.

J. Lifting rings from cabinets/assemblies shall be removed. Hole plugs shall be provided for the holes of the same color as the cabinet.

K. The System Supplier shall coordinate the installation, the placing and location of the system components, their connections to the process equipment panels, cabinets and devices. He shall be responsible to ensure that all field wiring for power and signal circuits are correctly done in accordance with best industry practice and provide for all necessary system grounding to ensure a satisfactory functioning installation.

3.02 SYSTEM TESTS AND ACCEPTANCE

A. After the equipment has been delivered and installed at the site, a field acceptance test shall be performed to verify the integrity of the system. The Engineer shall witness the test. Satisfactory completion of the test, as approved in writing by the Engineer, shall constitute conditional approval of the system. The system must operate without failure for a period of 100 hours before this test will be considered successful, and the system fully accepted.

B. Before this test is started, the System supplier shall satisfy himself that the system is operating correctly with live plant data.

C. Any malfunctions during the test shall be analyzed and corrections made by the System Supplier. The Owner's Project representative will determine whether any such malfunctions re sufficiently serious to warrant a repeat of this test.

3.03 FIELD TESTS

A. The system supplier shall furnish the services of the Manufacturer's servicemen, all special tools, calibration equipment and labor to perform the tests. Certified copies of the tests shall be furnished in duplicate to the Engineer.

B. Following connection, checkout, and final adjustment of all panels, instruments, meters, monitoring and control devices, a performance check shall be made on each. Analog inputs shall be tested to 0 percent, 25 percent, 50 percent, 75 percent and 100 percent of scale, as required. All status and alarm switches as well as all monitoring and control functions shall also be checked. Each device on the electrical schematic\Logic diagrams must be signed-off by the Engineer as being acceptable.

C. If, during running of the tests, one or more points appear to be out by more than the specified amount, the Manufacturer's servicemen shall make such adjustments or alterations as are necessary to bring equipment up to specification performance. Following such adjustments, the tests shall be repeated for all specified points to ensure compliance.

3.04 INSTRUCTION - STAFF TRAINING

A. All plant personnel will need training on the instrument systems. The system supplier shall be responsible for providing detailed Operation and Maintenance (O&M) Manuals. The O&M Manuals shall include specific details of equipment supplied and details of operations specified to this project. The training will be conducted at the facilities.

B. The O&M Manuals shall include descriptions of all equipment, the nature and intended modes of operation, testing procedures for all units in the System, and safety measures to be taken in operation. All necessary procedures and methods for effective operation of the System shall be included.

C. O&M Manuals shall include record drawings and instructions necessary for the panned maintenance of all equipment in the system. The O&M Manuals will incorporate maintenance procedures and schedules, and they will coordinate and be cross-referenced to detailed operating procedures provided by the manufacturers.

D. The system training shall be structured such that the operating personnel will understand the system's operation, and the functions available in the system. The amount of training will be a minimum of 1 day, scheduled as convenient for the Owner. Preventive and corrective maintenance of hardware shall be presented.

3.05 MAINTENANCE CONTRACT

A. Maintenance Controls: After the final acceptance of the instrument system, the vendor shall furnish to the Owner a one-year contract for complete maintenance service of the instrument system. The services under the maintenance contract will take place at the plant site. The contract will include preventive maintenance and calibration, emergency service repairs, replacements of defective or worn parts or device and accessories and expendable items, and verification of correct software operation. The service shall be performed by the manufacturer and shall provide for a minimum of one inspection during the contract year. The service technicians shall be equipped with all tools and test equipment necessary for calibration.

B. Preventive or corrective maintenance shall include a systematic and periodic examination of each device supplied under this section. This equipment shall be calibrated, cleaned, lubricated, adjusted or aligned to insure property operation. This preventive maintenance shall be rendered generally such that each component will be tested at least four times annually. The calibration shall include the simulation of the process variable system where applicable.

C. Emergency Service: Emergency service shall be provided during normal working hours (8:00 a.m. to 5:00 p.m. Monday through Friday) to correct any hardware defect or failure and to apply the appropriate corrective action to restore the defective device to the manufacturer's original specifications or tolerances. A qualified instrument technician directly employed by the manufacturer within 24 hours after notification shall provide this service.

D. Parts: As part of this maintenance service, all parts shall be provided by the manufacturer at no additional costs. Transfer of ownership shall take place when a part is installed in the Owner's instrumentation or other equipment covered by the Contract.

PART 4 - SYSTEM DETAILS

3.01 SYSTEM DETAILS

A. Unless specifically stated otherwise, the system supplier shall be responsible for providing all instrumentation, control equipment and auxiliary devices necessary to perform the functions specified herein and as shown and described on the contract drawings.

B. Any auxiliary devices such as lighting/surge protectors, relays, timers, signal isolators, signal boosters, etc., which are necessary for complete operation of the system, or to perform the function specified, shall be included, whether or not they are specifically shown or tabulated on the diagram.

END OF SECTION 13420

SECTION 15050

PIPE & PIPE FITTINGS - GENERAL

PART 1 - GENERAL

1.01 DESCRIPTION

A. The Work included under this Section includes the furnishment, installation, support, and testing of pipe and pipe fittings of the type(s) and size(s) and in the location(s) shown on the Drawings and as specified herein.

1.02 RELATED WORK

A. Section 09900 Painting
B. Section 15060 Hangers and Supports

1.03 SUBMITTALS

A. Submit shop drawings and material Specifications for all materials and equipment furnished under this section.

B. Submit manufacturer's "Certificate of Conformance" that pipe and fittings, another piping appurtenances meet or exceed the requirements of these Specifications.

1.04 QUALITY ASSURANCE

A. The location of all equipment, fixtures, and piping is considered to be approximate only and the Engineer has the right to change at any time before the work is installed, the position of equipment and piping to meet structural conditions, avoid interferences, provide proper clearances or for other sufficient causes. Such changes shall be made without additional expense to the Owner.

B. All permits and pay all fees required to carry out the piping work shall be secured by the Contractor. All laws, ordinances, codes, rules, and regulations of the local and state authorities having jurisdiction over any of the work specified herein shall be complied with. Where provisions of the Contract are in conflict with the codes, the more stringent of either the codes or the Contract documents shall govern.

C. The drawings and diagrams show the pipe sizes and general routing. Offsets and fittings required to avoid field interferences and provide improved layout shall be provided at no additional expense to the Owner.

D. All pipe, tube, hose and fittings in a given specification section shall be the product of a single manufacturer who is experienced in the manufacture of the materials to be furnished. The manufacturer must have provided materials which have been successfully installed and operated for at least 5 years in a similar application.

1.05 DELIVERY, STORAGE AND HANDLING

A. Care shall be exercised during loading, transporting, unloading, and handling to prevent damage of any nature to interior and exterior surfaces of pipe and fittings. Do not drop pipe and fittings.

B. All pipe and fittings shall be examined before installation, and no piece shall be installed which is found to be defective. Any damage to the pipe linings or coatings shall be repaired as directed by the Engineer at no additional cost to the Owner.

C. Materials shall be stored on the project site, or at another location as directed by the Engineer, in enclosures or under protective coverings in accordance with manufacturer's recommendations and as required by the Engineer.

D. The Contractor shall assume the responsibility to assuring that the materials are kept clean and dry, and that materials are not stored directly on the ground.

E. The manufacturer's specific instructions, recommendations and requirements shall be followed.

F. The materials shall be stored in a manner to protect items with epoxy shop coatings from exposure to UV light which can cause chalking of the epoxy. Length of acceptable exposure prior to providing UV protective measures shall be in accordance with coating manufacturer's recommendations. This includes protection from UV light after installation while awaiting covering or filling of tanks, or prior to field painting for items scheduled to be top coated as specified in Section 09900.

G. Factory-applied plastic end-caps on each length of pipe and tube shall be provided. End-caps shall be maintained through shipping, storage and handling to prevent pipe-end damage and prevent entrance of dirt, debris, and moisture. Stored pipes and tubes shall be protected and elevated above grade and enclosed with durable, waterproof wrapping. When stored inside, the structural capacity of the floor shall not be exceeded. Flanges, fittings, and specialties shall be protected from moisture and dirt by storage and enclosure, or by packaging with durable, waterproof wrapping.

H. If any defective pipe is discovered after it has been installed, it shall be removed and replaced with a sound pipe in a satisfactory manner. All pipe fittings shall be thoroughly cleaned before installing, shall be kept clean until they are used in the work, and when installed shall conform to the lines, grades and dimensions required.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Materials are to be as specified elsewhere in the Specifications and on the Project Drawings.

2.02 FINISHES

A. Pipe and Equipment Coatings - Under the provisions of Section 09900, the prime and field applied coatings are to be the products of a single manufacturer.

1. Once a paint manufacturer has been approved for this project, order all of the exposed pipe (except stainless steel), valves, fittings, equipment, hangers and supports prime coated with paint of the same manufacturer. Specifically, all piping that is not to be buried or bituminous coated soil pipe shall be furnished with an exterior prime coat instead of bituminous coating. Materials shall be coated in accordance with Section 09900. All pipe, valves, fittings, etc., shall be thoroughly cleaned in accordance with the applicable sections of the AWWA Specifications, before coatings are applied. Flange faces shall be cleaned and primed to prevent bleeding.

PART 3 - EXECUTION

3.01 INSPECTION

A. The Contractor shall provide all labor necessary to assist the Engineer to inspect pipe, fittings, gaskets, and other materials.

B. All materials shall be carefully inspected at the time of delivery and just prior to installation.

C. All pipe and fittings shall be carefully inspected for:

1. Defects and damage.
2. Deviations beyond allowable tolerances for joint dimensions.
3. Debris and foreign matter.

D. All areas and structures to receive piping shall be examined for:

1. Defects, such as weak structural components, that would adversely affect the execution and quality of work.
2. Deviations beyond allowable tolerances for pipe clearances.

E. All materials and methods not meeting the requirements of this Contract will be rejected, and all rejected materials shall be immediately removed from the project site, by the Contractor at no additional coast to the Owner. Work shall start only when conditions are corrected to the satisfaction of the Engineer.

3.02 PREPARATION

A. All pipe joints shall be cleaned and prepared to be free of scale, dirt and debris prior to connections.

B. The surface preparation of all piping, supports and hangers is included in Section 09900.

3.03 INSTALLATION

A. GENERAL:

1. All pipe and fittings shall be installed in strict accordance with the manufacturer's instructions and recommendations and as specified herein, and in accordance with the lines and grades shown on the drawings and as required for a complete installation. Piping shall be installed as close to walls, and ceilings as possible, yet should still facilitate maintenance and access to valves and devices. In general, piping systems shall parallel walls, partitions, and structural members. Care shall be taken such that stresses are not imposed on the pipe during installation.
2. All piping not being installed in trenches shall be supported in accordance with Section 15060 "Pipe Hangers & Supports". Concrete inserts for hangers and supports shall be furnished and installed in the concrete as it is placed. The inserts shall be set in accordance with the requirement of the piping layout and joint method and their locations shall be verified from approved piping layout drawings and the structural drawings. Layouts for hanger and supports shall be submitted to the Engineer for approval.
3. All valves, fittings, and appurtenances needed on the pipelines shall be set and jointed as indicated on the Drawings or as required.
4. Unions and control valves on services shall be provided to equipment specified under other Sections. All valves are to be installed in the upright position. Valves shall be installed and located so they can be operated easily and shall be located adjacent to the equipment.
5. All piping 2 inches and smaller shall have a sufficient number of unions to allow convenient removal of piping and shall be as approved by the Engineer.
6. Sleeves not initially set in the work shall be cut in place with permission of the Engineer. This work shall be performed by workmen competent to do the work and equipped with proper hand tools. Power tools with the exception of core boring machines shall not be used.
7. Welding shall only be performed by certified welders tested in the position applicable to the work. Welding shall be performed in accordance with AWS standards. Copies of welding certifications shall be provided to the Engineer.

B. INSTALLATION IN TRENCHES

1. All pipe and fittings shall be firmly supported on bedding material as shown on the Drawings and as specified in the appropriate Sections of these Specifications.
2. Pipe or fittings shall not be permanently supported on saddles, block stone, or any material which does not provide firm and uniform bearing along the outside length of the pipe.
3. The material under the pipe shall be thoroughly compacted to obtain a substantial unyielding bed shaped to fully support the pipe.
4. Suitable holes for the joints shall be excavated so that only the barrel of the pipe received bearing pressure from the supporting material after placements.
5. Each pipe length shall be laid so it forms close joints with the adjoining length and bring the inverts to the required grade. The pipe shall be set true to line and grade. Do not drive the pipe down to grade by striking it with a shovel handle, timber, rammer, or any other unyielding object.
6. Immediately after making a joint, the holes for the joints shall be filled with bedding material, and compacted.
7. When each pipe length has been properly set, place and compact enough of the bedding material between the pipe and the sides of the trench to hold the pipe in correct alignment.
8. After filling the sides of the trench, place and lightly tamp bedding material to complete the bedding as shown on the Drawings.
9. All necessary precautions shall be taken to prevent floatation of the pipe in the trench.
10. Bedding and backfill for all pipe materials shall be as specified elsewhere in the Specifications.

C. TEMPORARY PLUGS

1. When pipe installation work in trenches is not in progress, the open ends of the pipe shall be closed with temporary watertight plugs.
2. If water is in the trench when work is resumed, do not remove plugs until all danger of water entering the pipe is eliminated. Pipelines shall not be used as conductors for trench drainage during construction.

3.04 CLEANING AND TESTING

A. General

1. All piping shall be thoroughly cleaned prior to testing. All dirt, dust, oil, grease and other foreign material shall be appropriately removed. Care shall be exercised while cleaning to avoid damage to linings and coatings. Piping and equipment shall be in a thoroughly clean condition and ready for finish painting.
2. When the installation is complete, all pipelines shall be tested in the presence of the Engineer and the plumbing or building inspector in accordance with the requirements of the local, and state plumbing codes and the appropriate Sections of these Specifications, at not additional cost to the Owner. All testing shall be performed prior to backfilling or concealing, unless otherwise acceptable to the Engineer.

3. All labor, equipment, materials, taps, gages, and pumps required to conduct the tests shall be supplied by the Contractor at no additional cost to the Owner..
4. Tests shall be repeated as determined to be necessary by the Engineer to make the systems tight and acceptable. All retesting required by the Engineer shall be at no additional cost to the Owner.

END OF SECTION 15050

SECTION 15060

HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.01 DESCRIPTION

A. The Work included in this Section is the furnishment and installation of pipe hangers and supports to rigidly support pipes, maintain the necessary pitch, prevent vibration and movement, and to allow for the expansion and contraction of the pipe and pipe components.

1.02 RELATED WORK

A. Section 15050 Pipe & Pipe Fittings - General

1.03 REFERENCES

A. Manufacturers' Standardization Society SP-58, Pipe Hangers and Supports - Materials Design and Manufacture

B. Manufacturers' Standardization Society SP-69, Pipe hangers and Supports - Selection and Application

C. Manufacturers' Standardization Society SP-89, Pipe Hangers and Supports - Fabrication and Installation Practices

D. Manufacturers' Standardization Society SP-90, Guidelines on Terminology for Pipe Hangers and Supports

E. ASTM A 36 - Specification for Structural Steel

F. ASTM A 123 - Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

G. ASTM A 780 - Practice for Repair of Damaged Hot Dipped Galvanized Coatings

H. ASTM B 633 - Specification for Electrodeposited Coatings of Zinc on Iron and Steel

I. ASTM C 150 - Specification for Portland Cement

J. ASTM C 404 - Specification for Aggregates for Masonry Grout

K. ASME B 31.9 - Building Services Piping

L. American Welding Society (AWS) Structural Welding Code

1.04 DEFINITIONS

A. MSS: Manufacturers Standardization Society of The Valve and Fittings Industry, Inc.

1.05 PERFORMANCE AND DESIGN REQUIREMENTS

A. Unless otherwise specified on the Project Drawings, the design of each pipe support and pipe support frame work shall be the responsibility of the Contractor. Shop drawings shall be submitted to the Engineer for review and approval prior to their installation.

B. Supports shall be designed to be capable of supporting the combined operating weight of the supported equipment and connected systems and components.

1.06 SUBMITTALS

A. Product data from the manufacturer shall be submitted for each type of product indicated. This product data shall include installation instructions and fabrication details.

B. A pipe hanger and support schedule shall be submitted. This schedule shall include the size, location, manufacturer's data, and features of each type of pipe hanger and support that is to be utilized.

C. Welding certificates shall be submitted for each welding operator to be utilized in this aspect of the Project Work. This documentation shall certify that each welder has satisfactorily passed qualification tests for welding processes involved, in accordance with AWS D1.1 "Structural Welding Code - Steel" and, if pertinent, has undergone re-certification.

D. Shop drawings shall be submitted for each type of support and anchor to be utilized. These drawings shall indicate dimensions, weights, required clearances, and methods of assembly of components.

1.07 QUALITY ASSURANCE

A. All anchors and supports to be provided shall be in conformance with the Manufacturers' Standardization Society of the Valve and Fitting Industry, Inc. (MSS). All materials, design, manufacture, selection, application, and fabrication shall be in conformance with the appropriate MSS numbers.

B. Procedures and personnel shall be qualified in accordance to AWS D1.1/D1.1M, "Structural Welding Code - Steel".

PART 2 - PRODUCTS

2.01 MATERIALS

A. Manufactured Pipe Hangers and Supports

1. Hangers and support components shall be factory fabricated of materials, design, and from a manufacturer complying with MSS SP-58.
2. Components shall be stainless steel where installed for stainless steel piping. As a minimum, components to be stainless steel include clevis hangers, pipe clamps, pipe supports, plate bases, pipe saddles, U-bolts, floor stanchions, threaded rod with nuts, rod couplings, brackets and all miscellaneous connecting and supporting hardware. Structural steel work required for pipe racks and trapezes shall be A-36 steel, sandblasted, primed and finish painted using the approved paint system for this project indicated in Section 09900 “Painting”.
3. As a minimum, all components shall have hot-dipped galvanized coatings where installed for other piping and equipment.
4. Components shall have a plastic coating where installed for piping and equipment in chemical feed areas.
5. Pipe attachments shall have plastic coating for electrolytic protection where attachments are in direct contact with copper tubing.
6. Hangers and supports with a copper coating will not be acceptable.
7. All hangers and supports shall have some form of adjustment available after installation.
8. Floor supported process piping shall be supported by pipe supports which are provided with a base stand secured to the concrete using stainless steel anchors, adjustable shank, saddle, U-bolt, and hex nuts to hold pipe securely to the saddle, and shall have hot-dipped galvanized coatings where specified for other components.

B. MISCELLANEOUS MATERIALS

1. Steel Plates, Shapes, and bars shall conform to ASTM A 36.
2. Cement Grout - Portland cement (ASTM C 150, Type I or Type III) and clean uniformly graded, natural sand (ASTM C 404 Size No. 2). Mix ratio shall be 1.0 part cement to 3.0 parts sand, by volume, with minimum amount of water required for placement and hydration.

C. Pipe Alignment Guides - Factory fabricated, of cast semisteel or heavy fabricated steel, consisting of bolted two-section outer cylinder and base with two-section guiding spider that bolts tightly to pipe. Length of guides shall be as recommended by manufacturer to allow indicated travel.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Substrates and conditions under which supports and anchors are to be installed shall be examined. Installation shall not proceed until all unsatisfactory conditions have been corrected.

B. All hangers, supports, rods, inserts, clamps, brackets, bolts, and other supporting devices shall be installed in accordance with MSS SP-58, MSS SP-69, and MSS SP-89.

C. All supports, including those noted above, shall be installed to support pipe properly from the building structure. Hangers shall be secured to beams or from approved concrete inserts. Concrete inserts shall be installed before concrete is placed. Where piping is to be installed on structural steel supports, provide blocking of pipe rolls to prevent lateral movement. Piping shall not be supported from stairs and walkways.

D. All supports, including those noted above, shall allow for the controlled movement of piping systems, to permit the freedom of movement between pipe and pipe anchors and to facilitate the action of expansion joints, expansion loops, expansion bends and similar units.

E. Supports shall be installed with maximum spacing complying with MSS-69 and, at a minimum, at all changes in direction, at the end of piping runs, and at concentrated loads. Hangers and supports shall be installed at sufficiently close intervals to maintain alignment and prevent sagging.

F. Supports shall be installed with a minimum rod diameter complying with MSS SP-69.

G. All hangers and supports shall be installed complete with all necessary attachments, inserts bolts, rods, nuts, washers and other accessories.

H. Hangers and supports shall be installed so that piping, live and dead loads, and stresses from movement will not be transmitted to connected equipment.

I. Hangers and supports shall be installed to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B 31.9 for building services piping.

J. Anchors

1. Install anchors at proper locations to prevent stresses from exceeding those permitted by ASME B31.9 and to prevent transfer of loading and stresses to connected equipment.
2. Fabricate and install anchors by welding steel shapes, plates, and bars to piping and to structure. Comply with ASME B 31.9 and with AWS Standards D1.1
3. Anchor Spacings - where not otherwise indicted, install anchors at ends of principal pipe runs. Make provisions for preset of anchors as required to accommodate both expansion and contraction of piping.

K. Pipe Alignment Guides

1. Install pipe alignment guides on piping that adjoins expansion joints and elsewhere as indicated.
2. Anchor to building substrate.

L. Equipment Supports

1. Fabricate structural steel stands to suspend equipment from structure above or support equipment above floor.
2. Grouting - Place grout under supports for piping and equipment.

M. Shelf Bracket Supports

1. Anchor brackets into concrete wall using anchors specified in Section 15050 “Piping & Pipe Fittings - General”.

3.02 METAL FABRICATIONS

A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.

B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.

C. Field Welding Comply with AWS D1.1/D1.1M procedures for shielded, metal arc welding; appearance and quality of welds; and methods used in correcting welding work; and with the following.

1. Use material and methods that minimize distortion and develop strength and corrosion resistance of base materials.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. Finish welds at exposed connections so no roughness shows after finishing and so contours of welded surfaces match adjacent contours.

3.03 ADJUSTING

A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches (40 mm).

3.04 CLEANING AND PAINTING

A. For galvanized surfaces clean welds, bolt connections, and abraded areas and apply galvanizing repair paint to comply with ASTM A 780, and in accordance with Section 09900 “Painting”.

END OF SECTION 15060

SECTION 15062

DUCTILE IRON PIPE & FITTINGS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Provide and install all ductile iron pipe and fittings of the type(s) and sizes(s) in the location(s) shown on the Drawings and as specified herein.

1.02 RELATED WORK

A. Related Sections
1. Section 09900 Painting
2. Section 15050 Pipe and Pipe Fittings - General

1.03 REFERENCES

A. ANSI A21.51 (AWWA-C151) Standard Specification for Ductile Iron Pipe, Centrifugally Cast in Metal Molds or Sand Lined Molds for Water and Other Liquids.

B. ANSI A21.50 (AWWA-C150) Standard Specification for the Thickness Design of Ductile Iron Pipe.

C. ANSI A21.10 (AWWA-C110) Standard Specification for Cast Iron Fitting 2" through 48" for Water and Other Liquids.

D. ANSI A21.4 (AWWA-C-104) Standard Specification for Cement-Mortar Lining for Cast Iron Pipe and Fittings for Water.

E. ANSI A21.11 (AWWA-C111) Standard Specification for Rubber-Gasket Joints for Cast Iron and Ductile Iron Pressure Pipe Fittings.

F. ANSI A21.15 (AWWA-C115) Standard Specification for Flanged Ductile Iron Pipe with Threaded Flanges.

G. ASTM A307 - Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile.

1.04 DELIVERY, STORAGE & HANDLING

A. Standards for delivery, storage, and handling published in Section 15050 "Pipe and Pipe Fittings – General" are applicable.

B. Extra care when handling cement lined pipe shall be exercised. Damage to the lining of the pipe will render it unfit for use.

C. The spherical spigot ends and the plain ends of all pipe shall be protected during shipment by wood lagging securely fastened in place.

D. All pipe and fittings shall be subjected to a careful inspection and hammer test just prior to being installed.

1.05 SUBMITTALS

A. Submittals shall be made in accordance with the specifications detailed in Section 15050 "Pipe and Pipe Fittings – General".

1.06 QUALITY ASSURANCE

A. The provisions made in Section 15050 "Pipe and Pipe Fittings – General" for "Quality Assurance" are applicable.

B. The ductile iron pipe, gray iron or ductile iron fittings to be provided and installed under this Contract shall be inspected and tested at the foundry as required. Furnish in duplicate sworn certificates of the tests and the results.

