

**CITY OF BURLINGTON
REQUEST FOR PROPOSALS**

East Wastewater Treatment Facility Outfall Repair Project

Issued: 5/6/22

Non-Mandatory Pre-Bid Meeting: 5/12/22 at 9 AM

Questions Due: 5/20/22 at 4 PM

Due: 6/3/22 at 11 AM

I. PROJECT BACKGROUND

The City of Burlington experienced a significant storm event in the Fall of 2019 which resulted in damage to the City's East wastewater treatment facility (WWTF) effluent outfall. A portion of the 24-inch outfall pipe was washed away and a nearby storm drain experienced a similar failure. The City intends to enter into a contract with a qualified contractor to return the WWTF effluent outfall and storm drain to their original condition by the localized repair and replacement of each pipe section near the points of failure. Responding firms shall have related prior experience. **The Contractor shall complete all project work by December 31, 2022.**

The City intends to use FEMA funding for a portion of the project costs.

II. SCOPE OF WORK

The City of Burlington Department of Public Works is seeking agreements with qualified and licensed contractors to provide services required to complete work associated with the Burlington East Wastewater Treatment Facility (WWTF) Outfall Repair Project. This work includes: the replacement of approximately 10 linear feet of 24-inch ductile iron outfall pipe and 19 linear feet of 12-inch ductile iron drainage pipe directly adjacent to the Winooski River. Both pipes are part of the Burlington East WWTF infrastructure and will be fitted with restrained couplings or cast-in-place concrete collars. Installation of temporary chain-link fencing and fence gates shall be used as necessary throughout construction to maintain security of the wastewater treatment facility. Use of erosion control measures should be expected, including but not limited to turbidity curtains, erosion control matting, geotextile filter fabric, riprap slope protection, stone check dams, and mulch anchoring. Construction disturbance is to be minimized and the restoration and/or revegetation of the surrounding forest and wetland areas disturbed by construction will need to occur through coordination with the owner and the Winooski Valley Park District. The selected contractor shall provide a comprehensive one (1) year warranty on workmanship from date of final acceptance by the City and provide a certificate of manufacturer's warranty on the pipe, fittings, and coupling materials.

The selected contractor will be expected to enter into a Construction Agreement with the City. Unexpected or unforeseen conditions may warrant additional work beyond the original scope and will be evaluated on a case-by-case basis. Any changes to the Agreement will be issued in writing. The Contractor shall perform work in accordance with applicable rules, regulations, codes, and ordinance of local, state, and federal authorities. The contractor shall provide proof

of and carry insurance for the duration of the Agreement, naming the City as an additionally insured and provide proof of annual renew until the end of the Agreement term.

III. RESPONSE FORMAT

- a. **Proposal format.** Qualified firms interested in being considered for this project must submit a proposal that reflects their ability to provide the requested services. All proposals should be clear, concise, and allow the City to efficiently evaluate the qualifications of the submitting firm. All proposals must be submitted electronically and contain the following components.
 - i. Completed Bid Form signed by a representative of the participating firm.
 - ii. A letter of interest signed by the contact representative for the participating firm with the name, physical address, email address and telephone number of the submitting firm with a subject line titled: “East WWTF Outfall Repair Proposal.”
- b. A non-mandatory pre-proposal site visit to the City’s East WWTF will be held at **9:00 am on May 12, 2022**. Site visit attendees will meet at the East WWTF located at 267 Riverside Avenue in Burlington, Vermont.

IV. CONTRACTOR SELECTION

During the evaluation process, the City reserves the right, where it may serve the City’s best interest, to request additional information or clarifications. The City reserves the exclusive right to select or reject a firm that it deems to be in its best interest to do so. The City will award the project to the most advantageous proposal from a responsible and responsive offeror. All proposals shall be in full compliance with all applicable requirements of Federal, State and local laws. The City reserves the right to further negotiate the price proposal.

No proposal will be considered accepted until all necessary City authorizations, including those required by Board of Finance and City Council if necessary, have been received and an agreement is executed by both parties.

V. SUBMISSIONS

- a. **Pre-proposal site visit.** A non-mandatory pre-proposal site visit to the City’s East WWTF will be held at **9:00 am on May 12, 2022**. Site visit attendees will meet at the East WWTF located at 267 Riverside Avenue in Burlington, Vermont.
- b. **Deadline for Receipt of Proposals.** Proposals must be received by the point of contact no later than **11:00 AM on June 3, 2022**. Late replies will not be accepted under any circumstances. Proposals must be submitted by **e-mail** in a common PDF file with pages numbered to:

Martin Lee, PE
Water Resources Engineer

DPW, Water Resources Division
mlee@burlingtonvt.gov

The subject line of the e-mail should state: “East WWTF Outfall Repair Proposal.” It is the responsibility of the participating firm to ensure that the point of contact has received a complete proposal by the required deadline.

- c. Questions concerning this RFP shall be submitted via email to:

Martin Lee, PE
Water Resources Engineer
DPW, Water Resources Division
mlee@burlingtonvt.gov

Only e-mail communications will be accepted. All questions and requests for clarification must be received by **4:00 pm on May 20, 2022**. Based upon such inquiry the City may choose to issue an Addendum. Any revisions or answers to questions will be posted via addendum on the City’s RFP web page (<https://www.burlingtonvt.gov/RFP>).

Contractors are encouraged to be concise. All proposals must include, at a minimum, the following:

- a. Completed bid form including prices for each item, contact information and signature by an authorized representative for the firm.
- b. Signed Livable Wage, Outsourcing, and Union Deterrence Certifications with the bid sheet and described in the Supplemental General Conditions. Note that the selected Contractors shall be required to submit insurance certificates and may be asked to provide a client list if they have not already done work in the City of Burlington.

Note that the selected Contractors shall be required to submit insurance certificates and may be asked to provide a client list if they have not already done work in the City of Burlington.

VI. EXHIBITS

- A. Exhibit A: Technical Specifications
- B. Exhibit B: Bid Drawings
- C. Exhibit C: Bid Form
- D. Exhibit D: Draft Contract
- E. Exhibit E: Burlington Standard Contract Conditions
- F. Exhibit F: Burlington Livable Wage Ordinance Certification
- G. Exhibit G: Burlington Outsourcing Ordinance Certification
- H. Exhibit H: Burlington Union Deterrence Ordinance Certification

Bid documents include this main body of the request for proposals and all exhibits.

VII. CONTRACTING

The contractor must qualify as an independent contractor and, prior to being awarded a contract, must apply for registration with the Vermont Secretary of State's Office to do business in the State of Vermont, if not already so registered. The registration form may be obtained from the Vermont Secretary of State, 128 State Street, Montpelier, VT 05633-1101, PH: 802-828-2363, Toll-free: 800-439-8683; Vermont Relay Service – 711; web site: <https://www.sec.state.vt.us/>. The contract will not be executed until the consultant is registered with the Secretary of State's Office.

Prior to beginning any work, the consultant shall obtain Insurance Coverage in accordance with the Burlington Contract Conditions (Exhibit E in this RFP). The certificate of insurance coverage shall be documented on forms acceptable to the City.

VIII. AGREEMENT REQUIREMENTS

The selected consultant will be required to execute a contract with the City on the terms and conditions required by the City, including but not limited to those in the Burlington Contract Conditions (Exhibit E) and the attached Draft Agreement.

IX. LIMITATIONS OF LIABILITY

The City assumes no responsibility or liability for the response to this Request for Proposals.

X. COSTS ASSOCIATED WITH PROPOSAL

Any costs incurred by any person or entity in preparing, submitting, or presenting a proposal are the sole responsibility of that person or entity, including any requests for additional information or interviews. The City will not reimburse any person or entity for any costs incurred prior to the issuance of the contract.

XI. INDEMNIFICATION

Any party responding to this Request for Proposals is acting in an independent capacity and not as an officer or employee of the City. Any party responding to this Request for Proposals will be required to indemnify, defend, and hold harmless the City, its officers, and employees from all liability and any claims, suits, expenses, losses, judgments, and damages arising as a result of the responding party's acts and/or omissions in or related to the response.

XII. REJECTION OF PROPOSALS

The City reserves the right to reject any or all proposals, to negotiate with one or more parties, or to award the contract to the proposal the City deems will meet its best interests, even if that proposal is not the lowest bid. The City reserves the right to re-advertise for additional proposals and to extend the deadline for submission of the proposals. This Request for Proposals in no way obligates the City to award a contract.

XIII. OWNERSHIP OF DOCUMENTS

Any materials submitted to the City in response to this Request for Proposals shall become the

property of the City unless another arrangement is made by written agreement between the City and the responding party. The responding party may retain copies of the original documents.

XIV. DUTY TO INFORM CITY OF BID DOCUMENT ERRORS

If a bidder knows, suspects, or has reasonable cause to believe, that an error or omission exists in any bid documents, including but not limited to unit prices and rate calculations, the bidder shall immediately give the City written notice thereof. Contractor shall not cause or permit any work to be conducted that may related to the error or omission without first receiving written acknowledgment from the City that City representatives understand the possible error or omission and have approved the requested modifications to the bid or contract documents or that the contractor may proceed without any modification being made to the bid or contract documents.

XV. PUBLIC RECORDS

Any and all records submitted to the City, whether electronic, paper, or otherwise recorded, are subject to the Vermont Public Records Act. The determination of how those records must be handled is solely within the purview of City. All records the responding party considers to be trade secrets, as that term is defined by subsection 317(c)(9) of the Vermont Public Records Act, or that the responding party otherwise seeks to have the City consider as exempt must be identified clearly and specifically at the time of submission. It is not sufficient to merely state generally that a proposal is proprietary, contains a trade secret, or is otherwise exempt. Particular records, pages, and sections which are believed to be exempt must be specifically identified as such and must be separated from other records with a convincing explanation and rationale sufficient to justify each exemption from release consistent with Section 317 of Title 1 of the Vermont Statutes Annotated.

XVI. PUBLIC HEALTH EMERGENCIES

Bidders are advised that public health emergencies, as declared by the City, the State of Vermont, or the Federal Government, including the current pandemic of Novel Coronavirus (COVID-19), may introduce significant uncertainty into the project, including disruption of timelines or revised practices. Contractors shall consider public health emergencies as they develop project schedules and advance the work.

The City may require a public health emergency plan be submitted as part of the bid. This plan will contain:

- 1) Measures to manage risk and ensure that potential impacts to safety and mobility are mitigated in accordance with health and safety standards and guidelines proposed by local, state, and federal agencies;
- 2) A schedule for possible updates to the plan in advance of the start of work (see attached Draft Contract, Section 15); and
- 3) Means to adjust the schedule and sequence of work should the emergency change in nature or duration.

The City will have sole discretion to approve, deny, or require changes to this plan as a condition of consideration of the bid, will retain the right to inspect all work to ensure compliance with health

and safety standards, and may at any time require the contractor to stop work because of the emergency.

If a public health emergency is declared, the City will not be responsible for any delays related to the sequence of operations or any expenses or losses incurred as a result of any delays. Any delays related to public emergencies, including the current pandemic of Novel Coronavirus (COVID-19), will be excusable, but will not be compensable.

**EAST WASTEWATER TREATMENT FACILITY
OUTFALL REPAIRS**

BURLINGTON, VERMONT

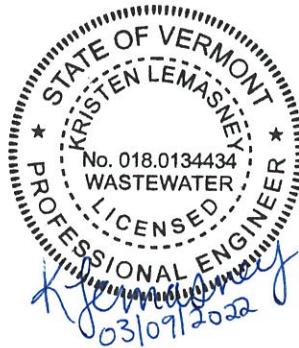
TECHNICAL SPECIFICATIONS

MARCH 2022

20455

**CITY OF BURLINGTON
BURLINGTON, VERMONT
TECHNICAL SPECIFICATIONS
FOR
EAST WASTEWATER TREATMENT FACILITY OUTFALL REPAIRS**

MARCH 2022



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SECTION 01010BSUMMARY OF WORKPART 1 - GENERAL1.1 DESCRIPTION:

- A. Work Included: The Work includes, but is not limited to, the following:
 - 1. Effluent and Stormwater Outfall Rehabilitation:
 - a. Wastewater treatment facility treated effluent outfall repair
 - b. Removal and disposal of existing effluent piping as shown on drawings
 - c. Storm drain outfall repair (BID ALTERNATE A)
 - d. Removal and disposal of existing storm drain piping as shown on drawings (BID ALTERNATE A)
 - e. Existing flow management/ bypass pumping for rehabilitation of the effluent outfall
 - f. Rebuilding and stabilization of the bank
 - g. Testing of outfalls for proper installation and performance.
 - 2. All related site work including trench excavation, groundwater dewatering, disposal of excess excavated materials, filter fabric, bedding, backfill, compaction, plantings, slope stabilization, loam/seed and landscaping.
 - 3. Other miscellaneous work shown in the Specifications for a complete and operational system.
- B. Related Work Specified Elsewhere
 - 1. Coordination: Section 01050
 - 2. Construction Schedules: Section 01310
 - 3. Temporary Bypass Pumping Systems: Section 01515
 - 4. Site work, piping, structures, testing requirements are specified in Division 2.
- C. Removals, Relocations and Rearrangements
 - 1. Examine the existing site for the work of all trades which will influence the cost of the work under the bid. This work shall include removals, relocations and rearrangements which may interfere with, disturb or complicate the performance of the work under the general bid involving systems, equipment and related service lines, which shall continue to be utilized as part of the finished project. The Contractor is responsible for all coordination in this regard.
 - 2. Provide in the bid a sufficient amount to include all removals, relocations, rearrangements and reconnections herein specified, necessary or required to provide approved operation and coordination of the combined new and existing systems and equipment.
 - 3. Provide in the bid a sufficient amount to include all temporary facilities required to maintain flows during the construction period, including bypass pumping, temporary piping, temporary metering, etc. The cost shall include the cost for all labor, tools, equipment and materials necessary.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.1 MAINTAIN EXISTING WORKS

A. Continuous Operations Criteria:

1. The Contractor shall conduct operations in such a manner and sequence which shall neither result in a disruption of, nor interfere with, the functional workings of any existing utilities.
2. The Contractor shall furnish, install and operate any piping, equipment and appurtenances necessary to provide the temporary services/facilities required during construction including, but not limited to, bypass pumping, flow barriers and diversions. Temporary facilities, if required, shall have pumping capacity equal to or greater than the existing maximum capacity of the piping as determined by their size and slope.
3. The Owner will operate and maintain all existing systems and equipment not modified or impacted by the project. The Contractor shall notify and coordinate with the Owner whenever Contractor's temporary facilities or construction will interface with existing utilities.
4. The Contractor shall be responsible for the operation and maintenance of all new and temporary facilities until such time as the new facilities are accepted by the Owner.

B. Existing Operations

1. The existing WWTF provides mechanical screening, grit removal, primary clarification, secondary treatment, chlorinate disinfection, and conveyance of final treated effluent flows.
2. Typical raw sewerage effluent flows at the WWTF are as follows:
 - a. Minimum: 0.21-mgd;
 - b. Annual Average: 0.47-mgd;
 - c. Maximum Month: 0.64-mgd;
 - d. Peak Hour: 1.95-mgd (98th percentile);
 - e. Peak Hour: 4.40-mgd (peak hour measured).
 - f. Contractor shall be required to convey the entire range of effluent flows for the duration of the project. Bypass pumping, if provided, shall be variable speed to match the effluent flows.

C. Maintain Treatment

1. State and federal regulations require that at all times during construction work under this contract, the treatment facility remain operational through construction, until such time as the new facilities are accepted and on-line.
2. The Contractor's operations shall not hinder the delivery, storage, and use of materials and supplies, nor hinder staff duties, nor disrupt utility service.
3. The Owner must have access to the existing plant and equipment at all times unless a specific exception is granted by the Owner.

D. Minimize Interference

1. The Contractor shall at all times conduct operations so as to interfere as little as possible with existing works. The Contractor shall develop a program, in

cooperation with the Owner, Engineer and interested officials, which shall provide for the construction and putting into service of the new works in the most orderly manner possible. This program shall be adhered to except as deviations therefrom are expressly permitted

2. Work of connecting with, cutting into and reconstructing existing pipes or structures shall be planned to interfere with the operation of the existing facilities for the shortest possible time and when the demands on the facilities best permit such interference. It may be necessary to work outside of normal working hours to minimize interference. Before starting work, which will interfere with the operation of existing facilities, the Contractor shall do all possible preparatory work and shall see that all tools, materials, and equipment are made ready and at hand.
3. The Contractor shall not use the Owner's bathrooms or kitchen facilities.
4. The Contractor shall limit their personnel to the proposed work areas and limits of work.
5. The Contractor shall limit parking of workers and subcontractors to areas designated by the Owner. On-site speed limit is 10 mph.

3.2 CONSTRUCTION SEQUENCE

- A. Construction of the proposed facilities will disrupt the existing structures and operations. To maintain continuous operations, the construction must be divided into phases or sequenced appropriately.
- B. The Contractor shall submit to the Engineer for review and acceptance a complete schedule of the proposed sequence of construction operations prior to commencing any work. This schedule shall include the Contractor's plans for doing the work. The sequencing plan and schedule shall clearly identify critical timeframes for taking facilities offline and for placing facilities into service, including sufficient time required for new equipment to be tested and proven reliable.
- C. The Contractor shall submit to the Engineer a written request to deviate from the above sequence with adequate supporting information to demonstrate to the Engineer that the continuity and degree of treatment will not be adversely affected.
- D. The Contractor shall allow in the Bid reasonable time to accommodate operations at the existing wastewater treatment plant, including the need for the Owner to respond to emergencies. The Contractor shall not be eligible for additional compensation due to interruptions of the Contractor's schedule, for the Owner to respond to routine conditions.
- E. The Contractor shall have all materials and equipment on-site, and shall receive the Owner's approval, prior to initiating work which requires any part of the existing wastewater treatment plant to be off-line.
- F. The Contractor shall include the cost of all temporary facilities required to maintain treatment during the construction period in his lump-sum bid price. The cost shall include the cost for all labor, tools, equipment, materials, and temporary systems, as necessary.

3.3 SCHEDULE LIMITATIONS AND WORK RESTRICTIONS/ REQUIREMENTS

- A. Work Hours:

1. All Work on weekdays shall be performed between the hours of 7 AM and 3 PM, except during emergencies.
 2. All Work shall be prohibited on Saturdays, Sundays, and legal holidays. Legal holidays include the following:
 - a. New Year's Day
 - b. Martin Luther King Day
 - c. President's Day
 - d. Town Meeting Day
 - e. Memorial Day
 - f. Independence Day
 - g. Bennington Battle Day
 - h. Labor Day
 - i. Columbus Day
 - j. Veteran's Day (Observed)
 - k. Thanksgiving Day
 - l. Christmas Day
 3. The Contractor shall request permission to work outside the work hours specified above at least 72-hours in advance of the proposed work. The Contractor shall not commence work outside of the work hours specified above unless or until granted such permission from the Owner and Engineer.
- B. Permitting Requirements:
1. All work within the 50-foot wetland buffer shall be done within a 10-foot off center of the outfalls in accordance with VT DEC Allowed Use.
- C. Special Coordination Requirements:
1. Portions of the work cross the Burlington Wildway trail along the Winooski River. All disturbances to the trail shall be coordinated with the Owner, Engineer, and the Winooski Valley Park District.
- D. Tree Cutting/Clearing:
1. Tree cutting and/or clearing is prohibited between June 1 and July 31 to protect the Northern Long-eared Bat.

END OF SECTION

SECTION 01050COORDINATIONPART 1 - GENERAL1.1 DESCRIPTION

- A. Contractor is required to work in close proximity to Owner's existing facilities. The Contractor, under this Contract, will be responsible for coordinating construction activities with Owner to ensure that services, facilities, and safe working conditions are maintained.
- B. Any damage to existing structures, equipment and property, accepted equipment or structures, and property or work in progress by others; as a result of the Contractor's or their subcontractor's operations shall be made good by the Contractor at no additional cost to the Owner.

1.2 COORDINATION WITH OTHERS

- A. City of Burlington:
 - 1. Contractor shall coordinate access, egress, detours and traffic control, if required, at each site with the Burlington Police Department. The Contractor shall notify Burlington Police, Fire Department and Rescue Squad at least 24 hours in advance of any street closings or detours.
 - 2. Contractor shall coordinate all work with the Owner.
 - 3. The Contractor shall be responsible for coordinating and maintaining public services to all public and private properties.
- B. Winooski Valley Park District:
 - 1. The Contractor shall be responsible for coordinating all impacts to the Burlington Wildway trail (Riverwalk Trail) along the Winooski River with the Winooski Valley Park District.
- C. The Contractor shall provide the Resident Project Representative and Chief Operator a construction schedule indicating the times to perform the work required. The Contractor shall update the schedule when required and give the facility one week notice before the start of any work. The Contractor shall provide the facility personnel enough time to obtain materials and perform the work required of them. The Contractor shall daily communicate with the Resident Project Representative and Chief Operator concerning updating the schedule, job progress, delay or early starts that affect the treatment process, facility staffing, etc.
- D. Weekly coordination meetings shall be held between the Contractor, Owner's Chief Operator/Superintendent and the Resident Project Representative. This meeting shall cover the following:
 - 1. Work to be completed the following week
 - 2. Project Schedule
 - 3. Shop Drawing and O&M issues
 - 4. Outstanding RFIs and Clarifications
 - 5. Change Orders and Field Orders
 - 6. Review of Record Drawing Information

7. Discussion/Resolution of any old issues
 8. New issues discussion
 9. Contractor's Safety and Health Plan Updates
- E. Snow Removal Coordination: The Contractor shall be responsible for all snow removal activities in construction and laydown areas onsite. WWTF staff will be responsible for snow removal on the main access road around the facility. Contractor is to coordinate closely with WWTF staff to maintain access to all areas of the facility to facilitate normal operations.

1.3 CONTRACTOR'S USE OF PREMISES

- A. Contractor shall have use of the premises within the limits shown on the Drawings and as identified below:
1. Wastewater Treatment Facility
 - a. Contractor laydown area as shown on the Drawings.
 - b. Contractor's trailer location and parking area established on the Drawings. Additional off-site vehicle parking may be required and will be coordinated with the Owner.
 - c. Entrance to the site: The main entrance to the site is on Riverside Avenue and will be used for deliveries and large vehicle traffic.
- B. Refer to Specification 01010B (Summary of Work) for requirements related to the work schedule.
- C. Contractor shall maintain access and utilities to the Wastewater Treatment Facility and all other adjacent facilities at all times. Whenever access is cut off in one direction, an alternative route for accessing all equipment and tankage must be maintained.
- D. Contractor shall coordinate delivery schedules, site access, and other construction-related activities with any other contractors that may be hired by the Owner during the course of construction.
- E. Contractor shall assume full responsibility for security of all their, and their subcontractors, materials and equipment stored on the site.
- F. If directed by the Owner, Contractor shall move any stored items which interfere with operations of Owner.
- G. Obtain and pay for use of additional storage or work areas if needed to perform the Work.
- H. Contractor shall not have access to Owner's lunch room, toilet or locker room facilities at any time and shall provide all necessary facilities in accordance with Specification Section 01500.

END OF SECTION

SECTION 01070

ABBREVIATIONS & SYMBOLS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Where any of the following abbreviations are used in these Specifications, they shall have the meaning set forth opposite each.

AASHTO	American Association of State Highway & Transportation Officials
AC	Alternating Current
ACI	American Concrete Institute
ACP	Asbestos Cement Pipe
AGA	American Gas Association
AIC	Ampere Interrupting Capacity
AGMA	American Gear Manufacturers Association
AIEE(IEEE)	American Institute of Electrical Engineers (Institute of Electrical and Electronics Engineers, Inc.)
AISC	American Institute of Steel Construction
AMP	Ampere 125-16
Amer. Std.	American Standard for Cast Iron Pipe Flanges and Flanged Fittings, Class 125 (ASA B16 11960)
ANSI	American National Standards Institute
API	American Petroleum Institute
ASA	American Standards Association
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AWG	American or Brown and Sharpe Wire Gage
AWWA	American Water Works Association
CCTV	Closed Circuit Television
CF	Cubic Foot
CFM	Cubic Foot Per Minute
CFS	Cubic Foot Per Second
CI	Cast Iron
CIPP	Cured-in-Place Pipe
CIPRA	Cast Iron Pipe Research Association
CSI	Construction Specifications Institute
CY	Cubic Yard
DC	Direct Current
DEP	Department of Environmental Protection
DI (DIP)	Ductile Iron (Pipe)
DOT	Department of Transportation
EDR	Equivalent Directional Radiation

EPA	U.S. Environmental Protection Agency
FPS	Feet Per Second
FT	Feet
GAL	Gallons
GPD	Gallons Per Day
GPM	Gallons Per Minute
HP	Horsepower
IBR	Institute of Boiler and Radiator Manufacturers
IN	Inches
ISA	Instrument Society of America
KVA	Kilovolt-ampere
KW	Kilowatt
LB	Pound
MACP	Manhole Assessment and Certification Program
MAX	Maximum
MGD	Million Gallons Per Day
MIN	Minimum
NACE	National Association of Corrosion Engineers
NASSCO	National Association of Sewer Service Companies
NBS	National Bureau of Standards
NEC	National Electrical Code, Latest Edition
NEMA	National Electrical Manufacturers Association
NEWWA	New England Water Works Association
NPT	National Pipe Thread
OS&Y	Outside Screw and Yoke
PCA	Portland Cement Association
PPM	Parts Per Million
PSI	Pounds Per Square Inch
PSIG	Pounds Per Square Inch Gage
PVC	Polyvinyl Chloride
RPM	Revolutions Per Minute
RUS	Rural Utility Service
SF	Square Foot
STL. W.G.	U.S. Steel Wire, Washburn and Moen, American Steel and Wire Cos., or Roebling Gage
SY	Square yard
TDH	Total Dynamic Head
USAS	Standards of the United States of America Standards Institute (formerly American Standards Association)
USS GAGE	United States Standard Gage
VC	Vitrified Clay
WSP	Working Steam Pressure
Fed. Spec.	Federal Specifications issued by the Federal Supply Service of the General Service Administration, Washington, D.C.

END OF SECTION

SECTION 01100ALTERNATESPART 1 - GENERAL1.1 DESCRIPTION

A. Work Included:

1. Each Bidder shall be held fully responsible for examining the scope of the Alternates generally defined herein and for recognizing any modifications to the Work caused by any Alternate

B. Alternate:

1. To enable the Owner to compare total costs where alternate materials and methods might be used, an Alternate has been established as described in this Section of these Specifications.

C. Related Work Specified Elsewhere:

1. Materials and methods to be used in the Base Bid and in the Alternate have been described on the DRAWINGS and in pertinent Sections of these Specifications.
2. Method for stating the proposed Contract Sum is described in the Bid Form.

D. Submittals:

1. All Alternates described in this Section are required to be reflected on the Bid Form as submitted by bidders. However, do not submit alternates other than as described in this Section, except as provided for "substitutions" under the General Conditions.

PART 2 - PRODUCTS2.1 PRODUCT HANDLING

- A. If the Owner elects to proceed on the basis of one or more of the described Alternatives, make all modifications to the Work required in furnishing and installing the selected Alternative or Alternatives to the approval of the Engineer and at no additional cost to the Owner other than as proposed on the Bid Form.

2.2 ALTERNATE NO. A – ADD EAST WWTF STORMWATER OUTFALL

- A. The work of this ALTERNATE shall consist of furnishing all labor, materials, tools and equipment required for repair of the existing stormwater outfall as described on the Contract Documents and to the standards outlined in these specifications. This ALTERNATE includes all work directly relating to the repair of the stormwater outfall including removal and disposal of 12" RC pipe, installation of new 12" DI pipe, and cast in place concrete collar. The work included in this ALTERNATE effects nearly every Section of these specifications and alternates. See DRAWINGS for explicit details.

PART 3 - EXECUTION

3.1 ADVANCE COORDINATION

Immediately after award of the Contract, or as soon thereafter as the Owner has made a decision on whether the Alternate will be selected, thoroughly and clearly advise all necessary personnel and suppliers as to the nature and extent of Alternates selected by the Owner. Use all means necessary to alert those personnel and suppliers involved as to all changes in the work caused by the Owner's selection or rejection of the Alternate.

END OF SECTION

SECTION 01150AMEASUREMENT AND PAYMENTPART 1 - GENERAL1.1 DESCRIPTION

- A. For lump sum items, payment shall be made to the Contractor in accordance with an accepted Progress Schedule and Schedule of Values on the basis of actual work completed.
- B. For unit-price items, payment shall be based on the actual amount of work accepted and for the actual amount of materials in place, as shown by the final measurements.
 - 1. All units of measurement shall be standard United States convention as applied to the specific items of work by tradition and as interpreted by the Engineer.
 - 2. At the end of each day's work, the Contractor's Superintendent or other authorized representative of the Contractor shall meet with the Resident Project Representative and determine the quantities of unit price work accomplished and/or completed during the work day.
 - 3. The Resident Project Representative will then prepare two "Daily Progress Reports" which shall be signed by both the Resident Project Representative and Contractor's Representative.
 - 4. Once each month the Resident Project Representative will prepare two "Monthly Progress Summation" forms from the month's accumulation of "Daily Progress Reports" which shall also be signed by both the Resident Project Representative and Contractor's Representative.
 - 5. These completed forms will provide the basis of the Engineer's monthly quantity estimate upon which payment will be made. Items not appearing on both the Daily Progress Reports and Monthly Progress Summation will not be included for payment. Items appearing on forms not properly signed by the Contractor will not be included for payment.
 - 6. After the work is completed and before final payment is made there for, the Engineer will make final measurements to determine the quantities of various items of work accepted as the basis for final settlement.

1.2 SCOPE OF PAYMENT

- A. Payments to the Contractor will be made for the actual quantities of the Contract items performed and accepted in accordance with the Contract Documents. Upon completion of the construction, if these actual quantities show either an increase or decrease from the quantities given in the Bid Form, the Contract unit prices will still prevail.
- B. The Contractor shall accept compensation, as herein provided, in full payment for furnishing all materials, labor, tools, equipment, and incidentals necessary to the completed work and for performing all work contemplated and embraced by the Contract; also for all loss or damage arising from the nature of the Work, or from the action of the elements, or from any unforeseen difficulties which may be encountered during the prosecution of the Work and until its final acceptance by the Engineer, and

for all risks of every description connected with the prosecution of the work, except as provided herein, also for all expenses incurred in consequence of the suspension of the work as herein authorized.

- C. The payment of any partial estimate or of any retained percentage except by and under the approved final invoice, in no way shall affect the obligation of the Contractor to repair or renew any defective parts of the construction or to be responsible for all damage due to such defects.

1.3 PAYMENT FOR INCREASED OR DECREASED QUANTITIES

- A. When alterations in the quantities of work not requiring supplemental agreements, as hereinbefore provided for, are ordered and performed, the Contractor shall accept payment in full at the Contract price for the actual quantities of work done. No allowance will be made for anticipated profits. Increased or decreased work involving supplemental agreements will be paid for as stipulated in such agreements.

1.4 OMITTED ITEMS

- A. Should any items contained in the bid form be found unnecessary for the proper completion of the work contracted, the Engineer may eliminate such items from the Contract, and such action shall in no way invalidate the Contract, and no allowance will be made for items so eliminated in making final payment to the Contractor.

1.5 PARTIAL PAYMENTS

- A. Partial payments shall be made monthly as the work progresses. Partial payment shall be made subject to the provisions of the Contract Conditions. Contractor's Partial Payment Requests shall be submitted in two parts; one part for FEMA eligible quantities and one part for non-eligible quantities. The breakdown of quantities will be determined by the Engineer.
- B. Technical Specifications may include Special Payment Provisions which provide additional restrictions on partial payments.

1.6 PAYMENT FOR MATERIAL DELIVERED

- A. When requested by the Contractor and at the discretion of the Owner, payment may be made for all or part of the value of acceptable, non-perishable materials and equipment which are to be incorporated into bid items, have not been used, and have been delivered to the construction site or placed in storage places acceptable to the Owner. Payment shall be subject to the provisions of the Contract Conditions.
- B. No payment shall be made upon fuels, supplies, lumber, false work, or other materials, or on temporary structures or other work of any kind which are not a permanent part of the Contract.

1.7 FINAL PAYMENT

- A. The Engineer will make, as soon as practicable after the entire completion of the project, a final quantity invoice of the amount of the Work performed and the value of such Work.

1.8 INCIDENTAL WORK

- A. Incidental work items for which separate payment is not made include (but are not

limited to) the following items:

1. Clearing, grubbing and stripping
2. Dust control
3. Temporary Construction Dewatering
4. Clean-up
5. Erosion control
6. Loam, seeding, grading, liming, fertilization, mulching and watering
7. Pipe bedding and backfill
8. Compaction testing of backfill
9. Restoration of property, and replacement of fences, curbs, structures, sign posts, guard rails, rock wall, mail boxes, traffic loop detectors and other minor items disturbed by the construction activities
10. Coordination with the Owner, Utilities and others, including related inspection cost (refer to Section 01050)
11. Utility crossings and relocations, unless payment is otherwise made
12. Project Signs
13. Trench boxes, steel and/or wood sheeting as required, including that left in place
14. Project record documents
15. Materials testing
16. Construction schedules, bonds, insurance, shop drawings, warranties, guarantees, certifications, and other submittals required by the Contract Documents
17. Repair and replacement of water lines under two inches in size, culverts, underdrains, rock lined drainage trenches in streets and other utilities damaged by construction activities and corresponding proper disposal of removed materials unless otherwise paid for
18. Cleaning, testing and disinfection of all water lines and appurtenances
19. Maintenance of all existing sewers flows and repair of existing sewer pipes
20. Final cleaning of sewers, force mains and storm drains
21. Final testing of manholes and sewers
22. Removal and disposal of existing sewer structures and pipe as and where indicated in the Drawings
23. Temporary utilities for construction and to maintain existing service during construction
24. Temporary utility services to buildings as required to maintain service during construction
25. Quality assurance testing
26. Temporary construction and other facilities not to be permanently incorporated into the Work necessary for construction sequencing and maintenance of operations
27. Weather protection
28. Permits not otherwise paid for or provided by the Owner
29. Visits to the Project site or elsewhere by personnel or agents of the Contractor, including manufacturer's representatives, as may be required

30. On-site and other facilities acceptable to Engineer for the storage of materials, supplies and equipment to be incorporated into the Work
31. Facilities start-up services required by the Contract Documents
32. Mobilization/demobilization
33. Test pits to determine existing utility locations and elevations, soils conditions, groundwater conditions, dewatering requirements and as required to complete the project
34. Cross-over channels and underdrains for sewer, storm drain and water excavation pits, and check dams for all excavated channels.
35. Flushing and final cleaning of storm drain system.
36. Engineer's temporary field office
37. Pipe markings
38. Pavement markings
39. Removal of existing pavement
40. Earthwork (except ledge)
41. Preconstruction photos and videos
42. Post completion CCTV and report of outfall piping installed under this Contract.
43. Construction administration and insurance

1.9 DESCRIPTION OF PAY ITEMS

- A. The following sections describe the measurement of and payment for the work to be done under the respective items listed in the Bid Form.
- B. Each unit or lump sum price stated in the Bid Form shall constitute full compensation, as herein specified, for each item of the work completed.

(1) East WWTF Effluent Outfall

Payment of the lump sum price for Item 1 shall be full compensation for furnishing all labor, materials, tools and equipment required and for upgrading of the treatment facilities, including effluent outfall flow management and rebuilding and stabilization of the bank, complete as indicated on the Drawings and as specified and all its' appurtenances in its entirety.

(A) East WWTF Stormwater Outfall

Payment for this item shall be full compensation for furnishing all labor, materials, tools and equipment required for repair of the existing stormwater outfall as described in the Contract Documents and to the standards outlined in these specifications. This item includes all work directly relating to the repair of the stormwater outfall including removal and disposal of 12" RC pipe, installation of the new 12" DI pipe, and cast in place concrete collar.

END OF SECTION

SECTION 01200

PROJECT MEETINGS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work Included: To enable orderly review during progress of the work, and to provide for systematic discussion of problems, the Engineer will conduct project meetings throughout the construction period.
- B. Related work described elsewhere: The Contractor's relations with their subcontractors and materials suppliers and discussions relative thereto, are the Contractor's responsibility and are not part of project meetings content.

1.2 QUALITY ASSURANCE

- A. Persons designated by the Contractor to attend and participate in the project meetings shall have all required authority to commit the Contractor to solutions agreed upon in the project meetings.

1.3 SUBMITTALS

- A. Agenda items: To the maximum extent practicable, advise the Engineer at least 24 hours in advance of project meetings regarding all items to be added to the agenda.
- B. Minutes: The Engineer will compile minutes of each project meeting and will furnish a copy to the Contractor. The Contractor may make and distribute such other copies as they wish.

PART 2 - PRODUCTS

(No products are required in this Section.)

PART 3 - EXECUTION

3.1 MEETING SCHEDULE

- A. Except as noted below for Preconstruction Meeting, project meetings will be held weekly. Coordinate as necessary to establish mutually acceptable schedule for meetings.

3.2 MEETING LOCATION

- A. Meetings will be held at the job site in the Engineers' field office, unless the Owner and/or Engineer determine that virtual meetings are applicable and appropriate for any reason (e.g., COVID, Safety and Health Plan, etc.).
 - 1. If meetings are required by Owner/Engineer to be held virtually, Engineer will host the meetings via Microsoft Teams. All required meeting attendees are responsible for providing hardware necessary to view, share, be heard and hear content of the meeting.