PART 2 - PRODUCTS

2.01 PIPE MATERIALS

A. Piping - General

1. Except where otherwise indicated on the Project Drawings, interior piping shall be Class 53 ductile iron pipe with a rated working pressure of at least 250 psi.
2. All ductile iron pipe shall be manufactured in accordance with the latest revision of ANSI/AWWA C 151/A21.51. Each pipe shall be subjected to a hydrostatic pressure test of at least 500 psi at the point of manufacture.
3. The class or nominal thickness, net weight without lining, and casting period shall be clearly marked on each length of pipe. Additionally, the manufacturer's mark, country where made, year in which the pipe was produced, and the letters "DI" or "Ductile" shall be cast or stamped on each pipe.
4. Except where otherwise indicated on the Project Drawings, the interior of all ductile iron piping shall be cement lined and seal coated in accordance with AWWA C 104.
5. The exterior of all ductile iron piping shall be coated in accordance with Section 09900 - "Painting".

B. Piping Joints

1. Except where otherwise indicated on the Project Drawings, all ductile iron piping shall have threaded ductile iron companion flanges, conforming to AWWA C115. These flanges shall be rated for at least 250 psi working pressure.
2. The ductile iron piping and flange shall be faced after threading the flange onto the pipe. The flanges shall be true to 90° with the pipe axis and shall be installed flush with the end of the pipe.
3. All flanged pipe shall be fabricated at the factory by the pipe manufacturer.
4. Gaskets shall be full face, 1/8 inch thick, and comprised of styrene butadiene (SBR) material in accordance with ANSI/AWWA C111/A21.11.
   a. Unless otherwise specified on the Project Drawings, all flanged gaskets shall be Toruseal gaskets as manufactured by American Ductile Iron Pipe, or an approved equal.
5. Flanged joints shall be assembled with bolts and nuts, bolt studs with nut on each end, or studs with nuts in tapped flanges.
6. Flange bolts, nuts, and studs shall be Grade B, meeting the requirements of ASTM A307, and cad-plated with x-heavy nuts.
7. Joint bracing shall be provided to prevent the piping from pulling apart under pressure as required, and as shown on the Project Drawings.

2.02 PIPE FITTINGS

A. General

1. Unless otherwise specified on the Project Drawings, all fittings to be utilized with ductile iron piping shall be ductile iron, in accordance with ANSI/AWWA C110/A21.10, latest revision, with a rated working pressure of at least 250 psi.
2. Except where otherwise indicated on the Project Drawings, all fittings shall be cement lined and seal coated in accordance with AWWA C104.
3. The exterior of all fittings shall be coated in accordance with Section 09900 - "Painting".
4. Fittings having non-standard dimensions shall be subject to the Engineer's review and acceptance.

B. Pipe Fitting Joints

1. Unless otherwise specified on the Project Drawings, all fittings shall have ductile iron flanged joints in accordance with AWWA C 110.
2. The flanges shall be rated for at least 250 psi working pressure.
3. Gaskets, flange bolts, nuts, and studs for fittings shall be as specified herein for piping.
4. Supports for fittings shall be as specified in Section 15060 – "Hanging and Supports for Plumbing, Piping, and Equipment".
5. Expansion joints installed on both suction and discharge sides of the new pumps shall be Series 500 heavy duty expansion joints as manufactured by Mercer Rubber Co., or approved equal.

PART 3 - EXECUTION

3.01 INSPECTION

A. All materials shall be carefully inspected at the time of delivery in accordance with Section 15050 “Pipe & Pipe Fittings - General.”

3.02 PREPARATION

A. Pipe surface preparation shall be performed in accordance with Section 09900 – “Painting”.

3.03 INSTALLATION

A. The installation of pipe and pipe fittings shall be in strict accordance with the pipe and fitting manufacturer’s instructions and recommendations, and Section 15050 - “Pipe & Pipe Fittings - General”.

3.04 FIELD QUALITY CONTROL

A. Field quality control shall comply with the provisions of Section 15050 “Pipe & Pipe Fittings - General”.

B. Pressure and leakage tests shall be required and shall be conducted in accordance with ANSI/AWWA C600. The test pressures for the various pipe lines shall be at least 1.5 times the operating pressure of the system, or 150 psi maximum. Actual test pressure shall be determined by the Engineer. Test pressure shall be maintained with no loss in pressure for a period of 2 hours minimum.

END OF SECTION 15062

SECTION 15110

VALVES AND SPECIALTIES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Work described under this section includes the furnishment, installation, support and testing of valves, and other related specialties, in the location(s) and of the size(s) and quantities shown on the Project Drawings, or as specified herein.

1.02 RELATED WORK

A. Related Sections

1. Section 15050 “Pipe and Pipe Fittings - General”
2. Section 15060 “Hangers and Supports”
3. Section 09900 “Painting”
4. Section 09905 “Surface Preparation and Shop Coatings”

1.03 REFERENCES

A. ASTM A126 - Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings

B. ASTM A307 - Specification for Carbon Steel Bolts and Studs, 60,000 psi tensile

C. ASTM A563 - Specification for Carbon and Alloy Steel Nuts

D. ASTM B62 - Specification for Composition Bronze or Ounce Metal Castings

E. ASTM D1784 - Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds

F. ASTM D4101 - Specification for Propylene Plastic Injection and Extrusion Materials

G. AWWA C500 - Standard for Gate Valves, for Water and Sewerage Systems

H. AWWA C504 - Standard for Rubber-Sealed Butterfly Valves

I. AWWA C508 - Standard for Swing-Check Valves for Waterworks Service, 2 in. through 24 in NPS

J. AWWA C509 - Standard for Resilient-Seated Gate Valves, for Water and Sewerage Systems

K. AWWA C550 - Protective Epoxy Interior Coatings for Valves and Hydrants

L. AWWA C800 - Standard for Underground Service Line Valves and Fittings

M. MSS SP45 - Standard for Bypass and Drain Connections

N. MSS SP80 - Standard for Bronze Gate, Globe, Angle and Check Valves

1.04 SUBMITTALS

A. Product data including body material, valve design, pressure and temperature classification, end connection details, seating materials, trim material and arrangement, dimensions and required clearances, and installation instructions shall be submitted for each type of valve to be provided.

B. Operation and maintenance manuals for each type of valve shall be submitted.

C. Performance and sizing data for air release valves including manufacturer's recommended sizing requirements shall be submitted.

D. Manufacturer's certification that valves and accessories meet or exceed the requirements of these Specifications shall be submitted.

1.05 QUALITY ASSURANCE

A. Unless otherwise specified, all valves of the same type and style shall be manufactured by one manufacturer.

PART 2 - PRODUCTS

2.01 GENERAL

A. All valves shall meet or exceed the pressure and temperature ratings specified.

B. Unless otherwise indicated, all valves shall be of the same size as the upstream pipe.

C. Unless otherwise indicated, all valves shall have the same end connections and an equivalent or higher pressure rating as the pipeline in which it is installed.

2.02 PLUG VALVES

A. Plug valves shall be 100% Port Eccentric Plug Valves

B. Valve body casting shall be ASTM A126 Class 'B' cast iron with a 175 psi pressure rating.

C. Valves shall have flanged ends. Flange diameter, thickness, and drilling shall conform to ANSI B16.1 Class 125.

D. Plug valves shall have a raised seat that is welded with 95% pure nickel.

E. The plug shall have an Acrylonitrile-Butadiene (NBR) or equivalent elastomer facing, in compliance with the ASTM D429 Method B standard.

F. The bonnet shall be ASTM A126 Class B cast iron, with a non-asbestos filler in styrene – butadiene rubber (NBR) O-ring binderseal.

G. The body and bonnet bearings shall be 316 L stainless sintered stainless steel

H. PTFE grit extruders shall be provided at the upper and lower plug journals to prevent the entry of grit and foreign solids onto the bearing area.

I. Acrylonitrile-butadiene V-type multiple V-ring packing shall be provided. The gland shall be easily accessible for adjustment, and the packing shall be able to be replaced or adjusted under pressure without the removal of the actuator or valve disassembly.

J. The plug valve shall open in a clockwise direction.

K. The valves shall be provided with a sealant injection gun and a pre-packed year's supply of NSF approved sealant.

L. All screws, studs, nuts bolts, etc, necessary for the valve installation are to be provided and, unless otherwise indicated, shall be composed of 316 stainless steel.

M. Plug valves shall be manufactured by DeZurik, or an approved equal.

N. Contractor shall be responsible for coordinating proper valve orientation per manufacturer's instructions.

2.03 CHECK VALVES

A. Swing Check Valves, 2-1/2" - 12"

1. Check valves shall meet the material, design, and manufacture requirements of AWWA C508, latest revision.
2. Check valves shall have a bronze to bronze seating assembly, and shall be supplied with external lever-and-weight assembly arms.
3. The valve clapper shall swing completely clear of the water way when the valve is fully open, permitting a "full flow' through the valve equal to the nominal pipe diameter.
4. Check valves shall be rated at a 200 psi working pressure, and a 400 psi hydrostatic test pressure for structural soundness. Seat tightness at rated working pressure shall be in accordance with AWWA C508.
5. The valve bodies shall be made of high strength cast iron conforming to ASTM-A126, Class B standards.

6. The check valves shall be furnished with ANSI B16.1/125# flanged ends.
7. The check valves shall have a double bronze side plug construction, and shall have hinge pins comprised of ASTM A276, type 304 stainless steel, rotating in bronze plugs. Bolts shall be electro-zinc plated steel with hex heads and hex nuts in accordance with ASTM A307 and A563.
8. Check valves shall be constructed to permit top entry for complete removal of internal components without removing the valve from the line. Glands shall be O-rings. Bosses shall be provided on check valves which may be tapped for draining or used for bypass. The inside and outside of all valves together with the working parts, except bronze and machined surfaces, shall be coated in accordance with AWWA C-550. Marking shall be in accordance with AWWA C-508 and shall include size, working pressure, and cast arrow to indicate direction of flow, name of manufacturer, and year of manufacture.
9. Check valves shall be manufactured by Kennedy Valve, or an approved equal.

2.04 MANUAL OPERATORS

A. Provide lever handles for quarter-turn valves 4 inches or smaller. Provide one level handle for each valve supplied.

B. Manual actuator hand wheels shall be furnished on valves 6 inches or larger. Valves shall be mounted vertically with right angle drive actuators. All components of the actuators shall be designed to withstand, without damage, a pull of 200 pounds as required by AWWA C504 - Section 12.3. Actuators shall be designed to close with an effort of less than 40 pounds torque.

PART 3 - EXECUTION

3.01 DELIVERY

A. Valves and accessories shall be prepared for shipping as required for complete protection. It shall be ensured that valves are dry and protected from rust and corrosion.

B. Valve ends shall be protected against damage to threads, and flange faces.

C. Valves shall be set in the best position for handling. Globe and gate valves shall be closed to prevent rattling. Ball valves shall be set open to minimize exposure of functional surfaces. Butterfly valves shall be set closed or slightly open. Block swing check valves shall be set in either the closed or open position.

D. Valve ends shall be sealed to prevent entry of foreign matter into valve body.

3.02 INSPECTION

A. Examine valve interior through the end ports for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.

B. Actuate valve through an open-close and close-open cycle. Examine functionally significant features, such as guides and seats made accessible by such actuation. Following examination, return the valve closure member to the shipping position.

C. Examine threads on both the valve and the mating pipe for form (i.e. out-or-round or local identification) and cleanliness.

D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Check gasket material for proper size, material composition suitable for service, and freedown form defects and damage.

E. Prior to valve installation, examine the piping for cleanliness, freedom from foreign materials, and property alignment.

F. All defective valves shall be replaced by the Contractor at no additional cost to the Owner.

3.03 STORAGE

A. The vale end protectors shall not be removed unless necessary for inspection. After inspection, the valve end protectors shall be reinstalled.

B. Valves shall be stored indoors, and protected from weather, moisture, and possible damage.

C. Valves or accessories shall not be strewed directly on the ground.

3.04 HANDLING

A. Valves and accessories shall be handled in such a manner as to prevent damage of any kind to the interior or exterior surfaces.

B. Valve hand wheels and stems shall not be used as lifting or rigging points. A sling shall be used to handle valves whose size require handling by crane or lift. Valves should be rigged in a manner to avoid damage to exposed valve parts.

3.05 INSTALLATION

A. Valves and accessories shall be installed in strict accordance with the manufacturer's instructions and recommendations, and in accordance with the arrangement depicted on the Project Drawings.

B. All valves shall be carefully erected and supported in their respective positions free from distortion and strain.

C. All valves connected to pumps and equipment shall be independently supported.

D. Unless otherwise shown on the Project Drawings, valves shall be in a location which allows for easy access.

E. Valves and unions shall be installed for each fixture and item of equipment arranged to allow equipment removal without system shutdown. Unions are not required on flanged devices.

F. A three-valve bypass shall be installed around each pressure reducing valve using throttling-type valves.

G. Valves shall be installed in horizontal piping with the stem at or above the center of the pipe.

H. Valves shall be installed in a position that allows full stem movements.

I. Swing check valves shall be installed in a horizontal position with the hinge pin level.

J. Valves and actuators shall be installed to be plumb in the vertical direction.

K. Install valves such that "open" and "close" position indicators are easily visible.

3.06 CONNECTIONS

A. Threaded connections

1. Connections of valves that are to be threaded shall be completed in full conformance with the valve manufacturer's recommendations.
2. The internal length of threads in valve ends and the proximity of the valve internal seat or wall shall be used to determine how far the pipe should be threaded into the valve.
3. Appropriate taping or thread compound shall be applied to the external pipe threads (except where dry seal threading is specified).
4. The joint shall be assembled wrench tight.

B. Flanged Connections

1. Flanged connections of valves shall be completed in full conformance with the valve manufacturer's recommendations.
2. Flange surfaces shall be aligned so that they are fully parallel.
3. Joints shall be assembled by sequencing bolt tightening to make initial contact of flanges and gaskets as flat and parallel as possible. Suitable lubricants shall be used on bolt threads. Bolts shall be tightened gradually and uniformly with a torque wrench.

3.07 FIELD ADJUSTMENTS, TESTING AND APPLICATION

A. All valves and accessories shall be checked and adjusted for smooth operations.

B. After piping systems have been tested and put into service, but before final adjusting and balancing, valves shall be inspected for leaks. Packing shall be adjusted or replaced to stop leaks. Valves shall be replaced if leak persists or if it is not functioning to the satisfaction of the Engineer.

C. The Contractor shall arrange and provide for a field service representative from the manufacturing company to be onsite to perform operator training in calibration, use, and maintenance of all equipment provided under this section. The contractor shall provide the Owner with a minimum of 7 days written notice of the arranged planned operator training.

3.08 CLEANING AND FINISHING

A. All mill scale, grease, and if applicable, protective coatings shall be cleaned from the exterior of the valves and the valves shall be prepared to receive finish paint, in accordance with the manufacturer's instructions, and Section 09900 "Painting".

B. Any scratches, marks and other types of surface damage, etc., shall be repaired if possible, with the original coatings as supplied by the factory, and in accordance with section 09900 "Painting" and to the full satisfaction of the Engineer.

3.09 FINAL ACCEPTANCE AND WARRANTY

A. The final acceptance of all equipment furnished under these Specifications will be withheld until after the installation and the field testing witnessed by the Engineer. Unless otherwise specified, the manufacturer and the Contractor shall guarantee the equipment against defects of any kind for a period of at least one year after final testing and acceptance.

END OF SECTION 15110

SECTION 16005

SUMMARY OF THE ELECTRICAL WORK

PART 1 - GENERAL

1.01 GENERAL INFORMATION & DESCRIPTION OF PROJECT

A. The electrical work for this project includes demolition and dismantling of the existing power, control, and instrumentation presently serving the existing duplex pump equipment. Refer to Section 16010 for detailed demolition instruction.

B. Additionally, electrical work includes providing all electrical materials and equipment necessary for the installation of a new electric service, underground service lateral, main service disconnect, manual transfer switch and emergency generator receptacle.

C. Additionally, electrical work includes providing all electrical materials for interconnection of duplex pump control panel, effluent level probes, SCADA system components, radio antenna and transmitter, and miscellaneous control devices associated with the duplex pump equipment.

1.02 REFERENCE

A. The following Sections shall be considered an integral part of this Section:

Division 1 - General Requirements

Division 16 - All Sections Inclusive

1.03 WORK INCLUDED

A. This Section describes the labor and materials required to accomplish the major components of Work associated with demolition, installation of control equipment and electrical systems described herein and as indicated on the Contract Drawings.

B. Prior to the start of Work, the Contractor shall verify acceptability of the construction schedule with the Owner. Intention being to avoid any unnecessary disruptions of pumping operations.

C. The Work shall include, but not be limited to, providing the following:

1. Maintaining continuous operations to the pump facility throughout the project, including temporary services throughout course of work.

2. Demolition of electrical service equipment, pump motor controls, non functional pump controls, and certain electrical equipment noted on electrical plan.

3. New electric service equipment, metering and underground service lateral up to and including Utility Co. service drop.

4. New service distribution equipment improvements including incoming main circuit breaker, manual transfer switch, and metering provisions.

5. Raceway and wiring systems for underground service entrance, transfer switch, emergency generator receptacle and raceways to support secondary distribution from duplex pump panel to existing pumps.

6. Interlock wiring for pump controls, instrumentation, interlock effluent level and alarm wiring *interconnecting* existing duplex pumps.

7. Relocation of existing SCADA system and radio antenna and transmitter components and hardware. Provide control and instrument wiring for these systems.

8. Ground grid installation for new electric service, generator receptacle, related metallic structures and auxiliaries. Raceways, equipment and circuit bonding, with the connection of new ground grid into pump system sewer force main.

9. All Conduit, wiring, fittings, boxes and pull boxes, mounting hardware, fittings, including accessories to support this installation.

10. Transport and dispose of all electrical demolition equipment. Deliver existing duplex pump panel, distribution panel, copper wiring and scrap metals to owner. Cleanup and disposal of unused materials and construction debris.

1.04 EQUIPMENT AND SERVICES BY OTHERS

A. GENERAL

a) The electrical contractor will remove and relocate existing SCADA system equipment, radio transmitter and antenna to new weather proof enclosure. Conduit and cabling required for antenna, flow and level sensors and pump thermal protection will be installed by the contractor. Internal connections, adjustments, programming, final terminal interconnects will be performed by the OWNER.

1.05 CODES

A. All work shall conform to the current edition of the State Basic Building Code, National Electric Code and NFPA standards for the facility. The provisions of the National Electric Code constitute a minimum standard. Utility, Design and Standards often require larger wire sizes, additional branch circuits and higher grades of equipment than the minimum that may be specified in the code. Where such provisions are called for in these specifications, they shall take precedence over code requirements.

1.06 SCHEDULING WORK

A. All work shall be performed following a schedule previously approved by the Engineer and the Owner/Facility. Reference Section 108 of the GNHWPCA's Standard Specifications.

B. All schedules shall be prepared using MS Project, or acceptable scheduling software.

C. Attention is directed to the fact that the Pump Station operations will remain in operation during the entire period of construction. The integrity and reliability of the distribution system, alarm and life safety utilities must be maintained at all times during construction. The Contractor will perform all work in a manner, schedule, and sequence such that normal building activities will be maintained in operation without interruption to the safety, use, and function of the facilities.

D. The Contractor shall request service outages and switching with the Project Manager a minimum of 48 hours prior to the required outage. The Project Manager will coordinate all requests.

E. ***Note well*** that the 48-hour notification may not necessarily assure a power outage. All requests for outages will be subject to the approval of the Owner administration and coordinated with activities surrounding the use and function of facilities at the time of request.

F. The successful bidder shall provide continuous supervision and adequate manpower to assure successful completion of work within the prescribed time limits. Normal working hours for this project will be at the Contractors discretion however, limited by the operations and availability of facilities.

G. At the discretion of the Owner's management, the Contractor will be permitted to work holidays, Saturdays, and Sundays or beyond normal hours. If, in the opinion of the Project Manager and/or Project Consulting Engineer, the progress of work has not maintained a timely schedule, the Contractor will expand his workforce, and work overtime hours in order to satisfy the requirements of the Project Schedule.

H. The Contractor shall furnish necessary manpower to startup and assist in testing the new service source. Any rework resulting from errors discovered during startup will be performed at no additional cost to this contract.

I. Location of equipment shown on plans shall be considered diagrammatic and approximate. All pertinent drawings shall be studied prior to installation of equipment. The Contractor shall consult with Project Engineer and verify all mounting heights, spacing, and exact locations for equipment. It shall be understood that prior to installation, any device or unit equipment, may be relocated a distance of ***TEN FEET*** from the location shown on the drawings. If relocation is required or directed by the Project Engineer, the change shall be performed at no additional cost to the contract.

J. The Contractor shall remove and/or relocate existing obstructions, electrical services, etc., interfering with the project modifications. Where interfering services are presently serving vital equipment operations, the Contractor shall reroute, rewire, or re-connect such

services and related components into their systems as directed by the Project Manager and Consulting Engineer.

K. During the progress of his work the Contractor shall notify the project manager of any latent or unknown conditions encountered that differ materially from information shown on the Plans or implied in these specifications.

L. The Engineer will promptly investigate such conditions and instruct the Contractor as to any field changes that may be required. Any increase or decrease in costs will be adjusted in the manner set forth in the GENERAL CONDITIONS of this document.

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT

A. Materials shall be free from defects, which would adversely affect the performance or maintainability of individual components or the overall assembly.

B. Material not specified herein shall be of the same quality used for the intended purpose in specification grade installations.

C. Unless otherwise specified herein, all equipment, material, and articles incorporated in the Work covered by this Section shall be factory new and without blemish or defect. Salvage or rebuilt equipment or materials will not be acceptable.

D. All electrical devices including safety switches, panelboards and control devices shall be identified by nameplates. Nameplates shall be white laminate (micarta or similar) with black engraved capital letters. A nameplate schedule shall be submitted for approval of all items. Tape nameplates are not acceptable.

2.02 SUBMITTALS

A. Specific instructions in each Section of Division 16 of this specification.

B. Manufacturer's Descriptive Literature.

1. Prior to procuring equipment or materials, and before executing any work, the Contractor shall submit to the Engineer four (4) copies of all manufacturer information to thoroughly describe the equipment and materials he proposes to furnish for accomplishment of the Work.

2. Submittals for each manufacturer item shall include, but not be limited to Manufacturer's descriptive literature, equipment shop drawings, wiring diagrams and installation instruction.

C. Upon completion of the Work, the Contractor shall provide four (4) sets of equipment shop drawings, performance data, and maintenance and operation instructions.

2.03 WARRANTY AND GUARANTEES

A. The Contractor, at the convenience of the Owner, shall remove, replace and/or repair, at its own cost and expense, any defects in workmanship, materials, ratings, capacities or characteristics occurring in or to the Work covered by the Contract within one (1) year, excepting equipment requirements in other sections. The period of such guarantee to commence with the Engineer's final acceptance of all Work covered under the Contract. The Manufacturer/Contractor, upon demand, shall pay for all damage to all other work resulting from such defects and all expenses necessary to remove, replace and/or repair such other work which may be damaged in removing, replacing or repairing the said defects.

B. Unless such removal, replacement and/or repair shall be performed by the Contractor within ten (10) working days after it receives written notice from the Owner specifying such defect, or if such defect is of such a nature that it cannot be completely removed, repaired and/or replaced within said ten (10) day period and the Contractor shall not have diligently commenced removing, repairing and/or replacing such defect within said ten (10) day period and shall not, thereafter, with reasonable diligence and in good faith, proceed to do such work, the Owner may employ such other person, firm or corporation as it may choose to perform such removal, replacement and/or repair and the Contractor agrees, upon demand, to pay to the Owner all amounts which it expends for such work.

2.04 PROJECT RECORD DOCUMENTS

A. The Contractor shall maintain an up-to-date set of Contract documents and note any and all revisions and deviations that are made during the course of the project.

PART 3 - EXECUTION

3.01 GENERAL

A. The Contractor shall provide all labor, materials, supervision, tools, and equipment to install all equipment and systems as indicated on the Contract Drawings and as specified herein.

1. Contractor shall field verify site conditions and lay out tasks prior to start of work.

2. Contractor shall initiate appropriate efforts to establish a ‘lock-out, tag-out’ zone around the affected equipment.

3. If pumping operations are deemed essential, a pre-construction temporary service with panelboard and current protection shall be provided. Work shall not start until all components are on site.

4. Install appropriate tags on the cable ends to maintain tractability and identity when dismantling existing equipment. This procedure will be maintained by the removal of system components. Restoration to the original condition of work area must be done prior to start of installation phase.

5. Tagged cable systems will be removed to the most advantageous point such that removal operation is not hampered by 'dangling' cables or cables presenting a tripping hazard.

6. Demolition and disposal of all materials not requested to be salvaged by the Owner.

7. Rigging into place and setting of new equipment.

8. System startup and testing including phasing and motor rotation with necessary adjustments at completion of installation.

9. Clean, paint, and name tag all conduits and equipment, where specified.

3.02 QUALITY ASSURANCE

A. The Work shall be performed only by experienced workmen related to the trade and task being accomplished, utilizing only the best quality materials and proper tools and procedures.

3.03 FIELD QUALITY CONTROL

A. GENERAL

1. Engage the services of the OEM service representative for initial start-up, testing, and calibration, and perform all adjustments to assure for smooth operations.

2. The Contractor shall provide sufficient manpower to assist the manufacturer representation in start-up, and testing of equipment. Contractor shall not be relieved of this task until operations are approved to the satisfaction of the Engineer.

3. The Contractor shall give a minimum of 48 hours notice to the Engineer and the Facility prior to the start of any tests or inspections.

4. The Contractor shall furnish all personnel to assist during testing. The facility management will not assume responsibility until the Work has been fully accepted by the Engineer.

END OF SECTION 16005

SECTION 16110

ELECTRICAL DEMOLITION and REMOVALS

PART 1 - GENERAL

1.01 WORK INCLUDED

A. This Section covers the requirements for the demolition and removal of equipment, devices and materials to facilitate the installation of new equipment. Equipment to be demolished and removed is, in general, indicated on the Contract Drawings. The demolition shall be performed in a sequential and phased manner in accordance with the Project Schedule. Work included, but not be limited to, providing the following:

1. Coordinate and assist Utility Co. in relocating existing overhead service lateral, service pole, metering and pump control cabinets.

2. Demolition associated with removal of existing 60A service equipment.

3. Removal, relocation and reserving power circuits associated with station duplex pumps and instrumentation.

B. The Contractor shall coordinate all demolition and removals with owner's management prior to the execution of work.

C. The Contractor shall understand that the Contract Drawings and Specifications relating to the demolition serve only to identify the Project Scope and area of Work. The drawings are not sufficiently detailed to reference every element to secure a material take off accounting for the total Scope of Work.

D. The Contractor shall furnish all labor, supervision, materials, and equipment required for the Work as indicated herein and on the Contract Drawings.

E. Contractor is responsible for removal and disposal of all demolition equipment and materials not marked as salvage, from the site.

F. The Owner will be responsible for any testing and disposal of hazardous materials.

1.02 RELATED SECTIONS

A. Division 1 of this Specification.

B. Division 16 of this Specification.

1.03 SPECIAL CONDITIONS

A. There may be elements of the system where ACM is suspected to exist. These areas may be in the form of electrical cable insulation. Asbestos Abatement shall be the responsibility of the Owner. **The Contractor shall notify the Agency Representative, Facility Representative, and the Construction Coordinator ten (10) days in advance of the time if and when asbestos removal is required.**

1.04 REFERENCES

A. Where applicable all work performed under this section shall be in accordance with the latest edition and latest addenda thereto of the applicable codes, standards and regulations of authority having jurisdiction.

B. Where reference is made to codes or standards, or to technical or trade specifications (such as ASTM or ANSI) or to the Engineer's standards, the latest edition and latest addenda shall be used.

PART 2 PRODUCTS

2.01 MATERIALS AND EQUIPMENT

A. Materials and equipment for equipment removals as specified in other Sections of this Specification.

PART 3 EXECUTION

3.01 EXAMINATION

A. Demolition work is based on casual field observation without the aid of extensive testing equipment and manpower. Report discrepancies to Engineer before disturbing and/or removing utilities.

B. Contractor shall verify station components, structural elements and detail indicated on drawings.

C. Notify the Engineer of any latent or unknown conditions encountered during the progress of his work that differ materially from the information shown on the Plans or as implied in the Specifications.

D. Engineer will promptly investigate such conditions and instruct the Contractor as to any field changes that may be required.

3.02 PREPARATION

A. Coordinate relocation of new service with Utility Co. in a manner that will minimize an unscheduled interruption of power.

B. Remove existing 60A service, manual transfer switch, generator power receptacle, duplex pump panel, in a sequence that will allow continued operation of the duplex pump equipment.

C. Remove existing SCADA control and instrumentation, antenna and radio transmitter, and relocate to new weather proof enclosure. Refer to Section 16160 for enclosure type.

D. Contractor shall remove and/or relocate all existing obstructions, electrical services, etc., interfering with new construction. Where such services are presently servicing system components vital to the pumping operations, the contractor shall reroute, rewire, and connect those services and components into their respective systems as directed by the Engineer.

E. Install appropriate tags on the cable ends to maintain tractability and identity when dismantling existing equipment. This procedure will be maintained by the removal of system components. Restoration to the original condition of work area must be done prior to start of installation phase.

F. Tagged cable systems will be removed to the most advantageous point such that removal operation is not hampered by 'dangling' cables or cables presenting a tripping hazard.

G. Deliver existing power wiring & cables, equipment panels, switches and pump duplex panel to owner for their use.

H. Removal from the site and disposal of remainder of demolition materials not designated for salvage.

3.03 PROJECT RECORD DOCUMENTS

A. Contractor shall maintain an up-to-date set of Contract documents and note any and all revisions and deviations that are made during the course of the project.

END OF SECTION 16110

SECTION 16111

ELECTRICAL RACEWAYS

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Metallic conduit.

B. Related Sections:

1. Section 16005 Summary of the Electrical Work
2. Section 16123 Building Wire and Cable
3. Section 16124 Instrument & Control Wire and Cable
4. Section 16130 Junction, Splice and Pull Boxes
5. Section 16160 Cabinets and Enclosures
6. Section 16170 Grounding and Bonding

1.02 DESIGN REQUIREMENTS

A. State of Connecticut Basic Building Code and the National Electric Code NFPA 70.

B. The provisions of the National Electric Code constitute a minimum standard. Design often requires larger sizes of wire, more branch circuits and better grades of equipment than the minimum that is specified in governing codes. Where provisions are called for in specifications, they shall take precedence over such code requirements.

1.03 REGULATORY REQUIREMENTS

A. Product shall conform to ANSI/NFPA requirements.

B. Furnish products listed and labeled by Underwriters Laboratory, Inc.

PART 2 - PRODUCTS

2.01 CONDUIT REQUIREMENTS

A. All wiring shall be installed in raceways as outlined in NFPA 70.

1. Exposed exterior & underground raceway shall be galvanized rigid steel type.

B. Raceways shall be 3/4 inch MINIMUM UL approved and labeled for specific use.

C. Intermediate Metallic Conduit and EMT conduit may be used within enclosure.

D. Raceways used for instrument and control systems, installed within enclosure, shall be NEC approved for use and application.

2.02 FLEXIBLE STEEL CONDUIT

A. Rotating motor assemblies and electrical devices shall be terminated with liquid tight flexible steel conduit.

B. Liquid tight flexible conduit 1-1/4" to ½" minimum shall be "Sealtite" Type UA.

C. Liquid tight flexible conduit larger than 1-1/4" shall be Type EF flexible conduit installed with compatible fittings of the same Manufacturer.

D. Flexible conduit shall be equipped with Thomas & Betts, Appleton Electric, Crouse-Hines/Cooper or Engineer Approved Equal fittings.

2.03 CONDUIT SEALS

A. Conduit seals shall be provided as noted on the Contract Drawings.

B. Conduit sleeves shall be schedule 40 wall PVC.

C. Fittings for sealing assemblies shall have a hot-dipped galvanized finish.

D. Seals shall be as manufactured by O.Z. Electric Manufacturing Company, General Signal Company, Link-Seal or approved equal.

PART 3 EXECUTION

3.01 DELIVERY, STORAGE AND HANDLING

A. Contractor shall deliver, store, protect and handle product at Site under provisions of this Specification. Damaged product will not be allowed for use on this project.

3.02 CONDUIT INSTALLATION

A. Conduits shall be grounded in accordance with the National Electrical Code.

B. Exposed raceways shall be installed parallel and perpendicular to structure(s).

C. Exposed conduits shall be supported by approved hangers, straps or racks not more than 5'-0" apart.

D. Conduits shall be grouped together, installed and fastened on galvanized utility channel or structural steel securely anchored to structure or walls.

E. Threaded joints shall be made watertight by applying sealant to the threads.

F. Conduits shall be reamed and burrs shall be removed and cleaned before introduction of wire within conduit.

G. Conduits installed underground, concrete or building walls shall be inspected by duly authorized inspectors before they are covered.

3.03 CONDUIT FITTINGS

A. Contractor shall provide grounding type insulated metallic bushings at all entries.

B. Intermediate fittings shall be cast type bodies with threaded hubs, gasketed screw type covers. Conduit unions where applicable shall be Erickson type couplings.

C. Conduit entries into equipment cabinets and sheet metal enclosures, and junction boxes shall be threaded type, malleable iron body, rain-tight hub fittings with insulated throat.

3.04 PROJECT RECORD DOCUMENTS

A. Contractor shall maintain an up-to-date set of Contract documents. Note any and all revisions and deviations that are made during the course of the project.

END OF SECTION 16111

SECTION 16123

BUILDING WIRE and CABLE

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Building wire & cable, wiring connectors & connections

B. Related Sections:

1. Section 16005 Summary of the Electrical Work
2. Section 16111 Electrical Raceways
3. Section 16124 Instrument & Control Wire and Cable
4. Section 16130 Junction, Splice and Pull Boxes
5. Section 16160 Cabinets and Enclosures
6. Section 16170 Grounding and Bonding

1.02 DESIGN REQUIREMENTS

A. ANSI/NFPA 70 National Electric Code (NEC)

1. The provisions of the National Electric Code constitute a minimum standard. Design and Standards often require larger sizes of wire, more branch circuits and better grades of equipment than the minimum which is specified in the code. Where such provisions are called for in these Specifications, they shall take precedence over such code requirements.

1.03 REGULATORY REQUIREMENTS

A. Where applicable, all electrical products and devices shall bear the Underwriters Laboratory, Inc. (UL), label.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturers for Building Wire and Cable are General Wire & Cable, Okonite, Rockbestos, Triangle Wire & Cable, or an Engineer Approved Equal.

2.02 MATERIALS SPECIFICATION

A. Wire sizes in these Specifications or on the Drawings are American Wire Gauge.

B. Wiring for branch and feeder circuits shall be stranded, tinned copper conductors, 600 VAC insulation rating, #12AWG minimum or as noted on Drawings.

C. Insulation NFPA70, table 310-90deg.C apply to all feeders and branch circuits,

D. Internal Motor Control and Control Panel wiring shall be switchboard type SIS, 600 VAC, #14 AWG tinned copper, 90 deg. C. ratings.

E. Conductors entering cable trays shall be multi-conductor cable type assembly and code NEC TYPE TC, 90 deg.C rated.

F. Rockbestos, X-LINK TC has been used as the basis for cable assembly design.

PART 3 EXECUTION

3.01 DELIVERY, STORAGE AND HANDLING

A. Contractor shall deliver, store, protect and handle wire on site under provisions of this specification. Accept wire on Site and inspect for damage.

3.02 PREPARATION

A. Refer to branch circuit arrangement shown on Contract Drawings.

3.03 INSTALLATION

A. Contractor shall install products in accordance with manufacturer's instructions.

B. The installation of all wire and cables shall result in a continuous conductor without splices between final terminations. Spliced conductors will not be allowed or acceptable.

C. Wiring shall be neatly trained and laced inside equipment, terminal and panelboards.

D. Cable, taps and terminations shall be full ampacity of conductor and not less than branch circuit rating.

E. Power cable and wiring extending vertically along structures will require strain relief fittings, install strain relief grips at top and end of services.

3.04 CABLE CONNECTORS

A. Wire and cable connectors for No. 8 AWG and smaller shall be of the pressure indent type with an insulating cover by Buchanan Electric Products, Burndy, ILSCO or Engineer Approved Equal.

B. Wire and cable connectors for No. 6 AWG and larger shall be of the bolted pressure type as manufactured by OZ Electrical Manufacturing Company, Burndy, T & B Company, or Engineer Approved Equal.

3.05 TESTING OF CABLES

A. Cables and each wiring system shall be tested for continuity and resistance to ground with megger testing device. Contractor will furnish testing instruments.

B. All cables shall be initially tested prior to their installation into raceways and cable trays. Cables shall be retested after installation. All cables and conductors that do not conform to the above standards will be considered damaged during installation.

C. Test results shall yield a minimum resistance between conductors and ground not less than 100 megohms per 1000ft, at 500VDC (max.) shall test free of grounds and short circuits.

D. Wiring not conforming to test standards must be considered damaged during installation and rejected. Contractor will reinstall damaged cables at no additional cost to this contract.

3.04 QUALITY CONTROL

A. Contractor shall inspect, assess, and measure tightness of bolted connections and compare torque measurements with manufacturer's recommendations.

B. Contractor shall verify continuity of each branch circuit conductor and establish correctness with Panelboard schedule with One Line Diagram for panel details.

3.05 PROJECT RECORD DOCUMENTS

A. Contractor shall maintain an up-to-date set of Contract documents and note all revisions and deviations that are made during the course of the project.

END OF SECTION 16123

SECTION 16124

INSTRUMENT & CONTROL WIRE and CABLE

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Instrument & Control Wire & Cable

B. Related Sections

1. Section 16005 Summary of the Electrical Work
2. Section 16111 Electrical Raceways
3. Section 16123 Building Wire and Cable
4. Section 16130 Junction, Splice and Pull Boxes
5. Section 16160 Cabinets and Enclosures
6. Section 16170 Grounding and Bonding

1.02 REFERENCES

A. All Work performed, where applicable under this Section, shall be in accordance with the most recent edition and most recent addenda thereto of the applicable codes, standards, specifications, regulations, procedures, and tests of the following organizations to the extent referred to herein:

1. Insulation ICEA Standard S-66-524.
2. Jacket Standard S-19-81 (CSPE).
3. ANSI/IEEE 383 & 323.
4. ICEA Standard T-29-520 Flame Test.
5. UL Listed Type TC - UL 1277.

1.03 DESIGN REQUIREMENTS

A. ANSI/NFPA 70 National Electric Code (NEC).

1. The provisions of the National Electric Code constitute a minimum standard. Design and Standards often require larger sizes of wire, more branch circuits and better grades of equipment than the minimum which is specified in the code. Where such provisions are called for in these specifications, they shall take precedence over such code requirements.

1.04 DEFINITIONS

A. Control Functions are opened or closed contact closures reflecting static equipment state.

B. Instrument sources are dynamic signal generating either current or voltage signal.

1.05 REGULATORY REQUIREMENTS

A. All Work performed, where applicable under this Section, shall be in accordance with the most recent edition and most recent addenda thereto of the applicable codes, standards, specifications, regulations, procedures, and tests of the following organizations to the extent referred to herein:

1. Underwriters Laboratory, Inc. (UL) UL Standard 1277

2. National Electric Code (NEC)

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturers for Instrument & Control Wire and Cable are: General Wire & Cable, Rockbestos, Triangle Wire & Cable, Okonite or an Engineer Approved Equal.

2.02 MATERIALS SPECIFICATION

A. Rockbestos X-LINK TC is the design basis for CABLE Tray Assembly.

B. Rockbestos Firezone is the design basis for individual device terminations at high temperature locations.

C. Wire sizes in these Specifications or on the Contract Drawings are American Wire Gauge, Single or Stranded - copper conductors, with ratings:

1. Control Services 300 VAC minimum rating.

2. Instrument Services 300 VAC minimum rating.

D. Control cables shall be twisted, multi assembly, stranded #14 AWG tinned copper annealed conductors, color coded silicon rubber insulation with an aluminum-backed fire barrier tape and cross linked polyolefin XLPE black outer jacket.

E. Instrument cables shall be shielded twisted, two insulated conductors with flexible strand tin coated annealed copper drain wire, helical aluminum laminated tape shield, isolation tape and copper drain wire. Conductors shall be No. 16 AWG stranded tinned copper conductors, color coded silicon rubber insulation. Cable assembly shall either be single or multi pair, according to application. Protective outer jacket shall be cross linked polyolefin XLPE black outer jacket.

F. Instrument cables, unless otherwise indicated in the Contract Documents, shall be two (2) pair assemblies.

G. Control and Instrument cables shall have NEC TYPE TC ratings.

H. Internal Pump Panel wiring shall be switchboard type SIS, 600 VAC, #146AWG tinned copper, 90 deg. C. ratings.

PART 3 EXECUTION

3.01 DELIVERY, STORAGE AND HANDLING

A. Contractor shall deliver, store, protect and handle wire on site under provisions of this Specification. Accept wire on Site and inspect for damage. Any wire which is damaged shall be rejected and replaced.

3.02 PREPARATION

A. Contractor shall refer to branch circuit arrangement shown on Contract Drawings.

B. Conduits must be swabbed and made thoroughly dry before pulling wire & cables.

3.03 INSTALLATION

A. Cables serving plant control functions shall be twisted multi conductor assembly,

B. Cables serving instrument functions shall be twisted, single or multi pair shielded,

C. The installation of all wire and cables shall be accordance with Manufacturer's instructions resulting in continuous conductors without splices between terminations. Spliced wire and cables will not be allowed or acceptable.

D. Control Panel and equipment wiring shall be continuous without splices and shall be identified at each end with sleeve type marker. Internal panel wiring and cabling shall be terminated with not more than TWO (2) wires on a device or terminal end.

E. Panel wiring shall be assembled in a neat and orderly fashion, with wiring neatly trained and lace wiring inside boxes, Control Equipment, MCC's, Panelboards and equipment terminal compartments.

F. Internal equipment wiring shall be terminated on terminal blocks to insure proper interface with new cabling and wiring. The terminal blocks shall be General Electric type CR-151B2, with permanent marking terminal strips.

G. Control wiring terminations and closing connections at control devices shall be terminated using compression type insulated ring lugs, crimp style connectors. All lugs shall be attached with an approved crimping tool.

3.04 TESTING OF CABLES

A. Cables and each wiring system shall be tested for continuity and resistance to ground with megger testing device. Contractor will furnish testing instruments.

B. Cables shall be initially tested prior to installation into raceways and cable trays.

C. Cables shall be retested after installation.

D. Cables and conductors that do not conform to the above standards will be considered damaged during installation and will be the responsibility of the Contractor.

E. Test shall yield a min. resistance between conductors and ground not less than 100 megohms per 1000ft, at 500VDC (max.) test free of ground and short circuits.

3.05 QUALITY CONTROL

A. Contractor shall inspect and measure tightness of bolted connections and compare torque measurements with manufacturer's recommendations.

B. Contractor shall verify continuity of each branch circuit conductor and establish correctness with panelboard, switchboard and/or with One Line Diagram.

C. Wire tests that do not conform to the above standards will be considered damaged during installation and rejected. Contractor will perform reinstallation of damaged cables at his own expense without additional cost to this contract.

3.06 PROJECT RECORD DOCUMENTS

A. Contractor shall maintain an up-to-date set of Contract Documents and note all revisions and deviations that are made during the course of the project.

END OF SECTION 16124

SECTION 16130

JUNCTION, SPLICE AND PULL BOXES

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Boxes general, Junction Boxes, Pull & Splice Boxes.

1.02 REFERENCES

A. All Work performed, where applicable under this Section, shall be in accordance with the most recent edition and most recent addenda thereto of the applicable codes, standards, specifications, regulations, procedures, and tests of the following organizations to the extent referred to herein:

1. ANSI/NFPA 70 National Electric Code
2. NEMA 250 Enclosures for Electrical Equipment

1.03 RELATED SECTIONS

A. Section 16005 Summary of the Electrical Work

B. Section 16111 Electrical Raceways

C. Section 16123 Building Wire and Cable

D. Section 16124 Instrument & Control Wire and Cable

E. Section 16160 Cabinets and Enclosures

F. Section 16170 Grounding and Bonding

1.04 SUBMITTALS

A. Contractor shall submit manufacturer’s standard data for, transfer switch, specialty boxes and enclosures.

B. Contractor shall submit product data and shop drawings including dimensions of physical size, entry and closure operating details.

1.05 REQUIREMENTS

A. Conform to ANSI/NFPA 70 - National Electric Code.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturer's for Junction, Splice and Pull Boxes are: Hammond Manufacturing Enclosures, Substitutions fall under the provisions of Section 16000 of this Specification.

2.02 BOXES - GENERAL

A. Boxes used in conjunction with branch circuits shall accommodate threaded metallic conduit and shall be threaded hub cast type with gasketed covers.

B. Boxes shall be of the material, finish, type and size specified and required for the location, kind of service, number of wires, and the function. Unless otherwise specified, they shall conform to the requirements of the "Standard for Cabinets and Boxes" (Designation:UL-50) and to the "Standard for Boxes and Fittings" (Designation:UL-514), Underwriters Laboratories, Inc., as may be applicable.

C. All boxes shall be suitable for industrial service, use in Damp and Wet locations, shall be Stainless Steel enclosures with rust-resistant parts, watertight and airtight, gaskets between box and removable cover.

D. Boxes not over 100 cubic inches in size shall be standard boxes not less than No. 14 U.S.S. gauge. Boxes over 100 cubic inches in size shall conform to the requirements for cabinets. Covers shall be of the same thickness as boxes and secured in position by means of brass screws. Covers shall be so arranged as to be readily and conveniently removed.

E. All Splice and Pull boxes for outdoor services shall be Stainless Steel , NEMA 4X.

F. Outlets for flush mounted switches and receptacles shall be aluminum four (4) inch square cast boxes with device covers suitable for industrial plant service.

G. Outlets for surface mounted switches and receptacles shall be cast aluminum boxes with threaded hubs, single or ganged, as required.

H. Approved sealing fittings and outlets shall be installed in classified areas.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Install product in accordance with NFPA 70.

B. Boxes shall be installed where shown on the Contract Drawings or where necessary to accommodate equipment device terminations, branches or services that have more than three (3) 90° bends.

C. All code required pull, splice, and junction boxes may not be shown on the Contract Drawings, but additional boxes of the proper code size shall be installed as may be necessary for a neat and satisfactory installation.

D. Boxes shall be set plumb and true, face parallel with plane of associated finish surface, at least one edge parallel to wall or ceiling.

E. Where applicable, faces of recessed box shall be flush with finished surface and, if required, extended with suitable extension devices.

F. All junction and pull boxes shall be rigidly fastened to the building structure and shall not depend on the conduits for support.

END OF SECTION 16130

SECTION 16160

CABINETS AND ENCLOSURES

PART 1 - GENERAL

1.01 WORK INCLUDED

A. Cabinets and Enclosures.

B. Related Sections

1. Section 16005 Summary of the Electrical Work
2. Section 16111 Electrical Raceways
3. Section 16123 Building Wire and Cable
4. Section 16124 Instrument & Control Wire and Cable
5. Section 16130 Junction, Splice and Pull Boxes
6. Section 16170 Grounding and Bonding

1.02 REFERENCES

A. All Work performed, where applicable under this Section, shall be in accordance with the most recent edition and most recent addenda thereto of the applicable codes, standards, specifications, regulations, procedures, and tests of the following organizations to the extent referred to herein:

1. ANSI/NFPA 70 National Electric Code
2. NEMA 250 Enclosures for Electrical Equipment

1.03 SUBMITTALS

A. Contractor shall submit manufacturer's standard data for enclosures and cabinets.

B. Contractor shall submit product data and shop drawings including dimensions of physical size, entry and closure operating details.

C. With manufacturer's installation instructions, Contractor shall indicate application conditions and limitations of use stipulated by product testing.

1.04 REGULATORY REQUIREMENTS

A. Conform to ANSI/NFPA 70 - National Electric Code.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturers for Cabinets and Enclosures shall be Hoffman, Barber Colman and or equal. Substitutions shall be as specified under the provisions of Section 01600 of these Specifications.

2.02 ENCLOSURES – GENERAL APPLICATION

A. Exterior– NEMA 4X Stainless Steel, Outdoors and exposed to weather.

B. Interior Indoor and Protected application– NEMA 1 galvanized painted steel.

C. Continuous Hinge Doors, with Hasp or Flush Latch.

D. Surface Cabinet type.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Contractor shall install product in accordance with NFPA 70 as applicable.