3.3 PRECONSTRUCTION MEETING

- A. Preconstruction meeting will be scheduled within twenty days after the Effective Date of the Agreement, but before the Contractor starts work at the site. Provide attendance by authorized representatives of the Contractor and all major subcontractors. The Engineer will advise other interested parties and request their attendance.
- B. Minimum agenda: Distribute data on, and discuss:
 - 1. Identification of key project personnel for Owner, Engineer, Contractor, funding/regulatory Agencies.
 - 2. Responsibilities of Owner, Engineer, Resident Project Representative, Contractor.
 - 3. Channels and procedures for communications.
 - 4. Construction schedule, including sequence of critical work.
 - 5. Easements, permits.
 - 6. Contract Documents, including distribution of required copies of original documents and revisions.
 - 7. Processing of Shop Drawings and other data submitted to the Engineer for review.
 - 8. Processing of field decisions and Change Orders.
 - 9. Rules and regulations governing performance of the Work, including funding/regulatory Agency requirements.
 - 10. Procedures for safety and first aid, security, quality control, housekeeping, and other related matters.

3.4 PROJECT MEETINGS

- A. Attendance: To the maximum extent practicable, assign the same person or persons to represent the Contractor at project meetings throughout progress of the Work. The Superintendent shall attend. Subcontractors, materials suppliers, and others may be invited to attend those project meetings in which their aspects of the Work are involved.
- B. Minimum agenda:
 - 1. Review, revise as necessary, and approved minutes of previous meeting.
 - 2. Review progress of the Work since last meeting, including status of submittals for approval.
 - 3. Review schedule of work to be accomplished prior to next meeting.
 - 4. Discuss monthly partial payment request.
 - 5. Review status of change order requests and Work Directive Changes.
 - 6. Identify problems which impede planned progress.
 - 7. Develop corrective measures and procedures to regain planned schedule.
 - 8. Complete other current business.

END OF SECTION

SECTION 01310CONSTRUCTION SCHEDULESPART 1 - GENERAL1.1 DESCRIPTION

- A. Work Included: Within ten (10) days after the effective date of the Agreement between Owner and Contractor submit to the Engineer an estimated progress schedule as specified herein.
- B. Form of Schedules:
 - 1. Narrative: Completely describe the construction methods to be employed.
 - 2. Network Analysis System:
 - a. Provide a separate horizontal schedule line for each trade or operation and show concurrent and preceding activities.
 - b. Present in chronological order the beginning of each trade or operation showing duration and float time.
 - c. Scale: Identify key dates and allow space for updating and revision.
 - 3. Mathematical Analysis:
 - a. A mathematical analysis shall accompany the network diagram. A computer printout will be acceptable.
 - b. Information shall be included on activity numbers, duration, early start, late start, etc. and float times.
- C. Content of Schedules:
 - 1. Provide complete sequence of construction by activity:
 - a. Shop Drawings, Project Data and Samples:
 - i. Submittal dates.
 - ii. Dates reviewed copies will be required.
 - b. Decision dates for:
 - i. Products specified by allowances.
 - ii. Selection of finishes.
 - c. Estimated product procurement and delivery dates.
 - d. Dates for beginning and completion of each element of construction.
 - 2. Identify work of separate phases and logically grouped activities.
 - 3. Show the projected percentage of completion for each item of work as of the first day of each month.
 - 4. Provide separate sub-schedules, if requested by the Engineer, showing submittals, review times, procurement schedules, and delivery dates.
 - 5. Schedule sheets shall be printed in color on 24"x36" paper, unless a smaller size paper is allowed by the Engineer.
- D. Updating:
 - 1. Show all work activities including those already complete.
 - 2. Show all changes occurring since previous submission.
 - 3. Indicate progress of each activity, show completion dates.
 - 4. Include:
 - a. Major changes in scope.

- b. Activities modified since previous updating.
- c. Revised projections due to changes.
- d. Other identifiable changes.
- 5. Provide narrative report, including:
 - a. Discussion of problem areas, including current and anticipated delay factors.
 - b. Corrective action taken or proposed.
 - c. Description of revisions that may affect schedules.
 - d. Description of activities to be performed in the next 6-week period.
 - e. Updated list of key shop drawings, project data and samples to be submitted in the next 6-week period.

1.2 SUBMITTALS

- A. Submit updated schedules with each progress payment request.
- B. Submit 4 copies of initial and updated schedules to the Engineer.

END OF SECTION

SECTION 01320

SAFETY AND HEALTH PLAN

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:

1. The Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the work, as outlined herein and in the Standard Contract Conditions. Within 10 days after the effective date of the Agreement between Owner and Contractor, submit to the Engineer a Safety and Health Plan as specified herein. Refer to submittals section below.
2. Contractor shall comply with all applicable Laws and Regulations related to the safety of persons or property, or for the protection of persons or property from damage, injury, illness, or loss; and shall erect and maintain all necessary safeguards for such safety and protection.
3. Contractor shall designate a qualified and experienced safety representative (OSHA defined "Competent Person") at the site whose duties and responsibilities shall be the prevention of accidents and maintaining and supervising of safety precautions and programs, including a "Job Hazards Analysis".
4. The Contractor shall be solely responsible to provide all labor, equipment, and utilities sufficient to ensure no construction noise, particulates, or odors, are allowed to accumulate to levels which adversely affect health or work in, or near the construction area.

B. Content of Safety and Health Plan:

1. Prepare complete safety and health plan in accordance with the requirements of CFR Title 29 Part 1926 - Safety and Health Regulations for Construction.
 - a. Provide documentation that Contractor's hazardous communication program is up to date.
 - b. Provide documentation that Contractor's safety training is up to date.
 - c. Prepare a project specific Safety and Health Plan addressing construction safety and protection, including but not limited to excavations, fall protection and egress, as well as provisions for construction in hazardous environmental conditions at the wastewater treatment facility. The hazardous environmental conditions at the wastewater treatment facility include, but are not limited to, confined space entry, electrically-classified spaces, chemical storage and handling areas, biological hazards, to name a few.
 - d. The Safety and Health Plan must address management of personnel and personnel safety at it relates to the COVID-19 pandemic.
 - e. The Safety and Health Plan must meet all City of Burlington requirements.

C. Updating:

1. Contractor shall be responsible for updating the Safety and Health Plan as appropriate throughout the course of the construction period.

1.2 SUBMITTALS

- A. Submit the Contractor's site-specific Safety and Health Plan to the Engineer, in accordance with Section 01340. Submit hardcopy submittals, if required.
- B. Submit updated Safety and Health Plans as necessary during the course of the project.
- C. The Safety and Health Plan is provided "for information only" to inform the Owner, Engineer and Resident Project Representative of the project specific safety program requirements; however, if the Safety and Health Plan incomplete (e.g., missing elements relevant to the project work), inadequate (e.g., outdated qualifications) or not project-specific, it will be returned "revise and resubmit". Delays related to an incomplete Safety and Health Plan are the responsibility of the Contractor.
- D. The Contractor will overview the plan with the Owner (and staff), Engineer (and Resident Project Representative) prior to work beginning at the project site, and subsequently when/if the safety plan is updated.
- E. Contractor's most current Safety and Health Plan shall be available at the construction site throughout the construction project.

1.3 ON-SITE COORDINATION MEETINGS

- A. Contractor shall review key aspects of Safety and Health Plan at the Pre-Construction Meeting, and subsequent on-site safety informational meeting.
- B. Contractor shall report to Engineer and Owner at each progress meeting concerning compliance with the Safety and Health Plan for the most recent construction period and new considerations and requirements for the upcoming period.
- C. Contractor shall hold weekly on-site coordination meetings with Resident Project Representative and Owner to ensure that Owner's staff is aware of key Safety and Health Plan requirements of the current phase of construction.

1.4 OWNER'S CONFINED SPACE ENTRY PROGRAM INFORMATION

- A. A copy of the Owner's Confined Space Entry Program is available for viewing at the facility and is not included herein.

END OF SECTION

SECTION 01340SUBMITTALSPART 1 - GENERAL1.1 DESCRIPTION

- A. Work Included:
 - 1. Submit all shop drawings, operations and maintenance manuals, Manufacturers' certificates, project data, and samples required by the Specifications.
- B. Related Work Specified Elsewhere:
 - 1. Construction Schedules: Section 01310
 - 2. Project Record Documents: Section 01720
- C. Submittals: This project shall utilize:
 - 1. Submittals – Electronic via Email/FTP with Hard Copy for Record
 - a. The Contractor shall submit to the Engineer an electronic submittal of shop drawings and O&M Manuals in portable document format (PDF) transmitted via email or file transfer protocol (FTP). The Engineer shall return an electronic PDF of the submittal review comments to the Contractor for distribution to subcontractors, suppliers and manufacturers. The electronic submittals shall serve as the electronic record of the project.
 - b. In addition, completed shop drawings and completed operations and maintenance (O&M) manuals shall be provided in hard copy (paper) format, for the record, in accordance with the following requirements.
 - i. Shop drawings and O&M manuals shall be considered “completed” once an action code of “0” or “1” has been attained, as specified below, unless otherwise directed by the Engineer.
 - ii. Once completed, the Contractor shall provide three hard copy sets (for Owner, Engineer and Resident Project Representative, respectively).
 - iii. Hard copy submittals shall be updated on a monthly basis, for those submittals completed during the preceding month.

1.2 SHOP DRAWINGS

- A. Shop Drawings are required for each and every element of the work.
- B. Shop Drawings are generally defined as all fabrication and erection drawings, diagrams, brochures, schedules, bills of material, manufacturers data, spare parts lists, and other data prepared by the Contractor, their subcontractors, suppliers, or manufacturers which illustrate the manufacturer, fabrication, construction, and installation of the work, or a portion thereof.
- C. The Contractor shall provide a completed Contractor Submittal Certification Form (copy provided for Contractor's use at the end of this Specification Section) which shall be attached to every copy of every shop drawing and signed by the Contractor and Manufacturer (where applicable). Shop Drawings shall show the principal dimensions, weight, structural and operating features, space required, clearances, type and/or brand of finish or shop coat, grease fittings, etc., depending on the subject of the drawing. When it is customary to do so, when the dimensions are of particular importance, or when so specified, the drawings shall be certified by the manufacturer or fabricator as correct for the work.

1. Each shop drawing submittal shall include a complete copy of the relevant specification section markup up to reflect “compliance” or “deviation” on an item-by-item basis.
- D. Shop Drawings shall be submitted as a complete package by specification section, unless otherwise reviewed and approved by the Engineer. It is the intent that all information, materials and samples associated with each specification section be included as a single submittal for the Engineer's review. Any deviation from this requirement, shall be requested in writing with an anticipated shop drawing breakdown/schedule prior to any associated submittal. An exception to this requirement are shop drawings for reinforcing steel, miscellaneous metals and structural steel, which shall be submitted separately for each structure unless otherwise permitted by the Engineer.
- E. The Contractor shall be responsible for the prompt and timely submittal of all shop and working drawings so that there shall be no delay to the work due to the absence of such drawings.
- F. No material or equipment shall be purchased or fabricated especially for the Contract until the required shop and working drawings have been submitted as hereinabove provided and reviewed for conformance to the Contract requirements. All such materials and equipment and the work involved in their installation or incorporation into the Work shall then be as shown in and represented by said drawings.
- G. Until the necessary review has been made, the Contractor shall not proceed with any portion of the work (such as the construction of foundations), the design or details of which are dependent upon the design or details of work, materials, equipment or other features for which review is required.
- H. All shop and working drawings shall be submitted to the Engineer by and/or through the Contractor, who shall be responsible for obtaining shop and working drawings from their subcontractors and returning reviewed drawings to them. Shop drawings shall be formatted to standard paper sizes to enable the Owner to maintain a permanent record of the submissions. Approved standard sizes shall be: (a) 24 inches by 36 inches; (b) 11 inches by 17 inches, and (c) 11 inches by 8-1/2 inches. Provision shall be made in preparing the shop drawings to provide a binding margin on the left hand side of the sheet. Shop drawings submitted other than as specified herein may be returned for resubmittal without being reviewed.
- I. Only drawings which have been checked and corrected by the fabricator should be submitted to the Contractor by their subcontractors and vendors. Prior to submitting drawings to the Engineer, the Contractor shall check thoroughly all such drawings to confirm that the subject matter thereof conforms to the Drawings and Specifications in all respects. All drawings which are correct shall be marked with the date, checker's name, and indication of the Contractor's approval, and then shall be submitted to the Engineer.
- J. If a shop drawing shows any deviation from the Contract requirements, the Contractor shall make specific mention of the deviations in the transmittal. Shop Drawings that contain significant deviations that are not brought to the attention of the Engineer may be subject to rejection.
- K. Should the Contractor submit equipment that requires modifications to the structures, piping, electrical conduit, wires and appurtenances, layout, etc., detailed on the Drawings, Contractor shall also submit details of the proposed modifications. If such

equipment and modifications are accepted, the Contractor, at no additional cost to the Owner, shall do all work necessary to make such modifications.

- L. A maximum of two submissions of each Shop Drawing will be reviewed, checked, and commented upon without charge to the Contractor. Any additional submissions which are ordered by the Engineer to fulfill the stipulations of the Drawings and Specifications, and which are required by virtue of the Contractor's neglect or failure to comply with the requirements of the Drawings and Specifications, or to make those modifications and/or corrections ordered by the Engineer in the review of the first two submissions of each Shop Drawing, will be reviewed and checked as deemed necessary by the Engineer, and the cost of such review and checking, as determined by the Owner, and based upon Engineer's documentation of time and rates established for additional services in the Owner-Engineer Agreement for this Project, may be deducted from the Contractor to make all modifications and/or corrections as may be required by the Engineer in an accurate, complete, and timely fashion. Resubmittals for the sole purpose of providing written responses to review comments will not be considered a resubmittal counting towards the two submission limit.
- M. Shop Drawings that include drawings or other material that is illegible or too small may be returned without review.
- N. American Iron & Steel certifications must be submitted with the initial shop drawing.

1.3 SAMPLES

- A. The Contractor shall submit samples when requested by the Engineer to establish conformance with the specifications, and as necessary to define color selections available. Submittals of "samples" shall be documented through the electronic submittal process by including a photograph of the item(s) and indicating the date the sample was mailed and/or delivered.

1.4 MANUFACTURER'S CERTIFICATES

- A. Prior to accepting the installation, the Contractor shall submit manufacturer's certificates for each item specified.
- B. Such manufacturer's certificates shall state that the equipment has been installed under either the continuous or periodic supervision of the manufacturer's authorized representative, that it has been adjusted and initially operated in the presence of the manufacturer's authorized representative, and that it is operating in accordance with the specified requirements, to the manufacturer's satisfaction. All costs for meeting this requirement shall be included in the Contractor's bid price.

1.5 SUBMISSION REQUIREMENTS

- A. Accompany submittals with a transmittal cover sheet, containing:
 - 1. Date.
 - 2. Project title and number.
 - 3. Contractor's name and address.
 - 4. The sequential shop drawing number for each shop drawing, project data and sample submitted shall be:
 - a. Specification Section number followed by a dash and then a sequential number beginning with 01 (e.g., 16000-01).

- b. Under limited situations when additional different pieces of equipment are submitted under the same specification section, those submittals shall be numbered sequentially (e.g. 05500-01, 05500-02, 05500-03, etc.).
 - c. Resubmittals shall include an alphabetic suffix after the corresponding sequential number (e.g., 16000-01A).
 - d. O&M submittals shall be numbered with the Specification Section number followed by a dash, the letters "OM", another dash, and then a sequential number beginning with 01 (e.g. 16000-OM-01). Resubmittals of O&Ms shall include an alphabetic suffix after the corresponding sequential number (e.g. 16000-OM-01A).
- 5. Notification of deviations from Contract Documents.
- 6. Other pertinent data.
- B. A completed Contractor Submittal Certification Form shall be attached to each hardcopy and electronic PDF of each shop drawing and must include:
 - 1. Project name
 - 2. Specification Section and sequential number with alphabet suffix for resubmittal
 - 3. Description
 - 4. Identification of deviations from Contract Documents.
 - 5. Contractor's stamp, initialed or signed, certifying review of the submittal, verification of field measurements and compliance with Contract Documents.
 - 6. Where specified or when requested by the Engineer, manufacturer's certification that equipment, accessories and shop painting meet or exceed the Specification requirements.
 - 7. Where specified, manufacturer's guarantee.
- C. Additional Requirements for Electronic Submittals:
 - 1. Each individual shop drawing or O&M submittal shall be contained in one PDF.
 - 2. The first page of the PDF shall be the Contractor Submittal Certification Form as described above.
 - 3. The electronic PDF shall be **exactly** as submitted in the hardcopy.
 - 4. The electronic PDF shall include an electronic table of contents that is bookmarked for each section of the submittal.
 - 5. The electronic PDF shall be configured such that is fully searchable.
 - 6. PDF versions of 24x36 drawings shall be converted to 24 x 36 PDFs so as not to lose the clarity of the original drawing.
 - 7. Electronic PDF submittals that are not submitted in accordance with the requirements stated above will not be reviewed by the Engineer.
 - 8. Electronic submittals shall be transmitted via the protocol established in Part 1 above.

1.6 RESUBMISSION REQUIREMENTS

- A. Revise initial submittals as required and resubmit as specified for initial submittal.
- B. Indicate on submittals any changes which have been made other than those required by Engineer. All renumbering of shop drawings, relabeling of individual pieces or assemblies or relocating of pieces or assemblies to other Drawings within the submittal shall be clearly brought to the attention of the Engineer. If relabeling of individual pieces or assemblies has taken place, the labels from the previous submittal

- shall be indicated to assist in comparing the original and resubmitted shop drawing.
- C. All resubmittals shall include a summary of the previous submittal review comments with the vendors' written response as to how the previous comments were addressed.

1.7 ENGINEER'S REVIEW

- A. The review of shop and working drawings hereunder will be general only, and nothing contained in this specification shall relieve, diminish or alter in any respect the responsibilities of the Contractor under the Contract Documents and in particular, the specific responsibility of the Contractor for details of design and dimensions necessary for proper fitting and construction of the work as required by the Contract and for achieving the result and performance specified thereunder.
- B. The Engineer's review comments will be summarized on a Submittal Review Form, which includes an action code. A description of each action code is provided below.
1. No Exceptions Taken (Status 0 on shop drawing log). The shop drawing complies with the Contract Document requirements. No changes or further information are required. Where appropriate, the submittal review form will be used to alert the Contractor, Owner and Field personnel of remaining items within that specification section that still needs to be submitted.
 2. Make Corrections Indicated (Status 1 on shop drawing log). The shop drawing complies with the Contract Document requirements except for minor changes, as indicated. Engineer requires that all comments will be addressed by the Contractor, unless otherwise notified in writing prior to execution of the relevant work.
 3. Conditional to Remarks (Status 2 on shop drawing log). The shop drawing potentially complies with the Contract Document requirements, contingent upon satisfactory resolution of review comments. Remarks will explicitly list what information needs to be resubmitted. Resubmittal from the Contractor should include a cover letter or summary which indicates how each review comment has been addressed. **This action code will not be used, or will be sparingly used, for electronic submittals.**
 4. Revise and Resubmit (Status 3 on shop drawing log). The shop drawing does not comply with the Contract Document requirement as submitted, but may with changes indicated and/or submission of additional information. The entire package must be resubmitted with the necessary information and a cover letter which indicates how each review comment has been addressed and where to find the information in the resubmittal.
 5. Rejected (Status 4 on shop drawing log). The shop drawing does not comply with the Contract Document requirements, for the reasons indicated in the remarks, and is unacceptable.
 6. For Information Only (Status 5 on shop drawing log). The shop drawing review was for information only.
 7. In Review (Status 6 on shop drawing log). The shop drawing is currently under review.

CONTRACTOR SUBMITTAL CERTIFICATION FORM

PROJECT: _____ CONTRACTOR'S PROJ. NO: _____

CONTRACTOR: _____ ENGINEER'S PROJ. NO: _____

ENGINEER: _____

SHOP
DRAWING
NUMBER:SPECIFICATION SECTION
OR DRAWING NO:SEQUENTIAL NUMBER
(& ALPHA SUFFIX FOR
RESUBMITTAL)

DESCRIPTION: _____

MANUFACTURER: _____

The above referenced submittal has been reviewed by the undersigned and I/we certify that the material and/or equipment meets or exceeds the project specification requirements with

☐ NO DEVIATIONS

or

☐ A COMPLETE LIST OF DEVIATIONS AS FOLLOWS^a:

By: _____

By: _____

Contractor^bManufacturer^c

Date: _____ Date: _____

a Any deviations not brought to the attention of the Engineer for review and concurrence shall be the responsibility of the Contractor to correct, if so directed.

b Required on all submittals

c When required by specifications Page ____ of ____

General Contractor's Stamp

SECTION 01370

SCHEDULE OF VALUESPART 1 - GENERAL1.1 DESCRIPTION

A. Work Included:

1. Provide a detailed breakdown of the Contract Sum showing values allocated to each of the various parts of the Work, as specified herein and in other provisions of the Contract Documents.

B. Related Work Specified Elsewhere:

1. Standard Contract Conditions
2. Section 01340 – Submittals

1.2 QUALITY ASSURANCE

- A. Use required means to assure arithmetical accuracy of the sums described.
- B. When so required by the Engineer, provide copies of the subcontracts or other data acceptable to the Engineer substantiating the sums described.

1.3 SUBMITTALS

- A. The proposed schedule of values (hereinafter referred to as “SOV”), meeting the requirements outlined below, shall be submitted to the Engineer for review. The SOV shall be used as the basis for reviewing and approving payment requisitions along with determining percentages of work completed. No payment requisitions will be processed until the Engineer has taken no exceptions to the schedule of values.
- B. The SOV shall consist of a detailed breakdown of all the work within the Contract Documents, as specified herein, and shall include a sufficient number of work items to serve as an accurate basis the General Contractor’s Application for Payment. Each work item shall include its prorated share of overhead and profit and subcontractor markup. The breakdown shall provide the level of detail outlined below.
 1. General Conditions:
 - a. Includes all work indicated in all specifications within Division 1.
 2. Civil and Site Work:
 - a. Includes all work indicated on the Drawings and all specifications within Division 2.
 3. Structural:
 - a. Includes all work indicated on the Drawings and all specifications within Division 3.
 4. Line items shall be broken down into work performed by the General Contractor or a Subcontractor
 5. Provide an aggregate percentage completed calculation for each major subcontractor (e.g., site, HVAC, ATC, systems integrator, plumber, electrician, etc.).

6. If a work item, or series of work items, are separated into construction phases which will require phased payments, the SOV shall have separate line-item values for each phase.

END OF SECTION

SECTION 01380CONSTRUCTION PHOTOGRAPHSPART 1 - GENERAL1.1 DESCRIPTION

A. Work Included:

1. Pre-Construction Record: Contractor shall utilize digital photographs and video to obtain a visual record of the project area; copies of same shall be given to the Engineer and Owner.
2. Notify Engineer at least three (3) working days prior to photographing or videoing the project area so Engineer may, at their option, observe.

1.2 QUALITY

- A. Pre-Construction Record: Quality shall be such that the condition of existing piping, river bank, and entire work limits can be readily determined.

1.3 SUBMITTAL OF PRINTS

A. Pre-Construction Record:

1. Submit pre-construction photographs/videos in accordance with Section 01340 prior to initiating any work on-site.
- B. The quality of the photos and video are subject to approval by the Engineer prior to the start of construction work in the areas shown by the photos.
- C. Photographs and videos taken for the project and submitted are released to the Owner and Engineer for reproduction and use for records retention, governmental and commercial purposes.

END OF SECTION

SECTION 01400
QUALITY CONTROL

PART 1 - GENERAL

1.1 REQUIREMENTS INCLUDED

- A. General Quality Control.
- B. Workmanship.
- C. Manufacturer's Instructions.
- D. Manufacturer's Certificates.
- E. Manufacturer's Field Services.
- F. Testing Laboratory Services.

1.2 RELATED REQUIREMENTS

- A. Section 01340 - Submittals: Submittal of Manufacturer's Instructions
- B. Section 02200 - Earthwork
- C. Section 03300 - Cast-in-Place Concrete
- D. Section 03305 - Concrete Testing
- E. Section 03930 – Concrete Coatings

1.3 QUALITY CONTROL

- A. Maintain quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.

1.4 WORKMANSHIP

- A. Comply with industry standards except when more restrictive tolerances or specified requirements indicate more rigid standards or more precise workmanship.
- B. Perform work by persons qualified to produce workmanship of specified quality.
- C. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, and racking.

1.5 MANUFACTURERS' INSTRUCTIONS

- A. Comply with instructions in full detail, including each step in sequence. Should instructions conflict with Contract Documents, request clarification from Engineer before proceeding.

1.6 MANUFACTURERS' CERTIFICATES

- A. When required by individual Specifications Section, submit manufacturer's certificate that products meet or exceed specified requirements.

1.7 MANUFACTURERS' FIELD SERVICES

- A. When specified in respective Specification Sections, require supplier and/or manufacturer to provide qualified personnel to observe field conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment as applicable, and to make appropriate recommendations.
- B. Representative shall submit written report to Engineer listing observations and

recommendations.

1.8 TESTING LABORATORY SERVICES

- A. Owner will employ and pay for services of an Independent Testing Laboratory to perform inspections, tests, and other services wherever an Independent Testing Laboratory is required by individual specification sections listed in paragraph 1.2 above, unless otherwise indicated.
- B. Services will be performed in accordance with requirements of governing authorities and with specified standards.
- C. Reports will present observations and test results and indicate compliance or non-compliance with specified standards and with Contract Documents. Independent Testing Laboratory will submit one copy of each report directly to each of the following: Engineer, Resident Project Representative, Contractor. Reports will be submitted within 5 days of obtaining test results. If test results indicate deficiencies, Independent Testing Laboratory shall telephone or email results to Engineer, Resident Project Representative and Contractor within 24 hours.
- D. Contractor shall cooperate with Independent Testing Laboratory personnel; furnish tools, samples of materials, design mix, equipment, storage and assistance as requested.
- E. Contractor shall coordinate all testing work and shall notify Engineer and Independent Testing Laboratory at least 24 hours prior to performing work requiring testing services.
- F. If scheduled tests or sampling cannot be performed because the work is not ready as scheduled, testing costs associated with the delay will be determined by Engineer and invoiced by Owner to Contractor. If unpaid after 60 days, the invoice amount will be deducted from the Contract Price. If adequate notice is not provided, Contractor shall suspend work on that portion of the Project until testing can be performed. Such suspension will not be grounds for a claim against the Owner for delay, nor will it be an acceptable basis for an extension of time.
- G. Payment for Independent Testing Laboratory services shall be as follows:
 - 1. General: Where testing is the Owner's responsibility, payment will be made as stated below unless other requirements are given in Specification Sections. Testing which is the responsibility of the Contractor will be considered an incidental item unless otherwise indicated in Section 01150, Measurement and Payment.
 - 2. Initial Testing: Owner will pay for initial tests.
 - 3. Retesting: Costs of retesting due to non-compliance will be paid by Owner. The cost of retesting will be determined by Engineer and Owner will invoice Contractor for this cost. If unpaid after 60 days, the invoice amount will be deducted from the Contract Price.
 - 4. Contractor's Convenience Testing: Inspections and tests performed for Contractor's convenience will be paid for by Contractor.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION
Not Used

END OF SECTION

SECTION 01515TEMPORARY BYPASS PUMPING SYSTEMSPART 1 - GENERAL1.1 DESCRIPTION

- A. The Contractor shall design, furnish, install, test, operate, maintain and remove temporary bypass pumping system(s) in order to divert sewage flow around the work area. Temporary bypass pumping system(s) shall be fully automated and able to reliably convey the full range of effluent flows, as scheduled herein.
- B. Additional Requirements Specified Elsewhere:
 - 1. Summary of Work: Section 01010
 - 2. Submittals: Section 01340

1.2 QUALITY ASSURANCE

- A. All system components specified herein shall be furnished by a Supplier who regularly engages in temporary bypass pumping systems. Supplier shall have a minimum of 15 years of experience with temporary bypass pumping systems. Supplier shall provide at least 5 references of project of a similar size and complexity as this project that have been performed within the past 5 years within New England.
- B. Supplier shall have sufficient equipment and spare parts inventory to perform normal rentals, including this project, and maintain at least 100% reserve equipment for this project for immediate delivery. Supplier shall have sufficient service personnel to provide service calls within 4 hours, 24 hours per day, 7 days per week.
- C. Temporary bypass pumping systems shall be:
 - 1. Godwin Pumps, Manchester, New Hampshire;
 - 2. Baker Corp, Oxford, Massachusetts;
 - 3. or equal.
- D. A qualified representative of the Supplier shall inspect the installation and supervise the startup and testing of the temporary bypass pumping system.
- E. The temporary bypass pumping system shall meet all applicable local, state and federal requirements.
- F. The temporary bypass pumping system shall be designed by a Professional Engineer licensed to practice in the State of Vermont. Compliance with this requirement shall be demonstrated via a signed and sealed submittal package, as specified herein.

1.3 SUBMITTALS

- A. In accordance with the requirements of Section 01340.
 - 1. Qualifications information
 - 2. Proposed schedule, sequence of construction, duration of activities and description of sewer control methods to be utilized for each element of the project.
 - 3. Coordination Drawings showing detailed layout of equipment, pumps, suction piping, discharge piping, fittings, valves, supports, materials, temporary enclosure and temporary odor control provided under this section.

4. List of duty equipment, pumps, piping, fittings, valves, and materials to be utilized by the Contactor for the temporary bypass pumping system.
 5. List of standby equipment and spare parts available on-site and off-site in order to ensure uninterrupted operation of the bypass pumping system in the event of a utility power failure.
 6. Fuel consumption rate at full speed duty and standby pumping.
 7. Fuel storage tank and secondary containment provision, including Spill Prevention Control and Countermeasure (SPCC) Plan, if applicable.
 8. Catalog cut sheets/ technical data for equipment and appurtenances.
 9. Performance curves for wastewater bypass pumps and suction lift, static head, headloss, and total dynamic head (TDH) calculations.
 10. Description of maintenance procedures to be utilized.
 11. Description of controls and alarm equipment to be utilized. Sample alarm log.
 12. Names of individuals responsible for on-call response, 24 hours per day, 7 days per week. Call list for alarm response.
- B. No construction related activities requiring the need for bypass pumping operations shall begin until the related project submittals are reviewed and all provisions of the work have been fully coordinated with the Owner, Agency, Engineer and any other parties having jurisdiction for the proposed work activities.

PART 2 - PRODUCTS

2.1 WASTEWATER BYPASS PUMPING SYSTEM

A. Pumping Equipment:

1. Temporary bypass pumping system(s) shall designed to convey the full range of effluent flows to accommodate work activities on the downstream outfall pipe.

EFFLUENT OUTFALL	
Duty	Treated, disinfected wastewater effluent
Minimum Flow	0.21 mgd
Annual Average Flow	0.47 mgd
Maximum Month	0.64 mgd
Peak Hour	1.95 MGD (98 th percentile)
Peak Hour	4.40 mgd (measured)

2. Each pump shall be a skid-mounted unit. The pump system may utilize available on-site manholes, junction/splitter structures, and/or tankage for suction and discharge, as appropriate.
3. The pumps shall be centrifugal trash pumps suitable for handling raw, unscreened sewage with solids up to 3 inches in diameter, and capable of running completely dry for extended periods of time without damage. Pumps shall be capable of static suction lifts to 28 vertical feet, at sea level.

4. The pump priming system shall be fully automatic, needing no form of adjustment or manual addition of water. The priming system shall be capable of priming the pump from a completely dry casing.
 5. All pumps shall be critically silenced to less than 68 decibels at 25 feet.
 6. Contractor shall provide appropriately sized portable spill guard containment dikes to contain leaks resulting from the pumping system, from the fuel storage tanks(s) and/or from the pumps and process piping within 5 feet of the system.
- B. Piping
1. Suction piping and discharge piping shall be constructed of:
 - a. Rigid galvanized steel pipe with ball and socket joints, Bauer HK Quick Coupling Piping or equal.
 - b. Fused HDPE piping
 - c. Connection to existing piping shall be made equivalent materials.
 2. Aluminum "irrigation" type piping or glued PVC pipe shall not be allowed.
- C. Controls and Alarms
1. The pump set shall be furnished with a weather-proof automatic control system consisting of floats and/or transducer level controls.
 2. The controller shall start/stop the pumps based on signals from high and low level floats or a transducer. The controller shall be capable of automatically varying the pump speed to match varying flow conditions and maintain a constant suction level, if scheduled herein.
 3. The controller shall annunciate and log all alarm conditions including but not limited to high upstream water level, duty pump failure, utility power loss and standby pump failure. The alarm log shall include the type of alarm, time of alarm, time alarm acknowledged, and time alarm condition cleared. Annunciation shall be via teledialer, two-way radio, cellular telephone, or equivalent.

PART 3 - EXECUTION

3.1 COORDINATION OF WORK

- A. Provide all labor and equipment necessary to coordinate work of this section and maintain communications.
- B. Notify all personnel, including but not limited to Owner, Engineer and Utility Companies, seven days in advance of any temporary bypass pumping work. The Owner will identify personnel to be notified in addition to those identified by the Contractor.
- C. Contractor shall coordinate temporary bypass pumping operations with the Owner and Engineer on a daily basis.

3.2 PERFORMANCE:

- A. General
 1. The Contractor shall install and test all sewer flow control methods to the satisfaction of the Owner and Engineer prior to proceeding with the Work.
 2. The Contractor shall be solely responsible for clean-up, repair, property damage costs and claims resulting from failure of the diversion system.

3. Any temporary pumps, piping, fuel storage, or other appurtenances associated with the temporary pumping system shall be either located above the 100-year flood elevation or protected against flotation or other damage which would be caused by a flood event.
- B. The temporary bypass pumping system shall be furnished, installed, tested, operated, maintained and removed as follows:
1. The Contractor shall furnish, install, and test temporary bypass pumping system and discharge pipelines.
 2. The Contractor shall test and debug all systems and verify that all necessary equipment, materials, spare parts, and labor are available on-site prior to operation of the system and prior to the demolition of any part of the existing pumping station facilities.
 3. The Contractor shall operate and maintain the system until the new Work is completed, demonstration tested and accepted by the Owner and Engineer.
 4. Contractor shall be responsible for making regulatory reporting notifications for any release of wastewater or fuel to the environment. Contractor shall provide copies of notifications to the Owner and Engineer.
 5. The Contractor shall anticipate that the Owner will require 7 calendar days of operation on the new, permanent Work following satisfactory completion of demonstration testing prior to beginning disassembly of the temporary bypass pumping system.
 6. Upon receipt of approval by the Owner and Engineer, the Contractor shall disassemble and remove the temporary bypass pumping system, including all appurtenant piping. Contractor shall restore the area impacted by the temporary bypass pumping system to a like-new condition.
- C. Contractor shall be responsible for cleanup, repairs, restoration and fines required to address spills or overflows from a failed bypass pumping system.

END OF SECTION

SECTION 01520

SITE SECURITY

PART 1 - GENERAL

1.1 SECURITY PROGRAM

A. The Contractor shall:

1. Protect work premises and Owner's operations from theft, vandalism, and unauthorized entry.
2. Initiate program in coordination with Owner's existing security system at job mobilization.
3. Maintain program throughout construction period.

1.2 ENTRY CONTROL

A. The Contractor shall:

1. Restrict entry of persons and vehicles into Project site and existing facilities.
2. Allow entry only to authorized persons with proper identification.
3. Maintain log of workmen, visitors and deliveries and make log available to Owner on request.
4. Coordinate entrance of persons, vehicles (including deliveries) in such a manner to not interfere with Owner's operations.

B. Owner will control entrance of persons and vehicles related to Owner's operations.

1.3 RESTRICTIONS

- A. The Contractor shall not allow cameras on site or photographs taken except by written approval of Owner.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION

SECTION 01562DUST CONTROLPART 1 - GENERAL1.1 DESCRIPTIONS

A. Work Included:

1. Furnish and apply water or calcium chloride on the road surfaces within the construction site, when required to control dust and when directed by the Engineer.
2. When dust control is not included as a separate item in the Contract, the work shall be considered incidental to the appropriate items of the Contract.

PART 2 - PRODUCTS2.1 MATERIALS

A. Water for Sprinkling:

B. Clean, free of salt, oil, and other injurious matter.

C. Calcium Chloride:

1. Meet the requirements of AASHTO M144.

PART 3 - EXECUTION3.1 APPLICATION

A. Water:

1. Apply water by methods approved by the Engineer.
2. Use approved equipment including a tank with gauge equipped pump and spray bar.

B. Calcium Chloride:

1. Apply at a rate sufficient to maintain a damp surface but low enough to assure non-contamination of water courses.
2. Apply water prior to calcium chloride addition.

END OF SECTION

SECTION 01630SUBSTITUTIONS & PRODUCT OPTIONSPART 1 - GENERAL1.1 DESCRIPTION

- A. The below listed requirements are in addition to the requirements contained in the "Substitutions, (paragraph 8.3 - 8.5)" for other Project's use".

1.2 SUBMITTALS

- A. Submit a written application for approval completely describing the proposed substitution.
- B. Submit, when requested by the Engineer:
1. Manufacturer's catalog data.
 2. Illustrations.
 3. Specifications.
 4. Samples.
 5. Other material that may be required to determine acceptability.

1.3 CRITERIA

- A. The following criteria will be used by the Engineer in determining the acceptability of proposed substitutions:
1. Adaptability to the design.
 2. Functional performance.
 3. Quality of materials.
 4. Strength of materials.
 5. Complexity, frequency and cost of maintenance.