B. Install product in conformance with Manufacturer's installation instructions.

END OF SECTION 16160

SECTION 16170

GROUNDING AND BONDING

PART 1 - GENERAL

1.01 WORK INCLUDED

A. System Grounding electrode and conductors.

B. Equipment grounding conductors.

C. Related Sections

1. Section 16005 Summary of the Electrical Work
2. Section 16111 Electrical Raceways
3. Section 16123 Building Wire and Cable
4. Section 16124 Instrument & Control Wire and Cable
5. Section 16130 Junction, Splice and Pull Boxes
6. Section 16160 Cabinets and Enclosures

1.02 REFERENCES

A. All Work performed, where applicable under this Section, shall be in accordance with the most recent edition and most recent addenda thereto of the applicable codes, standards, specifications, regulations, procedures, and tests of the following organizations to the extent referred to herein:

1. ANSI/NFPA 70 - National Electric Code

1.03 EXISTING GROUND GRID SYSTEM

A. Existing wetwell chamber ground grid shall be bonded and contacted with a new conductors.

B. Main service equipment metering, protection panels and wireways, motors, and pump control cabinets inclusive.

1.04 PERFORMANCE REQUIREMENTS

A. Ground system resistance shall not exceed 25 OHMS.

1.05 REGULATORY REQUIREMENTS

A. All Work performed, where applicable under this Section, shall be in accordance with the most recent edition and most recent addenda thereto of the applicable codes, standards, specifications, regulations, procedures, and tests of the following organizations to the extent referred to herein:

1. ANSI/NFPA 70 - National Electric Code

B. The ground system installation shall be in strict accordance with the current edition of the State Basic Building Code, National Electrical Code and IEEE Standards.

C. Where specified furnish products listed and labeled by Underwriters Laboratory.

PART 2 - PRODUCTS

2.01 WIRING

A. Stranded bare copper conductors and size in accordance with NEC - Article 250.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Detailed grounding will be noted on plan details and take precedence over the general requirements listed below. Ground connections shall be installed with copper conductors and not less than scheduled in NEC Table 250- 6.

B. Non-current carrying metallic parts of new equipment, cable trays, cabinets, control cabinets and electric loads shall be securely connected to the ground bus and ground grid.

C. Contact surfaces shall be thoroughly cleaned and bright before connection is made so as to ensure a good metal-to-metal contact.

D. Ground conductors and taps from equipment shall be made with as few connections as possible and welded with exothermic type connections.

E. Connections in walkways shall not be concealed. Ground cables shall be installed exposed and connections shall be readily accessible for inspection.

F. Connections shall be made at Transfer Switch, Service Enclosure, Service Neutral, Switchgear, and Control Equipment. Pump related equipment shall be grounded in accordance with manufacturers' detailed instructions.

END OF SECTION 16170

SECTION 16195

ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Main Service Entrance Equipment

B. Duplex Pump Panel

C. Nameplates and Labels

D. Wire and Cable Markers

1.02 REFERENCES AND REGULATORY REQUIREMENTS

A. Work performed, where applicable under this Section, shall be in accordance with the most recent edition and most recent addenda thereto of the applicable codes, standards, specifications, regulations, procedures and tests of the following organizations to the extent referred to herein:

1. ANSI/NFPA 70 - National Electric Code

1.03 SUBMITTALS

A. Submit summary and inventory of applicable equipment.

B. Product catalogs data for nameplates, labels, and markers.

PART 2 PRODUCTS

2.01 NAMEPLATES

A. Engraved multi layered laminated, black face with white lettering.

B. The nameplates shall be at least one (1) inch high by three (3) inches wide of 3-ply plastic or lamicoid to produce black letters on white background, or as approved by the Engineer.

C. The letters shall be 3/8 inch high and arranged in two (2) rows. Where equipment nomenclature requires additional space, larger nameplates shall be installed. Where space is a constraint, nameplates shall be of appropriate size to properly identify equipment or instrumentation.

2.02 WIRE MARKERS

A. Printed 1-1/2" diameter tags with numerals for detailed power cables, branch circuit wiring and control and instrument cables.

B. Individual Control Circuit conductors shall have shrink tube barreled type sleeves with unique nomenclature identifying the conductor with the origin, use, and function of the wire in a particular control scheme.

PART 3 EXECUTION

3.01 LOCATIONS

A. Nameplates shall be provided to identify service panelboard and control panels, circuit breakers, disconnects, and pump instrumentation devices.

B. Identification Tags for control cables and sleeved type markers at each conductor entering and exiting pump chamber, junction enclosures, end devices and pump Control System Cabinets.

C. Load Description Directories and Schedules at pump control panel.

D. Nameplates shall properly identify the equipment or instrumentation and shall be inscribed as noted in Construction Documents or as approved by the Engineer.

E. Each and Every Motor driven device serviced from utility and generator shall have appropriate signage indicating:

"MOTOR STARTS AUTOMATICALLY BY REMOTE CONTROL-DO NOT ATTEMPT TO SERVICE WITHOUT APPROVED TAG-OUT OF SERVICE PROCEDURE".

F. Arc Flash notification on all 480V/3 phase or 230V/3 phase equipment.

END OF SECTION 16195

SECTION 16425

SERVICE ENTRANCE EQUIPMENT

PART 1 - GENERAL

1.01 WORK INCLUDED

A. The requirements of the Contract, Division 1, and Division 16 apply to work in this Section. The Section Includes Low Voltage, Front-Accessible Service Entrance Equipment with circuit breakers as specified below and shown on the contract drawings.

1.02 RELATED SECTIONS

1.03 REFERENCES

A. The low voltage Service Entrance C.B. s and protection devices in this specification are designed and manufactured according to latest revision of the following standards.

1. ANSI 61
2. ANSI/NEMA PB 2, Deadfront Distribution Service Entrance C.B. s
3. ANSI/NEMA PB 2.1, General Instructions for Proper Handling, Installation, Operation, and Maintenance of Deadfront Service Entrance C.B. s Rated 600 Volts or Less
4. ANSI/NFPA 70, National Electrical Code
5. NEMA AB 1, Molded Case Circuit Breakers and Molded Case Switches
6. UL 489, Molded Case Circuit Breakers and Circuit Breaker Enclosures
7. UL 891, Dead Front Service Entrance C.B. s

1.04 DEFINITIONS

A. Front-Accessible only shall be as defined by UL 891 standard which requires that all line and load connections for phase, neutral, and ground conductors can be made and maintained from the front of the Service Entrance C.B. without access to the rear.

1.05 SYSTEM DESCRIPTION

A. The power system feeding low voltage service entrance Circuit Breaker will be served from Utility Co. Pole Mount Transformer,
B. System characteristics are 120/240/240volts, 60Hertz, 3 phase, 4wire DELTA grounded.

C. Service Entrance equipment shall have front access only and cabinet mounted.

1.06 SUBMITTALS

A. Manufacturer shall provide (6) copies of the following documents to owner for review and evaluation in accordance with general requirements of Division 1 and Division 16:

1. Product Data on specified product;
2. Shop Drawings on specified product;
3. Trip curves for each specified product.

1.07 INSTALLATION, OPERATION AND MAINTENANCE DATA

A. Manufacturer shall provide (6) copies of installation, operation and maintenance procedures to owner in accordance with general requirements of Division 1 and Division 16.

1.08 QUALIFICATIONS and QUALITY ASSURANCE

A. Manufacturer shall have specialized in the manufacture and assembly of low voltage Service Entrance Circuit Breakers for a minimum of 20 years.

B. Low voltage Service Entrance C.B. s shall be listed and/or classified by Underwriters Laboratories in accordance with standards listed in this specification.

1.09 DELIVERY, STORAGE, AND HANDLING

A. Contractor shall store, protect, and handle products in accordance with recommended practices listed in manufacturer's Installation and Maintenance Manuals.

B. Ship each Service Entrance C.B. wrapped for protection.

C. Contractor shall inspect and report concealed damage to carrier within 24 hours.

1.10 PROJECT SITE ENVIRONMENTAL CONDITIONS

A. Follow service conditions before, during and after Service Entrance C.B. installation.

B. Ambient temperature of area will be between minus [30] and plus [25] degrees C, the maximum ambient temperature per UL 891.

C. Low voltage Service Entrance C.B. s shall be mounted in protected enclosure, free from excess humidity, dust and dirt and away from hazardous materials.

D. Outdoor installation shall be protected to prevent water and moisture from entering enclosure.

1.11 WARRANTY

A. Contractor and Manufacturer warrants equipment to be free from defects in materials and workmanship for 1 year from date of installation.

1.12 FIELD MEASUREMENTS

A. Contractor shall make all necessary field measurements and verify that equipment shall fit in allocated space in full compliance with minimum required clearances specified in N.E.C.

PART 2 - PRODUCTS

2.01 MANUFACTURER

A. General Electric Company products have been used as the basis for design. Other manufacturers' products of equivalent quality, dimensions and operating features may be acceptable, at the Engineer's discretion, if they comply with all requirements specified in these Contract documents.

2.02 COMPONENTS

A. Refer to Contract Drawings for actual layout and location of equipment and components; current ratings of devices, metering, and components; voltage ratings of devices, assemblies; interrupting and withstand ratings of devices, and other required details.

B. Standard Features :

1. Service Entrance C.B. shall be surface and fully self-supporting within equipment enclosure to form the desired arrangement.

2. Service Entrance C.B. equipment shall be NEMA 1 dead front construction.

C. Service Entrance Enclosure shall be stainless steel with reinforced corner gussets. Assembly and frame shall be rigidly bolted to support structure.

1. Service Entrance C.B. shall be capable of being bolted directly to the rear of enclosure.

2. The equipment shall be front-access only. Components shall be front and rear aligned installed plumb with horizontal and vertical cover.

D. Provide hinged doors to access individually mounted device components. All doors shall have concealed hinges and be fastened by SS hex head bolts.

2.03 CONSTRUCTION

A. Service Entrance equipment shall be furnished as listed on drawings and specified herein, including circuit protection and interconnections.

B. Protective devices shall be rated for the voltage and frequency listed.

C. Service Equipment current ratings, including all devices, shall be based on a maximum ambient temperature per UL Standard 891. Temperature rise of Service Entrance C.B. and devices shall not exceed 65 degrees C in a 25 degree C ambient environment.

D. Service Entrance Device shall comply with UL Service Entrance requirements including a UL Service entrance label, with incoming line and load lugs, removable neutral bond, and ground bus for solid systems grounding.

E. Bus arrangement A-B-C left to right shall be used throughout to assure convenient and safe testing maintenance.

F. Incoming bus bars shall be rated for the main protection device and incoming conductors.

G. Bus Bars:

1. Shall be continuously silver-plated copper rated for current 100 amperes.
2. Assembly shall be braced to withstand mechanical forces exerted during short circuit conditions not less than 22KA RMS SYM.
3. Phase and neutral bus ampacity shall be as shown on plans.

2.04 UTILITY REVENUE METERING

A. Provide utility revenue metering assembly, rated for 100amperes, 240V, 3 phase operations complying with UI Co. standards.

B. Procure U.I. Co. approvals prior to ordering this equipment.

2.05 MANUAL TRANSFER SWITCH

A. Provide manual transfer switch , 100Amp rated, 240v 3 phase operations.

B. Switch shall be GE type TC35323 or Equal.

C. Refer to Spec section 16441 Enclosed Safety Switches for further instruction.

2.06 MAIN INCOMING CIRCUIT BREAKER

A. Main device shall be individually mounted molded case circuit breaker.

B. 125amp 3 pole frame, 100 A Trip 240VAC class for 120/240/240V Delta operations.

C. Main breaker shall have thermal magnetic trip units.

D. Main breaker shall be rated to carry 100 percent of their frame ampacity continuously.

E. Main Circuit Breaker shall be GE type TEB.

F. Lugs shall be tin-plated and UL listed for copper cable. Lugs shall be rated for 90 degree C.

G. Provide mechanical lugs for #3 conductor phase per the contract drawings.

H. Service Entrance C.B. lugs compartment shall be arranged for BOTTOM ENTRY of underground incoming cable,

2.07 FINISH

A. All steel surfaces shall be chemically cleaned prior to painting.

B. Exterior paint color shall be ANSI 61 Light Gray over phosphate - type rust inhibitor.

PART 3 - EXECUTION

3.01. EXAMINATION

A. The following procedures shall be performed by the Contractor.

B. Examine installation area to assure there is enough clearance to install Service Entrance Assembly within enclosure.

1. Check structure for uniformity and level surface.
2. Verify field measurements.
3. Verify that Service Equipment is ready to install.
4. Verify that required utilities are available, in proper location and ready for use.
5. Beginning the installation means contractor installer accepts the noted conditions.

3.02. INSTALLATION

A. Installation shall be performed by the Contractor.

B. THIS WORK WILL REQUIRE SHUTDOWN OF ENERGIZED UTILITY CIRCUIT. DO NOT ATTEMPT TO EXECUTE THIS WORK WITHOUT PERFORMING NECESSARY ISOLATION AND COORDINATION WITH UTILITY Co.

C. The work shall be performed under the direction of the U.I.Co. and their service specialists.

D. Install and terminate cable per equipment manufacturer's install instructions.

E. Install required Identification and safety labels.

3.03. FIELD QUALITY CONTROL

A. Adjust circuit breaker trip and time delay settings to values determined by the Project Engineer.

B. After installation and before energizing loads, verify and establish correct phase rotation

3.04. CLEANING

A. Clean interiors of enclosure and remove construction debris, dirt, construction materials.

B. Repaint scratched or marred exterior surfaces to match original finish.

END OF SECTION 16425

SECTION 16441

ENCLOSED SAFETY SWITCHES

PART 1 GENERAL

1.01 WORK INCLUDED

A. The requirements of the Contract Documents and Division 1 and Division 16 of these Specifications apply to work in this Section.

B. General, heavy and mill duty safety switches.

C. Related Sections:

1. Section 16005 Summary of the Electrical Work
2. Section 16111 Electrical Raceway
3. Section 16123 Building Wire and Cable
4. Section 16124 Instrument & Control Wire and Cable
5. Section 16130 Junction, Splice and Pull Boxes
6. Section 16160 Cabinets and Enclosures
7. Section 16170 Grounding and Bonding
8. Section 16195 Electrical Identification

1.02 REFERENCES

A. Safety switches and protection devices in this specification shall be designed and manufactured according to latest revision of the following standards.

1. ANSI/NEMA KS 1 - 1990, Enclosed and Misc. Distribution Equipment Switches (600 V)
2. ANSI/NFPA 70 - 1993, National Electrical Code
3. Federal Specification W-S-865 - Heavy Duty Switches
4. UL 98 - 1994, Enclosed and Dead Front Switches

1.03 SYSTEM DESCRIPTION

A. Manual Transfer and Safety switches shall be quick-make, quick-break construction. Switches shall be suitable for use as service entrance equipment.

B. All Devices shall be Heavy duty switches and shall be horsepower and I^2t rated.

1.04 SUBMITTALS

A. Manufacturer shall provide copies of following documents to owner for review and evaluation in accordance with the requirements of Division 1 and Division 16.

B. Shop Drawings and Product Data on specified product.

1.05 OPERATION AND MAINTENANCE DATA

A. Provide copies of installation, operation and maintenance procedures to owner in accordance with the requirements of Division 1 and Division 16.

B. Operation and maintenance data shall be submitted based on factory and field testing, operation and maintenance of specified product.

1.06 QUALITY ASSURANCE

A. Manufacturer shall have specialized in the manufacture and assembly of heavymill duty safety switches for 20 years.

B. Heavy duty safety switches shall be listed and/or classified by Underwriters Laboratories in accordance with standards listed in Article 1.03 of this specification, shall be CSA listed. And shall meet NEMA performance specifications.

C. Manufacturer's Certificate of ISO 9002 Compliance.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Contractor shall deliver, store, protect, and handle products in accordance with recommended practices listed in manufacturer's Installation and Maintenance Manuals. Handle in accordance with manufacturer's written instructions in order to avoid equipment damage, components, devices and finish.

1.08 EXTRA MATERIALS

A. Contractor shall provide sizes and ratings of spare fuses as indicated in drawings.

PART 2 PRODUCTS

2.01 MANUFACTURER

A. General Electric Company products have been used as the basis for design. Other manufacturers' products of equivalent quality, dimensions and operating features may be acceptable, at the Engineer's discretion, if they comply with all requirements specified or indicated in these Contract documents.

2.02 MANUFACTURED UNITS

A. Contractor shall furnish industrial grade heavy duty disconnect switches.

B. Manual transfer switch at service entrance serving utility and portable generator.

2.03 COMPONENTS

A. Equipment and component layout, location and ratings, shall be in accordance with those specified on the Contract Drawings.

2.04 CONSTRUCTION

A. Operation handle shall be a highly visible, box-mounted type that directly drives switch mechanism. It shall be able to be padlocked in OFF position with up to three padlocks with 5/16 inch diameter shanks.

B. Switches shall have defeatable, front access, coin-proof interlocks. Interlocks shall prevent opening the switch door when switch is ON and prevent turning switch ON when door open.

C. A high visibility, securely fastened nameplate shall show ON-OFF position indication.

D. Interior shall be easily removable. Provide wiring gutter, clear of obstructions and moving parts. Interior shall contain line and load terminations suitable for use with copper conductors.

E. Heavy Duty Enclosure, Type TH NEMA Class 12 enclosures.

F. Minimum ratings 50K symmetrical RMS ampere interrupting at 120/240VAC.

G. Transfer switch shall be 100 Amp, 240 V, 3-Ph with neutral block, 3 position and manually operated. Switch shall be G.E.Cat. # TC 35323.

PART 3 EXECUTION

3.01 INSTALLATION

A. Use NEMA 1 Enclosures within new Electrical Power Cabinet.

B. Install equipment as detailed in Manufacturer's instructions.

C. Install identifying nameplates and safety labels in clear view of operations.

3.02 FIELD QUALITY CONTROL

A. Inspect installed safety switches for anchoring, alignment, and grounding.

B. Tightness of all accessible mechanical and electrical connections shall be checked with calibrated torque wrench. Minimum acceptable values are specified in Manufacturer's instructions.

C. Switch mechanism, access doors and operating handles shall be adjusted for free mechanical and electrical operation as described in Manufacturer's instructions.

D. Enclosure interiors shall be cleaned of construction debris, dirt and shipping materials.

E. Scratched or marred exterior surfaces shall be repainted to match original finish.

END OF SECTION 16441

SECTION 16490

PROCESS INSTRUMENTATION AND CONTROL

PART 1 – GENERAL

1.01. WORK INCLUDED

The work covered under this section of the specifications includes the furnishing and installing of all instrumentation and control hereinafter specified to perform the intended function. The new lift station control panel shall be integrated with and the reuse of the existing telemetry/SCADA system on site and provide the system operator with graphical interface, monitoring and control as well as provide records of appropriate system transactions.

1.02 RELATED WORK

A. Refer to Division 16, Electrical for wiring standards and practices.

1.03 REFERENCES

The Pump Control Panel described in this specification are designed and manufactured according to latest revision of the following standards:

1. NFPA 70 - National Electrical Code
2. CE Compliant
3. UL 1449 3rd Edition
4. UL 1283 Listed
5. NEMA ICS1 Compliance

1.04 SUBMITTAL DRAWINGS

A. Descriptive literature and drawings for equipment and systems being furnished under this section shall be included in two submittals as a maximum. If two submittals are made, the first shall include all primary devices, transmitters, sensors, and field mounted equipment. The second submittal will include the balance of the submittal required. The submittal shall include as a minimum, equipment specifications, dimensional drawings, flow and other calculations, schematic drawings of each and every system within the complete offering, and such other information requested by the Engineer or considered necessary to the proper installation of the equipment. Furnish submittals in a Bound Booklet Form 8.5” X 11”. No sheets shall be larger than 8.5” X 11”. Foldout larger sheets will not be acceptable. This submittal shall include coordinated information and drawings for all items that the Single Source System Supplier is required to furnish under this section of the specifications, all in one integrated and coordinated manual. Each item of a submittal shall carry the appropriate title and be indexed against the appropriate specification item.

B. A quantity of four (4) sets of submittals shall be furnished for the Engineer's approval.

1.04 INSTRUCTION MANUALS

Prior to 65% of the value of job completion, System Supplier shall furnish two (2) copies to the Engineer and one (1) copy to the Owner of all descriptive matter and complete system operation instruction manuals in separate indexed binders coordinated with the equipment that is furnished and installed for approval. System Supplier shall incorporate Engineer's comments and resubmit for approval within 30 days of receipt of Engineer's comments. Once final approval is obtained, System Supplier shall furnish two (2) copies to the Owner and two (2) to the Engineer.

1.06 DELIVERY AND HANDLING

After delivery to the jobsite, the Contractor shall store all control panels off of the ground in a dry location until such time as it is mounted and supplied with electrical service. The Contractor shall also insure that the pump power and control cords, as well as control floats, are protected from submergence until they are properly installed and sealed.

PART 2 – CONTROL PANEL SPECIFICATIONS

2.01 MANUFACTURER

A. The quality-establishing brand for the control panels shall be that manufactured by Control Systems, Inc. of Jackson, Mississippi (601) 355-8594

B. CSI products have been used as the basis for design. Other manufacturers' products of equivalent quality, dimensions and operating features may be acceptable, at the Engineer's discretion, if they comply with all requirements specified or indicated in these Contract documents.

2.02 GENERAL DESCRIPTION

A. The pumps shall be controlled by a Duplex Pump Controller (DC1-2), per Component Specifications. The controller shall be capable of operating with float switches or a level controller with dry contact outputs for All-Stop, Lead Start and Lag Start during normal operation. In the automatic mode, the Duplex Pump Controller shall receive stop and start commands based upon the level in the station wet well as sensed by the float switches. The Duplex Pump Controller shall be a standard, catalogued product of a water and wastewater automation equipment manufacturer regularly engaged in the design and manufacture of such equipment for a period of at least fifteen (15) years. The duplex controller shall perform all control functions as specified in Component Specifications section. In addition, provide input indicator and test module with improper input sequence indicator and controls (FT-1), per Component Specifications. The duplex pump controller shall have the following indicators and controls for each pump:

a. Manual-Off-Automatic selector switch
b. Amber "Call" pilot light
c. Green "Off" pilot light
d. Red "Run" pilot light
e. Red "Seal Failure" pilot light (where required)

B. ELECTRIC SERVICE: The panel shall be designed for 120/240 Volt, three-phase, four-wire, 60 Hz power.

C. The actual motor horsepower and incoming service entrance may differ than that shown on the drawing. In addition, provide a through the deadfront operator mounted on the deadfront door. The operator shall prevent the deadfront door from being opened while the breaker is in the "ON" position.

D. SERVICE ENTRANCE SURGE PROTECTION DEVICE: Provide a service entrance rated Type 2, AC power distribution Surge Protection Device (SPD), per Component Specifications, designed to protect all types of loads fed from the distribution panels, branch panels and/or individual equipment panels. Units shall be UL listed and shall bear a UL label. Surge Protection Device shall be rated for 120kA per phase and 60kA per mode. Unit shall come complete with a 20 amp, 480 volt circuit breaker for disconnect means.

E. PHASE MONITOR: Provide a service entrance Power Monitor (PM), per Component Specifications. During power monitor failure, no three phase motors shall be allowed to operate. Phase monitor shall be protected by 1 amp, 480 volt fuses on the primary side.

F. PUMPS NO.1 & NO.2: Provide a properly sized combination circuit breaker and NEMA rated motor starter for type and size required by the servicing power company and for the motor horsepower being furnished. The actual horsepower may differ than that indicated on drawing. In addition, provide the following additional equipment and controls.

G. MOTOR MONITOR each motor, complete with 4-20mA output (MM-1 and MM-2) and properly sized Current Transformers (CT), all per Component Specifications. The Motor Monitor shall provide a positive run signal to the duplex controller, monitor proper motor running conditions, indicate motor running time, and motor full load running amperes. In addition, motor monitor shall come complete with either high or low amperes set point for the motor. In the event of low amperes, the motor shall be failed and not be allowed to operate until the failure is acknowledged. Motor running current shall be transferred to the future telemetry equipment for SCADA use.

H. DUPLEX ALARM TELEMETRY OPTION: Provide an Alarm Telemetry system for the Duplex Controller (DCAT), which provides auxiliary normally open relay contact outputs for the following duplex controller alarms: auxiliary alarm, improper sequence, Motor 1 Failure, Motor 2 Failure, Motor 1 Seal Failure, Motor 2 Seal Failure, and High Level. Provide the following features for the integration with the existing SCADA system.

a. The control circuitry shall be solid-state and contain an integral power supply with proper surge and over-current protection.

b. Provide an individual Normally Open, Dry-Contact output for each alarm that has a contact rating of 5 Amps @ 120 VAC, resistive.
c. Provide individual LED indicators for each output relay to show when each relay is energized.

I. CONTROL RELAYS: Provide necessary control relays (CR), per Component Specifications, to interface with each pumps running circuit. Pump running signals shall be available for the integration with the existing SCADA system use.

J. EXISTING SCADA EQUIPMENT: Provide a minimum of sixteen by twelve inch (16" x 12") space on the backplate of the control panel enclosure for future telemetry equipment.

K. FUTURE EQUIPMENT: Provide needed spacing on the interior dead-front for the future installation and upgrade with a CSI MPCT6 Level Meter/Controller, and CSI LF101 Line Filter.

L. BRANCH CIRCUIT BREAKERS: Provide the following 120 volt, single-phase branch circuit breakers, as shown on the drawings.

a. 20 amp – 1 pole, for Control Power and Alarm Light
b. 20 amp – 1 pole, for Future Telemetry Equipment
c. 20 amp – 1 pole, for SCADA Receptacle
d. 20 amp – 1 pole, for GFCI Duplex Receptacle
e. 20 amp – 1 pole, for SPARE

M. CONTROL POWER SURGE PROTECTOR: Provide a single phase, in-line (series) 120 volt, single-phase, 20A continuous power Surge Protection Device (SPD), per Component Specifications, designed to protect all of the loads fed from the control power circuit.

N. DUPLEX RECEPTACLE: Provide a 120V, 15 amp, duplex receptacle mounted on the backplate of the controller enclosure for programming and diagnostic equipment use. Receptacle shall come complete with handy box.

O. GROUND FAULT INTERRUPTER RECEPTACLE: Provide a 120 Volt, 15 amp, Duplex GFCI Receptacle mounted on the side of enclosure for electrical hand tool use.

P. INSTRUTION ALARM SWITCH: To be connected into SCADA panel.

2.03 CONSTRUCTION

A. Control panel enclosure shall be constructed of a minimum 14 gauge, type 304 stainless steel. Seams shall be continuously welded and ground smooth. Provide a seamless foam-in-place gasket to assure water tight and dust tight seal. Provide a rolled lip around three sides of door and all sides of enclosure opening to exclude liquids and contaminants. Provide an internal 3-point latch and type 316L stainless steel padlocking powerglide handle to assure security and a water-tight seal while still allowing convenient access. Exterior door(s) shall be removable by pulling a stainless steel continuous hinge pin. Enclosure shall have a #4 brushed finish. Enclosure shall be rated NEMA 4X and be manufactured by Hoffman, Stahlin, or approved equal.

B. Power and control wires shall be stranded copper type MTW. All wiring shall be in covered plastic wireway.

C. All points necessary for external connection in the control panel whether power or control shall be wired to a terminal strip located at the top or bottom of the enclosure as directed by the engineer. The terminal strip shall be permanently marked with the same designation as the wire connected to it.

D. Power and control wires shall be marked at both ends using self-adhering wire markers. No two wires having different functions within the control panel shall have the same markings.

E. All circuit breakers, starters, and other control devices mounted within the controller panel shall be labeled for identification both within the panel and on the wiring schematic with corresponding designations.

F. Control power shall be 120 Volts and shall be protected by the correctly sized circuit breaker. If required, provide a properly sized control power transformer with primary over current protection.

G. Each starter shall be provided with overload protection in all three phases and each individual starter shall have phase failure protection.

H. All selector switches, indicators, and pilot lights shall be identified with an engraved Bakelite nameplate. All selector switches, pilot lights, and control devices shall be visible and operable from the Controller exterior door or an interior deadfront panel when required. The deadfront panel shall be constructed of anodized aluminum and shall have a continuous aluminum hinge. An anodized aluminum deadfront shall be utilized when the Controller environment is not conducive to exposed controls or as specified on drawings.

I. All approval drawings shall be prepared per Joint Industrial Conference (J.I.C.) standards for engineers review **prior to any fabrication** of control equipment. The Controller shall be produced by an Underwriters Laboratories, Inc. (U.L.) 508 listed shop. Proof of label availability shall be submitted with approval drawings.

J. **Under no circumstances will a PLC type control panel be considered equal or acceptable.**

K. The Controller manufacturer shall provide a written warranty with approval drawings covering all Control materials and parts furnished for a period ending one year after final acceptance of the project. This warranty shall cover all material replacement, all labor, and all travel expenses.

L. The Controller manufacturer representative shall show satisfactory evidence that he maintains a fully equipped factory organization capable of furnishing adequate service for the equipment furnished, including replacement parts within a 75-mile radius of the job site. Suppliers employing outside organizations for "ON CALL" service shall not be

considered.

M. Controller manufacturer representative shall have a service department capable to respond in emergency condition twenty-four / seven and three-hundred sixty-five days a year (24/7/365).

N. The quality-establishing brand for the control panels shall be that manufactured by Control Systems, Inc. of Jackson, Mississippi.

2.04 COMPONENT SPECIFICATIONS

A. SERVICE ENTRANCE SURGE PROTECTION DEVICE (SPD): The SPD shall be mounted in the control panel adjacent to the Main Breaker. The TVSS is connected to the main bus in the panel with conductors of size and of no greater length than indicated in the Surge Protection Device manufacturer's installation instructions. SPD shall be a Type 2 device ideal for distribution panels, branch panels and critical loads.

1. SPD shall provide transient voltage surge suppression and electrical high frequency noise filtering. Unit is designed for parallel connection to the main bus. SPD unit uses selenium cells and metal oxide varistors to achieve its performance. Products using gas tubes, spark gaps, silicon avalanche diodes or other components, which under failed conditions would cause system failure, are not acceptable.

2. Manufacturer qualifications: The product of a manufacturer engaged in the commercial design and manufacture of the type of product described herein for a minimum five (5) years.

3. Standards: Product complies with the requirements of the following:
   a. CE Compliant
   b. UL 1449 3rd Edition
   c. UL 1283 Listed
   d. NEMA LS1 Compliance

4. Operating Voltage: 120/240 volts, 3-phase, 4-wire + ground

5. Maximum Continuous Operating Voltage (MCOV): greater than 115 percent of nominal voltage for all products. All suppression filter systems comply with NEMA LS 1.

6. Frequency: Operating frequency range of 47 – 64 Hertz.

7. Protection Modes: all phases – phase to ground; all phases – phase to neutral; all phases – phase to phase; and neutral to ground.

8. Rated Single Pulse Surge Current Capacity: at rated voltage, no less than:

120,000 A	Line to Line
60,000 A	Line to Neutral
60,000 A	Line to Ground

60,000 A Neutral to Ground

9. Tested Single Pulse Surge Current Capacity: Filter system is designed to withstand a single pulse surge current up to 150 percent of the design rating and tested at an independent test laboratory. In the absence of testing facilities capable of such testing, testing of individual components or sub-assemblies within a mode is accepted by ANSI C62.41-1991; the testing includes a Category C1 surge test followed by a second Category C1 test. The test results demonstrate the unit does not degrade by more than 10 percent from the initial test.

10. Clamping Voltage: Suppression filter system clamping voltages are in compliance NEMA LS1-1992.

11. High Frequency Filter: EMI-RFI noise rejection or attenuation values comply with test and evaluation procedures of NEMA LS1-1992.

12. Overcurrent Protection: Unit includes coordinated UL 489 or UL 198 listed or recognized overcurrent protection devices; if fuses are used unit incorporates non-encapsulated, field replaceable fuses.

13. Documentation: Provide product data including equipment manual, electrical and mechanical drawings indicated dimensions weights, mounting provisions, connection details and layout diagram, certified tests of UL1449 Listing/Clamp Voltages and NEMA LS1 compliance, certified single pulse surge current capacity testing, and minimum repetitive surge current capacity testing.

14. Status Indicators: Unit has long-life, solid state, externally visible status indicators that monitor the on-line status of each phase of the unit.

15. Warranty: 25-years Unlimited Free Replacement for service entrance Surge Protection Device.

16. Service Entrance Surge Protection Device system shall be equal to Joslyn TK- TK-TT120-3Y240 as required for service entrance.

TAG	SERVICE
SPD	Service Entrance Surge Protection Device

2.05 PHASE FAILURE/UNBALANCE/UNDER VOLTAGE/REVERSAL RELAY:

Phase monitor shall be designed to protect 3-phase motors regardless of size and for use with 200 – 240 or 425 – 485 VAC, 50 to 60 Hz motors to prevent damage. The unit shall constantly monitor the three phase voltages to detect harmful power line conditions, caused by single phasing, low voltage, phase reversal and voltage unbalance. When a harmful condition is detected, an output relay is deactivated after a trip delay. The output relay shall reactivate after power line conditions return to an acceptable level for the specified Restart Delay. The trip delay shall prevent nuisance tripping due to rapidly fluctuating power line conditions. Phase monitor shall have the following features and functions.

A. Under Voltage:
Trip: -15% of setting for 230V (-10% for 480V)
Reset: -12% of setting for 230V (-8% for 480V)

B. Over Voltage:
Trip: -15% of setting for 230V (-10% for 480V)
Reset: -12% of setting for 230V (-8% for 480V)

C. Phase Unbalance:
Trip: 7% with 5 second trip delay
15% with 1 second trip delay
Reset: 6%

D. Trip Delay: 5 seconds (delay is reduced to 1 second if Phase Unbalance is 15% or greater)

E. Reset Delay: 2 seconds standard (5-60 seconds optional)

F. Voltage Range: 200V to 240V or 425V to 525V

G. Output Rating: 10A resistive @ 240VAC
6A resistive @ 240VAC

H. Operating Temp: -40ºC to +50ºC, -38ºF to +122ºF

I. Storage Temp: -45ºC to +85ºC, -47ºF to +185ºF

J. Enclosure: Lexan, surface mount

K. UL and cUL listed

TAG	SERVICE
PM	Electrical System Power Monitor

2.06 CONTROL POWER SURGE PROTECTION DEVICE (SPD):

The surge protection device shall be mounted in the control panel in series with the control power circuit. Provide a single-phase, in-line series AC power line surge protector with the following features:

A. Rated voltage shall be 120 VAC @ 60Hz.

B. Current rating shall be 20 Amps @ 40°C.

C. The protection circuitry shall automatically reset after the transient has passed.

D. Protection modes shall be: Line to Neutral, Line to Ground, and Neutral to Ground.

E. Provide three (3) Green LED indicators to indicate protection status of each mode when power is present (L-N, L-G, N-G).

F. Varistors with integral thermally activated elements shall be used to open in the event of overheating due to the abnormal overvoltage, limited current conditions outlined in UL1449. The lower inductance of the varistors shall result in improved clamping performance to fast overvoltage transients.

G. Metal Oxide Varistors (MOV) shall have cured, flame retardant epoxy polymer coating meeting UL94V-0 requirements.

H. Electromagnetic Interference (EMI) filtration shall be incorporated into the unit to dampen unwanted signals from the protected side of the unit.

I. Operating temperature shall be -40 to +70°C.

J. Screw terminals shall be provided for all wiring.

K. Maximum continuous operating VAC shall be 115% of rated line voltage.

TAG	SERVICE
SP	Control Power Surge Protection Device

2.07 DUPLEX PUMP CONTROLLER:

Provide a duplex controller to control two pumps that includes the following control functions.

A. OPERATORS AND INDICATORS (for each pump)

1. Manual-Off-Automatic selector switch
2. Green "Off" pilot light
3. Red "Run" pilot light
4. Red "Pump Seal Failure" pilot light (If Required)

B. A Pump NO. 1 LEAD – ALTERNATE – Pump NO. 2 LEAD sequence selector switch to select either pump as lead pump or to select that the motors alternate as lead pump on each call for cycle.

C. Signal inputs for: stop, lead pump start, lag pump start and a high level alarm. The sensors shall be optically isolated and operate on 12VDC with a maximum current of 12mA for intrinsic safety.

D. Pilot light indicators for each level control input, which includes Start and Stop levels and Running inputs for each pump along with a high-level alarm.

E. A field adjustable failure time delay for each pump, in the range of five (5) seconds to six and a half (6½) minutes, to start the lag pump at the lead pump start point if the lead

pump fails or if the lead pump selector switch is placed in the off position. If a pump fails, the remaining functional pump shall remain the lead pump on future cycles.

The failed pump shall only be called to operate at the lag pump operating point. Normal pump alternation shall resume when failure condition is corrected and pump has been reset.

F. Soft stop feature to require the motors to stop three (3) seconds apart during the condition that both motors are running when signaled to stop. Soft start feature to require the motors to start three (3) seconds apart during conditions that the lead and lag motors are called for simultaneously.

G. Individual field adjustable time controls to delay starting each pump in the automatic mode after power failure or during initial startup.

H. Pump failure, pump seal failure, and high-level alarm red pilot lights shall flash when activated.

I. Provide pump running, pump failure and seal failure alarm contacts for each pump. In addition, provide a high-level alarm contact.

J. Manual override inputs for each pump, which can be used to manually override the duplex controls', pump outputs when the controls are in the Auto mode. Inputs shall be provided to start or stop each pump from a remote location.

K. Improper sequence alarm (if required) to activate the common alarm in the event the control level inputs are activated in the wrong order. The order shall be Stop, Lead Start, and Lag Start. The High-level alarm shall not be included in the improper sequence test.

L. Provide automatic pump alternation on seal failure when a seal failure condition is detected and the motors are in the automatic mode. The failed pump shall be made the lag pump on future cycles until the failure condition is corrected.

M. An exterior alarm light output which would flash the light brightly during any failure condition. The output shall allow the light to dim glow under normal conditions to indicate that power is on and the lamp is good. A normally open common alarm output contact shall be energized by these alarm conditions.

N. Provide integral Repeat Cycle timing controls for the pump controller, containing the following features:

1. The timer shall enable automatic On/Off control of the motors, based on separate on and off times which are set in either seconds or minutes.
2. The timing ranges shall be 1 to 1023 seconds or minutes depending on the field selectable range used. Independent ranges shall be included for On and Off timing.

TAG	SERVICE
DC1-2	Pump No. 1 & No. 2 Controller

2.08 DUPLEX ALARM TELEMETRY OPTION:

Provide an Alarm Telemetry system for the Duplex Controller, which provides auxiliary normally open relay contact outputs for the following duplex controller alarms: auxiliary alarm, improper sequence, Motor 1 Failure, Motor 2 Failure, Motor 1 Seal Failure, Motor 2 Seal Failure and High Level. Provide the following features for the DCAT system.

A. The control circuitry shall be solid-state and contain an integral power supply with proper surge and over-current protection.

B. Provide an individual Normally Open, Dry-Contact output for each alarm that has a contact rating of 5 Amps @ 120 VAC, resistive.

C. Provide individual LED indicators for each output relay to show when each relay is energized.

TAG	SERVICE
DCAT	Duplex Alarm Telemetry System

2.09 MOTOR MONITOR:

Provide an electronic solid state Motor Monitor with portional 4-20mA output, powered by 120 volt AC that will accept a zero (0) to five (5) amp input signal condition the signal to perform ON/OFF or OPEN/CLOSE discrete dry type setpoint contact conditions based on the input signal value. The Motor Monitor shall have the following features.

A. Provide an LCD readout meter providing field adjustable scales of 0-25.0, 0-50.0, 0-100.0, 0-250, 0-500 and 0-1000 to accurately indicate the motor full load current using the 0-5 amp input signal.

B. The Monitor shall be capable of displaying motor total running time up to 99,999.9 hours and be provided with reset capability from the rear of the monitor. The display shall include a non-volatile EEPROM memory backup that does not require battery backup during power failure.

C. Provide two (2) separate field adjustable setpoints, each with discrete, isolated sealed SPDT relay output contacts. The setting of each setpoint shall be adjustable throughout the complete signal range from the front of the Monitor. Each set point shall be provided with a field adjustable "ON" and "OFF" time delay, adjustable from zero (0) to fifteen (15) seconds. The actual setting of each setpoint shall be able to be displayed on the LCD readout at any time. An LED indicator shall be provided for each setpoint and shall operate as follows:

1. Setpoint No. 1: When setpoint is timing, the indicator shall burn amber. After timing period and current is at or above setpoint, indicator shall burn green.

2. Setpoint No. 2: When set point is timing, the indicator shall burn amber. After set timing period and current is at or above setpoint, indicator shall burn red.

D. Provide a 4-20mA or a 1-5Vdc output signal which is proportional to the amperes being measured. Load maximum impedance should not exceed 330 ohms. Output signal shall be factory calibrated.

TAG	SERVICE
MM-1	Pump No. 1 Motor Monitor
MM-2	Pump No. 2 Motor Monitor

2.10 FLOAT TEST:

Provide input indicator and test module with improper input sequence indicator and controls. The following controls and equipment shall be supplied.

A. Four deadfront panel mounted input pilot light indicators: One for each of the following level control points Stop, Lead Start, Lag Start and High Level alarm.

B. Four deadfront panel mounted pushbuttons to test each pump level control input.

C. Automatic input sequence monitoring, such that if the inputs do not occur in proper order (stop, lead start and lag start); a red pilot light indicator shall be activated.

D. If stop input fails, followed by lead input activation, lead pump shall operate and continue until lead pump input is removed and a field adjustable time delay has expired.

E. If stop input fails, followed by lead and lag input activation, both motors shall operate and continue until their respective input is removed and an individual field adjustable time delay for each pump has expired.

F. If stop, lead and lag inputs fail, followed by high level input activation, both motors shall operate and continue until the high level input is removed and a field adjustable time delay for each pump has expired.

G. Improper sequence activation shall also activate the common external alarm controls.

H. Improper sequence alarm shall require reset button activation to remove the alarm light.

TAG	SERVICE
FT-1	Float Test Module

2.11 CONTROL RELAYS:

Provide a SnapTrack channel mounted relay board with LED status indicator and individual quick-connect terminals. The SnapTrack can be optionally snapped to a DIN rail. The indicator LED shall turn on when the relay is energized. The terminals shall be

of the fixed screw cage clamp type, rated for at least 10 amps at 250 Volts.
Tubular screw clamp types will not be accepted. The relay shall be rated for 10 amps. Surge suppression shall be provided on the coil side of the relay. The board shall include built-in transient protection across the coil. DC powered versions shall include a built-in diode across the coil to protect external devices from coil surges. The relay and connectors shall be UL approved.

TAG	SERVICE
CR	Misc. Pump Control Relays

2.12 SPARE PARTS

A one-year supply of manufactures' recommended spare parts shall be provided. The spare parts shall be packaged for long-term storage and shall be protected against humidity and temperature. A spare parts list shall be furnished listing manufacture, device model number, part number, and quantity supplied.

A. Provide following spare packaged for long-term storage and delivered to owner.

QTY.	MODEL NO.	DESCRIPTION
1	DC101	Duplex Controller

B. The System Supplier shall maintain an inventory at his facility of at least one part of each type furnished on this project. These parts shall be available for delivery to the owner in a minimum of ten (10) hours.

C. Wetwell pressure transducer (0-15 ft)

PART 3 – EXECUTION

3.01 ENGINEERING SUPERVISION

A. The services of a qualified representative of the System Supplier shall be provided to inspect the completed installation, suggest all adjustments necessary to place the system in proper operation, and instruct operating personnel in the care and operation of the equipment furnished. A minimum of one (1) day and one (1) trip start-up service and training operating personnel shall be included. The services shall be furnished by the Contractor as a part of the work included under this section of the specifications.

B. The System Supplier shall show satisfactory evidence that he maintains, a fully equipped factory organization capable of furnishing adequate service for the equipment furnished, included replacement parts. Suppliers employing outside organizations for "ON CALL" service shall not be considered.

3.02 GENERAL INSTALLATION

A. Installation of instrumentation and controls shall be in strict compliance with the manufacturer's instruction. The locations of these items as shown on the Contract Drawings are approximate only. Exact locations shall be as approved by the Engineer during construction. It is the duty of the Contractor to obtain, in the field, all relevant information required for proper placement of instrumentation and controls. In the case of interference with other work, proceed as instructed by the Engineer and provide all materials and labor required to prevent construction delays.

B. Execution of the installation shall be in full accordance with codes and local rulings. The Contractor shall be responsible for any expenses that are a result of work performed contrary to said codes and regulations.

C. The System Supplier shall coordinate with the Contractor the installation, the location of process equipment, and connections of process equipment to related equipment panels, subject to the Engineer's approval. The equipment being furnished with electrical controls or instrumentation must be submitted to the System Supplier for approval and coordination with all other control and instrumentation on this project. This engineer will not approve any equipment submittal until this coordination has been accomplished.

END OF SECTION 16490

§ 102-17 PREQUALIFICATION

This project is budgeted and funded out of the Authority's Capital account; therefore, a State of Connecticut DAS prequalification certificate is NOT required.

§ 102-20

ITEMIZED PROPOSAL

For Constructing

PROJECT: MAIN STREET PUMP STATION
CABINET RELOCATION & REHABILITATION

GNHWPCA PROJECT NO. SSF 2014-03
The work proposed herein must be completed within 160 days of the Notice to Proceed.

Greater New Haven
Water Pollution Control Authority
260 East Street
New Haven, Connecticut 06511

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 Greater New Haven Water Pollution Control Authority, or any person in the employ of the Authority 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 Greater New Haven Water Pollution Control Authority in the amount of fifteen percent (15%) of the bid.

Accompanying this Proposal is a certified check or bank cashier's check or bid bond payable to the Greater New Haven Water Pollution Control Authority in the amount of $_____. In case this Proposal shall be accepted by the Authority, 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 Authority. 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 Authority a satisfactory "Faithful Performance Bond" and "Labor and Material Payment Bond" in the amount of one hundred percent (100%) of the Contract price.

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 Authority.

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**
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

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:** _____

Name and Addresses of Members of the Firm:

_____

_____

_____

GREATER NEW HAVEN WATER POLLUTION CONTROL AUTHORITY
Project: Main Street Pump Station Cabinet Relocation & Rehabilitation
East Haven, Connecticut
Project Number: SSF 2014-03

Schedule Of Bid Items

The quantities of work proposed in this form are intended for bidding purposes only. The Authority reserves the right to reject any proposal in which any of the bid prices are unbalanced to the potential detriment to the Authority.

ITEM NUMBER	ESTIMATED QUANTITY	UNIT	ITEM WITH UNIT PRICE WRITTEN IN WORDS	UNIT BID PRICE DOLLARS	UNIT BID PRICE CTS	AMOUNT BID DOLLARS	AMOUNT BID CTS
1000	1	LS	LUMP SUM For the Installation of New Power & Control Enclosures, as shown and detailed in the Project Plans and Specifications, including all work incidental thereto.				
1001	1	LS	LUMP SUM For the installation of (2) new pumps, cables, auto-coupling base bend and slide rail mounting system				
1002	1	All	ALLOWANCE For the reimbursement of a vac truck to pump out the valve pit until the new valves can be installed and a piped temporary bypass can be connected. (Reciepts for Vac truck disposal must be presented)	$10,000		$10,000	
BASE BID TOTAL OR GROSS SUM IN WORDS:						$ IN FIGURES	

Signature of Bidder: _____ Dated: _____

Printed Name: _____

Name of Firm: _____

STATEMENT OF QUALIFICATIONS

_____
Bidder

_____
Address

DATE: _____

Similar Projects Completed by Bidder:

1. NAME OF PROJECT: _____

OWNER: _____ ADDRESS: _____

CONTACT PERSON: _____ TELEPHONE: (___) _____

DATE STARTED: _____ DATE COMPLETED: _____

VALUE OF CONTRACT: _____

DESCRIPTION & APPROX. QUANTITIES OF MAJOR ITEMS: _____

_____

_____

2. NAME OF PROJECT: _____

OWNER: _____ ADDRESS: _____

CONTACT PERSON: _____ TELEPHONE: (___) _____

DATE STARTED: _____ DATE COMPLETED: _____

VALUE OF CONTRACT: _____

DESCRIPTION & APPROX. QUANTITIES OF MAJOR ITEMS: _____

_____

_____

3. NAME OF PROJECT: _____

OWNER: _____ ADDRESS: _____

CONTACT PERSON: _____ TELEPHONE: (___) _____

DATE STARTED: _____ DATE COMPLETED: _____

VALUE OF CONTRACT: _____

DESCRIPTION & APPROX. QUANTITIES OF MAJOR ITEMS: _____

_____

_____

BIDDER: _____

4. NAME OF PROJECT: _____

OWNER: _____ ADDRESS: _____

CONTACT PERSON: _____ TELEPHONE: (___) _____

DATE STARTED: _____ DATE COMPLETED: _____

VALUE OF CONTRACT: _____

DESCRIPTION & APPROX. QUANTITIES OF MAJOR ITEMS: _____

_____

_____

5. NAME OF PROJECT: _____

OWNER: _____ ADDRESS: _____

CONTACT PERSON: _____ TELEPHONE: (___) _____

DATE STARTED: _____ DATE COMPLETED: _____

VALUE OF CONTRACT: _____

DESCRIPTION & APPROX. QUANTITIES OF MAJOR ITEMS: _____

_____

_____

6. NAME OF PROJECT: _____

OWNER: _____ ADDRESS: _____

CONTACT PERSON: _____ TELEPHONE: (___) _____

DATE STARTED: _____ DATE COMPLETED: _____

VALUE OF CONTRACT: _____

DESCRIPTION & APPROX. QUANTITIES OF MAJOR ITEMS: _____

_____

_____

7. OTHER PROJECT REFERENCES: _____

_____

_____

_____

_____

ADDITIONAL SHEETS MAY BE ADDED AS REQUIRED

APPENDIX A

PERFORMANCE BOND
AND
LABOR AND MATERIALS PAYMENT BOND

PROJECT: **MAIN STREET PUMP STATION**
CABINET RELOCATION & REHABILITATION

GNHWPCA PROJECT NO. SSF 2014-03

BOND NO. _____

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS: That _____ as Principal, and _____, as Surety, located at _____ (Business Address), a surety insurer chartered and existing under the laws of the State of _____ and authorized to do business in the State of Connecticut, are held and firmly bound unto the Greater New Haven Water Pollution Control Authority, as Obligee, in the sum of _____ ($_____) for the payment whereof we bind ourselves, our heirs, executors, personal representatives, successors and assigns, jointly and severally.