1.4 RESULTING CHANGES

- A. If proposed substitutions are judged as being acceptable, make all changes to structures, buildings, piping, electrical, and other items necessary to accommodate the substitutions, at no additional cost to the Owner.
- B. Whenever it may be written that an equipment manufacturer must have a specified period of experience with their product, equipment which does not meet the specified experience period can be considered if the equipment supplier or manufacturer is willing to provide a bond or cash deposit for the duration of the specified time period which will guarantee replacement of that equipment in the event of failure.
- C. Engineer's Cost Reimbursement: Engineer will record Engineer's costs in evaluating a substitute proposed or submitted by Contractor. Whether or not Engineer approves a substitute so proposed or submitted by Contractor, Contractor shall reimburse Owner for the reasonable charges of Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the reasonable charges of Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.

END OF SECTION

SECTION 01710

PROJECT CLEANING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:

1. Maintain premises and public properties free from accumulations of waste, debris, and rubbish, caused by operations.
2. At completion of work, remove waste materials, tools, equipment, machinery and surplus materials, and clean all sight-exposed surfaces. Leave project clean and ready for use.

1.2 QUALITY ASSURANCE

- ###### A. Requirements of Regulatory Agencies:
- Conduct cleaning and disposal operations in accordance with all applicable local and state laws, ordinances, and code requirements.

PART 2 - PRODUCTS

2.1 MATERIALS

- ###### A. Use only cleaning materials recommended by manufacturer of surfaces to be cleaned.
- ###### B. Use cleaning materials only on surfaces recommended by cleaning material manufacturers.

PART 3 - EXECUTION

3.1 PERFORMANCE

A. Cleaning During Construction:

1. Execute cleaning operations to ensure that buildings, grounds, and public properties are maintained free from accumulations of waste materials and rubbish.
2. Entirely remove and dispose of material or debris during the progress of the work that has washed into or has been placed in watercourses, ditches, gutters, drains, catch basins, or elsewhere as a result of the Contractor's operations.
3. Wet down dry materials and rubbish to lay dust and prevent blowing dust.
4. At reasonable intervals during the progress of work, clean the site and dispose of waste materials, debris, and rubbish.
5. Clean interiors of buildings, when applicable, prior to finish painting, and continue to clean on an as-needed basis until buildings are ready for occupancy.
6. Handle materials in a controlled manner with as few handlings as possible. Do not drop or throw material from heights.
7. When applicable, schedule cleaning operations so that dust and other contaminants resulting from the cleaning process will not fall on wet, newly painted surfaces.

- B. Control of Hazards:
 - 1. Store volatile wastes in covered metal containers, and remove from premises daily.
 - 2. Prevent accumulation of wastes which may create hazardous conditions.
 - 3. Provide adequate ventilation during use of volatile or noxious substances.
- C. Disposal:
 - 1. Do not burn or bury rubbish and waste materials on project site.
 - 2. Do not dispose of volatile wastes, such as mineral spirits, oil, or paint thinner, in storm or sanitary drains.
 - 3. Do not dispose of wastes into streams or waterways.
- D. Final Cleaning:
 - 1. Employ experienced workmen, or professional cleaners, for final cleaning.
 - 2. Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials, from all sight-exposed interior and exterior finished surfaces.
 - 3. Repair, patch and touch up marred surfaces to specified finishes.
 - 4. Broom clean paved surfaces.
 - 5. Rake clean non-paved surfaces of the project site.
 - 6. Restore to their original condition those portions of the site not designated for alterations by the Contract Documents.

END OF SECTION

SECTION 01720PROJECT RECORD DOCUMENTSPART 1 - GENERAL1.1 DESCRIPTION

A. Work Included:

1. Keep accurate record documents for all additions, demolition, changes of material or equipment (from that shown on the Drawings), variations in work, and any other additions or revisions to the Contract (via Change Order, Work Change Directive, Field Order or Clarification).

B. Related Work Specified Elsewhere:

1. Shop Drawings, Project Data, and Samples are specified in Section 01340, Submittals.

1.2 MAINTENANCE OF DOCUMENTS

A. Maintain at job site, one copy of:

1. Contract Drawings
2. Specifications
3. Addenda
4. Reviewed Shop Drawings
5. Change Orders
6. Any other modifications to the Contract
7. Field Test Reports

B. Store documents in files and racks specifically identified for Record Drawing use, that are apart from documents used for construction.

C. File documents in a logical manner indexed for easy reference.

D. Maintain documents in clean, dry, legible condition.

E. Do not use record documents for construction purposes.

F. Make documents available at all times for inspection by the Engineer and Owner, and by the end of the project, transmit these documents to the Engineer.

G. Failure to maintain current records, as specified herein, shall be grounds for withholding retainage from monthly partial payment requests.1.3 RECORDING

A. Label each document "PROJECT RECORD" in large high printed letters.

B. Keep record documents current and do not permanently conceal any work until required information has been recorded.

C. General Field Recording Issues:

1. All swing ties shall be taken from existing, permanent features such as utility poles, corners of buildings and hydrants. Porches, sheds or other house additions shall be avoided as they could be torn down. A minimum of two swing ties shall be taken. Survey grade GPS coordinates are also acceptable.
2. Stations shall be recorded to the nearest foot.
3. Inverts shall be recorded to the nearest hundredth of a foot.

4. Elevations shall be recorded to the nearest hundredth of a foot.
 5. Building dimensions shall be recorded to the nearest 1/4".
 6. Equipment and Piping shall be recorded to the nearest tenth of a foot, and the overall dimensions and layout of the equipment shall be adjusted to reflect the equipment provided.
- D. Project Record Drawings - Legibly mark Contract Drawings to record existing utilities and actual construction of all work, including but not limited to the following (where applicable):
1. Existing Utilities
 - a. Water mains and services, water main gate valves, sewer mains and services, storm drains, culverts, steam lines, gas lines, tanks and other existing utilities encountered during construction must be accurately located and shown on the Drawings. In congested areas supplemental drawings or enlargements may be required.
 - b. Show any existing utilities encountered in plan and profile and properly labeled showing size, material and type of utility. Ties shall be shown on plan. Utility shall be drawn to scale in section (horizontally and vertically) and an elevation shall be called out to the nearest hundredth of a foot.
 - c. When existing utility lines are broken and repaired, ties shall be taken to these locations.
 - d. If existing water lines are replaced or relocated, document the area involved and pipe materials, size, etc. in a note, and with ties.
 2. Gravity Sewer Line
 - a. Change sewer line slopes indicated on Drawings if inverts are changed.
 - b. Draw any new gravity lines that are added on plan and profile.
 - c. Show any field or office redesigns.
 - d. Redraw the sewer line profile if manhole inverts are redrawn.
 - e. Redraw the sewer line on plan corresponding to relocated manholes.
 3. Ledge
 - a. Ledge profiles shall be shown. Note whether the plotted ledge profile reflects undisturbed or expanded conditions.
 4. Yard Piping and Buried Electrical Conduit
 - a. Site piping and utilities shall be drawn to reflect the installed locations, with ties and elevation of all bends (horizontal and vertical).
 5. Utilities
 - a. When encountered, additional utilities (e.g., gas, cable, telephone, fiber optic, etc.) shall be indicated on the Record Drawings.
- E. Specifications and Addenda - Legibly mark up each section to record:
1. Manufacturer, trade name, catalog number, and supplier of each product and item of equipment actually installed.
 2. Changes made by Change Order, Field Order, or other method.

1.4 SUBMITTALS

- A. At the completion of the project, and prior to the release of retainage, deliver record documents to the Engineer.
1. Record drawings shall be provided as a bound, red-line paper set.

2. Record drawings shall be provided as a bound, red-line paper set and an electronic file (pdf format) consisting of a full scan of the bound paper set.
 3. Record drawings shall be provided as a bound paper set of computer generated drawings, an electronic file (pdf format) of the bound paper set, and electronic files in AutoCAD format. Ownership of the drawings and files shall pass to the Owner at the time of submittal.
 4. Record drawings shall be provided as electronic files in ESRI GIS format. Ownership of the drawings and files shall pass to the Owner at the time of submittal.
 5. If the Contractor provides alternate or substitute equipment that requires revised arrangements from the Bidding Documents, the Contractor shall provide supplemental record drawings of these items in AutoCAD format.
- B. Accompany submittal with transmittal letter, in duplicate, containing:
1. Date, project title and number.
 2. Contractor's name and address.
 3. Title and number of each record document with certification that each document is completed and accurate.
 4. Signature of Contractor, or their authorized representative.
- C. Failure to supply all information on the Project Record Drawings as specified in Part 1.3 may result in withholding final completion and in non-approval of final payments of the Contract. If Contract Time has elapsed, this shall be grounds for imposing liquidated damages.

1.5 QUALITY ASSURANCE

- A. All horizontal and vertical dimensions, swing-ties, and elevations shall be accurate to within one-tenth of a foot, unless greater accuracy is specified elsewhere in the Specifications (e.g., concrete elevations, weir elevations, etc.).

PART 2 - PRODUCTS – NOT APPLICABLE

PART 3 - EXECUTION

3.1 MAINTAINING AND PROVIDING RECORDS

- A. Records shall be kept current as the work progresses.
- B. Records shall be made available for review by the Owner, Engineer, Resident Project Representative and/or Funding Agency(s) upon request.
- C. Records shall be kept current as the work progresses. Failure to maintain current records, as specified herein, shall be grounds for withholding additional retainage from monthly partial payment requests. Failure to provide records shall also be grounds for withholding of final payment and, if beyond contract time, shall be grounds for imposing liquidated damages.

3.2 AS-BUILT SURVEY PERFORMANCE

- A. From established survey control, and construction baseline as shown on the drawings, conduct surveys of the project area during construction as needed to obtain information of buried and above ground items. Surveys shall include information outlined in Section 1.3.

- B. Actual road alignments; walls; fence and guardrail; existing, new and relocated utility poles; traffic and warning sign locations; crosswalks, parking space and stop bar locations; retaining walls and foundations drains; all underground and overhead utility poles and lines within the project limits, including those installed on private property; all other new features and appurtenances and those existing features and appurtenances changed as a result of this project shall be included in the survey.

3.3 FORMAT FOR ELECTRONIC DELIVERABLES

- A. AutoCAD digital survey data for the as-built survey shall include:
 - 1. Copy of field notes and sketches of the survey.
 - 2. Paper copy of description of layers.
 - 3. Paper copy of base map.
 - 4. Provide digital information on compact disk with paper copy printout; information shall be provided in .DWG format (AutoCAD 2011 or earlier). Data shall be provided in 3D format (northing, easting, elevation, or Y, X, Z).
 - 5. Drawing scale: Minimum one inch = twenty feet.
 - 6. Layering:
 - a. Repetitive symbols made into blocks and defined on layer 0.
 - b. All entities shall be drawn “by layer” as opposed to individual properties.
 - c. Use one linetype and one color per layer as opposed to numerous colors/linetypes on a single layer.
 - d. Preface each layer with the initials of the Survey company or Contractor (example, Survey Company: SC “layername”).
 - e. Database text annotation will be coordinated so the text will be right-reading.
 - f. Place text on separate layers.

END OF SECTION

SECTION 02050ADEMOLITIONPART 1 - GENERAL1.1 DESCRIPTION

A. Work Included:

1. The Contractor shall furnish all labor, materials, tools, equipment and apparatus necessary and shall do all work required to complete the demolition, removal, and alterations of existing facilities as indicated on the Drawings, as herein specified, and/or as directed by the Engineer.
2. Demolition and alteration work within occupied areas shall be accomplished with minimum interference to the occupants and to the plant which shall be in continuous operation during construction.
3. All equipment, piping, and other materials that are not to be relocated or to be returned to the Owner shall become the property of the Contractor and shall be disposed of by him, away from the site of the work and at his own expense.
4. All demolition or removal of existing structures, utilities, equipment, and appurtenances shall be accomplished without damaging the integrity of existing structures, equipment, and appurtenances to remain, to be salvaged for relocation or stored for future use.
5. Such items that are damaged shall be either repaired or replaced at the Contractor's expense to a condition at least equal to that which existed prior to the start of his work.
6. Unless otherwise indicated, all items labeled to be "removed", "demolished" or "remove/demolish" shall be removed and disposed of off-site in accordance with all Local, State and Federal Regulations.
7. The Contractor shall not collect any samples of either Building Materials, Wastes, Soils, or any other site/project related materials, nor have the samples analyzed for any reason without prior written approval from the Owner or Engineer. Furthermore, the Contractor shall not hire or contract with another party or Consultant to conduct sampling of either Building Materials, Wastes, Soils, or any other site/project related materials or to conduct analytical analysis.
 - a. All sampling requests are to be directed in written format to the Owner and Engineer.
 - b. By collecting unauthorized samples, the Contractor shall assume any and all financial burden of the required corrective action.
 - c. If a sample is collected and analyzed without prior written approval from the Owner or Engineer, the Contractor shall be responsible for any and all remediation required by any applicable regulatory authority arising from or related to the samples collected and analyzed, as the validity of the materials sampled, sample locations and sampling protocols utilized cannot be confirmed by the Owner's or Engineer's independent Consultant.

- B. Related Work Specified Elsewhere: (When Applicable)
 - 1. Earthwork is specified in Section 02200.
 - 2. See Summary of Work, Section 01010.

1.2 JOB CONDITIONS

- A. Condition of Structures:
 - 1. The Owner assumes no responsibility for the actual condition of structures to be demolished.
 - 2. Conditions existing at the time of inspection for bidding purposes will be maintained by the Owner as far as practicable. However, variations within the structures may occur due to Owner's removal and salvage operations prior to the start of demolition work (where applicable).

1.3 UTILITIES

- A. Utility Locations:
 - 1. Utility locations are not shown on plans
- B. Coordination with Utilities:
 - 1. The Contractor shall make all necessary arrangements and perform any necessary work to the satisfaction of affected utility companies and governmental divisions involved with the discontinuance or interruption of affected public utilities and services.

1.4 SUBMITTALS

- A. Schedule - Demolition:
 - 1. Submit two (2) copies of proposed methods and operations of demolition to the Engineer for review prior to the start of work. Include in the schedule the coordination for shut-off, capping and continuation of utility services as required.
 - 2. Provide a detailed sequence of demolition and removal work to ensure the uninterrupted progress of the Owner's operations.

1.5 PROTECTIONS

- A. Ensure the safe passage of persons around the area of demolition. Conduct operations to prevent injury to adjacent buildings, structures, other facilities and persons. Erect temporary, covered passageways as required by authorities having jurisdiction.
- B. Protect the Riverwalk Trail parallel to the Winooski River that crosses the project site and restore any disturbances to match the existing conditions.
- C. Provide interior and exterior shoring, bracing, or support to prevent movement, settlement or collapse of structures to be demolished and adjacent facilities to remain.

1.6 DAMAGES

- A. The Contractor shall promptly repair damages caused by demolition operations to adjacent facilities at no cost to the Owner.

PART 2 - PRODUCTS – Not Applicable

PART 3 - PERFORMANCE

- A. Remove and dispose of non-salvageable material in accordance with all applicable local and state laws, ordinances and code requirements.
- B. Dispose of material daily as it accumulates.
- C. Carefully remove, store and protect from damage all materials to be salvaged.
- D. Buildings and Adjacent Property:
 - 1. Protect all buildings and property adjacent to equipment to be removed from damage by erecting suitable barriers or by other suitable means.
 - 2. Leave such buildings in a permanently safe and satisfactory condition.
- E. Maintaining Traffic:
 - 1. Do not close or obstruct streets, sidewalks, alleys or passageways without permission from authorities having jurisdiction.
- F. Mechanical/Process Demolition:
 - 1. Mechanical/Process demolition in general shall consist of the dismantling and removal of existing piping, tanks, pumps, motors, equipment and other appurtenances as specified, and indicated on the Drawings.
 - 2. It shall also include, where necessary, the cutting of existing piping for the purpose of making connections thereto.
 - 3. Piping not indicated to be removed but which may interfere with construction shall be removed to the nearest solid support, capped and left in place. Where piping that is to be removed passes through the wall of existing structures, it shall be cut off and properly capped on each side of the wall.
 - 4. When piping is to be altered or removed underground, the remaining piping shall be properly capped or plugged.
 - 5. Abandoned underground piping shall be left in place unless it interferes with new structures or unless otherwise noted on the Drawings.
- G. Salvage:

Salvaged items shall be stored on site for the Owner in an acceptable location and manner.
- H. Maintain Effluent Flow:
 - 1. During demolition, maintain effluent flow as outlined in Section 01010, Summary of Work.
- I. Demolition Sequence:
 - 1. The demolition sequence is to conform the reviewed and approved project schedule, and restrictions outlined in Section 01310, Construction Schedules.

END OF SECTION

SECTION 02110CLEARING AND GRUBBINGPART 1 - GENERAL1.1 DESCRIPTION

A. Work Included:

1. Clearing and grubbing includes, but is not limited to, removal of trees, brush, wooded growth, grass, shrubs, poles, posts, signs, fences, culverts and other vegetation and minor structures; the protection of designated wooded growth; the storage and protection of minor structures and materials which are to be replaced; and the disposal of nonsalvageable structures and materials, and necessary preliminary grading. Stumps are to remain in place and cut to grade unless otherwise noted (See Section 02271).

B. Limits of Work:

1. Perform clearing and grubbing work within the areas required for construction, or as shown on the Drawings, to a depth of 12 inches below the existing grade.
2. Perform additional clearing and grubbing work within areas and to depths which, in the opinion of the Engineer, interfere with excavation and/or construction, or are otherwise objectionable.
3. Clearing and grubbing is to be minimized along the bank to the minimum extents necessary for access.

C. Work Not Included:

1. Clearing and grubbing work performed for the convenience of the Contractor will not be considered for payment.

1.2 QUALITY ASSURANCE

A. Requirements of Regulatory Agencies:

1. Dispose of combustible material by burning only when permitted by and in accordance with all applicable local and state laws, ordinances and code requirements.

B. Remove and dispose of nonsalvageable structures and material in accordance with all applicable local and state laws, ordinances and code requirements.

PART 2 - PRODUCTS2.1 MATERIALS

A. Provide all materials required to complete the work.

B. All timber and wood shall become the property of the Contractor unless other agreements are made between the Owner and the Contractor.

C. Repair any damage to structures to the complete satisfaction of the Owner and Engineer.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Carefully preserve and protect from injury all trees and/or shrubs not to be removed.
- B. Right-of-way:
 - 1. Where excavation is required on public or private rights-of-way containing trees, shrubs, other growth, or any structure or construction, obtain the Engineer's direction concerning the extent to which such obstacles can be cleared or stripped prior to performing the Work.
 - 2. In all rights-of-way, remove only those particular growths or structures which are, in the opinion of the Engineer, essential for construction operations.
 - 3. All other removals or damage shall be replaced or restored at the Contractor's expense.

3.2 PERFORMANCE

- A. Clearing:
 - 1. Remove and dispose of all trees, brush, slash, stubs, bushes, shrubs, plants, debris and obstructions within the clearing limits required for equipment access to the outfall repair location, and except as otherwise shown on the Drawings or as directed by the Engineer.
 - 2. Do not remove stumps unless otherwise directed by the Engineer.
 - 3. Dispose of material to be removed daily as it accumulates.
 - 4. Take special care to completely dispose of all elm trees and branches immediately after cutting either by burial in approved locations or, when permitted, by burning in areas well removed from standing elm growth.
- B. Protection of Wooded Growth:
 - 1. Fell trees toward the center of the area being cleared to protect trees and shrubs to be left standing.
 - 2. Cut up, remove and dispose of trees unavoidably falling outside the area to be cleared.
 - 3. Employ skilled workmen or tree surgeons to trim and repair all trees that are damaged but are to be left standing.
- C. Grubbing:
 - 1. Perform grubbing work beneath new roads, driveways, walks, seeded areas and other areas and as directed by the Engineer.
 - 2. Grub out all sod, vegetation and other objectionable material to a minimum depth of 12 inches below the existing grade.
 - 3. Completely remove all stumps, including major root systems.
- D. Disposal:
 - 1. Remove from the site and dispose of material not being burned.
 - 2. Provide an approved disposal area unless otherwise specified.
- E. Burning:
 - 1. Dispose of combustible materials by burning, only if approved by local and state officials.
 - 2. Employ competent workmen to perform burning work in such a manner and at such locations that adjacent properties, trees and growth to remain, overhead cables, wires and utilities will not be jeopardized.

3. Do not leave fires unguarded.
4. Do not burn poison oak, poison ivy or other plants of similar nature.
5. Do not use tires or other combustible waste material to augment burning.
6. Burn combustible materials daily as the work progresses.
7. The Contractor shall be responsible for all damage caused by burning and shall be responsible for obtaining all necessary permits for burning.

3.3 REPLACEMENT OF MATERIALS

- A. Paving, Curbing and Miscellaneous Material:
 1. Remove all paving, subpaving, curbing, gutters, brick, paving block, granite curbing, flagging and minor structures that are over the area to be filled or excavated.
 2. Remove and replace bituminous asphaltic and portland cement concrete in accordance with the appropriate sections of these Specifications.
 3. Properly store and preserve all material to be replaced in a location approved by the Engineer.
- B. Shrubs and Bushes:
 1. Remove, store, and replace ornamental shrubs and bushes to be preserved in accordance with accepted horticultural practices.
- C. Topsoil:
 1. When applicable, carefully remove, store, and protect topsoil in accordance with the appropriate section of this division.
- D. Responsibility:
 1. Replace, at no additional cost to the Owner, materials lost or damaged because of careless removal or neglectful or wasteful storage, disposal or use of these materials.

END OF SECTION

SECTION 02115STRIPPING AND STOCKPILING TOPSOILPART 1 - GENERAL1.1 DESCRIPTION

- A. Work Included:
 - 1. Segregate topsoil approved by the Engineer prior to excavation, trenching and grading operations and stockpile it for use in the work.
- B. Related Work Specified Elsewhere (When Applicable):
 - 1. Demolition, clearing, grading, embankment, excavation and landscaping are specified in the appropriate sections in this division.

PART 2 - PRODUCTS2.1 MATERIALS

- A. Topsoil shall consist of friable loam of at least two percent decayed organic matter (humus), free of subsoil, and reasonably free of clay lumps, brush, roots, weeds, and other objectionable vegetation, stones and similar objects larger than one (1) inch in any dimension, litter and other materials unsuitable or harmful to plant growth. It shall contain no toxic materials.
- B. The quality of the topsoil material to be used shall be subject to approval by the Engineer.

PART 3 - EXECUTION3.1 PERFORMANCE

- A. Remove topsoil from the areas that are likely to be disturbed as a result of construction operations to a depth based on the soil profile, as approved by the Engineer.
- B. Remove topsoil from all designated areas prior to the performance of normal excavation.

3.2 STORAGE

- A. Transport topsoil and deposit in storage piles convenient to the areas which are subsequently to receive the application of topsoil.
- B. Stockpile topsoil separate from other excavated materials in areas approved by the Engineer.
- C. Take all necessary precautions to prevent other excavated material and objectionable material from becoming intermixed with the topsoil before, during and after stripping and stockpiling operations.
- D. Neatly trim and grade stockpiles to provide drainage from surfaces and to prevent depressions where water may become impounded.
- E. Construct temporary erosion control devices for all stockpiled material, subject to the Engineer's approval.
- F. All loam stripped and stockpiled shall be immediately seeded with 70%

Domestic/30% Perennial Rye Grass.

END OF SECTION

SECTION 02200EARTHWORKPART 1 - GENERAL1.1 DESCRIPTION

- A. The Work described by this Section consists of all earthwork encountered and necessary for construction of the project as indicated in the Contract Documents, and includes but is not limited to the following:
 - 1. Excavation
 - 2. Backfilling and Filling
 - 3. Compaction
 - 4. Embankment Construction
 - 5. Grading
 - 6. Providing soil material as necessary
 - 7. Disposal of unsuitable materials
 - 8. Disposal of excess suitable material
- B. Related Work Specified Elsewhere: (When Applicable)
 - 1. Quality Control is specified in Division 1.
 - 2. Clearing and Grubbing, Dewatering, Filter Fabric, Temporary Erosion Control, Stripping and Stockpiling of Topsoil, and Landscaping are specified in the appropriate sections of this Division.
 - 3. Pipe, fittings and valves are specified in Division 2.

1.2 QUALITY ASSURANCE

- A. Requirements of Regulatory Agencies:
 - 1. All work shall be performed and completed in accordance with all local, state and federal regulations.
 - 2. The General Contractor shall secure all other necessary permits unless otherwise indicated from, and furnish proof of acceptance by, the municipal and state departments having jurisdiction and shall pay for all such permits, except as specifically stated elsewhere in the Contract Documents.
- B. Line and Grade:
 - 1. The Contractor shall establish the lines and grades in conformity with the Drawings and maintain same to properly perform the work.
- C. Testing Methods:
 - 1. Gradation Analysis: Where a gradation is specified the testing shall be in accordance with ASTM C117 and ASTM C136 (or latest revision).
 - 2. Compaction Control:
 - a. Unless otherwise indicated, wherever a percentage of compaction for backfill is indicated or specified, it shall be the in-place density divided by the maximum density and multiplied by 100. The maximum density shall be the density at optimum moisture as determined by ASTM

Standard Methods of Test for Moisture-Density Relations of Soil Using 10-lb. Hammer and 18-in. Drop, Designation D1557 (Modified Proctor), or latest revision, unless otherwise indicated.

- b. The in-place density shall be determined in accordance with ASTM Standard Method of Test for Density of Soil in Place by the Sand Cone method, Designation D1556, (or latest revision) or Nuclear method Designation D6938.
- c. Wherever specifically indicated, maximum density at optimum moisture may be determined by ASTM Standard Methods of Test for Moisture Density Relations of Soils, ASTM D6938 (Standard Proctor).
- d. An Independent Testing Laboratory will be retained by the Owner to conduct all laboratory and field soil sampling and testing, and to observe earth work and foundation construction activities. Laboratory testing will consist of sieve analyses, natural water content determinations, and compaction tests. Field testing will consist of in-place field density tests and determination of water contents.

1.3 SUBMITTALS

- A. Collection of samples and testing of all materials for submittals shall be performed by the Independent Testing Laboratory and paid for by the Contractor until the materials are approved by the Owner or Engineer.
- B. Submit test results in accordance with the procedure specified in the General and Supplementary Conditions.
- C. Submit test results (including gradation analysis) and source location for all borrow material to be used at least 10 working days prior to its use on the site. Contractor shall identify and provide access to borrow sites.
- D. Submit moisture density curve for each type of soil (on site or borrow material) to be used for embankment construction or fill beneath structures or pavement.

1.4 TESTS

The Independent Testing Laboratory shall conform to the following procedures and standards:

- A. Submit test results in accordance with the procedure specified in the General and Supplementary Conditions.
- B. All testing shall be performed by a qualified Independent Testing Laboratory acceptable to the Engineer and Contractor at the Owner's expense unless otherwise indicated (see Section 01400 - Quality Control).
- C. Field density tests on embankment materials shall be as follows:
- D. Tests shall be taken on every 200 cubic yards of embankment material.
- E. Paved Areas and Building Slab Subgrade: Make at least one field density test of subgrade for every 2,000 sq. ft. of paved area or building slab, but in no case less than 3 tests. In each compacted fill layer, make one field density test for every 2,000 sq. ft. of overlaying building slab or paved area, but in no case less than 3 tests.
- F. Trenches: Field density test in trenches shall be taken at 75 linear foot intervals on every third lift.
- G. In addition to the above tests the Independent Testing Laboratory will perform additional density tests at locations and times requested by the Engineer.

- H. Additional density testing will be required by the Engineer if the Engineer is not satisfied with the apparent results of the Contractor's compaction operation.
1. If the test results fail to meet the requirements of these specifications, the Contractor shall undertake whatever action is necessary, at no additional cost to the Owner, to obtain the required compaction. The cost of retesting will be paid by Owner. The cost of retesting will be determined by Engineer and Owner will invoice Contractor for this cost. If unpaid after 60 days, the invoice amount for retesting will be deducted from the Contract Price. No allowance will be considered for delays in the performance of the work.
 2. If the test results pass and meet the requirements of these Specifications, the cost of the testing service will be borne by the Owner, but no allowance will be considered for delays in the performance of the work.

1.5 JOB CONDITIONS

A. Site Information:

1. Data on indicated subsurface conditions are not intended as representations or warranties of accuracy or continuity between soil borings. It is expressly understood that Owner and Engineer will not be responsible for interpretations or conclusions drawn there from by the Contractor. Data are made available for the convenience of Contractor.
2. Additional test borings and other exploratory operations may be made by Contractor at no additional cost to Owner.

B. Existing Utilities and Structures:

1. The locations of utilities and structures shown on the Drawings are approximate as determined from physical evidence on or above the surface of the ground and from information supplied by the utilities. The Engineer in no way warrants that these locations are correct. It shall be the responsibility of the Contractor to determine the actual locations of any utilities or structures within the project area.

PART 2 - PRODUCTS

2.1 SOIL MATERIAL

- A. Aggregate Base: Shall be screened or crushed gravel of hard durable particles free from vegetable matter, lumps or balls of clay and other deleterious substances. Type B Aggregate for base shall not contain particles of rock that will not pass the 4 inch square mesh sieve. The gradation of the part that passes a 3-inch sieve shall meet the following grading requirements:

<u>Sieve</u> <u>Designation</u>	<u>Percent by Weight</u> <u>Passing Square Mesh Sieves</u>
	<u>Type B</u> <u>Aggregate</u>
1/2 inch	35-75
1/4 inch	25-60
No. 40	0-25

No. 200

0-5

- B. Aggregate Leveling Course and Untreated Surface Course: Shall be screened or crushed gravel consisting of hard durable particles which are free from vegetable matter, lumps or balls of clay and other deleterious substances. The gradation of the material shall meet the grading requirements of the following table:

<u>Sieve Designation</u>	<u>Percentage by Weight Passing Square Mesh Sieves</u>
1 inch	95-100
3/4 inch	90-100
No. 4	40-65
No. 10	10-45
No. 200	0-7

- C. Blanket Drain Material: Shall be gravel of hard durable particles free from vegetable matter, lumps or balls of clay and other deleterious substances. Blanket drain material shall not contain particles of rock which will not pass the 2-inch square mesh. The gradation of the part that passes a 2-inch sieve shall meet the following grading requirements:

<u>Sieve Designation</u>	<u>Percentage by Weight Passing Square Mesh Sieves</u>
2 inch	100
1/4 inch	25-70
No. 40	0-30
No. 200	0-5

The blanket drain material shall have a permeability of 5×10^{-3} cm/sec. or faster. Permeability supersedes gradation requirements.

- D. Common Borrow: Shall consist of approved material required for the construction of the work where designated. Common borrow shall be free from frozen material, perishable rubbish, peat, organic, and other unsuitable material.

<u>Sieve Designation</u>	<u>Percentage by Weight Passing Square Mesh Sieves</u>
6-inch	100
No. 200	0-5

Common borrow may be used for embankments unless otherwise indicated and provided that the material is at a moisture content suitable for compaction to the specified density. No rocks shall exceed 3/4 of the depth of the specified lift thickness.

- E. Crushed Stone: Shall be a uniform material consisting of clean, hard, and durable particles or fragments, free from vegetable or other objectionable matter, containing angular pieces, as are those which come from a mechanical crusher. Gradation requirements shall be as follows:

<u>Sieve Designation</u>	<u>Percent by Weight Passing Square Mesh Sieve</u>
1-1/2 inch	100
1 inch	95-100
1/2 inch	25-60
No. 4	0-10

- F. Screened Stone: Shall be a well graded stone consisting of clean, hard, and durable particles or fragments, free from vegetable or other objectionable matter, meeting the following gradation requirements:

<u>Sieve Designation</u>	<u>Percent by Weight Passing Square Mesh Sieve</u>
1 inch	100
3/4 inch	90-100
3/8 inch	20-55
No. 4	0-10
No. 8	0-5

- G. Select Fill (Structural Fill): Shall consist of well graded granular material free of organic material, loam, wood, trash, snow, ice, frozen soil and other objectionable material and having no rocks with a maximum dimension of over 4 inches and meeting the following gradation requirements, except where it is used for pipe bedding in which case the maximum size shall be 2 inches.

<u>Sieve Designation</u>	<u>Percent by Weight Passing Square Mesh Sieve</u>
4 inch	100
3 inch	90-100
1/4 inch	25-90
No. 40	0-30

No. 200 0-5

- H. Sand: Shall be well graded durable material free of organic matter and conform to the following gradation requirements:

<u>Sieve Designation</u>	<u>Percent by Weight Passing Square Mesh Sieve</u>
3/8 inch	100
No. 4	95-100
No. 16	50-85
No. 50	10-30
No.100	2-10
No.200	0-5

Sand conforming to the requirement for fine aggregate in ASTM Standard Specifications for Concrete Aggregate, Designation C-33, will meet the above requirement.

2.2 CONCRETE

- A. If concrete is required for excess excavation, provide 3,000 psi concrete complying with requirements of Section 03300.

2.3 FILTER FABRIC

- A. If filter fabric is required, refer to Section 02260.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine the areas and conditions under which excavating, backfilling, filling, compaction and grading are to be performed and notify the Engineer in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.2 EXCAVATION

- A. General:
1. Excavation consists of removal and disposal of all material encountered when establishing line and grade elevations required for execution of the work.
 2. The Contractor shall make excavations in such manner and to such widths as will give suitable room for building the structures or laying and jointing the piping; shall furnish and place all sheeting, bracing, and supports; shall do all cofferdamming, pumping, and draining; and shall render the bottom of the excavations firm, dry and acceptable in all respects.
 3. All excavation shall be classified as either earth or ledge.

- a. Earth Excavation shall consist of the removal, hauling and disposal of all earth materials encountered during excavation including but not limited to native soil or fill, pavement (bituminous or concrete), existing sewers and manholes, ashes, loam, clay, swamp muck, debris, soft or disintegrated rock or hard pan which can be removed with a backhoe, or a combination of such materials, and boulders that do not meet the definition of "Ledge" below.
 - b. Ledge Excavation: Shall consist of the removal, hauling, and disposal of all ledge or rock encountered during excavation. "Ledge" and "rock" shall be defined as any natural compound, natural mixture that in the opinion of the Engineer can be removed from its existing position and state only by drilling and blasting, wedging, sledging, boring or breaking up with power operated tools. No boulder, ledge, slab, or other single piece of excavated material less than two cubic yards in total volume shall be considered to be rock unless, in the opinion of the Engineer it must be removed from its existing position by one of the methods mentioned above.
4. The Contractor shall not have any right of property in any materials taken from any excavation. Do not remove any such materials from the construction site without the approval of the Engineer. This provision shall in no way relieve the Contractor of his obligations to remove and dispose of any material determined by the Engineer to be unsuitable for backfilling. The Contractor shall dispose of unsuitable and excess material in accordance with the applicable sections of the Contract Documents.
- B. Additional Excavation: When excavation has reached required subgrade elevations, notify the Engineer and Resident Project Representative who will observe the conditions.
 1. If material unsuitable for the structure or paved area or pipeline (in the opinion of the Engineer) is found at or below the grade to which excavation would normally be carried in accordance with the Drawings and/or Specifications, the Contractor shall remove such material to the required width and depth and replace it with thoroughly compacted select fill, screened stone, crushed stone, or concrete as directed by the Engineer.
 2. All excavated materials designated by the Engineer as unsuitable shall become the property of the Contractor and disposed of at locations in accordance with all State and local laws and the provisions of the Contract Documents.
- C. Unauthorized Excavation: Shall consist of removal of materials beyond indicated subgrade elevations or dimensions without specific authorization of Engineer. Unauthorized excavation, as well as remedial work required by the Engineer shall be at the Contractor's expense. Remedial work required is as follows:
 1. Under footings, foundation bases, or retaining walls, fill unauthorized excavation with select fill or screened stone compacted to 95%. Provide 12" minimum select fill or screened stone directly under footings. Concrete fill may be used to bring elevations to proper position, when acceptable to Engineer.

2. If the bottom of a trench is excavated beyond the limits indicated, backfill the resulting void with thoroughly compacted screened stone, unless otherwise indicated.
3. Elsewhere, backfill and compact unauthorized excavations as specified for authorized excavations of same classification, unless otherwise directed by Engineer.

D. Structural Excavation:

1. Shall consist of the removal, hauling, disposal, of all material encountered in the excavation to permit proper installation of structures.
2. Excavations for structures shall be carried to the lines and subgrades shown on the Drawings.
3. Excavate areas large enough to provide suitable room for building the structures.
4. The extent of open excavation shall be controlled by prevailing conditions subject to any limits designated by the Engineer.
5. Provide, install, and maintain sheeting and bracing as necessary to support the sides of the excavation and to prevent any movement of earth which could diminish the width of the excavation or otherwise injure the work, adjacent structures, or persons and property in accordance with all state and OSHA safety standards.
6. Erect suitable fences around structure excavation and other dangerous locations created by the work, at no additional cost to the Owner.
7. Exposed subgrade surfaces shall remain undisturbed, protected, and maintained as uniform, plane areas and shape to receive the foundation components of the structure.
 - a. Conform to elevations and dimensions shown within a tolerance of plus or minus 0.10', and extending a sufficient distance from footings and foundations to permit placing and removal of concrete formwork, installation of services, other construction, and for inspection.
 - b. In excavating for footings and foundations, take care not to disturb bottom of excavation. Excavate by hand to final grade and trim bottoms to required lines and grades to leave solid base to receive the structure.
 - c. If a structure is to be constructed within the embankment, the fill shall first be brought to a minimum of 3 feet above the base of the footing. A suitable excavation shall then be made as though the fill were undisturbed earth.

E. Trench Excavation: Shall consist of removal, hauling and disposal of all material encountered in the excavation to the widths and depths shown on the Drawings to permit proper installation of underground utilities.

1. Excavate trenches to the uniform width shown on the Drawings sufficiently wide to provide sufficient space for installation, backfilling, and compaction. Every effort should be made to keep the sides of the trenches firm and undisturbed until backfilling has been completed and consolidated.
2. Trenches shall be excavated with approximately vertical sides between the elevation of the center of the pipe and an elevation one foot above the top of the pipe.

3. Grade bottoms of trenches as indicated for pipe and bedding to establish the indicated slopes and invert elevations, notching under pipe joints to provide solid bearing for the entire body of the pipe, where applicable.
 4. If pipe is to be laid in embankments or other recently filled material, the material shall first be placed to the top of the fill or to a height of at least two feet above the top of the pipe, whichever is the lesser. Particular care shall be taken to ensure maximum consolidation of material under the pipe location. The pipe trench shall be excavated as though in undisturbed material.
 5. Unless otherwise specifically directed or permitted by the Engineer, begin excavation at the low end of sewer and storm lines and proceed upgrade.
 6. Perform excavation for force mains and water mains in a logical sequence.
 7. The extent of open excavation shall be controlled by prevailing conditions subject to any limits prescribed by the Engineer.
 8. As the excavation progresses, install such shoring and bracing necessary to prevent caving and sliding and to meet the requirements of the state and OSHA safety standards, as outlined in the appropriate section of this Specification.
- F. Protection of Persons, Property and Utilities:
1. Barricade open excavations occurring as part of this work and post with warning lights in compliance with local and State regulations.
 2. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout and other hazards created by earthwork operations. Exercise extreme caution and utilize sheeting, bracing, and whatever other precautionary measures that may be required.
 3. Rules and regulations governing the respective utilities shall be observed in execution of all work. Active utilities and structures shall be adequately protected from damage, and removed or relocated only as indicated or specified. Inactive and abandoned utilities encountered in excavation and grading operations shall be removed, plugged or capped only with written authorization of the utility owner. Report in writing to the Engineer, the locations of such abandoned utilities. Extreme care shall be taken when performing work in the vicinity of existing utility lines, utilizing hand excavation in such areas, as far as practicable.
 4. Repair, or have repaired, all damage to existing utilities, structures, lawns, other public and private property which results from construction operations, at no additional expense to the Owner, to the complete satisfaction of the Engineer, the utility, the property owner, and the Owner.
- G. Stability of Excavations:
1. Slope sides of excavations to comply with all codes and ordinances having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated.
 2. Maintain sides and slopes of excavations in a safe condition until completion of backfilling.
- H. Shoring and Bracing:
1. Provide materials for shoring and bracing, such as sheet piling, uprights, stringers and cross-braces, in good serviceable condition.

2. Provide trench shoring and bracing to comply with local codes and authorities having jurisdiction. Refer to Specification Section 02156.
 3. Maintain shoring and bracing in excavations regardless of time period excavations will be open. Install shoring and bracing as excavation progresses.
- I. Material Storage:
1. Stockpile excavated materials which are satisfactory for use on the work until required for backfill or fill. Place, grade and shape stockpiles for proper drainage and protect with temporary seeding or other acceptable methods to control erosion.
 2. Locate and retain soil materials away from edge of excavations.
 3. Dispose of excess soil material and waste materials as herein specified.
- J. Dewatering:
1. To ensure proper conditions at all times during construction, the Contractor shall provide and maintain ample means and devices (including spare units kept ready for immediate use in case of breakdowns) with which to intercept and/or remove promptly and dispose properly of all water entering trenches and other excavations (including surface and subsurface waters).
 2. Excavations shall be kept dry until the structures, pipes, and appurtenances to be built therein have been completed to such extent that they will not be floated or otherwise damaged. Refer to Specification Section 02401.
- K. Cold Weather Protection:
1. Protect excavation bottoms against freezing when atmospheric temperature is less than 35°F.
 2. No frozen material shall be used as backfill or fill and no backfill shall be placed on frozen material.
- L. Separation of Surface Material:
1. The Contractor shall remove only as much of any existing pavement as is necessary for the prosecution of the work.
 2. Prior to excavation, existing pavement shall be cut where in the opinion of the Engineer it is necessary to prevent damage to the remaining road surface.
 3. Where pavement is removed in large pieces, it shall be disposed of before proceeding with the excavation.
 4. From areas within which excavations are to be made, loam and topsoil shall be carefully removed and separately stored to be used again as directed; or, if the Contractor prefers not to separate surface materials, he shall furnish, as directed, loam and topsoil at least equal in quantity and quality to that excavated.
- M. Dust Control:
1. During the progress of the work, the Contractor shall conduct his operations and maintain the area of his activities, including sweeping and sprinkling of streets as necessary, so as to minimize the creation and dispersion of dust. Refer to Specification Section 01562.
 2. If the Engineer decides that it is necessary to use calcium chloride for more effective dust control, the contractor shall furnish and spread the material, as directed.

3.3 BACKFILL AND FILL

A. General:

1. Backfilling shall consist of replacing material removed to permit installation of structures or utilities, as indicated in the Contract Documents.
2. Filling shall consist of placing material in areas to bring them up to grades indicated on the Drawings.
3. The Contractor shall provide and place all necessary backfill and fill material, in layers to the required grade elevations.
4. Backfill excavations as promptly as work permits, but not until completion of the following:
 - a. Acceptance by Engineer of construction below finish grade including, where applicable, dampproofing, waterproofing, and perimeter insulation.
 - b. Inspection, approval, and recording locations of underground utilities.
 - c. Removal of concrete formwork.
 - d. Removal of shoring and bracing, and backfilling of voids with satisfactory materials. Temporary sheet piling driven below bottom of structures shall be removed in manner to prevent settlement of the structure or utilities, or cut off and left in place if required.
 - e. Removal of trash and debris.
 - f. Permanent or temporary horizontal bracing is in place on horizontally supported walls.
 - g. Density testing having results meeting requirements specified herein.
5. In general, and unless otherwise indicated, material used for backfill of trenches and excavations around structures shall be suitable excavated material which was removed in the course of making the construction excavation. Unless otherwise specified or allowed by the Engineer the backfill and fill shall be placed in layers not to exceed 8 inches in thickness.
6. All fill and backfill under structures and pavement, and adjacent to structures, shall be compacted crushed stone or select fill as specified or as indicated on the Drawings. The fill and backfill materials shall be placed in layers not exceeding 8 inches in thickness.
7. All structures (including manholes) shall be placed on a 6-inch mat of screened stone unless otherwise indicated.
8. Suitable excavated material shall meet the following requirements:
 - a. Free from large clods, silt lumps or balls of clay.
 - b. Free from stones and rock fragments with larger than 12 inch max. dimension.
 - c. Free from organics, peat, etc.
 - d. Free from frozen material.
9. If sufficient suitable excavated material is not available from the excavations, and where indicated on the Drawings, the backfill material shall be select fill or common borrow, unless otherwise indicated, as required and as directed by the Engineer.
10. Do not backfill with, or on, frozen materials.
11. Remove, or otherwise treat as necessary, previously placed material that has frozen prior to placing backfill.

12. Do not mechanically or hand compact material that is, in the opinion of the Engineer, too wet.
 13. Do not continue backfilling until the previously placed and new materials have dried sufficiently to permit proper compaction.
 14. The nature of the backfill materials will govern the methods best suited for their placement and compaction. Compaction methods and required percent compaction is covered in Compaction section.
 15. Before compaction, moisten or aerate each layer as necessary to provide a water content necessary to meet the required percentage of maximum dry density for each area classification specified.
 16. Do not allow large masses of backfill material to be dropped into the excavation in such a manner that may damage pipes and structures.
 17. Place material in a manner that will prevent stones and lumps from becoming nested.
 18. Completely fill all voids between stones with fine material.
 19. Do not place backfill on or against new concrete until it has attained sufficient strength to support loads without distortion, cracking, and other damage.
 20. Deposit backfill and fill material evenly on all sides of structures to avoid unequal soil pressures.
 21. Keep stones or rock fragments with a dimension greater than two inches at least one foot away from the pipe or structure during backfilling.
 22. Leave sheeting in place when damage is likely to result from its withdrawal.
 23. Completely fill voids left by the removal of sheeting with screened stone which is compacted thoroughly.
- B. Pipe Bedding, Initial Backfill and Trench Backfill:
1. Place bedding and backfill in layers of uniform thickness specified herein, and as shown on the Drawings.
 2. Thoroughly compact each layer by means of a suitable vibrator or mechanical tamper.
 3. Install pipe bedding and initial backfill in layers of uniform thickness not greater than eight (8) inches.
 4. Deposit the remainder of the backfill in uniform layers not greater than eight inches.
 5. Provide underground utility marking tape for new utility trenches as shown on the Drawings. Refer to Section 02650 – Buried Utility Markings.
 6. Where soft silt and clay soils are encountered the trench shall be excavated six inches below the normal bedding and backfilled with 6-inches of compacted sand.
 7. Backfill trenches with concrete where trench excavations pass within 18 inches of column or wall footings and which are carried below the bottom of such footings, or which pass under wall footings. Place concrete to the level of the bottom of adjacent footings.
 8. The following schedule lists the bedding materials for various types of pipe. Refer to the pipe trench detail for dimensional requirements.

BEDDING REQUIREMENTS

DI or Concrete Pipe	screened stone or select fill.
PVC or PE Pipe	screened stone.

9. The following schedule lists the initial backfill requirements for various types of pipes. Refer to the pipe trench detail for dimensional requirements.

INITIAL BACKFILL REQUIREMENTS

DI or Concrete, Pipe	Screened stone or select fill
PVC or PE Pipe	Screened stone

10. Special bedding and backfill requirements shown on the Drawings supersede requirements of this section.
11. Where pipes or structures pass through or under the impervious core of the lagoon embankments, bedding and backfill material shall consist of the impervious embankment material. Extra care should be given to properly and thoroughly compact the bedding material around the pipe.
- C. Improper Backfill:
1. When excavation and trenches have been improperly backfilled, and when settlement occurs, reopen the excavation to the depth required, as directed by the Engineer.
 2. Refill and compact the excavation or trench with suitable material and restore the surface to the required grade and condition.
 3. Excavation, backfilling, and compacting work performed to correct improper backfilling shall be performed at no additional cost to the Owner.
- D. Ground Surface Preparation:
1. Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow, strip, scarify or break-up sloped surface steeper than 1 vertical to 4 horizontal.
 2. When existing ground surface has a density less than that specified under "compaction" for the particular area classification, break up the ground surface, pulverize, moisture-condition to the optimum moisture content, and compact to required depth and percentage of maximum density.

3.4 COMPACTION

- A. General:
1. Control soil compaction during construction to provide not less than the minimum percentage of density specified for each area classification.
- B. Percentage of Maximum Density Requirements:
1. Compact soil to not less than the following percentages of maximum dry density determined in accordance with ASTM D1557 as indicated.

- a. Structures: Compact each layer of backfill or fill material below or adjacent to structures to at least 95% of maximum dry density (ASTM D1557).
 - b. Off Traveled Way Areas: Compact each layer of backfill or fill material to at least 90% of maximum dry density (ASTM D1557).
 - c. Walkways: Compact each layer of backfill or fill material to at least 93% of maximum dry density (ASTM D1557).
 - d. Roadways, Drives and Paved Areas: Compact each layer of fill, subbase material, and base material to at least 95% of maximum dry density (ASTM D1557).
 - e. Pipes: Compact bedding material and each layer of backfill to at least 90% maximum dry density (ASTM D1557). Where backfilling with excavated material, compact to native field density.
 - f. Embankments: Compact each layer of embankment material to at least 95% of maximum dry density (ASTM D1557).
- C. Moisture Control:
1. Where subgrade or a layer of soil material must be moisture conditioned before compaction, uniformly apply water to surface of subgrade, or layer of soil material, in quantities controlled to prevent free water appearing on surface during or subsequent to compaction operations.
 2. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density.
 3. Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing or pulverizing until moisture content is reduced to a satisfactory level.
- D. Embankment Compaction:
1. After each embankment layer has been spread to the required maximum 8-inch thickness and its moisture content has been adjusted as necessary, it shall be rolled with a sufficient number of passes to obtain the required compaction. One pass is defined as the required number of successive trips which by means of sufficient overlap will ensure complete coverage and uniform compaction of an entire lift. Additional passes shall not be made until the previous pass has been completed.
 2. When any section of an embankment sinks or weaves excessively under the roller or under hauling units and other equipment, it will be evident that the required degree of compaction is not being obtained and that a reduction in the moisture content is required. If at any place or time such sinking and weaving produces surface cracks which, in the judgment of the Engineer are of such character, amount, or extent to indicate an unfavorable condition, he will recommend operations on that part of the embankment to be suspended until such time as it shall have become sufficiently stabilized. The ideal condition of the embankment is that attained when the entire embankment below the surface being rolled is so firm and hard as to show only the slightest weaving and deflection as the roller passes.

3. If the moisture content is insufficient to obtain the required compaction, the rolling shall not proceed except with the written approval of the Engineer, and in that event, additional rolling shall be done to obtain the required compaction. If the moisture content is greater than the limit specified, the material of such water content may be removed and stockpiled for later use or the rolling shall be delayed until such time as the material has dried sufficiently so that the moisture content is within the specified limits. No adjustment in price will be made on account of any operation of the Contractor in removing and stockpiling, or in drying the materials or on account of delays occasioned thereby.
 4. If because of insufficient overlap, too much or too little water, or other cause attributable to defective work, the compaction obtained over any area is less than that required, the condition shall be remedied, and if additional rollings are ordered, they will be done at no cost to the Owner. If the material itself is unsatisfactory or if additional rolling or other means fails to produce satisfactory results, the area in question shall be removed down to material of satisfactory density and the removal, replacement, and re-rolling shall be done by the Contractor, without additional compensation.
 5. Material compaction by hand--operated equipment or power-driven tampers shall be spread in layers not more than 6 inches thick. The degree of compaction obtained by these tamping operations shall be equal in every respect to that secured by the rolling operation.
- E. Compaction Methods: The Contractor may select any method of compaction that is suitable to compact the material to the required density.
1. General: Whatever method of compacting backfill is used, care shall be taken that stones and lumps shall not become nested and that all voids between stones shall be completely filled with fine material. All voids left by the removal of sheeting shall be completely backfilled with suitable materials and thoroughly compacted.
 2. Tamping or Rolling: If the material is to be compacted by tamping or rolling, the material shall be deposited and spread in uniform, parallel layers not exceeding the uncompacted thicknesses specified. Before the next layer is placed, each layer shall be tamped as required so as to obtain a thoroughly compacted mass. Care shall be taken that the material close to the excavation side slopes, as well as in all other portions of the fill area, is thoroughly compacted. When the excavation width and the depth to which backfill has been placed are sufficient to make it feasible, and it can be done effectively and without damage to the pipe or structure, backfill may, on approval, be compacted by the use of suitable rollers, tractors, or similar powered equipment instead of by tamping. For compaction by tamping or rolling, the rate at which backfilling material is deposited shall not exceed that permitted by the facilities for its spreading, leveling, and compacting as furnished by the Contractor.
- F. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, re-shape, and compact to required density prior to further construction.

3.5 GRADING:

- A. General:
 - 1. Grading shall consist of that work necessary to bring all areas to the final grades.
 - 2. Uniformly grade areas within limits of work requiring grading, including adjacent transition areas.
 - 3. Smooth finished surface within specified tolerances, compact with uniform levels or slopes between points where elevations are shown, or between such points and existing grades.
- B. Grading Outside Building Lines:
 - 1. Grade areas adjacent to building to drain away from structures and to prevent ponding.
 - 2. Grade surfaces to be free from irregular surface changes, and as follows:
 - a. Lawn or Unpaved Areas: Finish grade areas to receive topsoil to within not more than 1" above or below the required subgrade elevations.
 - b. Walks: Shape surface of areas under walks to line, grade and cross-section, with finish surface not more than 1/2" above or below the required subgrade elevation.
 - c. Pavements: Shape surface of areas under pavement to line, grade and cross-section, with finish surface not more than 3/8" above or below the required subgrade elevation.
- C. Compaction:
 - 1. After grading, compact subgrade surfaces to the depth and percentage of maximum density for each area classification.
- D. Protection of Graded Areas:
 - 1. Protect newly graded areas from traffic and erosion. Keep free of trash and debris.
 - 2. Repair and re-establish grades in settled, eroded, and rutted areas to specified tolerances.

3.6 BASE COURSE AND LEVELING COURSE

- A. General:
 - 1. Base course consists of placing the specified materials in layers to support a leveling course or paved surface, as indicated in the Drawings.
- B. Grade Control:
 - 1. During construction, maintain lines and grades including crown and cross-slope of base course and leveling course.
- C. Placing:
 - 1. Place base course on prepared subbase conforming to indicated cross-section and thickness. Maintain optimum moisture content for compacting base materials.
 - 2. Place leveling course on prepared base course, conforming to indicated cross-section and thickness. Maintain optimum moisture content for compaction.
- D. Shaping and Compacting:
 - 1. All layers of aggregate base course and leveling course shall be compacted to the required density immediately after placing. As soon as the compaction of any layer has been completed, the next layer shall be placed.

2. The Contractor shall bear full responsibility for and make all necessary repairs to the base leveling courses and the subgrade until the full depth of the base leveling courses is placed and compacted. Repairs shall be made at no additional cost to the Owner.
3. If the top of any layer of the aggregate base or leveling course becomes contaminated by degradation of the aggregate or addition of foreign materials, the contaminated material shall be removed and replaced with the specified material at the Contractor's expense.

END OF SECTION

SECTION 02260FILTER FABRICPART 1 - GENERAL1.1 DESCRIPTION

A. Work Included:

1. Furnish all materials and install filter fabric of the types, dimensions and in the location(s) shown on the Drawings and specified herein.

B. Related Work Specified Elsewhere:

1. Temporary Erosion Control, Riprap and Stone Ditch Protection, and Gabions and Revet Mattresses are specified in the appropriate sections of this Division.

1.2 QUALITY ASSURANCE

- A. A competent laboratory must be maintained by the manufacturer of the fabric at the point of manufacture to ensure quality control.
- B. During all periods of shipment and storage, the fabric shall be wrapped in a heavy duty protective covering to protect the fabric from direct sunlight, ultraviolet rays, temperatures greater than 140oF, mud, dirt, dust and debris.

1.3 SUBMITTALS

- A. Manufacturer shall furnish certified test reports with each shipment of material attesting that the fabric meets the requirements of this Specification

PART 2 - PRODUCTS2.1 MATERIALS

- A. Filter fabric for use in stabilization, drainage, underdrains, landscaping and beneath structures shall be formed in widths of not less than six (6) feet and shall meet the requirements of Table 1. Both woven and non-woven geotextiles are acceptable; however no "slit-tape" woven fabrics will be permitted for drainage, underdrain, and erosion control applications.

TABLE 1

<u>Geotextile Mechanical Property</u>	<u>Test Method</u>	<u>Minimum Permissible Value</u>
Grab Tensile Strength	ASTM D4632	120 pounds
Grab Elongation	ASTM D4632	50 percent
CBR Puncture Strength	ASTM D6241	310 pounds
Trapezoid Tear Strength	ASTM D4533	50 pounds
Water Flow Rate	ASTM D4491	120 gal/min/sf
Equivalent Opening Size (EOS)	ASTM D4751	U.S. Std. Sieve #80
Coefficient of Permeability	ASTM D4491	0.2 cm/sec

The geotextile shall have property values expressed in "typical" values that meet or exceed the values stated above as determined by the most recent test methods specified above.

- B. Filter fabric for use in reinforcement shall meet the requirements of Table 2. Woven and non-woven geotextiles are acceptable.

TABLE 2

<u>Geotextile Mechanical Property</u>	<u>Test Method</u>	<u>Minimum Permissible Value</u>
Wide Width Tensile Strength	ASTM 4595	195 pounds
Grab Tensile Strength	ASTM 4632	195 pounds
Grab Elongation	ASTM D4632	20 percent
CBR Puncture Strength	ASTM D6241	700 pounds
Trapezoid Tear Strength	ASTM D4533	85 pounds
Equivalent Opening Size (EOS)	ASTM D4751	U.S. Std. Sieve number(s) between #20 and #100

The geotextile shall meet or exceed the "typical" values stated above as determined by the most recent test methods specified above.

- C. Filter Fabric for use under riprap shall meet the requirements as specified in Section 02271 - Riprap and Stone Ditch Protection.
D. For Silt Fence, refer to Section 02270 - Temporary Erosion Control Execution

PART 3 - EXECUTION

- 3.1 Install filter fabric as shown on the drawings or as directed in appropriate specifications in this division or in accordance with manufacturer's instructions or as directed by the engineer.

END OF SECTION

SECTION 02270TEMPORARY EROSION CONTROLPART 1 - GENERAL1.1 DESCRIPTION

A. Work Included:

1. The work under this section shall include provision of all labor, equipment, materials, and maintenance of temporary erosion control devices, as specified herein, as shown on the Drawings and as directed by the Engineer.
2. Erosion control measures shall be provided as necessary to correct conditions that develop prior to the completion of permanent erosion control devices, or as required to control erosion that occurs during normal construction operations.
3. Construction operations shall comply with all federal, state, and local regulations pertaining to erosion control.
 - a. The Contractor is responsible for submitting an Erosion Prevention and Sediment Control (EPSC) Permit and implementing the practices laid out therein to minimize discharge of sediment from the site.
 - i. City permitting is now digital and can be found at <https://burlingtonvt.viewpointcloud.com/>. The direct link to the EPSC permit is provided below.
 - (1) <https://burlingtonvt.viewpointcloud.com/categories/1091/rec-ord-types/6485>
4. After awarding of or after being awarded the Contract, prior to commencement of construction activities, the Contractor will meet with the Engineer to discuss erosion control requirements and develop a mutual understanding relative to details of erosion control.

B. Related Work Specified Elsewhere:

1. Site work is specified in appropriate sections of this Division.

C. Design Criteria:

1. Conduct all construction in a manner and sequence that causes the least practical disturbance of the physical environment.
2. Stabilize disturbed earth surfaces in the shortest time and employ such temporary erosion control devices, as may be necessary, until such time as adequate soil stabilization has been achieved.

1.2 SUBMITTALS

- A. The Contractor shall furnish the Engineer, in writing, his work plan giving proposed locations for storage of topsoil and excavated material, before beginning construction. A schedule of work shall accompany the work plan. Acceptance of this plan will not relieve the Contractor of his responsibility for completion of the work as specified.
- B. The Contractor shall provide proof of approved Erosion Prevention and Sediment Control (EPSC) Permit prior to ground disturbing activity.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Baled Hay:
 - 1. At least 14" by 18" by 30" securely tied to form a firm bale, staked as necessary to hold the bale in place.
- B. Sandbags:
 - 1. Heavy cloth bags of approximately one cubic foot capacity filled with sand or gravel.
- C. Mulches:
 - 1. Loose hay, straw, peat moss, wood chips, bark mulch, crushed stone, wood excelsior, or wood fiber cellulose.
 - 2. Type and use shall be as specified by the "Vermont Standards and Specifications for Erosion Prevention & Sediment Control", latest addition, prepared by the Vermont Department of Environmental Conservation, herein after referred to as the BMP.
- D. Mats and Nettings:
 - 1. Twisted Craft paper, yarn, jute, excelsior wood fiber mats, glass fiber and plastic film.
 - 2. Type and use shall be as specified in the BMP.
- E. Permanent Seed:
 - 1. Conservation mix appropriate to the predominant soil conditions as specified in the BMP and subject to approval by the Engineer.
- F. Temporary Seeding:
 - 1. Use species appropriate for soil conditions and season as specified in the BMP and subject to approval by the Engineer.
- G. Water:
 - 1. The Contractor shall provide water and equipment to control dust, as directed by the Engineer.
- H. Silt Fence:
 - 1. Silt Fence shall be one of the commercially available brands, meeting the following requirements:

<u>Geotextile Mechanical Property</u>	<u>Test Method</u>	<u>Minimum Permissible Value</u>
Grab Tensile Strength (both directions)	ASTM D-4632	124 pounds
Puncture Strength	ASTM D-4833	60 pounds
Apparent Opening Size	ASTM D-4751	#30
Flow Rate	ASTM D-4491	8 gal/min/ft ²

2.2 CONSTRUCTION REQUIREMENTS

All temporary erosion control shall be installed in accordance with the Vermont Standards and Specification for Erosion Prevention and Sediment Control. The Erosion Prevention and Sediment Control Plan must be approved by the City of Burlington prior to construction.

- A. Temporary Erosion Checks:
 - 1. Temporary erosion checks shall be constructed in ditches and other locations as necessary.
 - 2. Baled hay, sandbags or siltation fence may be used in an arrangement to fit local conditions.
- B. Temporary Berms:
 - 1. Temporary barriers shall be constructed along the toe of embankments when necessary to prevent erosion and sedimentation.
- C. Temporary Seeding:
 - 1. Areas to remain exposed for a time exceeding 3 weeks shall receive temporary seeding as indicated below:

<u>Season</u>	<u>Seed</u>	<u>Rate</u>
Spring, Summer, or Early Fall (4/1 - 7/1 or 8/15-9/15)	Annual Rye Grass	40 lbs./acre
Winter (11/1 - 4/1)	Mulch w/Dormant Seed	80 lbs./acre*
Late Fall or Early Winter (9/15 - 11/1)	Winter Ryegrass	120 lbs./acre

* seed rate only

- D. Silt Fence shall be supported by posts and installed per the manufacturer's recommendations.
- E. Mulch All Areas Receiving Seeding:
 - 1. Use either wood cellulose fiber mulch (750 lbs./acre); or straw mulch with chemical tack (as per manufacturer's specifications). Wetting for small areas may be permitted. Biodegradable netting is recommended in areas to be exposed to drainage flow.
- F. Erosion control matting for slopes and ditches shall be anchored with pegs and/or staples per manufacturer's recommendations. Contractor shall provide matting along the flowline of all ditches and swales having a longitudinal slope in excess of 0.01 ft/ft, and on all slopes in excess of 3(H) to 1(V).

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Temporary Erosion Checks:

1. Temporary erosion checks shall be constructed in ditches and at other locations designated by the Engineer. The Engineer may modify the Contractor's arrangement of silt fences, bales, and bags to fit local conditions.
 2. Baled hay, silt fences, or sandbags, or some combination, may be used in other areas, as necessary, to inhibit soil erosion.
 3. Siltation fence shall be located and installed as shown on plans or as required to comply with all Federal, State and Local Regulations.
 4. Sedimentation ponds shall be sited and constructed to the grades and dimensions as shown on the Drawings and will include drainage pipe and an emergency spillway.
- B. Erosion control matting for slopes and ditches shall be installed where indicated on the Drawings and as required to stabilize the soil until permanent vegetative stabilization is established.
- C. Maintenance:
1. Erosion control features shall be installed prior to excavation wherever appropriate. Temporary erosion control features shall remain in place and shall be maintained until a satisfactory growth of grass is established. The Contractor shall be responsible for maintaining erosion control features throughout the life of the construction contract. Maintenance will include periodic inspections by the Owner or Engineer for effectiveness of location, installation and condition with corrective action taken by the Contractor, as appropriate.
- D. Removing and Disposing of Materials:
1. When no longer needed, material and devices for temporary erosion control shall be removed and disposed of upon approval by Engineer.
 2. When removed, such devices may be reused in other locations, provided they are in good condition and suitable to perform the erosion control for which they are intended.
 3. When dispersed over adjacent areas, the material shall be scattered to the extent that it causes no unsightly conditions nor creates future maintenance problems.
 4. Sedimentation basins, if no longer required, will be filled in, the pipe removed, the surface loamed and grass cover shall be established.

END OF SECTION

SECTION 02271RIPRAP AND STONE DITCH PROTECTIONPART 1 - GENERAL1.1 DESCRIPTION

- A. This work consists of furnishing all plant, labor, equipment, and materials and performing all work necessary to place a protective covering of erosion-resistant material on the slopes of embankments, spillways, streambanks, slopes of channels, or as directed by the Engineer. The work shall be done in accordance with these Specifications and in conformity with the lines and grades shown on the Drawings or established by the Engineer.
- B. Types of riprap included in this specification:
 - 1. Riprap - Riprap consists of stone dumped in place on a prepared slope of either a filter blanket or a filter fabric backing to form a well-graded mass with a minimum of voids.
 - 2. Filter Blanket - A filter blanket consists of one or more layers of graded material placed on the bank before placing the riprap in order to prevent the bank material from passing through the riprap protection. The thickness and gradation of filter blanket will be shown on the plans.
 - 3. Filter Fabric Backing - A filter fabric backing consists of a filter fabric overlain by a layer of coarse aggregate placed on the bank before placing the riprap to prevent the bank material from passing through the riprap protection. Filter fabric backing shall be used in lieu of a filter blanket where specifically called for on the plans or where approved by the Engineer

1.2 SUBMITTALS

- A. Submittals shall be in accordance with 01340 – Submittals, and the General Conditions of the Construction Contract.
- B. Submit test results (including gradation analysis) and source location for all riprap material to be used at least 10 working days prior to its use on the site. Contractor shall identify and provide access to borrow sites.

PART 2 - PRODUCTS2.1 MATERIALS

- A. Definition of the materials:
 - 1. Riprap:
 - a. Stone used for riprap shall be hard, durable, angular in shape; resistant to weathering and to water action; free from overburden, spoil, shale and organic material; and shall meet the gradation requirements for the class specified. Neither breadth nor thickness of a single stone should be less than one-third its length. Rounded stone or boulders shall not be accepted without written permission of the Engineer. Broken concrete may be substituted for stone with written authorization of the Engineer. Shale and stone with shale seams are not acceptable. The minimum weight of the

- stone shall be 155 pounds per cubic foot as computed by multiplying the specific gravity (bulksaturated-surface-dry basis, AASHTO Test T 85) times 62.3 pounds per cubic foot.
- b. Each load of riprap shall be reasonably well graded from the smallest to the maximum size specified. Stones smaller than the specified 10 percent size and spalls shall not be permitted in an amount exceeding 10 percent by weight of each load.
2. Filter Blanket - The filter blanket shall consist of one or more layers of screened gravel of the thickness as shown on the plans. The gradation of materials in the filter blanket shall be as shown on the Drawings. All material comprising the filter blanket shall be composed of tough, durable particles, reasonably free from thin, flat and elongated pieces, and shall contain no organic matter nor soft, friable particles in quantities in excess of those approved by the Engineer.
3. Filter Fabric Backing:
- a. Coarse Aggregate:
 - i. The coarse aggregate shall be composed of tough, durable particles, reasonably free from thin, flat, and elongated pieces, and shall contain no organic matter nor soft, friable particles in quantities in excess of those approved by the Engineer.
 - b. Filter Fabric:
 - i. The filter fabric shall be formed in widths of not less than six (6) feet.
 - ii. A competent laboratory must be maintained by the producer of the fabric at the point of manufacture to ensure quality control. During all periods of shipment and storage, the fabric shall be maintained, wrapped in a heavy duty protective covering to protect the fabric from direct sunlight, ultraviolet rays, temperatures greater than 140°F, mud, dirt, dust and debris.
 - iii. The vendor shall furnish certified test reports with each shipment of material attesting that the fabric meets the requirements of this Specification.

TABLE 1
REQUIREMENTS FOR FILTER FABRIC

<u>Test</u>	<u>Method</u>	<u>Requirements</u>
Breaking Load & Elongation	ASTM D5034, D5035, Grab Test Method, constant rate of travel 12" per minute.	Tensile Strength: 200 lbs any direction.
Weight Change in Water	CRD-C 575 or 6631 in Fed. Std.	Less than 1%
Bursting Strength	ASTM D751, using Diaphragm Bursting Tester	400 lbs. per square inch
Puncture Strength	ASTM D751, modified	120 lbs.
Seam Breaking Strength	ASTM D 1683, 1" square jaws, constant rate of traverse 12" per min.	180 lbs.
Abrasion Resistance Strength:*	ASTM D1175, modified	Tensile 55 lbs.
Percent of Open Area		Not less than 5%
Equivalent Opening Size		U.S. Standard Sieve No. 70
Permeability		0.02 to 0.3 cm/sec.
Specific Gravity Weight		0.95 Approximately .05 lb/sq/ft.
Seam sewn with polypropylene thread at point of manufacture		
Packaged in burlap		

* Tensile strength determined by Breaking Load & Elongation by the method stated in the first listing of Table 1.

B. Gradation of Coarse Aggregate for Filter Fabric Backing:

<u>Sieve Size</u>	<u>% Passing By Weight</u>
2-1/2"	100
2"	85 - 100
1"	35 - 70
1/2"	10 - 30
No. 4	0 - 5

C. Gradation of Riprap Stone:

Rip Rap will conform to the following FHWA standards for sizes and particle weights.

Nominal Riprap Class by Median Particle Diameter		d ₁₅		d ₅₀		d ₈₅		d ₁₀₀
CLASS	SIZE	MIN	MAX	MIN	MAX	MIN	MAX	MAX
I	6 in	3.7	5.2	5.7	6.9	7.8	9.2	12.0
II	6 in	5.5	7.8	8.5	10.5	11.5	14.0	18.0
III	12 in	7.3	10.5	11.5	14.0	15.5	18.5	24.0
IV	15 in	9.2	13.0	14.5	17.5	19.5	23.0	30.0
V	18 in	11.0	15.5	17.0	20.5	23.5	27.5	36.0
VI	21 in	13.0	18.5	20.0	24.0	27.5	32.5	42.0
VII	24 in	14.5	21.0	23.0	27.5	31.0	37.0	48.0
VIII	30 in	18.5	26.0	28.5	34.5	39.0	46.0	60.0
IX	36 in	22.0	31.5	34.0	41.5	47.0	55.5	72.0
X	42 in	25.5	36.5	40.0	48.5	54.5	64.5	84.0

Note: Particle size d corresponds to the intermediate ("B") axis of the particle.

Nominal Riprap Class by Median Particle Weight		W ₁₅		W ₅₀		W ₈₅		W ₁₀₀
CLASS	WEIGHT	MIN	MAX	MIN	MAX	MIN	MAX	MAX
I	20 lb	4	12	15	27	39	64	140
II	60 lb	13	39	51	90	130	220	470
III	150 lb	32	93	120	210	310	510	1100
IV	300 lb	62	180	240	420	600	1000	2200
V	1/4 ton	110	310	410	720	1050	1750	3800
VI	3/8 ton	170	500	650	1150	1650	2800	6000
VII	1/2 ton	260	740	950	1700	2500	4100	9000
VIII	1 ton	500	1450	1900	3300	4800	8000	17600
IX	2 ton	860	2500	3300	5800	8300	13900	30400
X	3 ton	1350	4000	5200	9200	13200	22000	48200

Note: Weight limits for each class are estimated from particle size by: $W = 0.85(yd^3)$ where d

corresponds to the intermediate ("B") axis of the particle, and particle specific gravity is taken as 2.65.

PART 3 - EXECUTION

3.1 CONSTRUCTION DETAILS

- A. Slopes to be protected by riprap shall be free of brush, trees, stumps, and other objectionable material and be dressed to a smooth surface. All soft or spongy material shall be removed to the depth shown on the Drawings or as directed by the Engineer and replaced with approved material. Filled areas will be compacted thoroughly. A toe trench as shown on the Drawings shall be dug and maintained until the riprap is placed.
 1. Riprap
 - a. Stone for riprap shall be placed on the prepared slope or area in a manner which will produce a reasonably well- graded mass of stone with the minimum practicable percentage of voids. The entire mass of stone shall be placed in conformance with the lines, grades, and thicknesses shown on the Drawings. Riprap shall be placed to its full course thickness in one operation and in such a manner as to avoid displacing the underlying material. Placing of riprap in layers, or by dumping into chutes, or by similar methods likely to cause segregation will not be permitted.
 - b. The larger stones shall be well distributed and the entire mass of stone shall conform to the gradation specified on the Drawings. All material going into riprap protection shall be so placed and distributed so that there will be no large accumulations of either the larger or smaller sizes of stone.
 - c. It is the intent of these Specifications to produce a compact riprap protection in which all sizes of material are placed in their proper proportions. Hand placing or rearranging of individual stones by mechanical equipment may be required to the extent necessary to secure the results specified.
 - d. Unless otherwise authorized by the Engineer, the riprap protection shall be placed in conjunction with the construction of the embankment with only sufficient lag in construction of the riprap protection as may be necessary to allow for proper construction of the portion of the embankment protected and to prevent mixture of embankment and riprap. The riprap protection shall be maintained until accepted, and any material displaced by any cause shall be replaced.
 - e. Riprap stone shall not be dropped from a height greater than one foot onto the filter blanket.
 2. Filter Blanket:
 - a. A filter blanket shall be placed on the prepared slope or area to the full specified thickness using methods which will not cause segregation of particle sizes within the bedding. The surface of the finished layer should be reasonably even and free from mounds or windrows.
 3. Filter Fabric Backing:

- a. A filter fabric shall be placed in the manner and at the locations shown in the Drawings or as directed by the Engineer. At the time of installation, fabric shall be rejected if it has defects, rips, holes, flaws, deterioration or damage incurred during manufacture, transportation or storage. The fabric shall be placed with the long dimension parallel to the centerline of the channel or shoreline unless otherwise directed by the Engineer, and shall be laid smooth and free of tension, stress, folds, wrinkles, or creases. The strips shall be placed to provide a minimum width of 36 inches of overlap for each joint. Overlap joints and seams shall be measured as a single layer of cloth. Securing pins with washers shall be inserted through both strips of overlapped cloth at not greater than the following intervals along a line through the midpoint of the overlap.