WHEREAS, Principal has entered into a contract dated as of the ___ day of _____, 200__ with Obligee for

_____

_____

_____

in accordance with drawings and specifications, which contract is incorporated by reference and made a part hereof, and is referred to as the Contract.

NOW, THEREFORE, THE CONDITION OF THIS BOND is that of Principal:

1. Performs the Contract at the times and in the manner prescribed in the Contract; and

2. Pays Obligee any and all losses, damages, expenses, costs, direct or indirect, and attorney's fees, including costs of any mediation, arbitration, litigation or appellate proceedings, that Obligee sustains because of any default by Principal under the Contract, including, but not limited to, all delay damages, whether liquidated or actual, incurred by Obligee;

then this Bond is void; otherwise it remains in full force and effect and Surety shall be fully liable for performance of the Principal's obligations provided thereunder.

In the event of a declaration of default of Principal by Obligee under the Contract, the Surety shall, within twenty (20) days of receipt of notice of such default, either: (1) tender the Obligee the full amount of the penal sum of this Bond; or (2) undertake to perform or complete the remaining Contract obligations itself through its agents or through independent contractors.

If Surety denies liability, in whole or in part, it shall notify the Obligee, in writing, citing the detailed reasons therefor, within fifteen (15) days of receipt of the aforesaid declaration of default of Principal.

The Surety, for value received, hereby stipulates and agrees that no changes, extensions of time, or additions to the terms of the Contract, or other work to be performed hereunder, or the specifications referred to therein shall in anyway affect its obligations under this Bond, and it does hereby waive notice of any such changes, extensions of time, alterations, or additions to the terms of the Contract, to the work thereunder or to the specifications.

In no event will the Surety be liable in the aggregate to Obligee for more than the penal sum of this Performance Bond, regardless of the number of suits that may be filed by Obligee.

Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the State of Connecticut and shall be instituted within the applicable statute of limitations for contract actions after Principal defaults.

IN WITNESS WHEREOF, the above parties have executed this instrument this ____ day of _____, 200__, the name of each party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

Signed, sealed and delivered
in the presence of:

PRINCIPAL

Witnesses as to Principal:

By:_____

_____

Name:_____

_____

Its:_____

STATE OF _____

COUNTY OF _____

The foregoing instrument was acknowledged before me this _____ day of _____, 200____ by _____, as _____ of _____, a _____ [corporation/limited liability company/partnership], on behalf of the [corporation/limited liability company/partnership]. [He/She[is personally known to me or what has produced _____ as identification and who [did] [did not] take an oath.

My Commission Expires:

_____
Notary Public (Signature)

(AFFIX NOTARY SEAL)

_____
(Printed Name)

_____
(Title or Rank)

_____
(Serial Number, if any)

ATTEST:

SURETY:

Witnesses as to Surety:

_____
(Printed Name)

_____ _____
(Business Address)

_____ _____
(Authorized Signature)

_____
(Printed Name)

OR

Witnesses as to Attorney-in-Fact:

_____
As Attorney-in-Fact
(Attach Power of Attorney)

_____ _____
(Business Address)

_____
(Printed Name)

_____
(Telephone Number)

STATE OF _____

COUNTY OF _____

The foregoing instrument was acknowledged before me this _____ day of _____, 200____ by _____, as _____ of _____, a _____ [corporation/limited liability company/partnership], on behalf of the [corporation/limited liability company/partnership]. [He/She[is personally known to me or what has produced _____ as identification and who [did] [did not] take an oath.

My Commission Expires:

_____
Notary Public (Signature)

(AFFIX NOTARY SEAL)

_____
(Printed Name)

_____
(Title or Rank)

_____
(Serial Number, if any)

BOND NO. _____

PAYMENT BOND (incorporating C.G.S. § 49-41)

KNOW ALL MEN BY THESE PRESENTS: That by this Bond, we, _____ (hereinafter called the "Principal") and _____ (hereinafter called the "Surety"), located at _____, a surety insurer chartered and existing under the laws of the State of _____ and authorized to do business in the State of Connecticut, are held and firmly bound unto the Greater New Haven Water Pollution Control Authority (hereinafter called "Owner") in the sum of _____ ($_____) for the payment whereof we bind ourselves, our heirs, personal representatives, executors, successors and assigns, jointly and severally.

WHEREAS, Principal and the Owner have reached a mutual agreement (hereinafter referred to as the "Contract") for the purpose of _____, said Contract being made a part of this Bond by this reference.

NOW, THEREFORE, THE CONDITION OF THIS BOND is that if the Principal:

1. Promptly makes payments to all claimants supplying the Principal with labor, materials or supplies, as used directly or indirectly by the Principal in the prosecution of the work provided for in the Contract; and

2. Pays the Owner for all losses, damages, expenses, costs, and attorneys' fees, including the costs of any mediation, arbitration, litigation or appellate proceedings, that the Owner sustains because of a default by the Principal under paragraph 1 of this Bond, then this Bond is void; otherwise this Bond remains in full force and effect.

BE IT FURTHER KNOWN:

Any changes in or under the Contract and compliance or noncompliance with formalities connected with the Contract or alterations which may be made in the terms of the said Contract, or in the work to be done under it, or the giving by the Owner of any extension of time for the performance of the said Contract, or any other forbearance on the part of the Owner or Principal to the other, shall not affect the obligation of the Principal and the Surety, or either of them, their heirs, personal representatives, successors or assigns under this Bond, notice to the Surety of any such changes, alterations, extensions or forbearance being hereby waived.

This Bond is issued in accordance with and expressly incorporates herein the requirements of Conn. Gen. Stat. § 49-41.

IN WITNESS WHEREOF, the above parties have executed this instrument this ____ day of _____, 200__, the name of each party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

Signed, sealed and delivered in the presence of:

Witnesses as to Principal:

_____

_____

PRINCIPAL:

By:_____

Name:_____

Its:_____

STATE OF _____

COUNTY OF _____

The foregoing instrument was acknowledged before me this ____ day of _____, 200__ by _____ as _____ of _____, a _____ [corporation/limited liability company /partnership], on behalf of the _____ [corporation/limited liability company/partnership]. [He/She] is personally known to me or who has produced _____ as identification and who [did] [did not] take an oath.

My Commission Expires:

_____

Notary Public (Signature)

(AFFIX NOTARY SEAL)

_____

(Printed Name)

_____

(Title or Rank)

_____

(Serial Number, if any)

ATTEST:

SURETY:

Witnesses as to Surety:

_____
(Printed Name)

_____ _____
(Business Address)

_____ _____
(Authorized Signature)

_____
(Printed Name)

OR

Witnesses as to Attorney-in-Fact:

_____
As Attorney-in-Fact
(Attach Power of Attorney)

_____

_____ _____
(Business Address)

_____
(Printed Name)

_____
(Telephone Number)

STATE OF _____

COUNTY OF _____

The foregoing instrument was acknowledged before me this ____ day of _____, 200__ by _____, as _____ of _____, a Surety, on behalf of the Surety. [He/She] is personally known to me or who has produced _____ as identification and who [did] [did not] take an oath.

My Commission Expires:

_____
Notary Public (Signature)

(AFFIX NOTARY SEAL)

_____
(Printed Name)

_____
(Title or Rank)

_____
(Serial Number, if any)

APPENDIX B

SAMPLE CERTIFICATE OF INSURANCE

PROJECT: **MAIN STREET PUMP STATION**
CABINET RELOCATION & REHABILITATION

GNHWPCA PROJECT NO. SSF 2014-03

SAMPLE

Certificate of Insurance

Issue Date (MM/DD/YY)

PRODUCER

INSURED

Contractor's Name

INSURERS AFFORDING COVERAGE			NAIC #
INSURER	A		
INSURER	B		
INSURER	C		
INSURER	D		
INSURER	E		

COVERAGES

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

CO LTR	TYPE OF INSURANCE	POLICY NUMBER	POLICY EFFECTIVE DATE (MM/DD/YY)	POLICY EXPIRATION DATE (MM/DD/YY)	Limits	
	GENERAL LIABILITY	POLICY NUMBER				
	COMMERCIAL GENERAL LIABILITY	PER PROJECT AGGREGATE ENDORSEMENT			EACH OCCURRENCE	$ 1,000,000
	CLAIMS MADE [ ] OCCUR. [x]				PRODUCTS-COMP/OP AGG.	$ 2,000,000
					PERSONAL & ADV INJURY	$
	[x] ISO FORM CG 00 01 12 04				GENERAL AGGREGATE	$ 2,000,000
	[x] XCU HAZARDS COVERAGE				FIRE DAMAGE (Any one fire)	$
	GEN'L AGGREGATE LIMIT APPLIES PER:				MED. EXPENSE (Any one person)	$
	POLICY [ ] PROJECT [x] LOC [ ]					
	AUTOMOBILE LIABILITY	POLICY NUMBER			COMBINED SINGLE LIMIT PER ACCIDENT	$ 1,000,000
	[x] ANY AUTO	PER PROJECT ENDORSEMENT				
	ALL OWNED AUTOS					$
	SCHEDULED AUTOS [x] OCCUR					
	HIRED AUTOS					$
	NON-OWNED AUTOS					
	GARAGE					$
	EXCESS LIABILITY	POLICY NUMBER				
	[x] INCLUDEDUMBRELLA FORM [x] OCCUR	PER PROJECT ENDORSEMENT			EACH OCCURRENCE	2,000,000
					AGGREGATE	$ 2,000,000
	WORKERS' COMPENSATION AND EMPLOYER'S LIABILITY	POLICY NUMBER			[x] STATUTORY LIMITS	
					EACH ACCIDENT FOR BODILY INJURY	$ 250,000
		COVERAGE APPLIES IN STATE OF JOBSITE OPERATION UNDER THIS SPECIFIC CONTRACT			DISEASE-POLICY LIMIT	$ 1,000,000
	THE PROPRIETOR, PARTNERS, EXECUTIVE OFFICERS ARE: [ ] INCL. [ ] EXCL.	USL&H COVERAGE IS INCLUDED WHERE NEEDED			EACH EMPLOYEE FOR BODILY INJURY BY DISEASE	$ 250,000

DESCRIPTION OF OPERATIONS/LOCATIONS/VEHICLES/SPECIAL ITEMS

1. All operations performed under **[Project Name] project, Street Address, City, State Zip.** _____ Project Number _____. The following are included as Additional Insured (Endorsement ISO Form CG 20 10 11 85 or equivalent) for all coverages except Workers' Compensation: The Greater New Haven Water Pollution Control Authority, its directors, officers, employees, subsidiaries & affiliates; **[list any others as identified by the contract documents ("Additional Insureds")]**.
2. All policies except workers' compensation are primary and non-contributing with any insurance maintained by Additional Insureds.
3. All policies contain an express waiver of subrogation rights against Additional Insureds.
4. For commercial general liability and excess liability coverages Additional Insureds are covered for liability arising out of named insured's ongoing and completed operations.
5. Listing of all endorsements to all policies identified on this certificate is attached hereto and incorporated herein.
6. All policies are occurrence based and project specific.

CERTIFICATE HOLDER

The Greater New Haven Water Pollution Control Authority
260 East Street
New Haven, CT 06511
Attn: Gabriel Varca

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED ** BEFORE THE EXPIRATION DATE THEREOF, THE ISSUING INSURER WILL MAIL 30 DAYS WRITTEN NOTICE TO THE CERTIFICATE HOLDER NAMED TO THE LEFT.

AUTHORIZED REPRESENTATIVE

***NON-RENEWED OR MATERIALLY CHANGED*

APPENDIX C

PREVAILING WAGE RATES

PROJECT: **MAIN STREET PUMP STATION**
CABINET RELOCATION & REHABILITATION

GNHWPCA PROJECT NO. SSF 2014-03

Minimum Rates and Classifications
for Heavy/Highway Construction

ID#: **H** 20323

Connecticut Department of Labor
Wage and Workplace Standards Division

By virtue of the authority vested in the Labor Commissioner under provisions of Section 31-53 of the General Statutes of Connecticut, as amended, the following are declared to be the prevailing rates and welfare payments and will apply only where the contract is advertised for bid within 20 days of the date on which the rates are established. Any contractor or subcontractor not obligated by agreement to pay to the welfare and pension fund shall pay this amount to each employee as part of his/her hourly wages.

Project Number: SSF 2014-03

Project Town: East Haven

FAP Number:

State Number:

Project: Main Street Pump Station Control Cabinet Replacement And Relocation, Pump Replacement

CLASSIFICATION	Hourly Rate	Benefits
01) Asbestos/Toxic Waste Removal Laborers: Asbestos removal and encapsulation (except its removal from mechanical systems which are not to be scrapped), toxic waste removers, blasters. **See Laborers Group 5 and 7**		
1) Boilermaker	33.79	34% + 8.96
1a) Bricklayer, Cement Masons, Cement Finishers, Plasterers, Stone Masons	32.50	28.34
2) Carpenters, Piledrivermen	31.00	22.50

As of: Tuesday, March 17, 2015

Project: Main Street Pump Station Control Cabinet Replacement And Relocation, Pump Replacement

2a) Diver Tenders	31.00	22.50
3) Divers	39.46	22.50
4) Painters: (Bridge Construction) Brush, Roller, Blasting (Sand, Water, etc.), Spray	45.10	18.55
4a) Painters: Brush and Roller	31.02	18.55
4b) Painters: Spray Only	34.02	18.55
4c) Painters: Steel Only	33.02	18.55
4d) Painters: Blast and Spray	34.02	18.55

Project: Main Street Pump Station Control Cabinet Replacement And Relocation, Pump Replacement

4e) Painters: Tanks, Tower and Swing	33.02	18.55
5) Electrician (Trade License required: E-1,2 L-5,6 C-5,6 T-1,2 L-1,2 V-1,2,7,8,9)	37.05	23.26 + 3% of gross wage
6) Ironworkers: Ornamental, Reinforcing, Structural, and Precast Concrete Erection	34.47	29.74 + a
7) Plumbers (Trade License required: (P-1,2,6,7,8,9 J-1,2,3,4 SP-1,2) and Pipefitters (Including HVAC Work) (Trade License required: S-1,2,3,4,5,6,7,8 B-1,2,3,4 D-1,2,3,4 G-1, G-2, G-8, G-9)	40.31	26.82
----LABORERS---- -		
8) Group 1: Laborer (Unskilled), Common or General, acetylene burner, concrete specialist	27.05	17.80
9) Group 2: Chain saw operators, fence and guard rail erectors, pneumatic tool operators, powdermen, air tool operator	27.30	17.80

10) Group 3: Pipelayers	27.55	17.80
11) Group 4: Jackhammer/Pavement breaker (handheld); mason tenders (cement/concrete), catch basin builders, asphalt rakers, air track operators, block pavers and curb setters	27.55	17.80
12) Group 5: Toxic waste removal (non-mechanical systems)	29.05	17.80
13) Group 6: Blasters	28.80	17.80
Group 7: Asbestos Removal, non-mechanical systems (does not include leaded joint pipe)	28.05	17.80
Group 8: Traffic control signalmen	16.00	17.80

----LABORERS (TUNNEL CONSTRUCTION, FREE AIR). Shield Drive and Liner Plate Tunnels in Free Air.----

13a) Miners, Motormen, Mucking Machine Operators, Nozzle Men, Grout Men, Shaft & Tunnel Steel & Rodmen, Shield & Erector, Arm Operator, Cable Tenders	31.28	17.80 + a
13b) Brakemen, Trackmen	30.37	17.80 + a
----CLEANING, CONCRETE AND CAULKING TUNNEL----		
14) Concrete Workers, Form Movers, and Strippers	30.37	17.80 + a
15) Form Erectors	30.68	17.80 + a
----ROCK SHAFT LINING, CONCRETE, LINING OF SAME AND TUNNEL IN FREE AIR:----		
16) Brakemen, Trackmen, Tunnel Laborers, Shaft Laborers	30.37	17.80 + a

17) Laborers Topside, Cage Tenders, Bellman	30.26	17.80 + a
18) Miners	31.28	17.80 + a
----TUNNELS, CAISSON AND CYLINDER WORK IN COMPRESSED AIR: ----		
18a) Blaster	37.41	17.80 + a
19) Brakemen, Trackmen, Groutman, Laborers, Outside Lock Tender, Gauge Tenders	37.22	17.80 + a
20) Change House Attendants, Powder Watchmen, Top on Iron Bolts	35.35	17.80 + a
21) Mucking Machine Operator	37.97	17.80 + a

Project: Main Street Pump Station Control Cabinet Replacement And Relocation, Pump Replacement

----TRUCK DRIVERS----(*see note below)

Two axle trucks	28.33	19.14 + a
Three axle trucks; two axle ready mix	28.43	19.14 + a
Three axle ready mix	28.48	19.14 + a
Four axle trucks, heavy duty trailer (up to 40 tons)	28.53	19.14 + a
Four axle ready-mix	28.58	19.14 + a
Heavy duty trailer (40 tons and over)	28.78	19.14 + a

Specialized earth moving equipment other than conventional type on-the road trucks and semi-trailer (including Euclids)	28.58	19.14 + a
----POWER EQUIPMENT OPERATORS----		
Group 1: Crane handling or erecting structural steel or stone, hoisting engineer (2 drums or over), front end loader (7 cubic yards or over), Work Boat 26 ft. & Over. (Trade License Required)	36.80	22.30 + a
Group 2: Cranes (100 ton rate capacity and over); Excavator over 2 cubic yards; Piledriver ($3.00 premium when operator controls hammer); Barlar Drill/Caisson. (Trade License Required)	36.48	22.30 + a
Group 3: Excavator/Backhoe under 2 cubic yards; Cranes (under 100 ton rated capacity), Gradall; Master Mechanic; Hoisting Engineer (all types of equipment where a drum and cable are used to hoist or drag material regardless of motive power of operation), Rubber Tire Excavator (Drott-1085 or similar);Grader Operator; Bulldozer Fine Grade (slopes, shaping, laser or GPS, etc.). (Trade License Required)	35.74	22.30 + a
Group 4: Trenching Machines; Lighter Derrick; Concrete Finishing Machine; CMI Machine or Similar; Koehring Loader (Skooper)	35.35	22.30 + a
Group 5: Specialty Railroad Equipment; Asphalt Paver; Asphalt Spreader; Asphalt Reclaiming Machine; Line Grinder; Concrete Pumps; Drills with Self Contained Power Units; Boring Machine; Post Hole Digger; Auger; Pounder; Well Digger; Milling Machine (over 24" Mandrell)	34.76	22.30 + a

Project: Main Street Pump Station Control Cabinet Replacement And Relocation, Pump Replacement

Group 5 continued: Side Boom; Combination Hoe and Loader; Directional Driller.	34.76	22.30 + a
Group 6: Front End Loader (3 up to 7 cubic yards); Bulldozer (rough grade dozer).	34.45	22.30 + a
Group 7: Asphalt Roller; Concrete Saws and Cutters (ride on types); Vermeer Concrete Cutter; Stump Grinder; Scraper; Snooper; Skidder; Milling Machine (24" and Under Mandrel).	34.11	22.30 + a
Group 8: Mechanic, Grease Truck Operator, Hydroblaster, Barrier Mover, Power Stone Spreader; Welder; Work Boat under 26 ft.; Transfer Machine.	33.71	22.30 + a
Group 9: Front End Loader (under 3 cubic yards); Skid Steer Loader regardless of attachments (Bobcat or Similar); Fork Lift, Power Chipper; Landscape Equipment (including hydroseeder).	33.28	22.30 + a
Group 10: Vibratory Hammer, Ice Machine, Diesel and Air Hammer, etc.	31.24	22.30 + a
Group 11: Conveyor, Earth Roller; Power Pavement Breaker (whiphammer), Robot Demolition Equipment.	31.24	22.30 + a

Group 12: Wellpoint Operator.	31.18	22.30 + a
Group 13: Compressor Battery Operator.	30.60	22.30 + a
Group 14: Elevator Operator; Tow Motor Operator (Solid Tire No Rough Terrain).	29.46	22.30 + a
Group 15: Generator Operator; Compressor Operator; Pump Operator; Welding Machine Operator; Heater Operator.	29.05	22.30 + a
Group 16: Maintenance Engineer/Oiler	28.40	22.30 + a
Group 17: Portable asphalt plant operator; portable crusher plant operator; portable concrete plant operator.	32.71	22.30 + a
Group 18: Power Safety Boat; Vacuum Truck; Zim Mixer; Sweeper; (minimum for any job requiring CDL license).	30.29	22.30 + a

Project: Main Street Pump Station Control Cabinet Replacement And Relocation, Pump Replacement

**NOTE: SEE BELOW

----LINE CONSTRUCTION----(Railroad Construction and Maintenance)----

20) Lineman, Cable Splicer, Technician	45.43	6.25%+19.20
21) Heavy Equipment Operator	40.89	6.25%+17.18
22) Equipment Operator, Tractor Trailer Driver, Material Men	38.62	6.25%+16.68
23) Driver Groundmen	24.99	6.25%+10.87
23a) Truck Driver	34.07	6.25%+15.41

As of: Tuesday, March 17, 2015

Project: Main Street Pump Station Control Cabinet Replacement And Relocation, Pump Replacement

----LINE CONSTRUCTION----

24) Driver Groundmen	30.92	6.5% + 9.70
25) Groundmen	22.67	6.5% + 6.20
26) Heavy Equipment Operators	37.10	6.5% + 10.70
27) Linemen, Cable Splicers, Dynamite Men	41.22	6.5% + 12.20
28) Material Men, Tractor Trailer Drivers, Equipment Operators	35.04	6.5% + 10.45

As of: Tuesday, March 17, 2015

Project: Main Street Pump Station Control Cabinet Replacement And Relocation, Pump Replacement

Welders: Rate for craft to which welding is incidental.

**Note: Hazardous waste removal work receives additional $1.25 per hour for truck drivers.*

***Note: Hazardous waste premium $3.00 per hour over classified rate*

ALL Cranes: When crane operator is operating equipment that requires a fully licensed crane operator to operate he receives an extra $1.00 premium in addition to the hourly wage rate and benefit contributions:

1) Crane handling or erecting structural steel or stone; hoisting engineer (2 drums or over)

2) Cranes (100 ton rate capacity and over) Bauer Drill/Caisson

3) Cranes (under 100 ton rated capacity)

Crane with 150 ft. boom (including jib) - $1.50 extra
Crane with 200 ft. boom (including jib) - $2.50 extra
Crane with 250 ft. boom (including jib) - $5.00 extra
Crane with 300 ft. boom (including jib) - $7.00 extra
Crane with 400 ft. boom (including jib) - $10.00 extra

All classifications that indicate a percentage of the fringe benefits must be calculated at the percentage rate times the "base hourly rate".

Apprentices duly registered under the Commissioner of Labor's regulations on "Work Training Standards for Apprenticeship and Training Programs" Section 31-51d-1 to 12, are allowed to be paid the appropriate percentage of the prevailing journeymen hourly base and the full fringe benefit rate, providing the work site ratio shall not be less than one full-time journeyperson instructing and supervising the work of each apprentice in a specific trade.

~~Connecticut General Statute Section 31-55a: Annual Adjustments to wage rates by contractors doing state work ~~

The Prevailing wage rates applicable to this project are subject to annual adjustments each July 1st for the duration of the project.

Each contractor shall pay the annual adjusted prevailing wage rate that is in effect each July 1st, as posted by the Department of Labor.

It is the contractor's responsibility to obtain the annual adjusted prevailing wage rate increases directly from the Department of Labor's website.

The annual adjustments will be posted on the Department of Labor's Web page: www.ct.gov/dol.

The Department of Labor will continue to issue the initial prevailing wage rate schedule to the Contracting Agency for the project.

All subsequent annual adjustments will be posted on our Web Site for contractor access.

Contracting Agencies are under no obligation pursuant to State labor law to pay any increase due to the annual adjustment provision.

Project: Main Street Pump Station Control Cabinet Replacement And Relocation, Pump Replacement

Effective October 1, 2005 - Public Act 05-50: any person performing the work of any mechanic, laborer, or worker shall be paid prevailing wage

All Person who perform work ON SITE must be paid prevailing wage for the appropriate mechanic, laborer, or worker classification.

All certified payrolls must list the hours worked and wages paid to All Persons who perform work ON SITE regardless of their ownership i.e.: (Owners, Corporate Officers, LLC Members, Independent Contractors, et. al)

Reporting and payment of wages is required regardless of any contractual relationship alleged to exist between the contractor and such person.

~~Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clause (29 CFR 5.5 (a) (1) (ii)).

Please direct any questions which you may have pertaining to classification of work and payment of prevailing wages to the Wage and Workplace Standards Division, telephone (860)263-6790.

As of: Tuesday, March 17, 2015

[New] In accordance with Section 31-53b(a) of the C.G.S. each contractor shall provide a copy of the OSHA 10 Hour Construc certified payroll on the project.

In accordance with Connecticut General Statutes, 31-53
Certified Payrolls with a statement of compliance
shall be submitted monthly to the contracting agency.

PAYROLL CERTIFICATION FOR PUBLIC WORKS PRO

WEEKLY PAYROLL

CONTRACTOR NAME AND ADDRESS:

SUBCONTRACTOR

PAYROLL NUMBER	Week-Ending Date	PROJECT NAME & ADDRESS

PERSON/WORKER, ADDRESS and SECTION	APPR RATE %	MALE/ FEMALE AND RACE*	WORK CLASSIFICATION Trade License Type & Number - OSHA 10 Certification Number	DAY AND DATE HOURS WORKED EACH DAY S	M	T	W	TH	F	S	Total ST Hours Total O/T Hours	BASE HOURLY RATE TOTAL FRINGE BENEFIT PLAN CASH	T F B P 1 ($
												$ Base Rate	1. 2. 3.
												$ Cash Fringe	4. 5. 6.
												$ Base Rate	1. 2. 3.
												$ Cash Fringe	4. 5. 6.
												$ Base Rate	1. 2. 3.
												$ Cash Fringe	4. 5. 6.
												$ Base Rate	1. 2. 3.
												$ Cash Fringe	4. 5. 6.

12/9/2013 *IF REQUIRED

WWS-CP1 *SEE REVERSE SID

OSHA 10 ~ATTACH CARD TO 1ST CERTIFIED PAYROLL

***FRINGE BENEFITS EXPLANATION (P):**

Bona fide benefits paid to approved plans, funds or programs, except those required by Federal or State Law (unemployment tax, worker's compensation, income taxes, etc.).

Please specify the type of benefits provided:

1) Medical or hospital care _____ 4) Disability_____

2) Pension or retirement _____ 5) Vacation, holiday_____

3) Life Insurance _____ 6) Other (please specify) _____

CERTIFIED STATEMENT OF COMPLIANCE

For the week ending date of _____,

I, _____of _____, (hereafter known as

Employer) in my capacity as _____ (title) do hereby certify and state:

Section A:

1. All persons employed on said project have been paid the full weekly wages earned by them during the week in accordance with Connecticut General Statutes, section 31-53, as amended. Further, I hereby certify and state the following:

a) The records submitted are true and accurate;

b) The rate of wages paid to each mechanic, laborer or workman and the amount of payment or contributions paid or payable on behalf of each such person to any employee welfare fund, as defined in Connecticut General Statutes, section 31-53 (h), are not less than the prevailing rate of wages and the amount of payment or contributions paid or payable on behalf of each such person to any employee welfare fund, as determined by the Labor Commissioner pursuant to subsection Connecticut General Statutes, section 31-53 (d), and said wages and benefits are not less than those which may also be required by contract;

c) The Employer has complied with all of the provisions in Connecticut General Statutes, section 31-53 (and Section 31-54 if applicable for state highway construction);

d) Each such person is covered by a worker's compensation insurance policy for the duration of his employment which proof of coverage has been provided to the contracting agency;

e) The Employer does not receive kickbacks, which means any money, fee, commission, credit, gift, gratuity, thing of value, or compensation of any kind which is provided directly or indirectly, to any prime contractor, prime contractor employee, subcontractor, or subcontractor employee for the purpose of improperly obtaining or rewarding favorable treatment in connection with a prime contract or in connection with a prime contractor in connection with a subcontractor relating to a prime contractor; and

f) The Employer is aware that filing a certified payroll which he knows to be false is a class D felony for which the employer may be fined up to five thousand dollars, imprisoned for up to five years or both.

2. OSHA~The employer shall affix a copy of the construction safety course, program or training completion document to the certified payroll required to be submitted to the contracting agency for this project on which such persons name first appears.

Weekly Payroll Certification For
Public Works Projects (Continued)

PAYROLL CERTIFICATION FOR PUBLIC WORKS PR

WEEKLY PAYROLL

PERSON/WORKER, ADDRESS and SECTION	APPR RATE %	MALE/ FEMALE AND RACE*	WORK CLASSIFICATION / Trade License Type & Number - OSHA 10 Certification Number	DAY AND DATE S	M	T	W	TH	F	S	Total ST Hours / Total O/T Hours	BASE HOURLY RATE / TOTAL FRINGE BENEFIT PLAN CASH	TYPE FRING BENE Per H 1 thro (see b
				HOURS WORKED EACH DAY									
												$ Base Rate $ Cash Fringe	1. $ 2. $ 3. $ 4. $ 5. $ 6. $
												$ Base Rate $ Cash Fringe	1. $ 2. $ 3. $ 4. $ 5. $ 6. $
												$ Base Rate $ Cash Fringe	1. $ 2. $ 3. $ 4. $ 5. $ 6. $
												$ Base Rate $ Cash Fringe	1. $ 2. $ 3. $ 4. $ 5. $ 6. $
												$ Base Rate $ Cash Fringe	1. $ 2. $ 3. $ 4. $ 5. $ 6. $

*IF REQUIRED

NOTICE: THIS PAGE MUST BE ACCOMPANIED BY A COVER PAGE (FORM # WWS-CP1)

[New] In accordance with Section 31-53b(a) of the C.G.S. each contractor shall provide a copy of the OSHA 10 Hour Construction Safety and Health Card for each em
certified payroll on the project.

In accordance with Connecticut General Statutes, 31-53
Certified Payrolls with a statement of compliance
shall be submitted monthly to the contracting agency.

PAYROLL CERTIFICATION FOR PUBLIC WORKS PROJECTS

WEEKLY PAYROLL

CONTRACTOR NAME AND ADDRESS:
Landon Corporation, 15 Connecticut Avenue, Northford, CT 06472

SUBCONTRACTOR NAME & ADDRESS
XYZ Corporation
2 Main Street
Yantic, CT 06389

WORKER'S
Travelers
POLICY #
EFFECTIVE
EXPIRATIO

PAYROLL NUMBER	Week-Ending Date	PROJECT NAME & ADDRESS
1	9/26/09	DOT 105-296, Route 82

PERSON/WORKER, ADDRESS and SECTION	APPR RATE %	MALE/ FEMALE AND RACE*	WORK CLASSIFICATION / Trade License Type & Number - OSHA 10 Certification Number	DAY AND DATE							Total ST Hours / Total OT Hours	BASE HOURLY RATE / TOTAL FRINGE BENEFIT PLAN CASH	TYPE OF FRINGE BENEFITS Per Hour 1 through 6 (see back)	GROSS PAY FOR ALL WORK PERFORMED THIS WEEK	TOTAL DEDUC	
				S	M	T	W	TH	F	S					FICA	FEDERAL WITH-HOLDING
				20	21	22	23	24	25	26						
				HOURS WORKED EACH DAY												
Robert Craft 81 Maple Street Willimantic, CT 06226		M/C	Electrical Lineman E-1 1234567 Owner OSHA 123456		8	8	8	8	8		S-TIME 40 O-TIME	$ 30.75 Base Rate $ 8.82 Cash Fringe	1. $ 5.80 2. $ 3. $ 2.01 4. $ 5. $ 6. $	$1,582.80		
Ronald Jones 212 Elm Street Norwich, CT 06360	65%	M/B	Electrical Apprentice OSHA 234567		8	8	8	8			S-TIME 40 O-TIME	$ 19.99 Base Rate $ 16.63 Cash Fringe	1. $ 2. $ 3. $ 4. $ 5. $ 6. $	$1,464.80	xx.xx	xxx.xx
Franklin T. Smith 234 Washington Rd. New London, CT 06320 SECTION B		M/H	Project Manager			8					S-TIME 8 O-TIME	$ Base Rate $ Cash Fringe	1. $ 2. $ 3. $ 4. $ 5. $ 6. $	$1,500.00	xx.xx	xx.xx
											S-TIME O-TIME	$ Base Rate $ Cash Fringe	1. $ 2. $ 3. $ 4. $ 5. $ 6. $			

7/13/2009
WWS-CP1

*IF REQUIRED

*SEE REVERSE SIDE

OSHA 10 ~ATTACH CARD TO 1ST CERTIFIED PAYROLL

***FRINGE BENEFITS EXPLANATION (P):**

Bona fide benefits paid to approved plans, funds or programs, except those required by Federal or State Law (unemployment tax, worker's compensation, income taxes, etc.).

Please specify the type of benefits provided:

1) Medical or hospital care Blue Cross 4) Disability _____

2) Pension or retirement _____ 5) Vacation, holiday _____

3) Life Insurance Utopia 6) Other (please specify) _____

CERTIFIED STATEMENT OF COMPLIANCE

For the week ending date of 9/26/09,

I, Robert Craft of XYZ Corporation, (hereafter known as

Employer) in my capacity as Owner (title) do hereby certify and state:

Section A:

1. All persons employed on said project have been paid the full weekly wages earned by them during the week in accordance with Connecticut General Statutes, section 31-53, as amended. Further, I hereby certify and state the following:

a) The records submitted are true and accurate;

b) The rate of wages paid to each mechanic, laborer or workman and the amount of payment or contributions paid or payable on behalf of each such employee to any employee welfare fund, as defined in Connecticut General Statutes, section 31-53 (h), are not less than the prevailing rate of wages and the amount of payment or contributions paid or payable on behalf of each such employee to any employee welfare fund, as determined by the Labor Commissioner pursuant to subsection Connecticut General Statutes, section 31-53 (d), and said wages and benefits are not less than those which may also be required by contract;

c) The Employer has complied with all of the provisions in Connecticut General Statutes, section 31-53 (and Section 31-54 if applicable for state highway construction);

d) Each such employee of the Employer is covered by a worker's compensation insurance policy for the duration of his employment which proof of coverage has been provided to the contracting agency;

e) The Employer does not receive kickbacks which means any money, fee, commission, credit, gift, gratuity, thing of value, or compensation of any kind which is provided directly or indirectly, to any prime contractor, prime contractor employee, subcontractor, or subcontractor employee for the purpose of improperly obtaining or rewarding favorable treatment in connection with a prime contract or in connection with a prime contractor in connection with a subcontractor relating to a prime contract; and

f) The Employer is aware that filing a certified payroll which he knows to be false is a class D felony for which the employer may be fined up to five thousand dollars, imprisoned for up to five years or both.

2. OSHA~The employer shall affix a copy of the construction safety course, program or training completion document to the certified payroll required to be submitted to the contracting agency for this project on which such employee's name first appears.

Robert Craft (Signature) owner (Title) 10/2/09 Submitted on (Date)

Section B: Applies to CONNDOT Projects ONLY

That pursuant to CONNDOT contract requirements for reporting purposes only, all employees listed under Section B who performed work on this project are not covered under the prevailing wage requirements defined in Connecticut General Statutes Section 31-53.

Robert Craft (Signature) owner (Title) 10/2/09 Submitted on (Date)

Note: CTDOL will assume all hours worked were performed under Section A unless clearly delineated as Section B WWS-CP1 as such. Should an employee perform work under both Section A and Section B, the hours worked and wages paid must be segregated for reporting purposes.

*****THIS IS A PUBLIC DOCUMENT*****
*****DO NOT INCLUDE SOCIAL SECURITY NUMBERS*****

Information Bulletin
Occupational Classifications

The Connecticut Department of Labor has the responsibility to properly determine "job classification" on prevailing wage projects covered under C.G.S. Section 31-53.

Note: This information is intended to provide a sample of some occupational classifications for guidance purposes only. It is not an all-inclusive list of each occupation's duties. This list is being provided only to highlight some areas where a contractor may be unclear regarding the proper classification.

Below are additional clarifications of specific job duties performed for certain classifications:

- ***ASBESTOS WORKERS***

Applies all insulating materials, protective coverings, coatings and finishes to all types of mechanical systems.

- ***ASBESTOS INSULATOR***

Handle, install apply, fabricate, distribute, prepare, alter, repair, dismantle, heat and frost insulation, including penetration and fire stopping work on all penetration fire stop systems.

- ***BOILERMAKERS***

Erects hydro plants, incomplete vessels, steel stacks, storage tanks for water, fuel, etc. Builds incomplete boilers, repairs heat exchanges and steam generators.

- ***BRICKLAYERS, CEMENT MASONS, CEMENT FINISHERS, MARBLE MASONS, PLASTERERS, STONE MASONS, PLASTERERS. STONE MASONS, TERRAZZO WORKERS, TILE SETTERS***

Lays building materials such as brick, structural tile and concrete cinder, glass, gypsum, terra cotta block. Cuts, tools and sets marble, sets stone, finishes concrete, applies decorative steel, aluminum and plastic tile, applies cements, sand, pigment and marble chips to floors, stairways, etc.

- ***CARPENTERS, MILLWRIGHTS. PILEDRIVERMEN. LATHERS. RESILEINT FLOOR LAYERS, DOCK BUILDERS, DIKERS, DIVER TENDERS***

Constructs, erects, installs and repairs structures and fixtures of wood, plywood and wallboard. Installs, assembles, dismantles, moves industrial machinery. Drives piling into ground to provide foundations for structures such as buildings and bridges, retaining walls for earth embankments, such as cofferdams. Fastens wooden, metal or rockboard lath to walls, ceilings and partitions of buildings, acoustical tile layer, concrete form builder. Applies firestopping materials on fire resistive joint systems only. Installation of curtain/window walls only where attached to wood or metal studs. Installation of insulated material of all types whether blown, nailed or attached in other ways to walls, ceilings and floors of buildings. Assembly and installation of modular furniture/furniture systems. Free-standing furniture is not covered. This includes free standing: student chairs, study top desks, book box desks, computer furniture, dictionary stand, atlas stand, wood shelving, two-position information access station, file cabinets, storage cabinets, tables, etc.

- **CLEANING LABORER**

• The clean up of any construction debris and the general cleaning, including sweeping, wash down, mopping, wiping of the construction facility, washing, polishing, dusting, etc., prior to the issuance of a certificate of occupancy falls under the *Labor classification.*

- **DELIVERY PERSONNEL**

• If delivery of supplies/building materials is to one common point and stockpiled there, prevailing wages are not required. If the delivery personnel are involved in the distribution of the material to multiple locations within the construction site then they would have to be paid prevailing wages for the type of work performed: laborer, equipment operator, electrician, ironworker, plumber, etc.
• An example of this would be where delivery of drywall is made to a building and the delivery personnel distribute the drywall from one "stockpile" location to further sub-locations on each floor. Distribution of material around a construction site is the job of a laborer/tradesman and not a delivery personnel.

- **ELECTRICIANS**

Install, erect, maintenance, alteration or repair of any wire, cable, conduit, etc., which generates, transforms, transmits or uses electrical energy for light, heat, power or other purposes, including the Installation or maintenance of telecommunication, LAN wiring or computer equipment, and low voltage wiring. ****License required per Connecticut General Statutes: E-1,2 L-5,6 C-5,6 T-1,2 L-1,2 V-1,2,7,8,9.***

- ***ELEVATOR CONSTRUCTORS***

Install, erect, maintenance and repair of all types of elevators, escalators, dumb waiters and moving walks. ****License required by Connecticut General Statutes: R-1,2,5,6.***

- ***FORK LIFT OPERATOR***

Laborers Group 4) Mason Tenders - operates forklift solely to assist a mason to a maximum height of nine (9) feet only.

Power Equipment Operator Group 9 - operates forklift to assist any trade, and to assist a mason to a height over nine (9) feet.

- ***GLAZIERS***

Glazing wood and metal sash, doors, partitions, and 2 story aluminum storefronts. Installs glass windows, skylights, store fronts and display cases or surfaces such as building fronts, interior walls, ceilings and table tops and metal store fronts. Installation of aluminum window walls and curtain walls is the "joint" work of glaziers and ironworkers which requires either a blended rate or equal composite workforce.

- ***IRONWORKERS***

Erection, installation and placement of structural steel, precast concrete, miscellaneous iron, ornamental iron, metal curtain wall, rigging and reinforcing steel. Handling, sorting, and installation of reinforcing steel (rebar). Metal bridge rail (traffic), metal bridge handrail, and decorative security fence installation. Installation of aluminum window walls and curtain walls is the "joint" work of glaziers and ironworkers which requires either a blended rate or equal composite workforce. Insulated metal and insulated composite panels are still installed by the Ironworker.

- ***INSULATOR***

• Installing fire stopping systems/materials for "Penetration Firestop Systems": transit to cables, electrical conduits, insulated pipes, sprinkler pipe penetrations, ductwork behind radiation, electrical cable trays, fire rated pipe penetrations, natural polypropylene, HVAC ducts, plumbing bare metal, telephone and communication wires, and boiler room ceilings. Past practice using the applicable licensed trades, Plumber, Sheet Metal, Sprinkler Fitter, and Electrician, is not inconsistent with the Insulator classification and would be permitted.

- ***LABORERS***

Acetylene burners, asphalt rakers, chain saw operators, concrete and power buggy operator, concrete saw operator, fence and guard rail erector (except metal bridge rail (traffic), metal bridge handrail, and decorative security fence

installation.), hand operated concrete vibrator operator, mason tenders, pipelayers (installation of storm drainage or sewage lines on the street only), pneumatic drill operator, pneumatic gas and electric drill operator, powermen and wagon drill operator, air track operator, block paver, curb setters, blasters, concrete spreaders.

- ***PAINTERS***

Maintenance, preparation, cleaning, blasting (water and sand, etc.), painting or application of any protective coatings of every description on all bridges and appurtenances of highways, roadways, and railroads. Painting, decorating, hardwood finishing, paper hanging, sign writing, scenic art work and drywall hng for any and all types of building and residential work.

- ***LEAD PAINT REMOVAL***

• Painter's Rate
  1. Removal of lead paint from bridges.
  2. Removal of lead paint as preparation of any surface to be repainted.
  3. Where removal is on a Demolition project prior to reconstruction.

• Laborer's Rate
  1. Removal of lead paint from any surface NOT to be repainted.
  2. Where removal is on a *TOTAL* Demolition project only.

- ***PLUMBERS AND PIPEFITTERS***

Installation, repair, replacement, alteration or maintenance of all plumbing, heating, cooling and piping. ****License required per Connecticut General Statutes: P-1,2,6,7,8,9 J-1,2,3,4 SP-1,2 S-1,2,3,4,5,6,7,8 B-1,2,3,4 D-1,2,3,4.***

- ***POWER EQUIPMENT OPERATORS***

Operates several types of power construction equipment such as compressors, pumps, hoists, derricks, cranes, shovels, tractors, scrapers or motor graders, etc. Repairs and maintains equipment. ****License required, crane operators only, per Connecticut General Statutes.***

- ***ROOFERS***

Covers roofs with composition shingles or sheets, wood shingles, slate or asphalt and gravel to waterproof roofs, including preparation of surface. (tear-off and/or removal of any type of roofing and/or clean-up of any and all areas where a roof is to be relaid)

- ***SHEETMETAL WORKERS***

Fabricate, assembles, installs and repairs sheetmetal products and equipment in such areas as ventilation, air-conditioning, warm air heating, restaurant equipment, architectural sheet metal work, sheetmetal roofing, and aluminum gutters. Fabrication, handling, assembling, erecting, altering, repairing, etc. of coated metal material panels and composite metal material panels when used on building exteriors and interiors as soffits, facia, louvers, partitions, wall panel siding, canopies, cornice, column covers, awnings, beam covers, cladding, sun shades, lighting troughs, spires, ornamental roofing, metal ceilings, mansards, copings, ornamental and ventilation hoods, vertical and horizontal siding panels, trim, etc. The sheet metal classification also applies to the vast variety of coated metal material panels and composite metal material panels that have evolved over the years as an alternative to conventional ferrous and non-ferrous metals like steel, iron, tin, copper, brass, bronze, aluminum, etc. Insulated metal and insulated composite panels are still installed by the Iron Worker. Fabrication, handling, assembling, erecting, altering, repairing, etc. of architectural metal roof, standing seam roof, composite metal roof, metal and composite bathroom/toilet partitions, aluminum gutters, metal and composite lockers and shelving, kitchen equipment, and walk-in coolers.

- ***SPRINKLER FITTERS***

Installation, alteration, maintenance and repair of fire protection sprinkler systems.
****License required per Connecticut General Statutes: F-1,2,3,4.***

- ***TILE MARBLE AND TERRAZZO FINISHERS***

Assists and tends the tile setter, marble mason and terrazzo worker in the performance of their duties.

- **TRUCK DRIVERS**

~~How to pay truck drivers delivering asphalt is under REVISION~~

Truck Drivers are requires to be paid prevailing wage for time spent "working" directly on the site. These drivers remain covered by the prevailing wage for any time spent transporting between the actual construction location and facilities (such as fabrication, plants, mobile factories, batch plant, borrow pits, job headquarters, tool yards, etc.) dedicated exclusively, or nearly so, to performance of the contract or project, which are

so located in proximity to the actual construction location that it is reasonable to include them. ***License required, drivers only, per Connecticut General Statutes.***

For example:

- Material men and deliverymen are not covered under prevailing wage as long as they are not directly involved in the construction process. If, they unload the material, they would then be covered by prevailing wage for the classification they are performing work in: laborer, equipment operator, etc.
- Hauling material off site is not covered provided they are not dumping it at a location outlined above.
- Driving a truck on site and moving equipment or materials on site would be considered covered work, as this is part of the construction process.

➢ *Any questions regarding the proper classification should be directed to:*

Public Contract Compliance Unit
Wage and Workplace Standards Division
Connecticut Department of Labor
200 Folly Brook Blvd, Wethersfield, CT 06109

(860) 263-6543.

Connecticut Department of Labor
Wage and Workplace Standards Division
FOOTNOTES

⇨ Please Note: If the "Benefits" listed on the schedule for the following occupations includes a letter(s) (+ a or + a+b for instance), refer to the information below.

Benefits to be paid at the appropriate prevailing wage rate for the listed occupation.

If the "Benefits" section for the occupation lists only a dollar amount, disregard the information below.

Bricklayers, Cement Masons, Cement Finishers, Concrete Finishers, Stone Masons
(Building Construction) and
(Residential- Hartford, Middlesex, New Haven, New London and Tolland Counties)

a. Paid Holiday: Employees shall receive 4 hours for Christmas Eve holiday provided the employee works the regularly scheduled day before and after the holiday. Employers may schedule work on Christmas Eve and employees shall receive pay for actual hours worked in addition to holiday pay.