<u>Pin Spacing</u>	<u>Slope</u>
2 feet	Steeper than 3:1
3 feet	3:1 to 4:1
5 feet	Flatter than 4:1

The fabric shall be turned down and buried two (2) feet at all exterior limits.

- b. Additional pins regardless of location shall be installed as necessary to prevent any slippage of the filter fabric. The fabric shall be placed so that the upstream strip of fabric will overlap the downstream strip. Should the Engineer direct that the fabric be placed with the long dimension perpendicular to the centerline of the channel or shoreline, the lower strip of fabric shall overlap the next higher strip. Each securing pin shall be pushed through the fabric until the washer bears against the fabric and secures it firmly to the foundation. The fabric shall be protected at all times during construction from contamination by surface runoff and any fabric so contaminated shall be removed and replaced with uncontaminated fabric. Any damage to the fabric during its installation or during placement of riprap shall be replaced by the Contractor. The work shall be scheduled so that the filter blanket shall be covered with riprap as soon as possible following filter blanket placement. Any damage to the filter material during placement of riprap shall be corrected prior to proceeding with the work.
- c. Securing pins for anchoring filter fabric shall be 3/16 inch steel bars, pointed at one end and fabricated with a head to retain a steel washer having an outside diameter of not less than 1.5 inches. The length of the pin shall not be less than 18 inches.
- d. A layer of coarse aggregate shall be placed on the filter fabric to the full specified thickness using methods which will not cause segregation of particle sizes. The surface of the finished layer shall be reasonably even and free from mounds or windrows.

END OF SECTION

SECTION 02401DEWATERINGPART 1 - GENERAL1.1 DESCRIPTIONA. Work Included:

1. Furnish, operate and maintain, dewatering equipment to lower and control ground water table levels and hydrostatic pressures to permit excavation, backfill, and construction to be performed in the dry; collect and dispose of ground and surface water where necessary to complete the work.

1.2 SUBMITTALS

- A. Provide submittals in accordance with Specification Section 01340. Submit design calculations, description and complete layout drawings of the proposed dewatering system, stamped and sealed by a Professional Engineer registered in the State of Vermont. Such review shall not relieve the Contractor of sole responsibility for the dewatering system as necessary to prevent damage and settlement to adjacent structures, utilities, streets adjacent to excavations and for the safety of persons working within the excavated areas.
- B. Submittal shall include: location, depth and size of wellpoints, headers, sumps, ditches; size and location of discharge lines; capacities of pumps and standby units, and detailed description of dewatering methods to be employed to convey the water from site to adequate disposal.
- C. Submit letter from dewatering system design engineer that the design of the dewatering system has been fully coordinated with the design of the excavation support system.

1.3 DESIGN

- A. Dewatering system shall be designed by a Professional Engineer registered in the State of Vermont who is experienced in the design of Dewatering systems
- B. Dewatering system shall be of sufficient size and capacity necessary to lower and maintain ground water table to an elevation at least one foot below the lowest foundation subgrade or bottom of pipe trench to allow material to be excavated in a dry condition. Materials to be removed shall be sufficiently dry to permit excavation to grades shown and to stabilize excavation slopes where sheeting is not required. Operate dewatering system continuously until backfill work has been completed.
- C. Control of surface and subsurface water is part of dewatering system requirements. Maintain adequate control so that:
 1. The stability of excavated and constructed slopes are not adversely affected by saturated soil, including water entering prepared subbase and subgrades where underlying materials are not free draining or are subject to swelling or freeze-thaw action.
 2. Erosion is controlled.
 3. Flooding of excavations or damage to structures does not occur.

4. Surface water drains away from excavations.
 5. Excavations are protected from becoming wet from surface water, or insure excavations are dry before additional work is undertaken
 6. Prevent loss of fines, seepage, boils, quick conditions or softening of foundation strata.
 7. Maintain stability of sides and bottom of excavation. Construction operations are performed in the dry.
 8. Any existing dewatering wells that can affect dewatering and excavation shall be sealed below the excavation subgrade.
- D. Design shall include an assessment of how the dewatering operations will affect the stability of all adjacent structures.
- E. Contractor is responsible to perform whatever additional geotechnical investigations are needed to design the dewatering system to allow for proper construction of new facilities while protecting adjacent structures from damage due to settlement, and in accordance with this specification.

PART 2 - PRODUCTS

Not Applicable

PART 3 - EXECUTION

3.1 PERFORMANCE

A. General:

1. Prior to any excavation below the ground water table, place system into operation to lower water table as required and operate it continuously 24 hours a day, 7 days a week until utilities and structures have been satisfactorily constructed, which includes the placement of backfill materials and dewatering is no longer required.
2. Keep work areas dewatered until the structures, pipes, and appurtenances to be built there have been completed to such an extent that they will not be damaged by water.
3. Thoroughly brace or otherwise protect against flotation all pipelines and structures which are not stable.
4. Maintain standby backup equipment and power supply throughout the duration of the dewatering operation.
5. Prevent soil particles from entering the discharge points.
6. Ground water level shall be maintained at least one foot below the bottom of the excavation.

B. Disposal of Water:

1. Dispose of water pumped or drained from the construction site in a suitable manner to avoid siltation of adjacent drainage structures and piping, wetlands or water bodies, injury to public health, damage to public and private property, and damage to the work completed or in progress. Refer to Section 02226 for more information on the disposal of water from dewatering.
2. Provide suitable temporary channels for water that may flow along or across the construction site.

3. Provide treatment as necessary to prevent discharge of contaminated ground water caused by Contractor's operations, or any contaminated ground water that may pass through the excavation support system selected by the Contractor.
 4. Contractor must obtain all necessary regulatory approvals for the disposal of dewatering flows. These may include, among others, approval by the USEPA under the National Pollutant Discharge Elimination System (NPDES) program for construction activities.
- C. Damage:
1. Avoid damage to and settlement of adjacent buildings, roads, structures, utilities and other facilities.
 2. Any damage to or settlement of structures resulting from the dewatering operations, or the failure of the Contractor to maintain the work in a suitably dry condition shall be repaired by the Contractor at no additional cost to the Owner.
- D. Temporary Underdrains:
1. When necessary, temporary underdrains may be placed in excavations.
 2. Underdrain pipe shall be perforated corrugated metal, polyethylene or P.V.C. pipe.
 3. Entirely surround the underdrain and fill the space between the underdrain and the pipe or structure with free draining material.
- E. Excavation Sump Pumping:
1. When necessary and where appropriate to the geotechnical conditions encountered, excavations may be over excavated 6 to 12 inches and filled with screened stone to allow sump pumping of groundwater.
 2. The system shall be installed with suitable screens and filters so that pumping of fines does not occur.
- F. Well and Wellpoint System:
1. If necessary, dewater the excavations and trenches with an efficient well or wellpoint system to drain the soil and prevent saturated soil from flowing into the excavated wells and area.
 2. Wellpoint and well system shall be of the type designed for dewatering work and shall be installed with suitable screens and filters so that pumping of fines does not occur.
 3. Pumping units shall be capable of maintaining sufficient suction to handle large volumes of air and water at the same time.
- G. Corrective Action:
1. If dewatering requirements are not satisfied due to inadequacy or failure of the dewatering system (loosening of the foundation strata, or instability of slopes, or damage to foundations or structures), perform work necessary for reinstatement of foundation soil and damaged structure resulting from such inadequacy or failure by Contractor, at no additional cost to Owner.

END OF SECTION

SECTION 02444CHAIN LINK FENCE AND GATESPART 1 - GENERAL1.1 DESCRIPTION

A. Work Included:

1. Furnish all materials and install chain link fence of the types, sizes and in the location(s) shown on the Drawings and specified herein.

B. Related Work Specified Elsewhere:

1. Cast-in-place concrete is specified in Division 3.

1.2 QUALITY ASSURANCE

A. Acceptable Manufacturers:

1. Anchor Fence, Inc.
2. Fences Unlimited, Inc.
3. On Guard Chain Link Fence
4. Master Halco
5. Richard's Fence
6. Or equivalent.

1.3 SUBMITTALS

- A. Submit satisfactory guarantees by the fence manufacturer covering any faults and defects in all parts of the fence arising from defective workmanship or materials for a period of one year from the date of installation.

PART 2 - PRODUCTS2.1 FENCE MATERIALS

A. Posts:

1. All posts: Galvanized steel, 35 percent minimum carbon content, 50,000 pounds per square inch minimum tensile strength.
2. Line Posts: 2-3/8 inch O.D. pipe weighing 3.65 pounds per linear foot or 2 inch x 2-1/4 inch H section weighing 4.10 pounds per linear foot.
3. End, Corner, and Pull Posts: 2-7/8 inch O.D. pipe weighing 5.79 pounds per linear foot.
4. Gate Posts: For single swing gates, or one leaf of double gates:
 - a. Up to 6 feet wide: 2-7/8 inch O.D. pipe weighing 5.79 pounds per linear foot.
 - b. 6 feet to 13 feet wide: 4 inch O.D. pipe weighing 9.11 pounds per linear foot.
5. Post Tops: Tubular post tops designed to prevent moisture from entering posts and to support top rail.

- B. All posts shall be of sufficient length to provide a 36 inch minimum setting in concrete footings, at a depth specified on the plans. Top Rails:

1. 1-5/8 inch O.D. galvanized steel pipe weighing 2.27 pounds per linear foot.
 2. Provided with galvanized, outside sleeve, self-centering 7 inch long couplings approximately every 20 feet.
 3. Top rails shall pass through the post tops and form a continuous brace from end to end of each stretch of fence.
 4. Securely fasten top rails to the terminal and corner posts with heavy galvanized steel brace bands and rail end connections.
- C. Horizontal Braces:
1. Provide horizontal braces (brace rails) at all pull, corner, and terminal posts midway between top rails and ground and extend to the first adjacent line posts.
 2. Securely fasten braces to the line posts by brace ends and brace bands and to pull, corner and terminal posts by rail ends and brace bands.
 3. Braces shall be 1-5/8 inch O.D. galvanized steel pipe weighing 2.27 pounds per linear foot with plain ends.
 4. Brace each corner and pull post on two sides.
 5. Brace each terminal post on one side.
- D. Diagonal Braces:
1. Provide diagonal braces (truss rods) from the brace ends on the line posts back to the bottom of pull, corner or terminal posts and fastened by brace bands.
 2. Diagonal braces shall be 3/8 inch diameter galvanized steel rods.
 3. Diagonal braces shall be provided with heavy galvanized iron turnbuckles to adjust the tension.
- E. Fence Fabric:
1. Wire: 9 gauge, 0.148 inch diameter galvanized steel wire, of medium high carbon quality, minimum tensile strength of 80,000 pounds per square inch, interwoven into 2 inch diamond mesh.
 2. Fabric: 72 inches wide, selvage shall be knuckled at bottom and twisted and barbed at top.
 3. PVC-coated fabric shall meet ASTM F668, Class 2a, 2-inch mesh, 0.120-inch diameter wire. color shall be selected by Owner.
- F. Fabric Connections - Securely fasten fabric to:
1. All terminal posts by 1/4 inch x 1/4 inch galvanized tension bars with 11 gauge galvanized pressed steel bands spaced approximately 14 inches apart.
 2. All line posts with 6 gauge galvanized wire clips spaced approximately 14 inches apart.
 3. All top rails with 9 gauge galvanized tie wires spaced approximately 24 inches apart.
 4. The bottom edge of the fabric shall be fastened to a bottom tension wire with wire ties spaced approximately 24 inches apart.

2.2 GATE MATERIALS

A. Gate Frames:

1. Fabricate from 2 inch O.D. steel pipe weighing 2.72 pounds per linear foot.
2. All welded construction with malleable iron or pressed steel corner fittings. All welds shall be ground smooth to the surface plane of the base metals. Welding shall be performed prior to galvanizing.

3. Frames shall be rigid enough to be free of twist or sag.
4. Gate leaves shall have truss rods or intermediate braces.
- B. Truss Rods:
 1. Install 3/8 inch diameter truss rod on each gate.
- C. Gate Fabric:
 1. Material and Fabrication: Identical to fence fabric.
 2. Installation: Securely fasten to gate with tension bars and hook bolts spaced approximately 15 inches apart.
- D. Hinges:
 1. Hinges shall be structurally capable of supporting the gate leaf and allow the gate to open and close without binding. The hinges shall be so designed to permit the gate to swing a full 180°.
 2. Bottom Hinges: Wraparound adjustable type designed to carry the weight of the gate.
 3. Upper Hinges: Wraparound adjustable type.
- E. Locking Devices:
 1. Positive type latching device with provision for padlocking.
- F. Gate Keeper:
 1. Install on centerline of double gates.
 2. Gate keeper shall be adjusted with gate keeper rod to prevent opening of gate levers when padlocked.
 3. Fabricate from a 1-3/4 inch wide by 1-3/4 inch deep galvanized channelway approximately 7 inches long.
 4. Anchor into a 12 inch by 12 inch by 3 feet deep concrete foundation with a 1-1/2 inch O.D. galvanized steel pipe, 18 inches long, welded to the channelway.
 5. Slope top edges of channelway from center toward each end.
 6. Form concrete foundation to meet tops of channelway sides to prevent its removal.
 7. Obtain approval from the Engineer prior to installation of the gate keeper.
- G. Outer Gate Catches:
 1. Material: Galvanized malleable iron or steel.
 2. Designed to anchor securely into 12 inch diameter by 3 feet deep concrete footing.
 3. Obtain approval from the Engineer prior to installation of outer gate catches.

2.3 WARNING SIGNS

- A. When applicable, provide warning signs.
- B. The number of signs, the location, size and wording shall be as shown on the Drawings or as directed by the Engineer.
- C. Materials:
 1. Extruded aluminum shall be 0.080 inch thick.
 2. Hardware shall be 304 stainless steel clips, nuts and bolts.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Galvanizing:

1. Hot dip galvanize all fence and gate materials.
2. Minimum zinc coating shall be 2.0 ounces per square foot of surface.
3. Galvanize all gate frames after fabrication.

3.2 INSTALLATION

- A. Post Spacing:
 1. Equidistant in the fence line.
 2. Maximum spacing 10 feet on centers.
- B. Post Setting:
 1. Set all posts plumb with tops aligned.
 2. Set all posts not less than 36 inches deep in concrete footings. Bottom of footings shall be at least 5' below finish grade. Slope top of footing to shed water.
- C. Bracing: Brace gate, corner, end and pull posts to the next nearest post with a horizontal brace (compression member) and a diagonal truss rod and truss tightener (tension member).
- D. Rails:
 1. Install rails before installing chain link fabric.
 2. Pass top rail through intermediate post caps.
 3. Provide expansion couplings spaced as recommended by manufacturer.
- E. Gates:
 1. All gates shall open a full 180°.
 2. All gates shall open outward unless noted otherwise.
- F. Alignment and Grade:
 1. Install fencing to the alignment shown on the Drawings or as directed by the Engineer.
 2. Changes in alignment of 30° or more shall be considered as corners.
 3. Install fencing to follow the general contour of the finished grades, unless otherwise shown on the Drawings or as directed by the Engineer.
 4. Install bottom edge of fence fabric approximately 2 inches above finished grade.
- G. Placement of Fabric:
 1. Stretch fabric to a uniform finish as tight as possible without pulling the material out of shape.
 2. Place fabric on the faces of the posts away from the site.
 3. Place the top edge of the fabric parallel with the top rail.
 4. Provide all stretcher bars, bands, ties, and all other fastening devices, accessories, and appurtenances for the complete installation of fencing and gates.
 5. Install fence fabric to provide approximately 2-inch deflection at center of span of fabric when a force of approximately 30 pounds is applied perpendicular to fabric. Fabric shall return to its original position when the force is removed.

END OF SECTION

SECTION 02480LANDSCAPINGPART 1 - GENERAL1.1 DESCRIPTION

A. Work Included:

1. Perform the following items of work as required to complete the work of this section as shown on the Drawings and as specified hereunder:
 - a. Spread stockpiled topsoil and furnish and spread any additional topsoil, required to meet the requirements of this section.
 - b. Furnish and sow grass seed/or sod in all areas within the work area to the extent indicated on the Drawings, and in existing grass areas which have been damaged or disturbed by the work of this Contract.
 - c. Furnish and install plant materials in all areas within the work area as indicated on the Drawings.
 - d. Provide maintenance services as specified hereunder.
- B. Examine all other sections of the Specifications and all Drawings for the relationship of the work under this section and the work of other trades. Cooperate with all trades in performing the work under this section.

1.2 SUBMITTALS AND TESTING

A. Seed:

1. Furnish the Engineer with duplicate signed copies of a statement from the vendor, certifying that each container of seed delivered to the project site is fully labeled in accordance with the Federal Seed Act and is at least equal to the specification requirements.
2. This certification shall appear in, or with, all copies of invoices for the seed.
3. Each lot of seed shall be subject to sampling and testing, at the discretion of the Engineer, in accordance with the latest rules and regulations under the Federal Seed Act.

B. Topsoil:

1. Inform the Engineer, within 30 days after the award of the Contract, of the sources from which the topsoil is to be furnished. It is the intent of this section that all topsoil which can be recovered from the site shall be used. Furnish additional topsoil as required.
2. Obtain representative soil samples, taken from several locations in the area under consideration for topsoil removal, to the full stripping depth.
3. Have soil samples tested by an independent soils testing laboratory, approved by the Engineer, at the Contractor's expense.
4. Have soil samples tested for physical properties and pH (or lime requirement), for organic matter, available phosphoric acid, and available potash, in accordance with standard practices of soil testing for agricultural use.
5. Approval, by the Engineer, to use topsoil for use in the work will be dependent upon the results of the soils tests.

C. Lime and Fertilizer:

1. Furnish the Engineer with duplicate copies of invoices for all lime and fertilizer used on the project showing the total minimum carbonates and minimum percentages of the material furnished that pass the 90 and 20 mesh sieves and the grade furnished.
2. Each lot of lime and fertilizer shall be subject to sampling and testing at the discretion of the Engineer.
3. Sampling and testing shall be in accordance with the official methods of the Association of Official Agricultural Chemists.
4. Upon completion of the project, a final check may be made comparing the total quantities of fertilizer and lime used to the total area seeded. If the minimum rates of application have not been met, the Engineer may require the Contractor to distribute additional quantities of these materials to meet the minimum rates.

1.3 DELIVERY, STORAGE AND HANDLING

A. Seed:

1. Furnish all seed in sealed standard containers, unless exception is granted in writing by the Engineer.
2. Containers shall be labeled in accordance with the United States Department of Agriculture's rules and regulations under the Federal Seed Act in effect at the time of purchase.

B. Fertilizer:

1. Furnish all fertilizer in unopened original containers.
2. Containers shall be labeled with the manufacturer's statement of analysis.

1.4 JOB CONDITIONS

A. Topsoil:

1. Do not place or spread topsoil when the subgrade is frozen, excessively wet or dry, or in any condition otherwise detrimental, in the opinion of the Engineer, to the proposed planting or to proper grading.

B. Seeding and Planting:

1. Work Seasons - Perform seeding and planting work only between the dates of 1 May to 20 June and 15 August to 1 October, except as otherwise directed in writing by the Engineer.
2. Weather Conditions:
 - a. Do not perform seeding work when weather conditions are such that beneficial results are not likely to be obtained, such as drought, excessive moisture, or high winds.
 - b. Stop the seeding work when, in the opinion of the Engineer, weather conditions are not favorable.
 - c. Resume the work only when, in the opinion of the Engineer, conditions become favorable, or when approved alternate or corrective measures and procedures are placed into effect.

PART 2 - PRODUCTS

2.1 MATERIALS FOR GRADING AND SEEDING

A. Topsoil:

1. Fertile, friable, natural topsoil typical of the locality, without admixture of subsoil, refuse or other foreign materials and obtained from a well-drained site. Mixture of sand, silt, and clay particles in equal proportions.
2. Free of stumps, roots, heavy of stiff clay, stones larger than 1-inch in diameter, lumps, coarse sand, weeds, sticks, brush or other deleterious matter.
3. Not less than 4 percent nor more than 20 percent organic matter.
4. Topsoil depth shall be 4-inches, unless otherwise indicated.

B. Fertilizer:

1. Fertilizer shall be used to counteract soil deficiencies as indicated by the soil analysis and as approved by the Engineer. It should be a complete fertilizer, a standard product complying with the state and federal fertilizer laws, part of the elements of which are derived from organic sources, containing the following percentages by weight:

Nitrogen	10N - Minimum 75 percent organic
Phosphorus	6 P -
Potash	4 K -

The fertilizer shall be delivered to the site in the original unopened containers bearing the manufacturer's guaranteed statement of analysis, or a manufacturer's certificate of compliance covering analysis shall be furnished to the Engineer. The fertilizer shall be spread at the rate of 17 to 20 lbs/1000 sq-ft.

C. Lime:

1. Provide lime which is ground limestone containing not less than 85 percent of total carbonate and of such fineness that 90 percent will pass a No. 20 sieve and 50 percent will pass a No. 100 sieve.
2. Coarser materials will be acceptable provided the specified rates of application are increased proportionately on the basis of quantities passing a No. 100 sieve. No additional payment will be made to the Contractor for the increased quantity.

D. Soil Enrichers:

1. They shall be one of the following materials:
 - a. Peat Moss - Finely shredded and consisting of not less than 90 percent organic matter.
 - b. Sawdust - rotten.
2. They shall be natural and suited to horticultural use. They shall not contain lumps, roots or other foreign matter over two inches in diameter. They shall be free from noxious weeds, seeds and other elements harmful to lawns. They shall be subject to inspection approval by the Engineer at the source and upon delivery and shall contain not more than 35 percent moisture by weight at the time of incorporation into the soil.

E. Mulch for Hydro Seeding:

1. Mulch material shall meet the following requirements:

- a. Hay or straw - Hay or straw mulch shall consist of long fibered hay or straw, reasonably free from noxious weeds or other undesirable material. No material shall be used which is so wet, decayed, or compacted as to inhibit even and uniform spreading. No chopped hay, grass clippings or other short fibered material shall be used unless directed.
 - b. Wood cellulose fiber - Wood cellulose fiber mulch shall consist of natural wood cellulose fiber containing no materials which will inhibit seed germination or plant growth. Sufficient non-toxic water soluble green dye shall be added to provide a definite color contrast to the ground surface to aid in even distribution. Wood fiber mulch shall be supplied in uniform packages not exceeding 100 pounds each. Each package shall be marked to show the air dry weight.
- F. Mulch Binder for Hydroseeding:
 - 1. Material for mulch binder shall be emulsified asphalt.
 - a. Emulsified asphalt mulch binder shall be a type acceptable to the Engineer and may be diluted with water to assure even distribution.
- G. Grass Seed Mixture
 - 1. Fresh, clean, new crop seed. Seed may be mixed by an approved method on the site, or may be mixed by the dealer. If the seed is mixed on the site, each variety shall be delivered in the original containers which shall bear the dealer's guaranteed statement of the composition of the mixture and the percentage of purity of each variety. The Dealers Guarantee Statement shall be delivered to the Engineer.
 - 2. Grass seed shall be composed of the following varieties which shall be mixed in the proportions and shall test to 80 percent minimum purity, and 80 percent germination.
 - Mix:
 - a. General Seed Mix – “Part 4 – Permanent Stabilization Through Seeding” (VT Standards and Specifications for Erosion and Sediment Control)._

2.2 MATERIALS FOR PLANTING

- A. Water:
 - 1. The Contractor shall arrange and pay for water required for the planting. Water shall be clean and suitable for domestic consumption.
- B. Manure:
 - 1. Manure shall be well rotted, unleached, horse or cow manure or a combination of both. It shall be free from any chemicals used to hasten decomposition artificially, or any other injurious substance.
 - 2. Manure shall be at least nine months old and not more than two years old, free from sawdust, hay, tanbark or wood shavings, or refuse of any kind. Manure shall consist of not more than 25 percent straw or other acceptable material.
- C. Stakes shall be white cedar or approved equal, of size and length as shown on the Drawings.
- D. Hose for guying shall be new black or green two-ply fiber garden hose, not less than 1/2 inch inside diameter. Seconds rejected by the factory are acceptable.
- E. Burlap for wrapping shall be first quality burlap at least eight ounces in weight and

six inches in width.

- F. Wire for tree guys shall be galvanized annealed steel wire, No. 14 gauge, as detailed.
- G. Tree paint shall be waterproof, adhesive and elastic, free from kerosene, coal tar creosote or any other material injurious to the life of the trees. Tree paint shall contain an antiseptic.
- H. Pine bark mulch shall be clean, shredded, free of weeds, seeds, insects and extraneous materials.
- I. Plant Materials:
 - 1. Plant materials shall conform to American Standard for Nursery Stock (April 15, 1951), sponsored by the American Association of Nurserymen, Inc., Standard Plant Names (1942) shall be the authority for plant names. Plant materials shall be of standard quality true to name and type and first class representatives of their species or variety.
 - 2. All plants shall conform to the varieties specified in the Plant List. No substitutions will be permitted unless approved in writing by the Engineer. Each bundle of plants and all separate plants shall be properly identified by name on legible, waterproof labels, securely attached thereto before delivery to the site.
 - 3. Plant materials shall be free of damage as a result of handling and transportation.
 - 4. All plant material shall be certified by the supplier to be free of disease and infestation.
 - 5. All plants shall be subject to approval at their source prior to shipment. The Contractor shall accompany the Engineer to inspect the materials, and shall request such inspection at least one week in advance.
 - 6. All plants shall be typical of their species or variety and shall have a normal habit of growth. They shall be first quality, sound, healthy, vigorous, well branched and densely foliated. They shall be free of disease, insect pests, eggs or larvae, and shall have healthy, well furnished root systems. Plants lacking compactness or proper proportions, and plants injured by too close planting in nursery rows will not be accepted.
 - 7. All plants shall conform to the measurements specified in the Plant List. Measurements specified shall be the minimum acceptable for each variety. Plants that meet these requirements specified, but do not possess a normal balance between height and spread, will not be accepted. Plants shall not be pruned prior to delivery.
 - 8. All plants and all tree trunks shall be measured when the branches are in their normal position. Dimensions noted for height and spread refer to the main body of the plant, and not from branch tip to branch tip. Height is defined as the approximate dimension from ground to top of last year's growth. Top spread is defined as the approximate spread to top or principal width. The height of tree trunks need not be specified if the required height can be obtained by pruning the lower branches without leaving unsightly scars or otherwise damaging the trunk. Shade trees shall be free of branches up to five feet, with a single leader, well branched and reasonably straight stems. No trees which have had their leaders cut, or are so damaged that cutting is necessary, will be accepted. Trees

which had their tops cut off some years previous will only be acceptable if the scar has not decayed. No trees with cut off tops will be accepted unless corrective surgery has been performed so as to effect a complete healing of the stem.

9. Caliper of trees shall be measured one foot above ground.
10. Plants larger in size than those specified in the Plant List may be provided if approved by the Owner or the Engineer, but the use of larger plants shall not increase the cost of the Contract. If the use of larger plants is approved, the ball of earth or spread of roots shall be increased in proportion to the size of the plant. If plants required to be bare rooted are furnished in sizes greater than specified, they shall be balled and burlapped.
11. All trees shall have straight trunks with single leader intact. There shall be no abrasion of the bark and no fresh cuts of limbs over 1-1/4 inch which have not completely callused over.
12. All plants shall be grown in nurseries and cultivated, sprayed, pruned, and fertilized annually in accordance with good horticultural practice. All plants shall have been grown under climatic conditions similar to those in the locality of the project, or shall have been acclimated to the conditions of the locality for at least two years.
13. All plants shall be freshly dug; neither heeled in plants nor plants from cold storage will be accepted. All plants shall have been transplanted or root pruned at least once in the past three years. Balled and burlapped plants shall come from soil which will hold a firm ball.
14. Plants marked "B&B" in the Plant List shall be adequately balled and burlapped with firm natural balls of soil, of diameter of sufficient depth to include all the roots. No plant required to be balled and burlapped shall be accepted if the ball is cracked or broken either before or during the process of planting, or when burlap, stakes, ropes or platform required in this connection have been removed.
15. All plants shall be handled so that the roots are adequately protected at all times. During shipment all plants shall be properly protected by a tarpaulin or other suitable covering.
16. No plants shall be so bound with rope or wire at any time so as to damage the bark, break branches, or destroy its natural shape. All balled and burlapped plants which cannot be planted immediately on delivery shall be set on the ground and well protected with soil or other acceptable material including watering. Until planted, all material shall be properly maintained.

2.3 STORAGE OF MATERIAL

- A. Materials such as fertilizers, ground limestone, etc. shall be stored in weatherproof storage areas and in such a manner that their effectiveness will not be impaired.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Equipment:
 1. Provide all equipment necessary for the proper preparation of the ground surface and for the handling and placing of all required materials.

2. Demonstrate to the Engineer that the equipment will apply materials at the specified rates.
- B. Subsoil Preparation:
 1. Before spreading topsoil, the subgrade shall be raked by approved means. Remove all stones greater than four inches and all debris or rubbish to a depth of six inches. Such materials shall be removed from the site.
- C. Screening:
 1. All topsoil shall be screened clear of all stones greater than one inch, sticks, plants, and all other foreign materials before being spread.
 2. During the screening of topsoil, commercial fertilizers and lime as required by the soil analysis shall be mixed with the topsoil so that they are evenly distributed throughout the screened topsoil.
 3. At the completion of this operation, topsoil is referred to as improved topsoil for the purpose of this specification and the Drawings.

3.2 SEED AND SOD BED PREPARATION

- A. Spread improved topsoil uniformly over subgrade and all areas where the existing grade has been changed and areas disturbed by construction operations except for those areas indicated on the site plans to be paved. No subsoil, topsoil, or improved topsoil shall be handled in any way when in a wet or frozen condition.
- B. Fine rake surface to receive seed or sod.
- C. After natural settlement and a light rolling, the completed work shall conform to the lines, grades, pitches, and spot elevations shown on the plans.
- D. Seeding may be done immediately thereafter, provided the seed bed has remained in a good friable condition and has not become wet.

3.3 SEASON

- A. Do all seeding work within the dates herein specified.
- B. If special conditions exist which may warrant a variance in the above dates, submit a written request to the Engineer stating the conditions and proposed variance. Permission for the variance will be given if, in the opinion of the Engineer, the variance is warranted.
- C. If seeding is authorized between May 15 and August 15, annual rye shall be sown separately in addition to the specified seed mix. Sow at the rate of six to eight pounds per 1000 square feet.

3.4 SEEDING AND SODDING

- A. Immediately before seeding and sodding, the ground shall be restored as necessary to a loose friable condition by discing or other approved method to a depth of not less than two inches. The surface shall be cleared of all debris and of all stones one inch or more in diameter.
- B. Seed all areas to be seeded with the specified grass seed, sowing evenly with an approved mechanical seeder at the rate specified in the seed mix schedule. Sow one half the seed in one direction and the other half at right angles to the first seeding. Cultipacker or approved similar equipment may be used to cover the seed and to firm the seed bed in one operation. In areas inaccessible to Cultipacker, the seeded ground shall be lightly raked and rolled in two directions with a water ballast roller. Extreme

care shall be taken during seeding and raking to insure that no change shall occur in the finished grades and that the seed is not raked from one spot to another.

- C. The hydraulic spray method of sowing seed may be used where approved by the Engineer. This work shall be done with an approved machine operated by a competent crew. Seed and fertilizing materials shall be mixed with water in the tank of the machine and kept thoroughly agitated so the materials are uniformly mixed and suspended in the water at all times during operation. The spraying equipment must be designed and operated to distribute seed and fertilizing materials evenly and uniformly on the designated areas at the required rates. If the Engineer finds the application uneven or otherwise unsatisfactory, the Engineer may require the hydraulic spray method to be abandoned and the balance of the work done as specified herein. Seed must be lightly raked into the surface of the soil unless seeding is to be followed within 24 hours by mulching.
 - 1. Applying Mulch - At the option of the Contractor, any of the following types of mulch material may be applied.
 - a. Hay or straw mulch shall be spread evenly and uniformly over the designated areas. Unless otherwise directed, mulch shall be applied to a thickness of 1". Too heavy application of mulch shall be avoided and lumps and thick spots shall be thinned. Unless otherwise authorized, the mulch shall be anchored in place by uniformly applying an asphalt mulch binder. Application of a concentrated stream of mulch binder will not be allowed. Asphalt mulch binder may be omitted when authorized by the Engineer and when there is a danger of the asphalt contaminating the surface of nearby structures, houses, vehicles, or other objects. Other methods of anchoring mulch may be used subject to the approval of the Engineer.
 - b. Wood fiber mulch shall be applied as a water-borne slurry. The wood fiber and water shall be thoroughly mixed and sprayed on the area to be covered so as to form a uniform mat of mulch at the rate of not less than 30 pounds per 1,000 square feet unit of area. Wood fiber mulch may be mixed with the proper quantities of seed, fertilizer and lime as required in this section, or may be applied separately after seeding has been carried out. In the latter case, it must be applied within 24 hours after seeding.
 - 2. Maintenance - The Contractor shall maintain the mulch by repairing any damaged mulch and by correcting any shifting of the mulch due to wind, water or other causes, until an acceptable growth of grass has been achieved, regardless of the acceptance status of the seeding. The Contractor shall supply additional mulch necessary as a result of damage or seed failure. Repairs to mulched areas and furnishing of additional mulch shall be incidental to this item. If wood fiber is used, any reseeding will require additional wood fiber mulch.
- D. Do not perform broadcast seeding work during windy weather.
- E. Compacting:
 - 1. Compact the entire area immediately after the seeding operations have been completed.

2. Compact by means of a cultipacker, roller, or other equipment approved by the Engineer weighing 60 to 90 pounds per linear foot of roller.
 3. If the soil is of such type that a smooth or corrugated roller cannot be operated satisfactorily, use a pneumatic roller (not wobbly wheel) that has tires of sufficient size to obtain complete coverage of the soil.
 4. When using a cultipacker or similar equipment, perform the final rolling at right angles to the prevailing slopes to prevent water erosion, or at right angles to the prevailing wind to prevent dust.
- F. Thoroughly wet soil surfaces before sodding. Place sod pieces tightly together, tamping gently into position as the work progresses. After each area of sodding is completed, roll the entire surface in two directions with a water ballast roller, and soak the newly sodded areas.
- G. After the grass has started, all of the areas greater than five square feet which fail to show a uniform stand of grass for any reason whatsoever shall be reseeded repeatedly until all areas are covered with a satisfactory growth of grass.
- H. At the time of the first cutting, set mower blades two inches high. All lawns shall receive at least two mowings before acceptance. Schedule for mowing shall be coordinated with the Engineer.
- I. Maintenance shall also include all temporary protection fences, barriers and signs and all other work incidental to proper maintenance.
- J. Maintain grass areas until a full stand of grass is indicated, which will be a minimum of 45 days after all seeding or sodding work is completed, and shall not necessarily relate to Substantial Completion of the General Contract.
- K. Protection and maintenance of grass areas shall consist of watering, weeding, cutting, repair of any erosion and reseeded as necessary to establish a uniform stand of the specified grasses, and shall continue until Acceptance by the Engineer of the work of this section. It shall also include the furnishing and applying of such pesticides as are necessary to keep grass areas free of insects and disease. All pesticides shall be approved by Engineer prior to use.

3.5 SEEDING AND SODDING INSPECTION FOR PROVISIONAL ACCEPTANCE

- A. The Engineer shall inspect all work for Provisional Acceptance upon written request of the Contractor. The request shall be received at least ten calendar days before the anticipated date of inspection.
- B. Upon completion and reinspection of all repairs or renewals necessary in the judgment of the Engineer, the Engineer shall certify in writing to the Owner as to the Provisional Acceptance of the work of this section.
- C. Upon approval of the Provisional Acceptance by the Owner, the Owner will assume maintenance of the lawn areas.

3.6 GUARANTEE

- A. The Contractor shall submit a written guarantee to the Engineer, after Provisional Acceptance of grass, covering reseeded of grass areas which do not survive through one full growing season after the date of Provisional Acceptance, at no cost to the Owner.

3.7 CLEAN-UP

- A. Any soil or similar material which has been brought on to paved areas by hauling operations or otherwise shall be removed promptly, keeping these areas clean at all time.
- B. Upon completion of work under this section all excess stones, debris, and soil resulting from work under this section, which have not previously been cleaned up, shall be removed from the project site.

3.8 PLANTING METHOD

- A. The Contractor shall excavate plant pits, furnish and place all plants, and then maintain them in a satisfactory manner until final acceptance.
- B. All pits shall be of size and shape as shown on the Drawings.
- C. For tree and shrub planting, soil used for backfilling shall be improved topsoil as recommended by soil analysis, with the following additions:
 - 1. For deciduous plants use a mixture of four parts topsoil and one part of manure.
 - 2. For evergreen plants use a mixture of four parts topsoil and one part of peat moss as specified under Soil Enrichers.
- D. Plant pits within or near paved areas shall be prepared prior to the laying of the pavement. Where tree pits in paved areas are to be covered with mulch, trees shall be placed at sufficient depth below finished grade to allow for the depth of the mulch.
- E. Plants shall be set plumb and straight, and at such a level that after settlement, a normal or natural relationship of the crown of the plant with the ground surface is established. Each plant shall be planted in the center of the pit. When balled, burlapped and platformed plants are set, the platform shall first be removed from the pit and the soil shall be carefully tamped under and around the base of each ball to fill all voids. All burlap, ropes, and wires shall be removed from the sides and tops of balls, but no burlap shall be pulled out from under the balls, except for plastic burlap, which shall be completely removed from the pit.
- F. All seals shall remain unbroken and visible on plant material until final inspection by Engineer. The Contractor shall remove all seals immediately after final inspection.

3.9 PLANTING SEASON

- A. Do all planting work within the dates herein specified.

3.10 PRUNING, PAINTING, SPRAYING

- A. Pruning:
 - 1. Each tree and shrub planted shall be pruned to preserve the natural character of the plant and in a manner appropriate to the particular requirements of the landscape design. In general, approximately one third of the wood shall be removed by thinning or shortening branches, but no leaders shall be cut.
 - 2. All pruning shall be done with sharp tools. All pruning cuts shall be made flush and clean, especially where lower branches have been removed from collected trees.
- B. Painting:
 - 1. Pruning cuts over one-half inch in diameter shall be painted with tree paint specified under "Materials" on all exposed cambium as well as other exposed living tissues.

3.11 STAKING

- A. All staking shall be done immediately after wrapping. Stakes shall be driven perpendicular into the ground around the periphery of the ball of the tree. Plants shall stand plumb after staking.

3.12 WATERING

- A. Plantings shall be watered in a satisfactory manner during and immediately after planting, not less than twice per week, until provisional acceptance.
- B. Suitable water for maintaining plants shall be provided by the Owner. The Contractor shall furnish the hose and hose connections from the outlets where water is furnished. Contractor is responsible for all watering until provisional acceptance.

3.13 MAINTENANCE

- A. Maintenance shall begin immediately after each plant is planted. Plants shall be watered, mulched, weeded, fertilized, cultivated and otherwise maintained and protected until provisional acceptance.
- B. Guys shall be tightened and repaired. Defective work shall be corrected as soon as possible after defects become apparent, and weather and season permit.

3.14 TREE SURGERY

- A. Existing trees shall be trimmed of all dead and diseased limbs at the direction of the Engineer. All cuts shall be made close to the trunk and those over one inch in diameter shall be covered with an acceptable tree paint manufactured for this specific purpose. In the case of important large trees where a small amount of cavity work would prolong their lives, such work should be done. The services of a qualified tree surgeon are recommended.

3.15 INSPECTION AND PROVISIONAL ACCEPTANCE

- A. The Engineer will inspect all planting work for provisional acceptance upon request of the Contractor.
- B. The Contractor shall furnish full and complete written instructions for maintenance of the planting to the Owner at the time of provisional acceptance.
- C. After all necessary corrective work has been completed and maintenance instructions have been received by the Owner, the Engineer will certify in writing the provisional acceptance of the planting.

3.16 GUARANTEE PERIOD

- A. All plants shall be guaranteed by the Contractor for a period of not less than one full year from time of provisional acceptance.
- B. At the issuance of provisional acceptance, the Owner shall take over maintenance of the planting. Nevertheless, the guarantee of all plant material will remain with the Contractor. The Contractor shall ascertain that the Owner properly waters and maintains all planting during the one year guarantee period.
- C. At the end of the guarantee period, any plant that is missing, dead, not true to name or size as specified, or not in satisfactory growth, as determined by the Engineer, shall be replaced. In case of reasonable doubt or question regarding the condition and satisfactory establishment of a rejected plant, the Engineer may allow such a plant to

remain through another complete growing season, at which time the rejected plant, if found to be dead, in an unhealthy or badly impaired condition, shall be replaced at once. The Contractor will not be required to replace an inspected and accepted plant more than once.

- D. Replacements shall be plants of the same kind and size as specified in the Plant List. They shall be furnished and planted as specified herein. The cost of replacement shall be borne by the Contractor, except where it can be definitely shown that loss resulted from Owner's failure to maintain planting as instructed.

3.17 FINAL INSPECTION AND FINAL ACCEPTANCE

- A. At the end of the guarantee period, inspection will be made by the Engineer, at the request of the Contractor.
- B. After all necessary corrective work has been completed, the Engineer will certify in writing the final acceptance of the planting.

3.18 CLEAN UP

- A. Upon completion of work under this section, all excess stones, debris and soil resulting from planting work shall be removed from project site. The site shall be restored to a better condition than was present prior to construction.

END OF SECTION

SECTION 02615DUCTILE IRON PIPE & FITTINGS
(BURIED APPLICATIONS)PART 1 - GENERAL1.1 DESCRIPTION

- A. Work Included: Provide and install ductile iron pipe and fittings of the type(s) and size(s) in the location(s) shown on the Drawings and as specified herein.
- B. Related Work Specified Elsewhere:
 - 1. Pipe and Pipe Fittings - General is specified in the appropriate Section in this Division.
 - 2. Excavation, Bedding and Backfill are specified in this Division.

1.2 SUBMITTALS

- A. Submit shop drawings in accordance with the applicable section of Division 1 and the General Conditions of the Construction Contract.
- B. Submit manufacturer's "Certification of Conformance" that pipe and fittings meet or exceed the requirements of these Specifications.
- C. Submit manufacturers installation instructions and specifications for all pipe and fittings.

1.3 QUALITY ASSURANCE

- A. Standards (As Applicable):
 - 1. Cement-mortar lining for water: ANSI A21.4 (AWWA C104).
 - 2. Rubber gasket joints: ANSI A21.11 (AWWA C111).
 - 3. Ductile iron pipe thickness: ANSI A21.50 (AWWA C150).
 - 4. Ductile iron pipe centrifugally cast in metal or sand lined molds: ANSI A21.51 (AWWA C151).
 - 5. Pipe flanges and fittings: ANSI B16.1 and ANSI A21.10 (AWWA C110).
 - 6. Threaded, flanged pipe: ANSI A21.15 (AWWA C115).
 - 7. Cast and ductile iron fittings: ANSI A21.10 (AWWA C110).
 - 8. Ductile Iron Compact Fittings: ANSI 21.53 (AWWA C153).
- B. Acceptable Manufacturers:
 - 1. Tyler
 - 2. Griffin
 - 3. Union
 - 4. US Pipe
 - 5. Or equivalent.

1.4 DELIVERY, STORAGE & HANDLING

- A. Exercise extra care when handling ductile iron pipe because it is comparatively brittle.
- B. Exercise extra care when handling cement lined pipe because damage to the lining will render it unfit for use.
- C. Protect the spherical spigot ends and the plain ends of all pipe during shipment by

wood lagging securely fastened in place.

PART 2 - PRODUCTS

2.1 PIPE MATERIALS

A. General:

1. All exterior (buried) ductile iron pipe shall have push-on or mechanical joints unless otherwise specified or shown on the Drawings. Pipe within valve pits and other structures is considered interior pipe and shall be flanged.
2. Unless otherwise shown on the Drawings or in the pipe schedule, the minimum thickness of ductile iron pipe shall be:
 - a. For pipe 4 inches in diameter and smaller: Class 51.
 - b. For pipe 6 inches in diameter and larger: Class 52 (water applications); Class 50 (wastewater applications).
 - c. Pipe with flanges: Class 53.
3. Pipe for use with sleeve type couplings shall have plain ends (without bells or beads) cast or machined at right angles to the axis.
4. Pipe shall be double thickness cement lined and seal coated unless noted otherwise on the Drawings.
5. Pipe for use with split type couplings shall have ends with cast or machined shoulders or grooves that meet the requirements of the manufacturer of the couplings.
6. Factory applied bituminous coatings (in accordance with AWWA C151) shall be furnished on the exterior of all underground piping unless specified otherwise.
7. The outside of pipe within structures and exposed shall not be coated with bituminous coating, but shall be thoroughly cleaned and given one shop coat of Intertol Rustinhibitive Primer 621 by Koppers Co.; Multiprime by PPG Industries; Chromox 13R50 Primer made by Mobil Chemical Co.; or equivalent.

B. Joints (as shown on Drawings or as specified):

1. Push-on and Mechanical Joint:
 - a. The plain ends of push-on pipes shall be factory machined to a true circle and chamfered to facilitate fitting the gasket.
 - b. Provide gaskets manufactured from a composition material suitable for exposure to the fluid to be contained within the pipe. On high temperature applications such as air lines, the gaskets shall be suitable for service from 40°F to 250°F.
 - c. Bolts and nuts for buried mechanical joints shall meet the AWWA C-111 requirements and be made of high strength, low alloy steel.
2. Flanged:
 - a. Provide specially drilled flanges when required for connection to existing piping or special equipment.
 - b. Flanges shall be long-hub screwed tightly on pipe by machine at the foundry prior to facing and drilling.
 - c. Gaskets:
 - i. Ring type of rubber with cloth insertion.

- ii. Thickness of gaskets 12 inches in diameter and smaller: 1/16 inch.
 - iii. Thickness of gaskets larger than 12 inches in diameter: 3/32 inch.
 - d. Fasteners:
 - i. Make joints with bolt, studs with a nut on each end, or one tapped flanged with a stud and nut.
 - ii. The number and size of bolts shall meet the requirements of the applicable ANSI standard.
 - iii. Nuts, bolts, and studs shall be Grade B meeting the requirements of ASTM A307.
 - iv. After jointing, coat entire joint with bituminous material compatible with pipe coating unless other coating required by Section 09900.
 - e. When applicable, provide and install flange clamps as shown on the Drawings.
3. Joint Bracing:
- a. Provide joint bracing to prevent the piping from pulling apart under pressure as required and as shown on the Drawings.
 - b. Types of bracing:
 - i. Pipe and fittings furnished with approved lugs or hooks cast integrally for use with socket pipe clamps, tie rods, or bridles. Bridles and tie rods shall be a minimum of 3/4 inch diameter except where they replace flange bolts of a smaller size, in which case they shall be fitted with a nut on each side of the pair of flanges. The clamps, tie rods, and bridles shall be coated with bituminous paint in buried installations and shall be coated with the same coatings as the piping system in interior installations after assembly or, if necessary, prior to assembly.
 - ii. Mechanical joint follower gland pipe restrainers.
 - (1) Ductile iron gland and restraining ring.
 - (2) Gasket shall be standard MJ gasket -ANSI/AWWA-C111/A21.11.
 - (3) Working pressure 350 psi, up to 8 inches; 250 psi, 10 inches to 16 inches.
 - (4) Test pressure two times working pressure.
 - (5) Grip Rings™, Romac Industries, or other equivalent as approved by Engineer.
 - iii. Other types of bracing as shown on the Drawings.

2.2 FITTINGS

A. Standard Fittings:

- 1. Pressure rating of 350 psi for D.I. compact fittings and 250 psi for all others unless indicated otherwise on the Drawings or as specified.
- 2. Joints the same as the pipe with which they are used or as shown on the Drawings.
- 3. Cement lining and seal coat as specified for pipe.
- 4. Factory applied bituminous coatings shall be furnished for all underground fittings.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Provide all labor necessary to assist the Engineer to inspect pipe, fittings, gaskets, and other materials.
- B. Carefully inspect all materials at the time of delivery and just prior to installation.
- C. Carefully inspect all pipe and fittings for:
 - 1. Defects, such as weak structural components, that adversely affect the execution and quality of work.
 - 2. Deviations beyond allowable tolerances for pipe clearances.
- D. Immediately remove all rejected materials from the project site.

3.2 INSTALLATION

- A. General:
 - 1. Install in strict accordance with the pipe and fitting manufacturer's instructions and recommendations and as specified or as shown on the Drawings.
 - 2. Concrete thrust blocks or other acceptable thrust resistant system is required at all fittings on pressure pipe. Where thrust blocks are used, these shall be placed against undisturbed soil or screened gravel compacted to 95 percent and shall be placed so that the joints are accessible for repairs.
- B. Assembling Joints:
 - 1. Push-on Joints:
 - a. Insert the gasket into the groove of the bell.
 - b. Uniformly apply a thin film of special lubricant over the inner surface of the gasket that will contact the spigot end of the pipe.
 - c. Insert the chamfered end of the plain pipe into the gasket and push until it seats against the bottom of the socket.
 - 2. Bolted Joints:
 - a. Remove rust preventive coatings from machined surfaces prior to assembly.
 - b. Thoroughly clean and carefully smooth all burrs and other defects from pipe ends, sockets, sleeves, housings and gaskets.
 - c. After jointing coat all bolts with bituminous material compatible with the pipe coating required herein and/or in Section 09900.
 - 3. Flanged Joints:
 - a. Insert the nuts and bolts (or studs), finger tighten, and progressively tighten diametrically opposite bolts uniformly around the flange to the proper tension.
 - b. Execute care when tightening joints to prevent undue strain upon valves, pumps, and other equipment.
 - 4. Mechanical Joints:
 - a. Thoroughly clean, with a wire brush, surfaces that will be in contact with the gaskets.
 - b. Lubricate the gasket, bell, and spigot by washing with soapy water.
 - c. Slip the gland and gasket, in that order, over the spigot and insert the spigot into the bell until properly seated.

- d. Evenly seat the gasket in the bell at all points, center the spigot, and firmly press the gland against the gasket.
 - e. Insert the bolts, install the nuts finger tight, and progressively tighten diametrically opposite nuts uniformly around the joint to the proper tension with a torque wrench.
 - f. The correct range of torque (as indicated by a torque wrench) and the length of wrench (if not a torque wrench) shall not exceed:
 - i. Range or Torque: 60-90 ft.-lbs.
 - ii. Length of Wrench: 10 inches.
 - g. If effective joint sealing is not attained at the maximum torque specified above, disassemble, thoroughly clean, and reassemble the joint. Do not overstress the bolts to tighten a leaking joint.
5. Bell and Spigot Joints:
- a. Thoroughly clean the bell and spigots and remove excess tar and other obstructions.
 - b. Insert the spigot firmly into place and hold securely until the joint has been properly completed.
- C. Fabrication:
- 1. Tapped Connections:
 - a. Make all tapped connections as shown on the Drawings or as required by the Engineer.
 - b. Make all connections watertight and of adequate strength to prevent pullout.
 - c. Drill and tap normal to the longitudinal axis of the pipe.
 - d. Taps in fittings shall be located where indicated by the manufacturer for that particular type of fitting.
 - e. The maximum sizes of taps in pipes and fittings without busses shall not exceed the sizes listed in the appendix of ANS A21.51 based on 2 full threads for ductile iron and 3 full threads for cast iron.
 - 2. Cutting:
 - a. Perform all cutting as set forth in AWWA C600.
 - b. Carefully chamfer all cut ends to be used with push-on joints to prevent damage to gaskets when pipe is installed.
- D. Pipe Deflection:
- 1. Push-on and Mechanical Joints:
 - a. The maximum permissible deflection of alignment at joints shall be limited to that given in AWWA C600.
 - 2. Flexible Joints:
 - a. The maximum deflection in any direction shall not exceed the manufacturer's instructions and recommendations.

END OF SECTION

SECTION 02616

DUCTILE IRON MAIN ANTI-CORROSION POLYETHYLENE ENCASEMENT (POLYWRAP)

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work Included: Furnish all materials and install polyethylene encasement (polywrap) of ductile iron water and sewer main for all ductile iron main, valves and fittings and as specified herein.
- B. Related Work Specified Elsewhere: Ductile Iron pipe and fittings, trench excavation, valves.

1.2 QUALITY ASSURANCE

- A. A competent laboratory must be maintained by the manufacturer of the polywrap at the point of manufacture to insure quality control.
- B. During all periods of shipment and storage, the fabric shall be wrapped in a heavy duty protective covering to protect the fabric from direct sunlight, ultraviolet rays, and temperatures greater than 140oF, mud, dirt, dust and debris.

1.3 SUBMITTALS

- A. Manufacturer shall furnish certified test reports with each shipment of material attesting that the polywrap meets the requirements of this Specification.
- B. Contractor shall submit product information they intend to use and the installation method they intend to employ.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. **Linear low density polyethylene (LLDPE)** Polyethylene encasement protection wrap for ductile iron pipe. 8 mil thickness. Tubes or sheets

TABLE 1

<u>Geotextile Mechanical Property</u>	<u>Test Method</u>	<u>Minimum Permissible Value</u>
Tensile Strength (both directions)	ASTM D882	3600 psi
Elongation	ASTM D882	800 percent
<u>Geotextile Mechanical Property</u>	<u>Test Method</u>	<u>Minimum Permissible Value</u>
Dielectric Strength	ASTM D149	800 V/mil
Impact Resistance	ASTM D1709-B	600 g
Propagation Tear Resistance Strength	ASTM D1922	2550 gf

DUCTILE IRON MAIN ANTI-CORROSION
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- B. Polywrap shall meet all requirements of ANSI/AWWA C105/A21.5
- C. Polywrap shall consist of 3 layers of co-extruded linear low density polyethylene fused into a single layer, minimum 8 Mil thickness.
- D. Inside surface of Polywrap shall be infused with an antimicrobial compound to mitigate microbiologically induced corrosion (MIC) and a volatile corrosion inhibitor to control galvanic corrosion.
- E. The polywrap shall meet or exceed the minimum values stated above as determined by the most recent test methods specified above. The product must be marked with the specification conformance, applicable pipe sizes and the words “corrosion protection”.

PART 3 - EXECUTION

3.1 GENERAL

- A. Quality of installation is more important than the actual sequence followed.
- B. Polyethylene shall not be stored in the sun.
- C. When lifting polyethylene-encased pipe with a crane, use a synthetic sewn “sling” or padded wire rope sling to protect the polyethylene.
- D. Remove all lumps of clay, mud, cinders, etc., on the pipe surface before encasing the pipe.
- E. Prevent soil or bedding material from becoming trapped between the pipe and the polyethylene.
- F. When installing polyethylene encasement below the water table or in areas subject to tidal action, seal as thoroughly as possible both ends of each polyethylene tube with polyethylene adhesive tape or plastic tie straps at the joint overlap. Additionally, place circumferential wraps of tape or plastic tie straps at two-foot intervals along the barrel of the pipe to help minimize the space between the polyethylene and the pipe.

3.2 DUCTILE IRON PIPE AND FITTINGS

Installation of the polywrap shall be done in accordance with one of the three recommended methods as outlined in ANSI/AWWA C105/A21.5. Methods A and B use polyethylene tubes, and method C uses polyethylene sheets.

- A. Method A uses one length of polyethylene tube, overlapped at the joints, for each length of pipe. A minimum of 2' overlap shall be used. The polyethylene wrap shall be cut approximately 2 feet longer than that of the pipe section. After assembling the pipe joint, the polyethylene shall be overlapped approximately one (1) ft. and at all joints sealed with approved adhesive tape. Additional taping shall be used at 3 foot (3') intervals along the pipe. Any rips, punctures or other damage to the polyethylene shall be repaired immediately with adhesive tape. All copper service connections shall be wrapped for a distance of 3 feet from the centerline of the main. Before installing the polyethylene wrap, the exterior of the pipe shall be free of foreign material.
- B. Method B uses a length of polyethylene tube for the barrel of the pipe and a separate length of polyethylene tube or sheet for the joints. The national standard does not recommend Method B for bolted-type joints unless an additional layer of polyethylene is provided over the joint area as in Methods A and C. If this method is chosen an additional layer of polyethylene will be provided over the joint area.

- C. In Method C, each section of pipe is completely wrapped with a flat polyethylene sheet.

3.3 JOINTS, VALVES, APPURTENANCES AND TAPS

- A. All ductile iron pipe, fitting and valves will be wrapped in accordance with C105/A21.5.
- B. Pipe-shaped appurtenances: bends, reducers, offsets, and other pipe-shaped appurtenances in shall be covered in the same manner as the pipe.
- C. Joints: Overlap joints as in normal installation; then tape the polyethylene securely in place at valve stems and other penetrations. When bolted-type joints are used, care should always be taken to prevent bolts or other sharp edges of the joint configuration from penetrating the wrap.

END OF SECTION

SECTION 02655COUPLINGS & CONNECTORS FOR BURIED APPLICATIONSPART 1 - GENERAL1.1 DESCRIPTION

- A. Furnish and install couplings and connectors of the type and size in the location shown on the Drawings and as specified herein.

1.2 QUALITY ASSURANCE

- A. Minimum pressure rating equal to that of the pipeline in which they are to be installed.
- B. Couplings and connectors, other than those specified herein, are subject to the Engineer's approval. Acceptable Manufacturers:
 - 1. Romac Industries
 - 2. Krausz
 - 3. Smith Blair
 - 4. For Meter Box Company
 - 5. Or Equal
- C. Reference Standards:
 - 1. AWWA C104 – Cement-Mortar Lining for Ductile-Iron Pipe and Fittings
 - 2. AWWA C111 – Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings
 - 3. AWWA C116 – Protective Fusion-Bonded Coatings for the Interior and Exterior Surfaces of Ductile-Iron and Gray-Iron Fittings
 - 4. AWWA C153 – Ductile-Iron Compact Fittings
 - 5. AWWA C213 – Fusion-Bonded Epoxy Coatings and Linings for Steel Water Pipe and Fittings
 - 6. AWWA C219 – Bolted, Sleeve-Type Couplings for Plain-End Pipe

1.3 SUBMITTALS

- A. Submit shop drawings in accordance with the applicable section of Division 1 and the General Conditions of the Construction Contract.
- B. Submit manufacturers product data and installation instructions.

PART 2 - PRODUCTS2.1 MATERIALS

- A. All Couplings and Connectors:
 - 1. Gasket Materials: Composition suitable for exposure to the liquids to be contained within the pipes.
 - 2. Diameters to properly fit the specific types of pipes on which couplings and connectors are to be installed.
- B. Sleeve Type Transition Couplings (for 4 – 12" pipe size)
 - 1. Buried Non-Restrained Couplings:
 - a. Two top facing bolt design

COUPLINGS & CONNECTORS FOR BURIED APPLICATIONS

- b. Fusion bonded epoxy ductile iron center sleeve, end rings and bolt guides. Ductile iron meeting or exceeding ASTM A536, Grade 65-45-12.
 - c. Two wedge-section EPDM or NBR rubber gaskets compounded for water service. NSF-61 certified for potable water service.
 - d. Ductile iron heat treated grippers, 304 stainless steel draw hooks, and reinforced nylon ramp runners.
 - e. Nuts and bolts shall be 304 Stainless Steel with rolled thread and anti-galling compound.
 - f. Couplings shall be long barrel type.
 - g. Coupling shall be fusion bonded epoxy coated meeting AWWA C213 and NSF-61 standards for potable water applications.
 - h. Acceptable Manufacturers:
 - i. Romac Industries – Macro HP™
 - ii. Krausz – Hymax® 2
 - iii. Smith Blair – Model 421
 - iv. Or Equal
- 2. Buried Restrained Couplings:
 - a. Two top facing bolt design
 - b. Fusion bonded epoxy steel or ductile iron center sleeve and end rings.
 - c. Two wedge-section EPDM or NBR rubber gaskets compounded for water service and NSF-61 certified.
 - d. 304 Stainless Steel bridge or Armor over gasket in expansion zone.
 - e. Nuts and bolts shall be 304 Stainless Steel with rolled thread and anti-galling compound.
 - f. Couplings shall be long barrel type.
 - g. Coupling shall be fusion bonded epoxy coated meeting AWWA C213 and NSF-61 standards for potable water applications
 - h. Acceptable Manufacturers:
 - i. Romac Industries – Alpha™
 - ii. Krausz – Hymax Grip
 - iii. Smith Blair – Pipe Lock Coupling
 - iv. Or Equal
- C. Solid Sleeve Couplings
 - 1. Solid sleeves shall be ductile iron with mechanical joint ends.
 - 2. Couplings shall meet AWWA/ANSI C-153/A21.53 and C-111/A21.11 for joints, and C-104/A21.4 for cement lining in sizes 3"-24".
 - 3. Nuts and bolts shall be ductile iron low alloy steel per ANSI/AWWA A21.11/C-111.
 - 4. Acceptable Manufacturers:
 - a. Romac – Model 501
 - b. Smith Blair – Model 441.
 - c. Ford – Model FC1 or FC2A
 - d. Or Equal
- D. Flexible Couplings for drain connections (Fernco or equal)
 - 1. Rubber material with stainless steel clamps
 - 2. Must provide a positive seal against infiltration and exfiltration

3. Coupling materials must conform to applicable portions of ASTM C443 (Concrete), C564 (Cast Iron), D1869 (A.C.), D5926 (PVC), C1173 (transition) and CSA B602.
- E. Mechanical Joint Adaptors (Foster Adaptor® – Infact Corporation)
 1. Required to connect fittings and valves with mechanical joints
 2. Ductile iron construction mechanical joint bolt pattern.
 3. Bolts and nuts shall meet AWWA C-111.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Sleeve Type Couplings:
 1. Thoroughly clean pipe ends a minimum of 12-inches from the ends prior to installing couplings and use soapy water as a gasket lubricant.
 2. Slip an end ring and gasket over each pipe and place the center sleeve centered over the joint.
 3. Insert the other pipe length into the center sleeve the proper distance.
 4. Press the gaskets and end rings evenly and firmly into the center sleeve flares.
 5. For two-bolt systems, insert or tighten the bolts, finger tighten and progressively tighten nuts on the top of the coupling with a torque wrench applying the torque recommended by the manufacturer. For multiple bolt systems, insert or tighten the bolts, finger tighten and progressively tighten diametrically opposite nuts around the coupling with a torque wrench applying the torque recommended by the manufacturer.
 6. Insert and tighten the tapered threaded lock pins as needed.
- B. Install thrust rods, supports, and other provisions to properly support pipe weight and axial equipment loads.

END OF SECTION

SECTION 02754SEWER LINE JOINT TESTINGPART 1 - GENERAL1.1 DESCRIPTION

- A. Work Included: Provide all necessary labor, materials, supervision and equipment to satisfactorily test sewer line joints.
- B. Related Work Specified Elsewhere: Sewer flow control and sewer line cleaning are specified in the appropriate sections in this Division.

PART 2 - PRODUCTS2.1 MATERIALS

- A. Not applicable in this Section.

PART 3 - EXECUTION3.1 PERFORMANCE

- A. Equipment:
 - 1. Closed-circuit television system.
 - 2. Testing device (packer):
 - a. Capable of isolating individual joints by creating a sealed void space around the joint being tested.
 - b. Constructed such that low pressure air can be admitted into the void area.
 - c. Shall Contain a pressure gauge accurate to one tenth (0.1) psi in-line with the feed line to monitor the void pressure.
 - d. Capable of performing in sewer lines where flows do not exceed 1/4 of the pipe diameter without resorting to any method of flow control.

3.2 TESTING

- A. Test all joints except those with visible infiltration.
- B. Procedure:
 - 1. Position the packer on each joint to be tested.
 - 2. Inflate the sleeves on each end of the packer.
 - 3. Apply four (4.0) psi pressure above the existing hydrostatic pressure on the outside of the joint to the void area created around the inside perimeter of the joint.
 - 4. Shut off the supply of air once the pressure has stabilized at the required amount.
 - 5. Monitor the void pressure for thirty (30) seconds.
 - 6. Repair the joint if the pressure drops more than one half (1/2) psi in the thirty (30) seconds.
- C. Water or chemical pressure testing may be used in lieu of air testing subject to review and approval by the Engineer.

END OF SECTION

SECTION 03300ACAST-IN-PLACE CONCRETE (SHORT FORM)PART 1 - GENERAL1.1 SECTION INCLUDES

- A. Cast-In-Place Concrete indicated on the Contract Drawings
- B. Formwork
- C. Concrete and CMU deformed reinforcement bars and accessories
- D. Epoxy and expansion anchors
- E. Concrete finishing, curing, modifications and repairs
- F. Concrete testing
- G. Non-Shrink Grout

1.2 RELATED SECTIONS

- A. Section 01340 - Submittals
- B. Section 01400 - Quality Control

1.3 REFERENCES

- A. This section contains references that are applicable to this Specification Section. The applicable edition of the indicated references shall be the version that was the most current at the time of the Advertisement of Bids. If referenced documents have been discontinued by the issuing organization, references to those documents shall mean the replacement documents issued or otherwise identified by that organization or, if there are no replacement documents, the last version of the document before it was discontinued. Where document dates are given in the following listing, references to those documents shall mean the specific document version associated with that date, whether or not the document has been superseded by a version with a later date, discontinued, or replaced.
- B. ACI 117/117M – Specifications for Tolerances for Concrete Construction and Materials and Commentary
- C. ACI 301/301M - Specifications for Structural Concrete
- D. ACI 302.1R - Guide to Concrete Floor and Slab Construction
- E. ACI 304.2R - Guide to Placing Concrete by Pumping Methods
- F. ACI 306.1 - Standard Specification for Cold Weather Concreting
- G. ACI 306R – Guide to Cold Weather Concreting
- H. ACI 308.1/308.1M - Specification for Curing Concrete
- I. ACI 318/318M - Building Code Requirements for Structural Concrete and Commentary
- J. ACI 347R - Guide to Formwork for Concrete
- K. ACI 350/350M - Code Requirements for Environmental Engineering Concrete Structures
- L. ACI 355.2 – Qualification of Post-Installed Mechanical Anchors in Concrete & Commentary
- M. ACI 355.4/355.4M – Qualification of Post-Installed Adhesive Anchors in Concrete

and Commentary

- N. ACI SP-066 – ACI Detailing Manual
- O. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
- P. ASTM A675/A675M - Standard Specification for Steel Bars, Carbon, Hot-Wrought, Special Quality, Mechanical Properties
- Q. ASTM A706/A706M – Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement
- R. ASTM A1064/A1064M – Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
- S. ASTM C31/C31M - Standard Practice for Making and Curing Concrete Test Specimens in the Field
- T. ASTM C33/C33M - Standard Specification for Concrete Aggregates
- U. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens
- V. ASTM C40 – Standard Test Method for Organic Impurities in Fine Aggregates for Concrete
- W. ASTM C42/C42M - Standard Test Method of Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
- X. ASTM C88 – Standard Test Method for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate
- Y. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete
- Z. ASTM C131/C131M – Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
- AA. ASTM C150/C150M - Standard Specification for Portland Cement
- BB. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete
- CC. ASTM C172 - Practice for Sampling Freshly Mixed Concrete
- DD. ASTM C231 - Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
- EE. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete
- FF. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
- GG. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete
- HH. ASTM C535 – Standard Test Method for Resistance to Degradation of Large-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
- II. ASTM C595/C595M - Standard Specification for Blended Hydraulic Cements
- JJ. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
- KK. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete
- LL. ASTM C989/C989M - Standard Specification for Slag Cement for Use in Concrete and Mortars
- MM. ASTM C1059/C1059M - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete

- NN. ASTM C1077 - Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation
- OO. ASTM C1157/C1157M - Standard Performance Specification for Hydraulic Cement
- PP. ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures
- QQ. ASTM C1260 – Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)
- RR. ASTM C1293 – Standard Test Method for Determination of Length Change of Concrete Due to Alkali-Silica Reaction
- SS. ASTM C1315 - Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete
- TT. ASTM C1567 – Standard Test Method for Potential Alkali-Silica Reactivity of Combinations of Cementitious Materials and Aggregate (Accelerated Mortar-Bar Method)
- UU. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
- VV. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers - Tension
- WW. ASTM E329 – Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection
- XX. ASTM E1155 - Standard Test Method for Determining FF Floor Flatness and FL Floor Levelness Numbers
- YY. AWS D1.4/D1.4M – Structural Welding Code – Reinforcing Steel
- ZZ. Concrete Reinforcing Steel Institute -10-MSP Manual of Standard Practice
- AAA. Concrete Reinforcing Steel Institute - Placing Reinforcing Bars
- BBB. ICC-ES AC58 - Acceptance Criteria for Adhesive Anchors in Masonry Elements
- CCC. ICC-ES AC308 - Acceptance Criteria for Post-Installed Adhesive Anchors in Concrete Elements

1.4 QUALITY ASSURANCE

- A. Perform work in accordance with ACI 301/301M, ACI 117/117M ACI 306.1 and ACI 308.1/308.1M, except as modified here-in.
- B. All curing, finishing and repair materials shall meet all Federal and State regulations pertaining to Volatile Organic Compounds (VOC) Compliance.
- C. Contractor performing flatwork finishing of concrete slabs shall provide at least one (1) flatwork finisher certified as an ACI Concrete Flatwork finisher.
- D. Expansion and epoxy anchors shall meet the following requirements:
 - 1. Expansion anchors shall be qualified for earthquake loading (use in cracked concrete) in accordance with ACI 355.2.
 - 2. Epoxy anchors shall be qualified for earthquake loading (use in cracked concrete) in accordance with ACI 355.4.
 - 3. Epoxy anchors installed shall be qualified in accordance with ACI 355.4 requirements for sensitivity to installation direction.

4. Epoxy anchors shall be installed by personnel certified by an applicable certification program that includes written and performance tests in accordance with ACI/CRSI Adhesive Anchor Installation Certification program

1.5 QUALIFICATIONS OF INDEPENDENT TESTING LABORATORY

- A. Independent Testing Laboratory shall conform to concrete testing requirements of ASTM C1077 and ASTM E329.
- B. Key personnel must be qualified and experienced in concrete quality assurance.
- C. Perform concrete field quality control testing with personnel certified as an ACI Concrete Field-Testing Technician, Grade 1 according to the American Concrete Institute (ACI).

1.6 SUBMITTALS

- A. Submit shop drawings for concrete and masonry reinforcement prior to fabrication, showing bar bends, details and placement and certified copies of Mill Test Reports for the reinforcing steel materials analysis. Conform to ACI SP-066. Details shall include:
 1. Sizes, dimensions, and locations for reinforcement and supports
 2. Bending diagrams and schedules
 3. Splices
 4. Cover and clearances
 5. Class designation and details for bar supports
 6. Pertinent reinforced concrete details with dimensions and elevations
 7. Embedded items furnished by other trades and/or under other sections of the specification that are to be cast in concrete where interference with reinforcing steel bars may occur
 8. Show reinforcement on plan views of slabs, wall elevations and sections, beam elevations and details. Provide plan details at wall intersections and openings.
- B. Submit Concrete Mix designs including field performance test results which meet the criteria specified in ACI 301, Section 4. Mix design shall include:
 1. Proportions for all ingredients, 28-day design compressive strength, water to cementitious materials ratio, admixture dosages, slump, and air content.
 2. Cement Manufacturer's Certificates of conformance with ASTM C150 taken during the last 90 days.
 3. Supplementary Cementitious Materials: Source and test reports with certificates of conformance with ASTM C618 for fly ash and ASTM C989/C989M for slag cement for actual material to be used in the Work taken during the last 90 days.
 4. Aggregate: data not older than 90 days, except test data for soundness, abrasion, alkali reactivity – not older than 12 months. Fine and coarse aggregate data shall include:
 - a. Sources
 - b. Specific Gravity
 - c. Sieve analyses per ASTM C33/C33M, including fineness modulus of fine aggregate
 - d. Organic impurities for fine aggregate per ASTM C40

- e. Potential alkali reactivity (except not required if a cement containing less than 0.60% alkalis is used, per ASTM C33/C33M), per ASTM C1260, ASTM C1293, or ASTM C1567
 - f. Soundness per ASTM C88
 - g. Abrasion for coarse aggregate per ASTM C131/C131M and ASTM C535
- 5. Product data and material safety data sheets for concrete admixtures.
- 6. Test reports by testing agencies meeting ASTM E329:
 - a. Field test data used to determine the standard deviation used for establishing the required average design strength, and field test data documenting that the proposed concrete proportions will produce an average compressive strength equal or greater than the required average compressive strength, shall be from within the previous 12 months.
 - b. Laboratory trial batch data shall be from within the previous 24 months.
- C. Submit product data and material safety data sheets for concrete accessories.
- D. Submit sample concrete mix delivery slip that shall include the following information:
 - 1. Serial number of ticket
 - 2. Date and project location
 - 3. Name and location of ready mixed concrete plant
 - 4. Truck number, time loaded, cubic yards delivered
 - 5. Mixture design
 - 6. Quantities of admixtures, with brand names
 - 7. Quantities and types of cement, fly ash and/or slag
 - 8. Quantity of water including quantity of water withheld
 - 9. Quantities of fine and coarse aggregate including moisture content, nominal maximum aggregate size
 - 10. Quantity of water added subsequent to plant batching
 - 11. Unloading time and location
- E. Submit product data and material safety data sheets for form release agent.
- F. Submit product data for epoxy adhesive anchors. Data shall include:
 - 1. Material properties of anchors and epoxy adhesive
 - 2. ICC-ES AC58 (creep test) report
 - 3. ICC-ES AC308 report
 - 4. Allowable and ultimate loads of the anchor system
 - 5. Storage requirements
 - 6. Installation requirements including:
 - a. Drilling method (diamond drill bit shall be prohibited)
 - b. Drill bit diameter and depth of hole for each size anchor
 - c. Hole cleaning procedure and required condition of hole
 - d. Requirements for discarding initial discharge to ensure proper mixing
 - e. Hole filling procedure
 - f. Time period when anchor cannot be contacted or otherwise disturbed
 - g. Gel and cure times as a function of temperature
 - h. Installation temperature requirements for cartridges and base material
- G. Submit product data and sample for form ties.