Elevator Constructors: Mechanics

a. Paid Holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Veterans' Day, Thanksgiving Day, Christmas Day, plus the Friday after Thanksgiving.

b. Vacation: Employer contributes 8% of basic hourly rate for 5 years or more of service or 6% of basic hourly rate for 6 months to 5 years of service as vacation pay credit.

Glaziers

a. Paid Holidays: Labor Day and Christmas Day.

Power Equipment Operators
(Heavy and Highway Construction & Building Construction)

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. Holidays falling on Saturday may be observed on Saturday, or if the employer so elects, on the preceding Friday.

Ironworkers

a. Paid Holiday: Labor Day provided employee has been on the payroll for the 5 consecutive work days prior to Labor Day.

Laborers (Tunnel Construction)

a. Paid Holidays: 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.

Roofers

a. Paid Holidays: July 4th, Labor Day, and Christmas Day provided the employee is employed 15 days prior to the holiday.

Sprinkler Fitters

a. Paid Holidays: Memorial Day, July 4th, Labor Day, Thanksgiving Day and Christmas Day, provided the employee has been in the employment of a contractor 20 working days prior to any such paid holiday.

Truck Drivers

(Heavy and Highway Construction & Building Construction)

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.

Project: Main Street Pump Station Control Cabinet Replacement And Relocation, Pump Replacement

Minimum Rates and Classifications for Building Construction

ID# : B 20323

Connecticut Department of Labor
Wage and Workplace Standards Division

By virtue of the authority vested in the Labor Commissioner under provisions of Section 31-53 of the General Statutes of Connecticut, as amended, the following are declared to be the prevailing rates and welfare payments and will apply only where the contract is advertised for bid within 20 days of the date on which the rates are established. Any contractor or subcontractor not obligated by agreement to pay to the welfare and pension fund shall pay this amount to each employee as part of his/her hourly wages.

Project Number: SSF 2014-03

Project Town: East Haven

State#:

FAP#:

Project: Main Street Pump Station Control Cabinet Replacement And Relocation, Pump Replacement

CLASSIFICATION	Hourly Rate	Benefits
1a) Asbestos Worker/Insulator (Includes application of insulating materials, protective coverings, coatings, & finishes to all types of mechanical systems; application of firestopping material for wall openings & penetrations in walls, floors, ceilings	35.75	28.82
1b) Asbestos/Toxic Waste Removal Laborers: Asbestos removal and encapsulation (except its removal from mechanical systems which are not to be scrapped), toxic waste removers, blasters.**See Laborers Group 7**		
2) Boilermaker	35.24	25.01

As of: **Tuesday, March 17, 2015**

Project: Main Street Pump Station Control Cabinet Replacement And Relocation, Pump Replacement

3a) Bricklayer, Cement Mason, Concrete Finisher (including caulking), Stone Masons	32.50	28.74 + a
3b) Tile Setter	33.75	24.21
3c) Terrazzo Mechanics and Marble Setters	31.69	22.35
3d) Tile, Marble & Terrazzo Finishers	26.26	20.69
3e) Plasterer	32.50	29.45

------LABORERS------

As of: **Tuesday, March 17, 2015**

4) Group 1: Laborers (common or general), acetylene burners, carpenter tenders, concrete specialists, wrecking laborers, fire watchers.	27.05	17.80
4a) Group 2: Mortar mixers, plaster tender, power buggy operators, powdermen, fireproofer/mixer/nozzleman (Person running mixer and spraying fireproof only)..	27.30	17.80
4b) Group 3: Jackhammer Operators/Pavement Breaker, mason tender (brick) and mason tender (cement/concrete)	27.55	17.80
4c) **Group 4: Pipelayers (Installation of water, storm drainage or sewage lines outside of the building line with P6, P7 license) (the pipelayer rate shall apply only to one or two employees of the total crew who primary task is to actually perform the mating of pipe sections) P6 and P7 rate is $26.80	27.30	17.80
4d) Group 5: Air track operators, Sand blasters	27.80	17.80
4e) Group 6: Nuclear toxic waste removers, blasters	30.05	17.80

4f) Group 7: Asbestos/lead removal and encapsulation (except it's removal from mechanical systems which are not to be scrapped)	28.05	17.80
4g) Group 8: Bottom men on open air caisson, cylindrical work and boring crew	27.55	17.80
4h) Group 9: Top men on open air caisson, cylindrical work and boring crew	27.05	17.80
4i) Group 10: Traffic Control Signalman	16.00	17.80
5) Carpenter, Acoustical Ceiling Installation, Soft Floor/Carpet Laying, Metal Stud Installation, Form Work and Scaffold Building, Drywall Hanging, Modular-Furniture Systems Installers, Lathers, Piledrivers, Resilient Floor Layers.	31.00	22.50
5a) Millwrights	31.60	22.75

6) Electrical Worker (including low voltage wiring) (Trade License required: E1,2 L-5,6 C-5,6 T-1,2 L-1,2 V-1,2,7,8,9)	37.05	23.26 + 3% of gross wage
7a) Elevator Mechanic (Trade License required: R-1,2,5,6)	47.96	28.385+a+b
-----LINE CONSTRUCTION----		
Groundman	24.37	6.5%+10.04
Linemen/Cable Splicer	44.30	6.5%+17.70
8) Glazier (Trade License required: FG-1,2)	34.58	18.55

9) Ironworker, Ornamental, Reinforcing, Structural, and Precast Concrete Erection	34.47	29.74 + a

----OPERATORS----

Group 1: Crane handling or erecting structural steel or stone, hoisting engineer 2 drums or over, front end loader (7 cubic yards or over); work boat 26 ft. and over. (Trade License Required)	36.80	22.30 + a
Group 2: Cranes (100 ton rate capacity and over); Excavator over 2 cubic yards; Piledriver ($3.00 premium when operator controls hammer); Bauer Drill/Caisson. (Trade License Required)	36.48	22.30 + a
Group 3: Excavator; Backhoe/Excavator under 2 cubic yards; Cranes (under 100 ton rated capacity); Grader/Blade; 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)	35.74	22.30 + a
Group 4: Trenching Machines; Lighter Derrick; Concrete Finishing Machine; CMI Machine or Similar; Koehring Loader (Skooper).	35.35	22.30 + a

Project: Main Street Pump Station Control Cabinet Replacement And Relocation, Pump Replacement

Group 5: Specialty Railroad Equipment; Asphalt Paver; Asphalt Reclaiming Machine; Line Grinder; Concrete Pumps; Drills with Self Contained Power Units; Boring Machine; Post Hole Digger; Auger; Pounder; Well Digger; Milling Machine (over 24" Mandrell)	34.76	22.30 + a
Group 5 continued: Side Boom; Combination Hoe and Loader; Directional Driller; Pile Testing Machine.	34.76	22.30 + a
Group 6: Front End Loader (3 up to 7 cubic yards); Bulldozer (rough grade dozer).	34.45	22.30 + a
Group 7: Asphalt roller, concrete saws and cutters (ride on types), vermeer concrete cutter, Stump Grinder; Scraper; Shooper; Skidder; Milling Machine (24" and under Mandrell).	34.11	22.30 + a
Group 8: Mechanic, grease truck operator; hydroblaster; barrier mover; power stone spreader; welding; work boat under 26 ft.; transfer machine.	33.71	22.30 + a
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).	33.28	22.30 + a

As of: **Tuesday, March 17, 2015**

Group 10: Vibratory hammer; ice machine; diesel and air, hammer, etc.	31.24	22.30 + a
Group 11: Conveyor, earth roller, power pavement breaker (whiphammer), robot demolition equipment.	31.24	22.30 + a
Group 12: Wellpoint operator.	31.18	22.30 + a
Group 13: Compressor battery operator.	30.60	22.30 + a
Group 14: Elevator operator; tow motor operator (solid tire no rough terrain).	29.46	22.30 + a
Group 15: Generator Operator; Compressor Operator; Pump Operator; Welding Machine Operator; Heater Operator.	29.05	22.30 + a

Group 16: Maintenance Engineer/Oiler.	28.40	22.30 + a
Group 17: Portable asphalt plant operator; portable crusher plant operator; portable concrete plant operator.	30.60	22.30 + a
Group 18: Power safety boat; vacuum truck; zim mixer; sweeper; (Minimum for any job requiring a CDL license).	30.29	22.30 + a
------PAINTERS (Including Drywall Finishing)------		
10a) Brush and Roller	31.02	18.55
10b) Taping Only/Drywall Finishing	31.77	18.55

10c) Paperhanger and Red Label	31.52	18.55
10e) Blast and Spray	34.02	18.55
11) Plumber (excluding HVAC pipe installation) (Trade License required: P-1,2,6,7,8,9 J-1,2,3,4 SP-1,2)	40.31	26.82
12) Well Digger, Pile Testing Machine	33.01	19.40 + a
Roofer: Cole Tar Pitch	38.50	14.25
Roofer: Slate, Tile, Composition, Shingles, Singly Ply and Damp/Waterproofing	37.00	14.25

15) Sheetmetal Worker (Trade License required for HVAC and Ductwork: SM-1,SM-2,SM-3,SM-4,SM-5,SM-6)	34.87	32.40
16) Pipefitter (Including HVAC work) (Trade License required: S-1,2,3,4,5,6,7,8 B-1,2,3,4 D-1,2,3,4, G-1, G-2, G-8 & G-9)	40.31	26.82
------TRUCK DRIVERS------		
17a) 2 Axle	28.33	19.14 + a
17b) 3 Axle, 2 Axle Ready Mix	28.43	19.14 + a
17c) 3 Axle Ready Mix	28.48	19.14 + a

17d) 4 Axle, Heavy Duty Trailer up to 40 tons	28.53	19.14 + a
17e) 4 Axle Ready Mix	28.58	19.14 + a
17f) Heavy Duty Trailer (40 Tons and Over)	28.78	19.14 + a
17g) Specialized Earth Moving Equipment (Other Than Conventional Type on-the-Road Trucks and Semi-Trailers, Including Euclids)	28.58	19.14 + a
18) Sprinkler Fitter (Trade License required: F-1,2,3,4)	39.76	19.87 + a
19) Theatrical Stage Journeyman	25.76	7.34

Project: Main Street Pump Station Control Cabinet Replacement And Relocation, Pump Replacement

Welders: Rate for craft to which welding is incidental.

**Note: Hazardous waste removal work receives additional $1.25 per hour for truck drivers.*

***Note: Hazardous waste premium $3.00 per hour over classified rate*

ALL Cranes: When crane operator is operating equipment that requires a fully licensed crane operator to operate he receives an extra $1.00 premium in addition to the hourly wage rate and benefit contributions:

1) Crane handling or erecting structural steel or stone; hoisting engineer (2 drums or over)

2) Cranes (100 ton rate capacity and over) Bauer Drill/Caisson

3) Cranes (under 100 ton rated capacity)

Crane with 150 ft. boom (including jib) - $1.50 extra
Crane with 200 ft. boom (including jib) - $2.50 extra
Crane with 250 ft. boom (including jib) - $5.00 extra
Crane with 300 ft. boom (including jib) - $7.00 extra
Crane with 400 ft. boom (including jib) - $10.00 extra

All classifications that indicate a percentage of the fringe benefits must be calculated at the percentage rate times the "base hourly rate".

Apprentices duly registered under the Commissioner of Labor's regulations on "Work Training Standards for Apprenticeship and Training Programs" Section 31-51d-1 to 12, are allowed to be paid the appropriate percentage of the prevailing journeymen hourly base and the full fringe benefit rate, providing the work site ratio shall not be less than one full-time journeyperson instructing and supervising the work of each apprentice in a specific trade.

The Prevailing wage rates applicable to this project are subject to annual adjustments each July 1st for the duration of the project.

Each contractor shall pay the annual adjusted prevailing wage rate that is in effect each July 1st, as posted by the Department of Labor.

It is the contractor's responsibility to obtain the annual adjusted prevailing wage rate increases directly from the Department of Labor's website.

The annual adjustments will be posted on the Department of Labor's Web page: www.ct.gov/dol. For those without internet access, please contact the division listed below.

The Department of Labor will continue to issue the initial prevailing wage rate schedule to the Contracting Agency for the project.

All subsequent annual adjustments will be posted on our Web Site for contractor access.

Contracting Agencies are under no obligation pursuant to State labor law to pay any increase due to the annual adjustment provision.

As of: **Tuesday, March 17, 2015**

Project: Main Street Pump Station Control Cabinet Replacement And Relocation, Pump Replacement

Effective October 1, 2005 - Public Act 05-50: any person performing the work of any mechanic, laborer, or worker shall be paid prevailing wage

All Person who perform work ON SITE must be paid prevailing wage for the appropriate mechanic, laborer, or worker classification.

All certified payrolls must list the hours worked and wages paid to All Persons who perform work ON SITE regardless of their ownership i.e.: (Owners, Corporate Officers, LLC Members, Independent Contractors, et. al)

Reporting and payment of wages is required regardless of any contractual relationship alleged to exist between the contractor and such person.

~~Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clause (29 CFR 5.5 (a) (1) (ii)).

Please direct any questions which you may have pertaining to classification of work and payment of prevailing wages to the Wage and Workplace Standards Division, telephone (860)263-6790.

As of: **Tuesday, March 17, 2015**

Opportunity ⋆ Guidance ⋆ Support

CONNECTICUT DEPARTMENT OF LABOR

THIS IS A PUBLIC WORKS PROJECT

Covered by the

PREVAILING WAGE LAW

CT General Statutes Section 31-53

If you have QUESTIONS regarding your wages
CALL (860) 263-6790

Section 31-55 of the CT State Statutes requires every contractor or subcontractor performing work for the state to post in a prominent place the prevailing wages as determined by the Labor Commissioner.

Sec. 31-53b. Construction safety and health course. New miner training program. Proof of completion required for mechanics, laborers and workers on 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 (g) 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 48 or, in the case of telecommunications employees, has completed at least ten hours of training in accordance with 29 CFR 1910.268.

(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, 2009, 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 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.

(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.

(P.A. 06-175, S. 1; P.A. 08-83, S. 1.)

History: P.A. 08-83 amended Subsec. (a) by making provisions applicable to public works project contracts entered into on or after July 1, 2009, replacing provision re total cost of work with reference to Sec. 31-53(g), requiring proof in certified payroll form that new mechanic, laborer or worker has completed a 10-hour or more construction safety course and adding provision re new miner training program, amended Subsec. (b) by substituting "person" for "employee" and adding "or program", amended Subsec. (c) by adding "or in accordance with Federal Mine
Safety and Health Administration Standards" and setting new deadline of January 1, 2009, deleted former Subsec. (d) re "public building", added new Subsec. (d) re exemptions for public service company employees and delivery drivers who perform no labor other than delivery and made conforming and technical changes, effective January 1, 2009.

Informational Bulletin

THE 10-HOUR OSHA CONSTRUCTION SAFETY AND HEALTH COURSE

(applicable to public building contracts entered into *on or after July 1, 2007,* where the total cost of all work to be performed is at least $100,000)

(1) This requirement was created by Public Act No. 06-175, which is codified in Section 31-53b of the Connecticut General Statutes (pertaining to the prevailing wage statutes);

(2) The course is required for public building construction contracts (projects funded in whole or in part by the state or any political subdivision of the state) entered into on or after July 1, 2007;

(3) It is required of private employees (not state or municipal employees) and apprentices who perform manual labor for a general contractor or subcontractor on a public building project where the total cost of all work to be performed is at least $100,000;

(4) The ten-hour construction course pertains to the ten-hour Outreach Course conducted in accordance with federal OSHA Training Institute standards, and, for telecommunications workers, a ten-hour training course conducted in accordance with federal OSHA standard, 29 CFR 1910.268;

(5) The internet website for the federal OSHA Training Institute is http://www.osha.gov/dso/otm/training/edcenters/fact_sheet.html;

(6) The statutory language leaves it to the contractor and its employees to determine who pays for the cost of the ten-hour Outreach Course;

(7) Within 30 days of receiving a contract award, a general contractor must furnish proof to the Labor Commissioner that all employees and apprentices performing manual labor on the project will have completed such a course;

(8) Proof of completion may be demonstrated through either: (a) the presentation of a *bona fide* student course completion card issued by the federal OSHA Training Institute; *or* (2) the presentation of documentation provided to an employee by a trainer certified by the Institute pending the actual issuance of the completion card;

(9) Any card with an issuance date more than 5 years prior to the commencement date of the construction project shall not constitute proof of compliance;

(10) Each employer shall affix a copy of the construction safety course completion card to the certified payroll submitted to the contracting agency in accordance with Conn. Gen. Stat. § 31-53(f) on which such employee's name first appears;

(11) Any employee found to be in non-compliance shall be subject to removal from the worksite if such employee does not provide satisfactory proof of course completion to the Labor Commissioner by the fifteenth day after the date the employee is determined to be in noncompliance;

(12) Any such employee who is determined to be in noncompliance may continue to work on a public building construction project for a maximum of fourteen consecutive calendar days while bringing his or her status into compliance;

(13) The Labor Commissioner may make complaint to the prosecuting authorities regarding any employer or agent of the employer, or officer or agent of the corporation who files a false certified payroll with respect to the status of an employee who is performing manual labor on a public building construction project;

(14) The statute provides the minimum standards required for the completion of a safety course by manual laborers on public construction contracts; any contractor can exceed these minimum requirements; and

(15) Regulations clarifying the statute are currently in the regulatory process, and shall be posted on the CTDOL website as soon as they are adopted in final form.

(16) Any questions regarding this statute may be directed to the Wage and Workplace Standards Division of the Connecticut Labor Department via the internet website of http://www.ctdol.state.ct.us/wgwkstnd/wgemenu.htm; or by telephone at (860)263-6790.

THE ABOVE INFORMATION IS PROVIDED EXCLUSIVELY AS AN EDUCATIONAL RESOURCE, AND IS NOT INTENDED AS A SUBSTITUTE FOR LEGAL INTERPRETATIONS WHICH MAY ULTMATELY ARISE CONCERNIG THE CONSTRUCTION OF THE STATUTE OR THE REGULATIONS.

November 29, 2006

Notice

To All Mason Contractors and Interested Parties Regarding Construction Pursuant to Section 31-53 of the Connecticut General Statutes (Prevailing Wage)

The Connecticut Labor Department Wage and Workplace Standards Division is empowered to enforce the prevailing wage rates on projects covered by the above referenced statute.

Over the past few years the Division has withheld enforcement of the rate in effect for workers who operate a forklift on a prevailing wage rate project due to a potential jurisdictional dispute.

The rate listed in the schedules and in our Occupational Bulletin (see enclosed) has been as follows:

Forklift Operator:

- **Laborers (Group 4) Mason Tenders** - operates forklift solely to assist a mason to a maximum height of nine feet only.

- **Power Equipment Operator (Group 9)** - operates forklift to assist any trade and to assist a mason to a height over nine feet.

The U.S. Labor Department conducted a survey of rates in Connecticut but it has not been published and the rate in effect remains as outlined in the above Occupational Bulletin.

Since this is a classification matter and not one of jurisdiction, effective January 1, 2007 the Connecticut Labor Department will enforce the rate on each schedule in accordance with our statutory authority.

Your cooperation in filing appropriate and accurate certified payrolls is appreciated.

STATUTE 31-55a

- SPECIAL NOTICE -

To: All State and Political Subdivisions,Their Agents, and Contractors

Connecticut General Statute 31-55a - Annual adjustments to wage rates by contractors doing state work.

Each contractor that is awarded a contract on or after October 1, 2002, for (1) the construction of a state highway or bridge that falls under the provisions of section 31-54 of the general statutes, or (2) the construction, remodeling, refinishing, refurbishing, rehabilitation, alteration or repair of any public works project that falls under the provisions of section 31-53 of the general statutes shall contact the Labor Commissioner on or before July first of each year, for the duration of such contract, to ascertain the prevailing rate of wages on an hourly basis and the amount of payment or contributions paid or payable on behalf of each mechanic, laborer or worker employed upon the work contracted to be done, and shall make any necessary adjustments to such prevailing rate of wages and such payment or contributions paid or payable on behalf of each such employee effective each July first.

- The prevailing wage rates applicable to any contract or subcontract awarded on or after October 1, 2002 are subject to annual adjustments each July 1st for the duration of any project which was originally advertised for bids on or after October 1, 2002.
- Each contractor affected by the above requirement shall pay the annual adjusted prevailing wage rate that is in effect each July 1st, as posted by the Department of Labor.
- It is the ***contractor's*** responsibility to obtain the annual adjusted prevailing wage rate increases directly from the Department of Labor's Web Site. The annual adjustments will be posted on the Department of Labor Web page: www.ctdol.state.ct.us. For those without internet access, please contact the division listed below.

- The Department of Labor will continue to issue the initial prevailing wage rate schedule to the Contracting Agency for the project. All subsequent annual adjustments will be posted on our Web Site for contractor access.

Any questions should be directed to the Contract Compliance Unit, Wage and Workplace Standards Division, Connecticut Department of Labor, 200 Folly Brook Blvd., Wethersfield, CT 06109 at (860)263-6790.

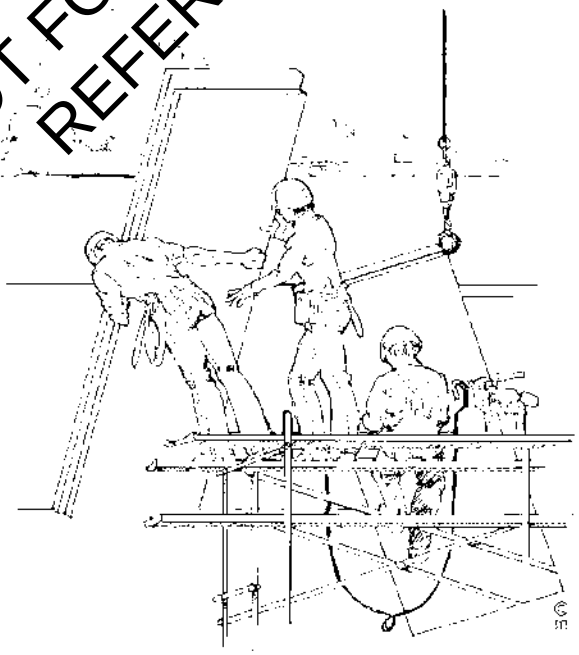
~NOTICE~

TO ALL CONTRACTING AGENCIES

Please be advised that Connecticut General Statutes Section 31-53, requires the contracting agency to certify to the Department of Labor, the total dollar amount of work to be done in connection with such public works project, regardless of whether such project consists of one or more contracts.

Please find the attached "Contracting Agency Certification Form" to be completed and returned to the Department of Labor, Wage and Workplace Standards Division, Public Contract Compliance Unit.

✎ Inquiries can be directed to (860) 263-6543



CONNECTICUT DEPARTMENT OF LABOR
WAGE AND WORKPLACE STANDARDS DIVISION
CONTRACT COMPLIANCE UNIT

CONTRACTING AGENCY CERTIFICATION FORM

I, _____, acting in my official capacity as _____,
authorized representative title

for _____, located at _____,
contracting agency address

do hereby certify that the total dollar amount of work to be done in connection with

_____, located at _____,
project name and number address

shall be $_____, which includes all work, regardless of whether such project

consists of one or more contracts.

CONTRACTOR INFORMATION

Name:_____

Address:_____
Authorized Representative:_____
Approximate Starting Date:_____

Approximate Completion Date:_____

_____ _____
Signature Date

Return To: Connecticut Department of Labor
Wage & Workplace Standards Division
Contract Compliance Unit
200 Folly Brook Blvd.
Wethersfield, CT 06109

Date Issued: _____

CONNECTICUT DEPARTMENT OF LABOR
WAGE AND WORKPLACE STANDARDS DIVISION

CONTRACTORS WAGE CERTIFICATION FORM

Construction Manager at Risk/General Contractor/Prime Contractor

I,_____ of _____
Officer, Owner, Authorized Rep. Company Name

do hereby certify that the _____
Company Name

_____
Street

_____
City

and all of its subcontractors will pay all workers on the

_____
Project Name and Number

_____
Street and City

the wages as listed in the schedule of prevailing rates required for such project (a copy of which is attached hereto).

_____
Signed

Subscribed and sworn to before me this _____ day of _____,_____.

_____
Notary Public

Return to:

Connecticut Department of Labor
Wage & Workplace Standards Division
200 Folly Brook Blvd.
Wethersfield, CT 06109

Rate Schedule Issued (Date): _____