- H. Submit a conduit layout plan under the appropriate sections of Division 16 prior to submitting reinforcing steel shop drawings.
- I. Submit methods to be used to protect the concrete during cold weather placements. The Engineer's review shall be for information only as the Contractor is responsible for the means and methods of protection of concrete placed during cold weather.
- J. Submit methods to be used to protect the concrete during hot weather placements. The Engineer's review shall be for information only as the Contractor is responsible for the means and methods of protection of concrete placed during hot weather.
- K. Submit product data and material safety data sheets for curing compounds, floor sealers and floor hardeners. Indicate the intended use and location for all products.
- L. Submit product data and material safety data sheets for repair materials. Indicate the intended use and location for all products.
- M. Submit curing methods.
- N. Submit qualifications of flatwork finisher.
- O. Independent Testing Laboratory will submit one copy each of all test reports to each of the following: Engineer, Resident Project Representative, Contractor and concrete supplier. Reports shall indicate the following information:

Project Name	Air content
Placement Location	Cure box min/max temps
General Contractor	Cylinder Nos
Concrete supplier	Cylinder weights
Technician	Date of breaks
Date cast	Break type
Date picked up	Break load
Design strength	Break strength
Air temp	Truck Arrival Time
Concrete temp	Truck Unload Time
Lab/Field cured	Cylinder size
Final slump	
- P. Independent Testing Laboratory will submit reports within 5 days of testing or inspection.
- Q. Independent Testing Laboratory will telephone the Engineer within 24 hours if tests indicate deficiencies.

PART 2 - PRODUCTS

2.1 FORM MATERIALS

- A. Undamaged smooth form facing materials such as plywood, hardboard, metal and plastic that will produce a smooth form finish with fins and offsets not exceeding 1/8 inch. Surfaces shall be clean, free of scratches, mars and discolorations.
- B. Steel: Minimum 16 ga. sheet, well matched, tight fitting, stiffened to resist loads without excess deflection.
- C. Aluminum: Forms with unoxidized surfaces shall be pretreated with a calcium hydroxide and water paste followed by repeated water rinsing until hydrogen bubbles no longer form.

- D. Chamfer Corners: Chamfer, Wood Strip Type; $\frac{3}{4}$ " x $\frac{3}{4}$ " minimum, maximum possible length.
- E. Form Ties:
 - 1. Exterior backfilled walls of below grade spaces: Factory fabricated adjustable length assembly providing a minimum 1.5 inch break back dimension with a minimum 1 inch diameter tapered wood or plastic cones to leave a uniform hole for patching on both sides of the wall. All ties require a tightly fitted waterstop washer at the midpoint. Tie systems that use plug style waterstops inserted into tie holes after removal of forms are not permitted
 - 2. Non-liquid retaining structures: Snap-off type, galvanized metal, adjustable lengths designed to break back at least 1 inch from finished surface or ties as indicated above.
- F. Form release agent: Non-staining colorless, compatible with finishes.
 - 1. Bio Strip WB, SpecChem by HD Supply White Cap
 - 2. StarSeal EF Bio-Release by Vexcon
 - 3. Q-2 Form Release by Dayton Superior
 - 4. Farm Fresh XL by Dayton Superior
 - 5. Clean Strip by Dayton Superior
 - 6. or equivalent

2.2 REINFORCING STEEL

- A. "Reinforcing Steel" shall include all bars, anchorages, stirrups, dowels, ties, tie-wire, chairs and other steel supports, and spacers, as noted on the Contract Drawings, specified herein, and as required for the proper completion of the Work.
- B. Bars: ASTM A615 Grade 60; deformed new materials. Cold-bent in accordance with CRSI 10-MSP
- C. Welded wire fabric: ASTM A1064/A1064M. Flat sheets are required, rolls are not permitted
- D. Tie wire: ASTM A1064/A1064M, annealed. Provide epoxy coated for epoxy-coated reinforcing and galvanized for architectural concrete.
- E. Bolsters, chairs, spacers and other supports to properly position reinforcement shall conform to the "Bar Support" recommendations of CRSI 10-MSP, and shall be of adequate strength and design to prevent displacement of reinforcement and discoloration of concrete. Where concrete surfaces are exposed to view, weather and/or moisture supports shall be Class 1 Plastic, Plastic Protected, or epoxy-coated. Supports for bottom reinforcement for slabs placed on soil or on a mud mat with no more than 3 inches of cover shall be Class 3 chairs with integral plates or precast concrete blocks not less than 4 inches square.

2.3 FABRICATION OF REINFORCING STEEL

- A. Conform to CRSI Code of Standard Practice-Fabrication.
- B. Cold bend bars.
- C. Bend bars around revolving collar of recommended size.

2.4 EXPANSION ANCHORS

- A. Approved for use in cracked concrete in accordance with ACI 355.2.
- B. Stainless steel AISI Type 316 for galvanized and aluminum fabrications; cadmium plated for painted steel fabrications.
 - 1. Hilti Kwik-Bolt TZ or Hilti HSL, by Hilti Fastening Systems
 - 2. Tru Bolt Stud Anchor by Ramset Fastening System
 - 3. Power-Stud by Powers Fasteners
 - 4. Or equivalent

2.5 EPOXY ADHESIVE ANCHORS

- A. Includes epoxy anchor systems and epoxy adhesive for threaded rods and reinforcing steel bars.
- B. Approved for use in cracked concrete in accordance with ACI 355.4/355.4M.
- C. Materials:
 - 1. Anchor: AISC Type 316 Stainless Steel threaded rod with washer and nut.
 - 2. Adhesive:
 - a. Epoxy adhesive for anchoring reinforcement to concrete shall be a two-component solid epoxy-based system supplied in manufacturer's standard side-by-side cartridge and dispensed through manufacturer's standard static-mixing nozzle. Except for gel times, epoxy adhesive shall conform to ASTM C881. The Grade, Class and Type of epoxy shall be that which is appropriate for the intended use.
 - b. Epoxy adhesive shall pass the creep test requirements of ICC-ES AC58.
 - c. Acceptable manufacturers:
 - i. SET-XP or ET-HP by Simpson Strong Tie Co., Inc.
 - ii. HIT-RE 500-SD by Hilti, Inc.
 - iii. or equal.
- D. Embedment depth for reinforcing bars: Unless otherwise indicated on the Drawings, the embedment depth shall be per the manufacturer's requirements such that:
 - 1. The ultimate strength exceeds the tensile strength of the bar.
 - 2. The ultimate strength divided by a minimum safety factor of 3.75 is at least 40 percent of the yield strength of the bar.

2.6 CAST-IN-PLACE CONCRETE

- A. Concrete Materials:
 - 1. Portland cement: ASTM C150/C150M; Type II. Cement shall be furnished from one source during the project.
 - 2. Blended cements: ASTM C595/595M. Do not use blended cements conforming to ASTM C595/595M if they contain cements conforming to ASTM C1157/C1157M.
 - 3. Supplementary Cementitious Materials:
 - a. Ground Granulated Blast Furnace Slag: ASTM C989 - Grade 100 or 120.
 - b. Silica Fume: ASTM C1240
 - c. Fly Ash: ASTM C618 - Type F

4. Aggregates:

- a. Prohibited: crushed hydraulic cement concrete for aggregate.
- b. Fine aggregate shall consist of washed inert natural sand, free from mineral or other coatings, soft particles, clay, loam, organic or other deleterious materials conforming to the requirements of ASTM C33/C33M and the following requirements:

SIEVE NO.	PERCENT PASSING
4	95 to 100
8	80 to 100
16	50 to 85
30	25 to 60
50	5 to 30
100	0 to 10

The Fineness Modulus shall be between 2.3 to 3.1. The percentage retained between any two consecutive sieves shall not exceed 45%. Color of supernatant liquid above test sample tested in accordance with ASTM C40 shall not be darker than organic plate No. 3.

- c. Coarse aggregate shall consist of a well graded crushed stone or a washed gravel conforming to the requirements of ASTM C33/C33M and the following requirements:

SIEVE	PERCENT PASSING			
	NO. 8 (3/8")	NO. 67 (3/4")	NO. 57 (1")	NO. 467 (1 1/2")
1-1/2 inch	-	-	100	95-100
1 inch	-	100	95-100	-
3/4 inch	-	90-100	-	35-70
1/2 inch	100	-	25-60	-
3/8 inch	85-100	20-55	-	10-30
No. 4	10-30	0-10	0-10	0-5
No. 8	0-10	0-5	0-5	-
No. 16	0-5	-	-	-
No. 50	-	-	-	-

The limits of deleterious substances and physical property requirements shall be listed in ASTM C33/C33M, Table 4, for severe weathering regions.

- d. Aggregate reactivity testing:
 - i. Perform testing on the aggregate in accordance with ASTM C1260 (Rapid Mortar-Bar Test).
- e. Do not use aggregate having a 14 day expansion greater than 0.10% (considered potentially reactive), except if additional testing is performed as follows:

- i. ASTM C1567 (Accelerated Mortar-Bar Test): The 14 day expansion is not greater than 0.10%, or if tested per
 - ii. ASTM C1293 (Concrete Prism Test): The 2-year expansion of concrete prisms is not greater than 0.04%,
 - iii. Cement containing less than 0.60% alkalis is used per ASTM C33/C33M
 - f. Evidence of a satisfactory service record in lieu of testing for alkali reactivity is not permitted.
- 5. Water: Potable from municipal water supply or shall meet the requirements of ASTM C1602. Admixtures:
 - 1. Low Range Water Reducer: MasterPozzolith 210 by BASF; WRDA with HYCOL by W.R. Grace & Company; or equivalent meeting ASTM C494 Type A.
 - 2. High Range Water Reducer (superplasticiser): MasterRheobuild 1000 or MasterGlenium 3030 by BASF; Daracem 100 or ADVA 140M by W.R. Grace & Company; or equivalent meeting ASTM C494 Type F.
 - 3. Water reducing-retarding agents: for use when ambient temperature is above 70°F, replace water reducing agent in whole or in part with water reducing-retarding agent meeting ASTM C494 Type D. Use amounts to produce concrete with a set time equal to that at 70°F without the retarder.
 - 4. Air entraining agent: MasterAir AE 200 by BASF, DAREX II AEA by W.R. Grace & Company; or equivalent meeting ASTM C260.
 - 5. Non-corrosive non-chloride accelerator: MasterSet FP 20 by BASF; PolarSet by W. R. Grace; or equivalent meeting ASTM C494 Type C or E.
 - 6. Not permitted: Calcium chloride, thiocyanates or admixtures containing chloride ions.
 - 7. All admixtures used for each mix design shall be from one common manufacturer.
- C. Concrete Mix Design
 - 1. Concrete Class:
 - a. Class A: Reinforced concrete structures
 - b. Class B: Concrete Fill, Conduit and Pipe Encasements and topping for prestressed precast concrete plank
 - 2. Mix Design:
 - a. Class A: $f'c = 4,500$ psi, max $w/cm = 0.42$
 - b. Class B: $f'c = 3,000$ psi, max $w/cm = 0.50$
 - 3. Maximum nominal aggregate size:
 - a. Coarse aggregate shall conform to the grading given in Table 2 of ASTM C33/C33M for sizes (i.e., nominal maximum aggregate sizes) No. 67 (3/4") and No. 8 (3/8").
 - b. Class A: No. 67 (3/4")
 - c. Class B: No. 8 (3/8")
 - d. Concrete Fill:
 - i. 1/2": minimum thickness less than 2 1/4 inches and fills screeded into place by process equipment,

- ii. $\frac{3}{4}$ " : minimum thickness from 2 $\frac{1}{4}$ inches to less than 6 inches,
 - iii. 1 $\frac{1}{2}$ " : minimum thickness of 6 inches or greater
 - e. Electrical Ductbanks: 3/8"
 - f. Topping of prestressed precast concrete plank: $\frac{1}{2}$ "
- 4. Air entrainment:
 - a. All concrete, except as noted below, shall be air entrained in accordance with the nominal maximum aggregate size, with a tolerance of plus or minus 1.5%:
 - b. No. 8 (3/8") – 7.5%
 - c. No. 67 (3/4") – 6.0%
 - d. Interior concrete slabs to be hard troweled shall have a maximum air content of 3.0%. After the curing period (at which time they are protected), such slabs shall be protected from freezing temperatures for a minimum of 8 weeks. Thereafter, and for the duration of the Contract if such slabs might be subject to freezing temperatures, they shall be fully sheltered from rain, snow and all other water sources.
- 5. Cement: The proposed mix design shall contain cementitious materials in the following proportions:
 - a. Portland Cement - No less than 75% of the total by weight.
 - b. Ground Granulated Blast Furnace Slag - No greater than 25% of the total by weight.
 - c. Fly Ash - No greater than 15% of the total by weight.
- 6. The slump shall be 3" with a 1" plus or minus tolerance at the point of delivery, without use of a high range water reducer. When a high range water reducer is used, the slump shall be as stated above before it is added, and a maximum of 8" at the point of delivery after it is added.
- 7. Water:
 - a. The amount of water carried on the aggregate and the effect of admixtures is included in the water content. Provide that water carried on the aggregate is determined periodically by test and the amount of free water on the aggregate is subtracted from water added to the mixture.
 - b. Maximum amount of water: that required to produce a plastic mixture of the strength and water to cementitious materials ratio specified and the required density, uniformity and workability. Consistency of the mixture: that required for the specific placing conditions and methods.
- 8. High Range Water Reducing admixtures shall be used for all concrete to be pumped or with a specified water/cement ratio below 0.50. High range water reducer shall be added either at the concrete batch plant or on site to obtain the slumps as indicated above.
- 9. Concrete shall be furnished from one supplier and batch plant during the project.
- 10. The Concrete producer shall select the concrete mix proportions on the basis of past field performance or the use of trial mixes, both in accordance with ACI 301, Section 4, "Concrete Mixtures".

2.7 ACCESSORIES

- A. Expansion Joint Fillers (Expansion joints and slab perimeter joints):
 - 1. For joints less than ½" thick: J-Joint polyethylene foam with tear off strip for sealant or equivalent; joint filler to be slab thickness in depth less 0.5 inch for sealant. Deck-o-Foam by W.R. Meadows, Polyfoam by Superior Profiles, or equivalent
 - 2. For joints ½" thick or greater: Self-expanding cork by W.R. Meadows or BoMetals Inc. or equivalent, size as indicated on the Drawings.
- B. PVC Waterstops:
 - 1. PVC waterstops shall meet COE CRD-C 572 except:
 - a. Tensile strength shall exceed 2,000 psi;
 - b. Minimum ultimate elongation shall be 300 percent; and
 - c. Shall be extruded virgin polyvinylchloride with no scrap, reclaimed material, or pigment, and
 - d. Shall be either the flat ribbed type or wire reinforced flat ribbed type
 - 2. Flat Ribbed Type Waterstop:
 - a. Construction and Control Joints: 3/8-inch-thick by 6 inches wide. Type R638 by Vinylex Corporation, Style 679 by Sika Greenstreak, Type FR-6380 by Paul Murphy Plastics Company or equivalent.
 - b. Containment Curbs: 3/16 inch by 4 inches wide. Type R4-316T by Vinylex Corporation, Style 781 by Sika Greenstreak, Type FR-4316 by Paul Murphy Plastics Company, or equivalent.
- C. Surface applied waterstops (hydrophilic rubber type):
 - 1. Hydrotite CJ-1020-2K by Sika Greenstreak
 - 2. Swellseal Joint by de neef Construction Chemicals, Inc.
 - 3. ConSeal CS-231 by Concrete Sealants, Inc.
 - 4. Or equivalent
- D. Surface applied waterstops (elastomeric adhered type):
 - 1. System shall consist of Polyolefin (FPO) sheeting strips adhered to the concrete with an epoxy resin. The hypalon strips shall be minimum 8 inches wide and minimum 2 mm thick. The hypalon rubber shall exhibit a minimum tensile strength of 1,000 psi in accordance with ASTM D412.
 - 2. Sikadur Combiflex SG Type 20-P
 - 3. Sikadur Combiflex SG Type 20-M approved for drinking water contact
 - 4. Or equivalent
- E. Epoxy bonding adhesive: Epoxy resin/portland cement moisture resistant bonding agent: Armathec 110 EpoCem by Sika Corporation, Corr-Bond by Euclid Chemical Company, Epobond by L&M Construction Chemicals, Inc. or equivalent.
- F. Structural inserts: of type and size shown on the drawings; Richmond Screw Anchor, Heckman Building Products, Hohman and Barnard, Dayton Superior or equivalent.
- G. Bond Breaker: Thompson's Water Seal or equivalent, or form oil.

2.8 CURING MATERIALS

- A. Curing and Sealing Compound:
 - 1. Conform to ASTM C309 Type 1 Class B.

2. Acceptable products:
 - a. Harris Emulsion Kurseal 309 by A.H. Harris & Sons, Inc.
 - b. Aqua-Cure VOX by Euclid Chemical Company
 - c. Starseal EF Cure by Vexcon Chemicals
 - d. Or equivalent.
- B. Curing/Hardening Compound:
 1. Sodium Silicate Type
 2. Acceptable products:
 - a. Eucosil by Euclid Chemical Company
 - b. Harris AsSuper KurHard by A.H. Harris & Sons, Inc.
 - c. Or equivalent.
- C. Curing, Sealing and Hardening Compound:
 1. Acrylic water based compound
 2. Acceptable products:
 - a. Ashford Formula by Curecrete
 - b. Starseal EF Medium Gloss by Vexcon Chemicals
 - c. Harris Super Kurseal 800 Emulsion by A.H. Harris
 - d. Or equivalent.
- D. Curing Water: Water shall be potable from a municipal water supply or shall meet the requirements of ASTM C1602, and shall be free of materials that have the potential to stain concrete. The temperature of the curing water shall not be lower than 20°F cooler than the surface temperature of the concrete at the time the water and concrete come in contact.
- E. Curing Blanket: ASTM C171. Cellulose fabric sheets with an impervious layer on one side. Konkure by Raven Industries, UltraCure by Sika Industries or equivalent.
- F. Curing Paper: ASTM C171, regular or white waterproof paper.

2.9 FINISHING MATERIALS

- A. Slab Sealer:
 1. Silane or Siloxane based 96% chloride ion screen
 2. Do not apply to surfaces cured with curing compounds
 3. Acceptable products:
 - a. Euco-Guard-100 by Euclid Chemical
 - b. SikaGard 701W by Sika Corporation
 - c. Starseal EF Weather Seal Plus by Vexcon Chemicals
 - d. Or equivalent
- B. Slab Hardener:
 1. Fluorosilicate water based.
 2. Acceptable products:
 - a. Ultrasil 7 by Euclid Chemical??
 - b. Lapidolith by Sonneborn
 - c. Fluohard by L&M Construction Chemicals, Inc.
 - d. Or equivalent
- C. Evaporation Retardant:
 1. Water based polymer liquid evaporation retardant

2. Acceptable products:
 - a. E-CON as manufactured by L&M Construction Chemicals, Inc.
 - b. SikaFilm by Sika Corporation
 - c. MasterKure ER 50 by Master Builders (Caribbean??)
 - d. Or equivalent.

2.10 REPAIR MATERIALS FOR STRUCTURAL DEFECTS

- A. Patching Mortar: 1 part of a mixture of white and grey portland cement to 2.5 parts of damp loose sand. Cement type to match substrate.
- B. Epoxy Adhesive:
 1. Two or three part water based epoxy bonding agent with cementitious components
 2. Acceptable products:
 - a. Armatec 110 Epocem by Sika Corporation
 - b. Corr-Bond by Euclid Chemical Co.
 - c. Epobond by L&M Construction Chemicals
 - d. MasterEmaco P 124 by Master Builders
 - e. Or equivalent
- C. Repair of random cracks (dry – free of liquid or moisture):
 1. 2-component, 100% solids, moisture-tolerant, low-viscosity, high-strength, multipurpose, epoxy resin adhesive.
 2. Acceptable products:
 - a. Sikadur 35 Hi-Mod LV by Sika Corporation
 - b. Eucopoxy Injection Resin by Euclid Chemical Co.
 - c. MasterInject 1500 by Master Builders
 - d. Or equivalent
- D. Repair of random cracks (wet - presence of liquid or moisture):
 1. Low viscosity polyurethane resin that expands and forms a closed cell foam when it comes in contact with water.
 2. All cracks that are wet (either damp or leaking) at the time of repair shall be repaired with a material that is specifically intended for wet repair as recommended by the manufacturer.
 3. Acceptable products:
 - a. SikaFix HH LV by Sika Corporation
 - b. Dural Aqua-Fil by Euclid Chemical Co.
 - c. MasterInject 1210 IUG by Master Builders
 - d. Or equivalent
- E. Repair of excessive cracking:
 1. Two component, 100% solids, moisture-tolerant, epoxy or urethane crack sealer / penetrating sealer
 2. Acceptable products:
 - a. Sikadur 55 SLV by Sika Corporation
 - b. Euco Qwikstitch by Euclid Chemical Co.
 - c. Or equivalent
- F. Repair of spalls, honeycombs areas and air voids and cementitious overlays:

1. Polymer modified, non-sag cementitious repair mortar with corrosion inhibitor.
2. Repair material shall include peastone for repairs of greater depth as required by the manufacturer. For repair areas involving depths generally in excess of three (3) inches, utilize a repair material suitable for the depth of repair.
3. Acceptable products:
 - a. SikaTop 122 Plus or 123 Plus by Sika Corporation
 - b. Tamms Structural Mortar by Euclid Chemical Co.
 - c. MasterEmaco N 400
 - d. Or equivalent
- G. All repair materials shall be installed in accordance with the manufacturer's recommendations.
- H. All repair materials in contact with potable water shall be NSF Standard 61 approved.

2.11 STORAGE OF MATERIALS

- A. Protect materials from ground and the elements.
- B. Maintain cement in dry condition.
- C. Store reinforcement and all other embedded items on skids.
- D. Keep surface applied waterstops dry.
- E. Remove defective materials from site. Do not store on site.

PART 3 - EXECUTION

3.1 FORMWORK

- A. Conform to ACI 301.
- B. Verify lines, levels and measurements before proceeding.
- C. Erect plumb and straight. Maintain rigid. Brace sufficiently.
- D. Allow no concrete leakage. Provide continuous, straight, smooth exposed surfaces.
- E. Treat forms with form release agent prior to erecting forms. Do not apply form release agent at formed surfaces of construction joints designed with continuous reinforcement or remove all traces from formed joint prior to subsequent concrete placement. Protect reinforcing from contact with form release agent. Any and all form release agent that contacts reinforcing shall be thoroughly removed.
- F. Earth forms not permitted for below grade walls, slabs and footings.
- G. Camber formwork as necessary.
- H. Chamfer all exposed outside corners and edges 0.75 inch unless otherwise noted.
- I. Clean out inside of forms of all foreign materials prior to concrete placement.
- J. Install reinforcing steel spacers as required.
- K. Maintain specified tolerances.
- L. Maintain vertical forms and shores supporting the cast concrete for the time periods indicated below:
 1. Walls and Vertical Surfaces: 36 hours
 2. Forms may be unlocked after 24 hours but shall remain in place for the indicated time periods

3. Time period listed above represents cumulative number of hours during which the temperature of the air surrounding the concrete is above 50°F and the concrete has been damp and no loss of moisture has occurred.
- M. Reshore as required.
- N. Form pressures increase with the use of concrete with High Range Water Reducers. Design forms accordingly.
- O. Clean and repair surfaces of forms to be re-used in work. Split, frayed, delaminated or otherwise damaged form facing material will not be acceptable for exposed surfaces. Apply new form release agent as specified for new formwork.

3.2 REINFORCING STEEL

- A. Conform to the CRSI Code of Standard Practice.
- B. Do not weld reinforcement unless the Engineer takes no exceptions - in writing. When permitted, welding shall be in accordance with AWS D1.4/D1.4M.
- C. Splicing reinforcing steel:
 1. Welded wire fabric: Install in longest sheets practical. Welded wire fabric shall be lapped 1½ wire spacings or 12 inches and securely tied at maximum 24 inches on center. Offset end laps in adjacent sheets.
 2. Reinforcing bars: Splices shall be located as shown on the Contract Drawings. Where not shown, splices shall be located away from areas of maximum stress, and shall be reviewed, with no exceptions taken, by the Engineer. Minimum splice lengths shall be as indicated on the Contract Drawings.
- D. Provide bar supports: on grade use concrete brick; elsewhere use manufactured wire supports.
- E. Reinforcement shall be securely tied at intersections with tie wire or clips in a manner that will keep all metal away from exposed concrete surfaces.
- F. Cutting, heating and bending of reinforcement embedded in the concrete will not be allowed
- G. All reinforcement within an area of a continuous concrete placement shall be installed, supported, and secured before beginning concrete placement.

3.3 EMBEDDED ITEMS

- A. Contractor shall coordinate the installation and securing of all embedded items.
- B. Contractor shall coordinate number and layout of masonry dowels with the mason prior to installation.
- C. Pipes or conduits for embedment within a slab, wall or beam, other than those merely passing through, shall satisfy the following:
 1. Shall not be larger in outside diameter than one-third (1/3) the thickness of the slab or wall.
 2. Shall not be spaced closer than 3 diameters on center.
 3. Shall not impair significantly the strength of the concrete.
 4. Only two conduits or pipes shall cross at any point. The sum of the outside diameter of the crossing pipes or conduits shall not exceed one-third (1/3) of the thickness of the concrete thickness.

5. Conduit shall not be located between the bottom of reinforcing steel and bottom of concrete slab.
6. Aluminum conduit shall not be embedded in concrete.
7. Conduit shall be installed such that there will be NO cutting, bending, and/or displacement of reinforcing from its proper location.
8. Conduit shall not be installed prior to review of conduit layout plan with no exceptions taken by the Engineer.
9. Bondouts in concrete slabs or walls for pipes or conduit shall not be installed unless reviewed with no exceptions taken by the Engineer.

3.4 WATERSTOPS

- A. Waterstops shall be continuous throughout and around all corners and intersections. For PVC waterstops, use factory fabricated intersections such as corners, tees and crosses. Bending waterstop around corners will not be acceptable.
- B. PVC waterstop splices in the field shall be straight butt type. Splices shall be heat fused welded using a Teflon coated thermostatically controlled waterstop splicing iron at 380 °F in accordance with the manufacturer's recommendations. Unacceptable field splices include the following:
 1. Tensile strength less than 80% of the parent section.
 2. Misalignment of centerbulbs and ribs more than 1/16 inch, or that reduces cross section by more than 15%.
 3. Visible porosity, bubbles, or inadequate bonding. If while prodding the joint with a penknife the knife breaks through the outer portion of the weld into a bubble.
 4. Visible signs of splice separation when cooled splice is bent by hand at a sharp angle, including bond failure greater than 1/16 inch depth.
 5. Combined misalignment and bond failure with net cross section reduction of more than 15%.
 6. Charred or burnt material.
 7. Edge welded tee intersections.
- C. All waterstops shall have 2 inches of concrete cover where designated to terminate.
- D. Center waterstop in joint and secure in correct position with hog rings or grommets spaced 12 inches apart along both edges of waterstop and wired to adjacent reinforcement prior to concrete placement.
- E. Pressure wash or otherwise clean waterstop of any and all dried concrete splatter from previous concrete placements.
- F. Hold PVC waterstop rigid with split bulkhead forms at all joints.
- G. Surfaces to receive surface-applied waterstop shall be cleaned of all debris. Apply primer in accordance with manufacturer's recommendations and install surface-applied waterstop. Protect from contact with water.
- H. Place concrete uniformly to avoid displacing waterstop.
- I. Thoroughly vibrate concrete around waterstop to avoid honeycombing and voids in concrete and to ensure complete contact between waterstop and concrete.
- J. Notify Engineer 24 hours prior to installing waterstops.

3.5 EXPANSION ANCHORS AND EPOXY ADHESIVE ANCHORS

- A. Anchors shall be installed by qualified personnel trained to install adhesive anchors.
- B. Anchors shall be installed in strict accordance with the Manufacturer's Printed Installation Instructions (MPII).
- C. Each installer shall at all times have in their possession the MPII.
- D. Adhesive anchors shall be installed in concrete having a minimum age of 21 days at time of installation.
- E. All adhesive anchor cartridges shall have the expiration date clearly visible. Material past its expiration date shall not be used, and shall be immediately removed from the site.
- F. Embedded reinforcement shall be located with proper equipment prior to drilling to ensure that each drilling location does not coincide with existing reinforcement. Drilling through reinforcement shall be prohibited.
- G. If existing reinforcing steel is encountered while drilling, offset the drill hole by a maximum of 2-inches. The new relocated hole shall be in the same line as the line of drilled holes. All offset holes shall be a minimum of 4-inches from a free concrete edge. Maintain the original spacing locations of the remaining dowels as indicated on the Contract Drawings.
- H. Diamond drill bits shall not be permitted. Hammer drills shall be used.
- I. The initial material extruded from each adhesive anchor cartridge shall be discarded in accordance with the manufacturer's instructions to ensure that all material is properly mixed.
- J. Depth stop shall be used to ensure correct drilling depth. Drilled holes shall be blown out with air, thoroughly wire-brushed with a repeated back and forth movement, blown out, thoroughly wire-brushed, and blown out again. Adhesive shall be injected starting from the bottom of the hole, and slowly withdrawn as filling progresses to prevent air pockets.
- K. Anchored reinforcement shall remain completely undisturbed between manufacturer's specified gel time and the full cure time. Zero load shall be applied during this time.

3.6 PLACING CONCRETE

- A. Notify Engineer and Independent Testing Laboratory 24 hours' minimum prior to each placement.
- B. All reinforcement within the area of one day's concrete placement shall be tied in place, and observed by the Engineer, prior to commencing concrete placement.
- C. All concrete delivery trucks at each placement shall be tested for slump and air content.
- D. Assure placement and proper location of all embedded items.
- E. Provide concrete Delivery Slip prepared at batch plant with each truck load of concrete showing the information listed under Submittals in this Section.
- F. Water: additional water added to the mix shall be carefully monitored as follows:
 - 1. Residual, wash, and/or other water in drums: completely discharged prior to concrete batching (drums backed out).

2. Slump adjustment: additional water shall not be added from the time of batching to the point of delivery at the Project site.
 3. Water added after arrival at Project site: accurately metered and recorded on the delivery ticket. The amount of water withheld from batching shall be clearly indicated on the delivery slip. The total water added at the site shall include water added for the truck and water added to the drum from any initial washdown.
- G. Place concrete from mixing truck to final location quickly and without segregation.
- H. Place all concrete from the delivery truck within 90 minutes of addition of water to cement, or cement to aggregate, whichever occurs first. When air temperature is 90°F and above, this time shall be reduced to 60 minutes. These times may be exceeded only upon review with no exceptions taken by the Engineer, and only if all tests for air content, slump and temperature are also within specified limits.
- I. Standing water shall be removed from all forms (except as permitted during hot weather placements) and excavations and the Work shall be kept dry during concrete placement. No water shall be thrown on, allowed to flow over, or rise upon the concrete until it is thoroughly set.
- J. Runways shall be provided for wheeled concrete handling equipment. Runways shall not be supported upon placed reinforcement.
- K. Concrete truck chute shall conform to the following:
1. Minimum slope: 3 horizontal to 1 vertical. Maximum slope: 2 horizontal to 1 vertical. Between these limits the chute slope shall be such to ensure continuous flow without segregation.
 2. Provide baffle at end of chute to prevent segregation. If the end of the chute is more than 3 feet above the surface of deposit, a spout is to be used. The spout is to be kept full of concrete with the end kept as near as practical to the surface of the deposit.
 3. The chute shall be steel or steel-lined. Aluminum chutes are not permitted. Sections of the chute shall have the same slope throughout.
 4. The chute is to be thoroughly flushed with water before and after each use with the water discharged outside the forms.
- L. Freefall from concrete truck discharge chute, pump hose and hopper hose: 4 feet maximum.
- M. The accumulation of concrete on the forms and/or reinforcement above the level of placement shall be avoided. The splashing of concrete upon formwork that is set for a subsequent concrete placement shall be prevented due to the resulting marks on the finished concrete.
- N. Concrete placements shall be carried out in a continuous operation until the placement of the entire section between construction joints is complete. Place against plastic concrete only.
- O. Do not place partially hardened concrete. Re-tempering is not permitted.
- P. Compacting and vibrating concrete:
1. Concrete may be deposited in one or multiple layers. Consolidate each layer by mechanical internal vibrating equipment supplemented by hand spading, rodding, and tamping as required. The depth of each layer shall not exceed the

smaller of 20 inches and the depth that can be properly vibrated with the equipment used. When deposited in multiple layers, the vibrator shall penetrate the preceding layer approximately 6 inches to blend layers. Ensure that initial setting of the previous layer doesn't occur prior to placement of subsequent layer.

2. Do not use vibrator to move fresh concrete within the forms. Insert vibrator at approximately 18 inch intervals, and over-vibration resulting in segregation shall be prevented.
3. Concrete shall be thoroughly consolidated around reinforcement, embedded items and into corners of forms.
4. Vibratory screeds are acceptable for slabs up to 8 inches thick, however internal vibration is required in areas of load-transfer dowels and electrical conduit. Internal vibration is required for slabs thicker than 8 inches.

Q. Placing concrete in cold weather:

1. Conform to ACI 306.1 for concrete placements in cold weather as defined below. When freezing temperatures may occur during periods not defined as cold weather, concrete surfaces shall be protected against freezing for at least the first 24 hours after placement.
2. Cold Weather:
 - a. Cold weather is defined as any and all periods when for more than three consecutive days the average daily outdoor temperature drops below 40°F. (The average daily temperature is the average of the highest and lowest temperature during the period from midnight to midnight.) When temperatures higher than 50°F occur during more than half of any 24-hour duration, the period shall not be regarded as cold weather.
 - b. When freezing temperatures may occur during periods not defined as cold weather, concrete surfaces shall be protected against freezing for at least the first 24 hours after placing.
3. Concrete shall conform to the following temperature limitations when delivered to the project site:

		Concrete Thickness			
Item	Air Temperature	Less than 12 in	12-36 in	36-72 in	Greater than 72 in
Minimum concrete temperature as placed and maintained					
1	--	55°F	50°F	45°F	40°F
Minimum concrete temperature as mixed for indicated air temperature					
2	Above 30°F	60°F	55°F	50°F	45°F
3	0 to 30°F	65°F	60°F	55°F	50°F
4	Below 0°F	70°F	65°F	60°F	55°F

4. The concrete mixing temperature shall not be higher than the minimum concrete placement temperature (Items 2-4 in the table above) by more than 15°F.
5. An Accelerator may be used in the mix design when placing concrete in air temperatures below 50°F.

6. All material and equipment required for cold weather placement, protection and curing shall be available at the project site before commencing concrete placement.
 7. Any enclosure for weather and climate protection shall be in place before depositing any concrete. Heating within the enclosure shall maintain the temperature specified with a reasonable degree of uniformity in all parts of the enclosure. All exposed concrete surfaces within the enclosure shall be kept sufficiently moist to prevent drying. Heating appliances shall not be placed in a manner so as to damage the enclosure, forms, supports, or expose any area of concrete to drying out or to excessive temperatures.
 8. All snow, ice and frost shall be removed from the surfaces against which the concrete is to be placed including subgrade and reinforcement.
 9. Do not place concrete on frozen ground. Insulate or heat subgrade to ensure temperature of subgrade material is above 32°F when concrete is placed.
 10. All embedded items having a cross sectional area of 1.00 square inches or greater, including #9 and larger reinforcing steel bars shall be at a temperature not less than 10°F at time of concrete placement.
 11. Cover, insulate and/or heat as required to protect concrete and provide frost protection beneath structure. Thermal protection shall be provided immediately after concrete placement. Except when supplemental heat is provided, the R-value of the insulation shall be per the recommendations of Chapter 9 of ACI 306R.
- R. Placing concrete in hot weather:
1. Hot Weather: Job-site conditions that accelerate the rate of moisture loss or rate of cement hydration of freshly mixed concrete, including an ambient temperature of 80°F or higher, and an evaporation rate that exceeds 1 kg/m²/h.
 2. Temperature of concrete when placed shall not exceed 90°F. When the air temperature is 90°F and above, procedures to cool mixture ingredients shall be employed. These include:
 - a. Providing shaded storage for aggregate,
 - b. Frequent sprinkling or fog spraying of coarse aggregate,
 - c. Using chilled batch water and/or ice.
 3. Forms and reinforcement shall be sprinkled with cold water just prior to concrete placement. When possible, placement of slabs should be scheduled accordingly in order to minimize problems associated with direct sunlight and/or drying winds.
- S. Pumping: The inside diameter of pipes and hoses used to convey the concrete shall be a minimum of three times the maximum size aggregate of the mixture. In order to minimize altering the concrete properties, long vertical sections at the end of the pump line is prohibited. A horizontal hose run, a hose loop, or a slide gate at the end of the hose is to be used to reduce loss of entrained air.
- T. Thoroughly moisten subgrade materials prior to placing slabs on grade.
- U. When placing new concrete directly against existing concrete, clean the surface of all contamination and debris, and roughen by steel shot-blasting, abrasive (sand) blasting, or water-jetting (hydrodemolition). Use of scabblers, scarifiers, bush

hammers, or pneumatic hammers is not permitted. The prepared surface shall be water-saturated for a minimum of six hours, and the excess water shall be removed immediately prior to placement of concrete. Apply epoxy bonding agent to the prepared surface to bond to new concrete.

- V. Provide concrete pads and foundations for all equipment as shown on Drawings or as required by the equipment manufacturer. Set anchor bolts for equipment with templates at correct elevations using manufacturer's shop drawings reviewed by the Engineer with no exceptions taken unless otherwise indicated. All equipment pads shall be sized by the Contractor and equipment supplier.
- W. Contractor shall coordinate concrete truck wash-out area with Owner.

3.7 TESTING CAST-IN-PLACE CONCRETE

- A. An Independent Testing Laboratory, selected and paid for by the Owner and directed by the Engineer and/or Resident Project Representative, shall test and sample Class A concrete for strength, slump and air content as indicated herein.
- B. The General Contractor shall notify the Independent Testing Laboratory of proposed upcoming concrete placements as follows.
 - 1. The General Contractor shall notify the Testing Laboratory of proposed concrete placements on a weekly basis.
 - 2. The General Contractor shall notify the Testing Laboratory of specific placements a minimum of 24 hours in advance.
- C. Obtain 5 standard test cylinder samples measuring 6"Ø x 12" or 8 test cylinders measuring 4"Ø x 8" for each class of concrete placed in any one day at the following frequency:
 - 1. For each 100 cubic yards of placed concrete, or
 - 2. For each placement less than 100 cubic yards
- D. Concrete cylinders shall be tested as follows:
 - 1. 6"Ø x 12" cylinders:
 - a. Test 2 cylinder at 7 days; two cylinders at 28 days
 - b. Hold one cylinder for later testing (if required)
 - 2. 4" Ø x 8" cylinders:
 - a. Test 3 cylinders at 7 days; three cylinders at 28 days.
 - b. Hold two cylinders for later testing (if required)
- E. Perform slump tests and air entrainment tests at the project site on each truck and at each sampling. Perform slump and air entrainment tests for each condition if applicable:
 - 1. Before addition of high range water reducer (when the high range water reducer is added on site instead of the batch plant)
 - 2. After addition of additional mix water withheld at the batch plant (when the high range water reducer is added on site)
 - 3. After addition of high range water reducer (all concrete).
- F. Sample concrete for testing of air and slump at the discharge end of the truck. When concrete is pumped, concrete taken for test cylinders shall be at the discharge end of the pump hose. All concrete sampled for testing shall be taken from the beginning of the concrete truck discharge. No concrete shall be placed until the testing is complete.

All concrete sampled for casting of cylinders shall be taken from the middle third of the concrete truck discharge.

- G. Perform strength, slump and air entrainment tests at other times when directed by the Resident Project Representative.
- H. Additional testing and sampling required as a result of deficient results or improper curing shall be paid for by Owner. The cost of resampling and retesting will be determined by Engineer, and Owner will invoice Contractor for this cost. If unpaid after 60 days, this invoice amount will be deducted from the Contract Price.
- I. Contractor shall provide and maintain an insulated, heated concrete cylinder curing box, 4 foot square minimum, with a min.-max. thermometer and maintain the temperature between 60°F and 80°F. Contractor to coordinate the location and specific details of the curing box with the Resident Project Representative and Independent Testing Laboratory.
- J. Contractor shall provide access to the site at all times for the Independent Testing Laboratory Personnel.
- K. Additional concrete tests:
 - 1. Independent Testing Laboratory shall provide additional testing of in-place concrete that does not comply with the requirements of the Contract Documents or is considered substandard as directed by Engineer. Additional tests may consist of non-destructive testing, cores drilled from the area in question or load tests. Costs of additional testing will be paid by Owner. The cost of the additional testing will be determined by Engineer and Owner will invoice Contractor for that cost. If unpaid after 60 days, the invoice amount will be deducted from the Contract Price.
 - 2. When the concrete strength is substandard as defined in this Section, concrete core specimens shall be obtained and tested from the affected area. A minimum of three (3) cores shall be taken for each sample in which the strength requirements were not met. The drilled cores shall be obtained and tested in conformance with ASTM C42. Engineer will determine the size and location of the required core samples.

3.8 FINISHES

- A. Repair all defects and allow repair material to properly cure prior to finishing concrete.
- B. Clean all exposed concrete surfaces and adjoining work stained by leakage of concrete.
- C. Finish concrete surfaces as scheduled.

3.9 FINISHING SLABS AND FLATWORK

- A. Screed to bring concrete surface to proper contour and elevation.
- B. Highway straightedge, bull float or darby float the concrete surface immediately after screeding.
- C. Allow bleeding process to complete and for all bleed water to evaporate. Slabs shall not be finished while bleed water is on the surface. Means to accelerate drying such as applying dry cement, sand, and other materials shall be prohibited.

- D. After completion of the above listed procedures, provide one of the concrete finishes listed below as indicated in the Schedule of Finishes:
1. (FF) Float Finish: Float the surface with magnesium or cast aluminum float or with a power finishing machine. Floating shall begin when the water sheen has evaporated and when the slab has stiffened sufficiently to allow proper operation of a power-driven float. Hand floating with wood, aluminum or magnesium floats shall be used at locations inaccessible to a power float.
 2. (LTF) Light Trowel Finish: Provide Float Finish. Apply trowel with a minimum number of passes to provide a sealed surface free of trowel marks. Do not apply an excessive number of trowel passes.
 3. (HTF) Hard Trowel Finish: Provide Float Finish. Steel trowel surface immediately after floating to produce smooth surface. Steel trowel again after concrete has hardened enough so that mortar does not adhere to trowel edge. Ringing sound should be apparent when performing second troweling due to tilted, compacting motion. The finished surface shall be free of trowel marks and uniform in texture and appearance.
 4. (WFF) Wood Float Finish: Allow concrete to stiffen. Use wood float to provide even surface with open pores.
 5. (LBF) Light Broom Finish: Provide FF or WFF as indicated above. While plastic draw a soft-bristled broom, over the concrete in long even strokes with downward pressure. Broom transverse to traffic or at right angles to the slope of the slab.
 6. (SF) Scratch Finish: Roughen the surface with stiff brushes or rakes before final setting. Remove laitance and loose aggregate.
- E. Flatness and Levelness: All concrete slabs with a HTF shall be finished to achieve the following "Face Floor Profile Numbers" for composite flatness (FF) and composite levelness (FL) in accordance with Section 10.15 of ACI 302.1:
1. Specified Overall Value: FF 20/FL 15.
 2. Minimum Local Value: FF 15/FL 10.
- F. Schedule of Finishes:
1. Interior slabs:
 - a. Finish: HTF [or LTF]
 - b. Curing:
 - i. Apply two coats of curing, sealing and hardening compound, or
 - ii. Moist cure and apply two coats of curing, sealing and hardening compound
 2. Exterior slabs
 - a. Finish: LBF
 - b. Curing:
 - i. Apply two coats of curing, sealing and hardening compound
 - ii. Moist cure and apply two coats of curing, sealing and hardening compound

3.10 VERTICAL FORMED SURFACE FINISHES

- A. Concrete surfaces "exposed to view" shall be defined as those exposed to view upon

completion of the Work, whether or not a painted finish is specified. Surfaces which will be covered by fill, such as exterior faces of walls, shall not be considered exposed to view.

- B. Surface tolerance classes indicated herein are specified in ACI 117, and include abrupt surface irregularities that are measured within 1-inch of the irregularity, and gradual surface irregularities measured as the maximum gap between the concrete and the near surface of a 5-foot straight-edge, measured between contact points.
- C. Environmental Surface Finish-2.0 (ESF-2.0):
 - 1. Patch voids larger than $\frac{3}{4}$ inch wide or $\frac{1}{4}$ inch deep.
 - 2. Projections exceeding $\frac{1}{4}$ inch in height to be removed.
 - 3. Patch form tie holes.
 - 4. Repair surface and structural defects as indicated in this Section.
 - 5. Surface tolerance Class B with formed surface irregularities not more than $\frac{1}{4}$ inch.
 - 6. Unless otherwise indicated, ESF-2.0 shall be provided for formed surfaces not exposed to view.
- D. Environmental Surface Finish-3.0 (ESF-3.0):
 - 1. The concrete surface shall be of uniform color, texture and free of all irregularities.
 - 2. The arrangement of the facing material shall be orderly and symmetrical, with the number of seams kept to the minimum.
 - 3. Patch voids larger than $\frac{3}{4}$ inch wide or $\frac{1}{4}$ inch deep.
 - 4. Projections exceeding $\frac{1}{8}$ inch in height to be removed.
 - 5. Patch form tie holes.
 - 6. Repair surface and structural defects as indicated in this Section.
 - 7. Additional finishing and surface preparation will be required for surfaces to receive concrete coatings or waterproofing. Refer to Section 03930 (Coatings) or 07120 (Waterproofing).
 - 8. Surface tolerance Class A in accordance with ACI 117 with formed surface irregularities not more than $\frac{1}{8}$ inch.
 - 9. Unless otherwise indicated, ESF-3.0 shall be provided for formed surfaces exposed to view.
- E. Schedule of Finishes:
 - 1. Interior wall surfaces exposed to view
 - a. Finish: ESF-3.0
 - b. Curing:
 - i. Apply two coats of curing and sealing compound, or
 - ii. Moist cure
 - 2. Exterior wall surfaces exposed to view from top of walls to 6" below grade
 - a. Finish: ESF-3.0
 - b. Curing:
 - i. Apply two coats of curing and sealing compound, or
 - ii. Moist cure
 - 3. Exterior below grade wall surfaces not exposed to view
 - a. Finish: ESF-2.0

- b. Curing:
 - i. Apply two coats of curing and sealing compound, or
 - ii. Moist cure

3.11 CURING

- A. Curing: Curing shall begin immediately following the initial set of concrete or after slab surface finishing has been completed when it will not mar, erode or stain the concrete surface and shall continue after form removal. All concrete shall be cured to attain strength and durability by one of the following methods for a minimum of seven consecutive days immediately after placement:
 - 1. Moist Cure
 - a. Ponding or continuous sprinkling. Intermittent wetting and drying is not an acceptable curing method.
 - b. Application of curing blankets kept continuously wet.
 - c. Application of curing paper kept continuously wet. Use wet methods for the first 24 to 30 hours. Lap side joints 4 inches, and end joints 6 inches. Tape joints or weigh down paper to prevent displacement. Repair any and all tears during the curing period. Apply paper no earlier than 24 hours, and no later than 30 hours, after finishing. The slab surface shall be maintained in a wet condition beneath the paper at all times.
 - d. Contractor shall provide additional heat as required to maintain moist curing.
 - 2. Application of concrete curing compounds.
 - a. For slabs, apply immediately following the disappearance of the surface water sheen after the final finishing pass. For formed concrete, apply immediately after form removal.
- B. Moisture loss from surfaces placed against wooden or metal forms exposed to heating by the sun shall be minimized by keeping the forms wet until they can be safely removed.
- C. After form removal of vertical elements, the concrete shall be cured as indicated for the balance of time remaining as specified above. All exposed concrete (tops of walls) within vertical forms shall begin moist curing within 24 hours of placement, regardless of the duration that the forms will remain in place.
- D. Cold Weather:
 - 1. Unless otherwise superseded by more stringent requirements within this Specification, conform to ACI 306.1 for placement of concrete in cold weather as defined in Part 3.6.
 - 2. Thermal protection must be provided immediately after concrete placement. Procedures for covering, insulating, housing and/or heating concrete shall be prearranged. Except when supplemental heat is provided, the R-value of the insulation shall be in accordance with the recommendations of Chapter 9 of ACI 306R.
 - 3. Concrete structures shall be covered, insulated and heated as required to prevent frost penetration beneath the structures.

4. Maintain concrete at the following minimum temperature (measured at concrete surface) for a minimum protection period of 7 days:
 - a. Sections of less than 12 inch minimum dimension: 55°F
 - b. Sections of 12 to 36 inch minimum dimension: 50°F
 - c. Sections of 36 to 72 inch minimum dimension: 45°F
 - d. Sections greater than 72 in minimum dimension: 40°F
5. Protect concrete from damage due to concentrated heat sources to minimize local carbonation of the concrete surfaces. Combustion heaters shall be located so they do not apply heat directly to the concrete surfaces.
6. For those surfaces requiring curing compounds, reapply curing compounds every two days during heating period or at greater frequencies as required by the manufacturer.
7. The temperature shall be monitored at the surface of the concrete, including corners and edges, which are more vulnerable to low temperature. The concrete surface temperature shall be recorded a minimum of twice per each 24 hour period.
8. Slabs, regardless of air content, shall not be exposed to freezing temperatures when exposed to rain, snow or other water sources, prior to reaching a compressive strength of 3500 psi.
9. Concrete shall be cooled gradually at the end of the protection period. The maximum allowable temperature drop at the concrete surfaces during the first 24 hours after the end of the curing period shall not exceed 5°F in any 1 hour and shall not exceed the following total gradual temperature drop in the first 24 hours:
 - a. Sections of less than 12 inch minimum dimension: 50°F
 - b. Sections of 12 to 36 inch minimum dimension: 40°F
 - c. Sections of 36 to 72 inch minimum dimension: 30°F
 - d. Sections greater than 72 in minimum dimension: 20°F
- E. Hot Weather:
 1. Unless otherwise superseded by the requirements within this Specification, conform to ACI 308.1 for curing of concrete in hot weather as defined in Part 3.6.
 2. Protect concrete from plastic shrinkage cracking and rapid evaporation of water.
 3. Shade concrete from direct sun and protect from wind.

3.12 TOLERANCES

- A. Maximum allowable deviations from dimensions, elevations, slopes and position shall conform to ACI 117. Tolerances apply to concrete dimensions only, not to positioning of vertical reinforcing steel, dowels, or embedded items.

3.13 FAILURE TO MEET STRENGTH REQUIREMENTS

- A. The strength of the concrete in place will be considered substandard if any one of the following results occur: (Note: A strength test is defined as the average of two 6"Ø x 12" cylinders or three 4"Ø x 8" cylinders)

1. The average any three (3) consecutive strength tests at 28 days is less than the specified strength (f'_c).
 2. More than 10 percent of the strength tests have strengths less than the specified strength (f'_c).
 3. A compressive strength test result falls below the specified strength (f'_c) by more than 500 psi.
- B. Concrete which fails to meet the strength requirements as outlined above will be reviewed by the Engineer. The Engineer will determine whether the substandard concrete will be accepted, rejected or additional tests performed.
- C. When substandard concrete occurs as defined in Part A, the Engineer will require corrective measures to be taken immediately in order to increase the average of subsequent strength tests. In addition, the Engineer may require cores drilled in the area of question in accordance with this Section. If the core tests are inconclusive or impractical to obtain, load tests may be required, and their results evaluated in accordance with ACI 318 Chapter 27. If the average of the three cores is less than 85% of the specified strength or if one core is less than 75% of the specified 28-day strength, then that portion of the structure shall be strengthened by a method proposed by the Contractor and no exceptions taken by the Engineer or replaced by the Contractor at no additional cost to the Owner.

3.14 DEFECTIVE CONCRETE

- A. Concrete work will be considered deficient if it does not conform to strength and material durability requirements (including water-to-cementitious materials ratio), location, elevation, dimension, shape, alignments, and/or appearance as required in the Contract Documents. Specific examples of deficient concrete include (but are not limited to):
1. Concrete containing reinforcement that does not meet the requirements of the Contract Documents for size, quantity, strength, position, or arrangement.
 2. Concrete which differs from the required dimensions or locations in such a manner as to reduce the strength.
 3. Concrete surfaces not finished or cured in accordance with this Section.
 4. Concrete work in hot or cold weather that doesn't meet the requirements of the Contract Documents.
 5. Formed surfaces larger or smaller than specified dimensional tolerances. If the Engineer permits the Contractor to correct the error, such correction shall be as directed and in such a manner as to maintain the strength, function and appearance of the structure.
 6. Concrete members cast in the wrong location may be rejected and shall be removed at no additional cost to the Owner if the strength, appearance or function of the structure is adversely affected.
 7. Concrete exposed to view with defects which adversely affect the appearance of the specified finish shall be repaired. If, in the opinion of the Engineer, the defects cannot be repaired, the concrete may be accepted or rejected in accordance with the decision of the Engineer.
 8. Concrete work damaged from accidents, poor construction practices or fire.

- B. Any deficient concrete may be subject to rejection and replacement at no additional cost to the Owner if the Engineer deems necessary.

3.15 PROTECTION

- A. In addition to providing protection against hot and cold weather, provide the following additional protective measures for freshly placed concrete:
1. Protect concrete against vibration until concrete has attained 33% of its 28-day strength. Do not compact soil [drive piles or blast ledge] within 100 feet of freshly placed concrete until concrete has attained 33% of its 28-day strength.
 2. Protect concrete against premature loads until the concrete has been in place for 28 days and the design strength has been attained (unless otherwise indicated). Premature loads include but are not limited to:
 - a. Backfilling
 - b. Loading slabs
 - c. Building CMU walls atop slabs
 - d. Installing equipment on slabs
 - e. Installing equipment atop slabs prior to completion of backfilling

END OF SECTION

APPENDIX A

US Army Corps of Engineers Authorization



**DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS
NEW ENGLAND DISTRICT
696 VIRGINIA ROAD
CONCORD MA 01742-2751**

August 23, 2021

CENAE-RDC-62
Regulatory Division
File Number: NAE-2021-00074

Mr. Chapin Spencer
City of Burlington
149 Church Street
Burlington, Vermont 05401

Dear Mr. Spencer:

The U.S. Army Corps of Engineers (USACE), has reviewed your application to place fill in about 0.003 acre of the Winooski River in conjunction with the repair of existing 12" and 24" outfall pipes at the East Wastewater Treatment Facility off Riverside Avenue in Burlington, Vermont. The work is shown on the enclosed plans, on seven sheets, titled "East Plant Outfall" (dated "11/12/2020") and "EAST WASTEWATER TREATMENT FACILITY OUTFALL REPAIR" (undated).

Based on the information that you have provided, we verify that the activity is authorized under General Permit # 6 of the enclosed December 6, 2017 Federal permit known as the Vermont General Permits (GPs).

Please review the enclosed GPs carefully, including the general conditions beginning on page 26, to be sure that you and whoever does the work understand its requirements. A copy of the GPs and this verification letter shall be available at the project site throughout the time the work is underway. Performing work within our jurisdiction that is not specifically authorized by this determination or failing to comply with any special condition(s) provided below or all the terms and conditions of the GPs may subject you to the enforcement provisions of our regulations. You must perform this work in compliance with the terms and conditions of the GPs.

You must complete and return the enclosed Work Start Notification to this office before the anticipated starting date. You must also complete and return the enclosed Compliance Certification Form within one month following the completion of the authorized work.

This authorization presumes that the work as described above and as shown on your plans noted above is in waters of the U.S. If you wish, you may request an approved jurisdictional determination (which may be appealed), by contacting the Corps district for further instruction.

This authorization expires on December 6, 2022. You must commence or be under contract to commence the work authorized herein by December 6, 2022, and complete the work by December 6, 2023. If not, you must contact this office to determine the need for further authorization before beginning or continuing the activity. We recommend that you contact us *before* this authorization expires to discuss reissuance. Please contact us immediately if you change the plans or construction methods for work in our jurisdiction. We must approve any changes before you undertake them. This authorization does not obviate the need to obtain other Federal, state, or local authorizations required by law.

We continually strive to improve our customer service. In order for us to better serve you, we would appreciate your completing our Customer Service Survey located at <https://regulatory.ops.usace.army.mil/customer-service-survey>.

Please contact Michael S. Adams of my staff at (802) 872-2893 if you have any questions.

Sincerely,

Frank J. DelGiudice
Chief, Permits & Enforcement Branch
Regulatory Division

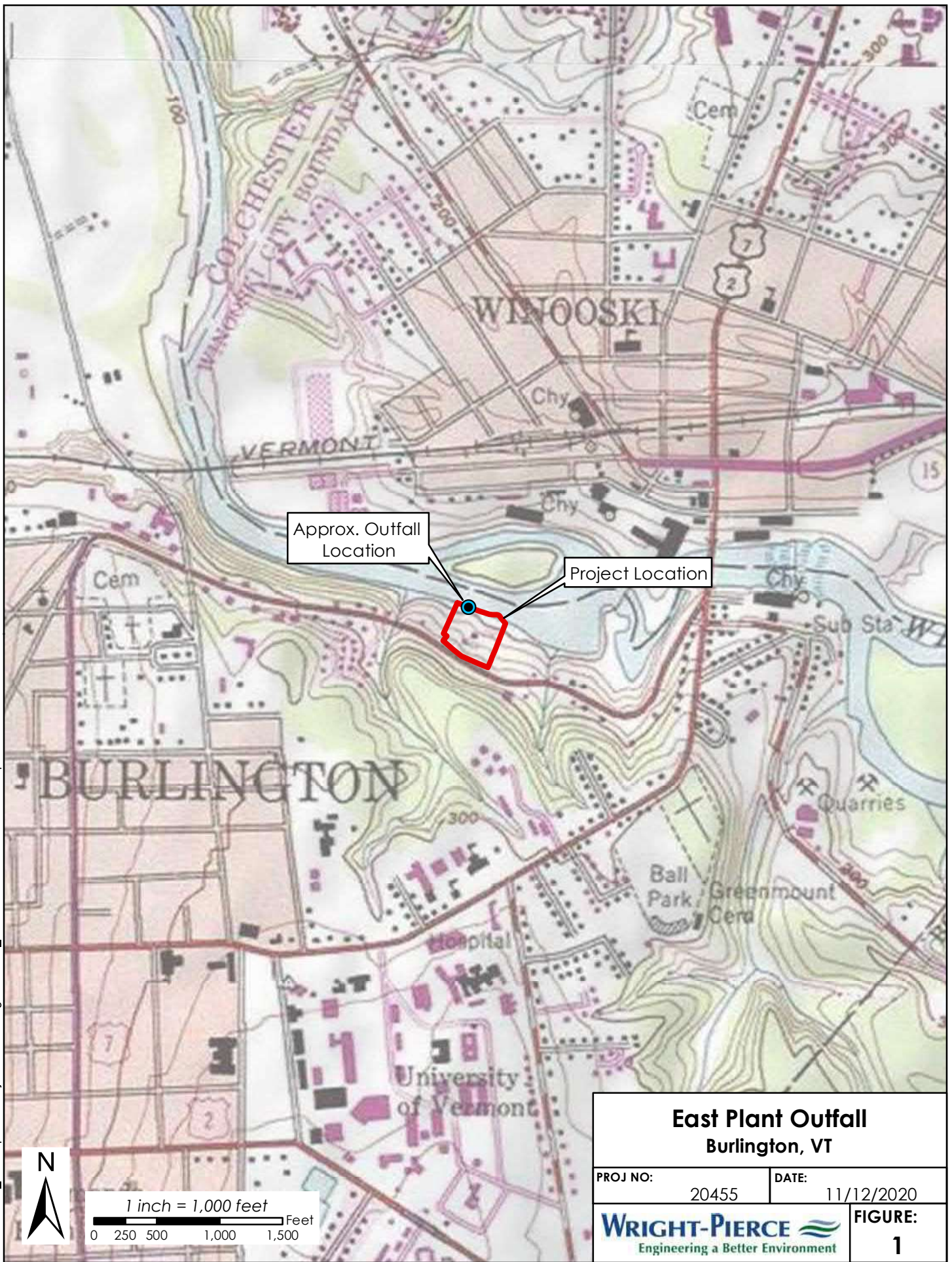
Enclosures

cc:

Mr. Christopher G. Brunelle, VT DEC, Chris.Brunelle@vermont.gov

Mr. Jake Shactman, Wright-Pierce, Jacob.schactman@wright-pierce.com

Mr. Chapin Spencer, City of Burlington, cspencer@burlingtonvt.gov





**US Army Corps
of Engineers®**

New England District

(Minimum Notice: Permittee must sign and return notification
within one month of the completion of work.)

COMPLIANCE CERTIFICATION FORM

USACE File Number: NAE-2021-00074

Name of Permittee: City of Burlington

Verification Date: August 23, 2021

Please sign this certification and return it to the following address upon completion of the activity and any mitigation required by the permit. You must submit this after the mitigation is complete, but not the mitigation monitoring, which requires separate submittals.

* EMAIL TO: michael.s.adams@usace.army.mil *
* or *
* MAIL TO: U.S. Army Corps of Engineers, New England District *
* Vermont Project Office *
* 11 Lincoln Street, Room 210 *
* Essex Junction, Vermont 05452 *

Please note that your permitted activity is subject to a compliance inspection by an U.S. Army Corps of Engineers representative. If you fail to comply with this permit you are subject to permit suspension, modification, or revocation.

I hereby certify that the work authorized by the above referenced permit was completed in accordance with the terms and conditions of the above referenced permit, and any required mitigation was completed in accordance with the permit conditions.

Signature of Permittee

Date

Printed Name

Date of Work Completion

Telephone Number

General Permit No.: NAE-2017-02232
Applicant: General Public in the State of Vermont

Effective Date: December 6, 2017
Expiration Date: December 6, 2022

**DEPARTMENT OF THE ARMY
GENERAL PERMITS FOR THE
STATE OF VERMONT**

The New England District of the U.S. Army Corps of Engineers (Corps) hereby issues General Permits (GPs) for activities subject to Corps jurisdiction in waters of the United States (U.S.), including navigable waters, within boundaries of the State of Vermont. These GPs are issued in accordance with Corps regulations at Title 33 of the Code of Federal Regulations, Parts 320–332 (see 33 CFR 325.2(e)(2)). These GPs will provide protection to the aquatic environment and the public interest while effectively authorizing activities that have no more than minimal individual and cumulative adverse environmental effects.

I. GENERAL CRITERIA

1. In order for activities to qualify for these GPs, they must meet the terms, eligibility criteria and stipulations listed in Appendix A – General Permits, as well as the General Conditions (GCs) listed in Appendix B. The Corps will consider any activity requiring Corps authorization to be unauthorized if that activity is under construction or completed and does not comply with all of the terms and conditions.
2. Project proponents are encouraged to contact the Corps with questions at any time. Pre-application meetings (see 33 CFR 325.1(b)), whether arranged by the Corps or requested by permit applicants, are encouraged to facilitate the review of projects. Pre-application meetings and/or site visits can help streamline the permit process by alerting the applicant to potentially time-consuming concerns that may arise during the evaluation of their project (e.g., avoidance, minimization and compensatory mitigation requirements, historic properties, and endangered species).
3. Federal and state jurisdictions may differ in some instances. Applicants are responsible for applying for and obtaining any of the required state or local approvals (see General Condition (GC) 1). A permit from the Corps may be required for specific projects regardless of State of Vermont jurisdiction.

These GPs may also be used to authorize projects that are not regulated by the State of Vermont (e.g., seasonal floats or moorings).

4. How to Obtain/Apply for Authorization:

Project proponents must read the text of each GP and the GCs to see if an activity is eligible for authorization.

a. Self-Verification (SV):

- i. May proceed without application or notification to the Corps provided the project proponent verifies that the activity will meet the terms and conditions of applicable GPs. Project proponents must comply with other federal laws such as the National Historic Preservation Act

(NHPA), the Endangered Species Act (ESA) and the Wild and Scenic Rivers Act. Consultation with outside experts, such as the State Historic Preservation Office, Stockbridge-Munsee Tribe, and the U.S. Fish and Wildlife Service (USFWS) may also be necessary.

b. Pre-Construction Notification (PCN):

i. For activities that do not qualify for SV, the applicant must submit a PCN to obtain written verification from the Corps before starting work in Corps jurisdiction. Applicants must submit the following directly to the Corps at the Vermont Project Office (VPO):

- A completed Corps application form (ENG Form 4345¹).
- Plans that illustrate the proposed work in reference to the limits of Corps jurisdiction as applicable. Plans should be on 8.5" x 11" or 11" x 17" paper and contain all other appropriate information.
- Federal wetland delineation documentation (i.e. Wetland Determination Data Forms).
- Any information on federally listed endangered and threatened species and critical habitat that occur or may occur in the project area (See GC 11). Contact information for the Vermont Agency of Natural Resources (VT ANR), Vermont Fish & Wildlife Department, and the Nongame and Natural Heritage program is provided on Page 37.
- Any correspondence with the Vermont State Historic Preservation Officer (VT SHPO) and the Stockbridge-Munsee Tribal Historic Preservation Officer (THPO) indicating coordination with these entities to ensure compliance with GC 10. Applicants are encouraged to submit a copy of their application materials to the VT SHPO and THPO, for projects in Addison, Rutland and Bennington counties, at the same time, or before, they apply to the Corps to be reviewed for the presence of historic, archaeological or tribal resources in the permit area that the proposed work may affect.

The Corps will coordinate review of all PCN activities with federal and state agencies to ensure that the proposed activity results in no more than a minimal impact to the aquatic environment. This may require project modifications involving avoidance, minimization, and/or compensatory mitigation for unavoidable impacts to ensure the net effects of a project are minimal.

ii. Emergency Situations: Contact the Corps in the event of an emergency situation for information on the application and approval process. Emergency situations are limited to sudden, unexpected occurrences that could potentially result in an unacceptable hazard to life, a significant loss of property, or an immediate, unforeseen, and significant economic hardship if corrective action requiring a permit is not undertaken within a time period less than the normal time needed to process an application under standard procedures. Emergency work is subject to the same terms and conditions of these GPs as non-emergency work, and similarly, must qualify for authorization under the GPs; otherwise an Individual Permit (IP) is required. The Corps will work with all applicable agencies to expedite verification according to established procedures in emergency situations.

5. Projects that are not authorized by these GPs may require an IP (33 CFR 325.5(b)) and proponents must submit an application directly to the Corps. These GPs do not affect the Corps' IP review process or activities exempt from Corps permit requirements. The Corps retains discretionary authority on a case-by-case basis to elevate a SV to PCN or IP, or a PCN to IP based on concerns for the aquatic environment or for any other factor of the public interest (33 CFR 320.4(a)). Whenever the Corps notifies an applicant that a PCN or IP is required, no work in Corps jurisdiction may be conducted until the Corps issues the required authorization in writing indicating that work may proceed. For IPs an

¹ Located at www.nae.usace.army.mil/regulatory under "Forms."

individual 401 Water Quality Certification (WQC) or waiver is required from the VT ANR. Contact the VT ANR for procedures on how to apply for the WQC.

II. JURISDICTION/AUTHORITY TO ISSUE PERMITS

1. Permits are required from the Corps of Engineers for the following regulated activities:
 - a. Work and structures that are located in, under or over any navigable water of the U.S. (defined at 33 CFR 329) that affect the course, location, condition, or capacity of such waters; or the excavating from or depositing material in navigable waters. (Regulated by the Corps under Section 10 of the Rivers and Harbors Act of 1899);
 - b. The discharge of dredged or fill material into waters of the U.S. (defined at 33 CFR 328), which is regulated by the Corps under Section 404 of the Clean Water Act (CWA).
2. Related laws: 33 CFR 320.3 includes a list of related laws, including: Section 401 of the CWA, Section 402 of the CWA, the National Historic Preservation Act of 1966, the Endangered Species Act, the Fish and Wildlife Act of 1956, Magnuson-Stevens Act, and Section 7(a) of the Wild and Scenic Rivers Act.
3. In order for authorizations under this GP to be valid, a WQC under Section 401 of the CWA (33 USC 1341) or waiver thereof must be obtained from the VT ANR, Watershed Management Division prior to the commencement of work in Corps jurisdiction. The VT ANR has granted WQC for SV activities provided that (a) the Corps will exercise its discretionary authority to review any project covered under SV when notified by the VT ANR that such project represents a threat to water quality and; (b) upon issuing notice to the Corps, VT ANR may exercise its discretion to require an individual water quality certification.

The VT ANR conditionally granted WQC for PCN activities provided the Corps notifies the VT ANR of a project application for a PCN activity. The VT ANR retains its discretion to require an individual WQC. The VT ANR will respond within the same response times required of the Federal resource agencies.

III. ELIGIBLE ACTIVITIES

An activity listed below may be authorized by this GP only if that activity and the permittee satisfy all of the GP's terms and conditions. Any activity not specifically listed below may still be eligible for the GP; applicants are advised to contact the Corps for a specific eligibility determination.

“Permanent impacts” means waters of the U.S. that are permanently affected by filling, flooding, excavation, drainage or clearing because of the regulated activity. Permanent impacts include permanent discharges of dredged or fill material that change an aquatic area to dry land, increase the bottom elevation of a waterbody, or change the use of a waterbody. Temporary impacts include, but are not limited to, waters of the U.S. that are temporarily filled, flooded, excavated, drained or cleared because of the regulated activity. Temporary impacts are usually associated with construction activities and often involve the placement of cofferdams and construction mats. These fills are removed when construction is completed. Pilings and associated structures do not ordinarily constitute a discharge of fill material. Impacts resulting from activities eligible for exemptions under §404(f) of the CWA are not considered when calculating the impact area.

Vermont General Permits

1. Aids to Navigation
2. Repair or maintenance of existing currently serviceable, authorized or grandfathered structures/fills, removal of structures
3. Moorings
4. Pile-supported structures & floats, including boat lifts/hoists and other miscellaneous structures & work
5. Boat ramps and marine railways
6. Utility line activities
7. Dredging, beach nourishment, rock removal & rock relocation
8. Discharges of dredged or fill material incidental to the construction of bridges
9. Shoreline and bank stabilization projects
10. Aquatic habitat restoration, establishment and enhancement activities
11. Fish and wildlife harvesting activities
12. Oil spill and hazardous material cleanup
13. Cleanup of hazardous and toxic waste
14. Scientific measurement devices
15. Survey activities
16. Mining Activities
17. New/expanded developments & recreational facilities
18. Linear transportation projects and stream/wetland crossings
19. Energy generation and renewable energy generation facilities and hydropower projects
20. Temporary fill not associated with any other GP activities
21. Agricultural activities

APPENDIX A – GENERAL PERMITS

GP 1. AIDS TO NAVIGATION (Section 10) Aids to navigation and regulatory markers that are approved by and installed in accordance with the requirements of the U.S. Coast Guard (USCG). See 33 CFR 66, Chapter I, subchapter C.	
Self-Verification (SV) Eligible	Pre-Construction Notification (PCN) Required
1. Aids to navigation and regulatory markers approved by and installed in accordance with the requirements of the USCG. Not located within a Corps Federal Navigation Project (FNP).	1. Work not eligible for SV. 2. Aids to navigation and regulatory markers or temporary buoys, markers, floats, and similar structures that are located within a Corps FNP.

GP 2. REPAIR OR MAINTENANCE OF EXISTING CURRENTLY SERVICEABLE, AUTHORIZED OR GRANDFATHERED STRUCTURES/FILLS & REMOVAL OF

STRUCTURES AND FILLS (Sections 10 & 404) (a) Repair, rehabilitation, or replacement of any previously authorized, currently serviceable structure or fill, or of any currently serviceable structure or fill authorized by 33 CFR 330.3 (activities occurring before certain dates), provided that the structure or fill is not to be put to uses differing from those uses specified or contemplated for it in the original permit or the most recently authorized modification. Minor deviations in the structure's configuration or filled area, including those due to changes in materials, construction techniques, requirements of other regulatory agencies, or current construction codes or safety standards that are necessary to make the repair, rehabilitation, or replacement are authorized. Includes removal of structures and fill.

Not authorized under GP 2: Permanent impacts >5,000 SF in Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands, and >1 acre in all other waterways and/or wetlands.

Self-Verification (SV) Eligible	Pre-Construction Notification (PCN) Required
<p>1. Repair, replacement in-kind, or maintenance of existing, currently serviceable, authorized structures or fills with no substantial expansion or change in use:</p> <ul style="list-style-type: none"> - Conditions of the original authorization apply. - Minor deviations in fill design allowed. - The repair, rehabilitation, or replacement of those structures or fills destroyed or damaged by storms, floods, fire or other discrete events is authorized, provided the repair, rehabilitation, or replacement is commenced, or is under contract to commence, within two years of the date of their destruction or damage. In cases of catastrophic events, such as hurricanes or tornadoes, the Corps may waive the two-year limit in writing provided the permittee can demonstrate funding, contract, or other similar delays. - Maintenance includes, but it is not limited to, the removal of accumulated sediments and debris in the vicinity of existing structures (such as bridges, culverted road crossings, water intake structures, dams, etc.), provided: (a) removal is the minimum necessary to restore the waterway in the vicinity of the structure to the approximate dimensions that existed when the structure was built; and (b) all dredged or excavated materials are deposited and retained in an upland area. <p>2. Bulkhead replacement via installation of new bulkhead within 18" of existing bulkhead & backfill.</p> <p>3. Construction mats of any area necessary to conduct activities that were previously authorized, authorized under SV, or not subject to regulation in all waterways and wetlands other than Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands and should be removed as soon as work is completed.</p> <p>4. Removal of previously authorized structures or fills.</p>	<p>1. Work not eligible for SV.</p> <p>2. Dam and flood control or levee repair, rehabilitation, or replacement which involves a change in the flood elevation or permanent water surface elevation of the impoundment.</p> <p>3. Construction mats of any area necessary to conduct activities that were previously authorized, authorized under SV, or not subject to regulation in Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands and should be removed as soon as work is completed.</p> <p>4. The discharge of more than <i>de minimis</i> (i.e., inconsequential) quantities of accumulated bottom sediment occurring from or through a dam into downstream waters.</p> <p>NOTE 1: Grandfather dates include structures or work completed before December 18, 1968 & fill placed before July 25, 1975 for Corps purposes only.</p> <p>NOTE 2: This GP authorizes the repair, rehabilitation, or replacement of any previously authorized structure or fill that does not qualify for the CWA §404(f) exemption for maintenance. See 33 CFR 323.4(a)(2).</p>

GP 3. MOORINGS (Section 10) (a) New private, non-commercial, non-rental, single-boat moorings; (b) Minor relocation of previously authorized moorings; (c) Mooring field expansions, boundary reconfigurations, or modifications of previously authorized mooring fields; and (d) Maintenance and replacement of moorings.

Not authorized under GP 3: Moorings or moored vessels that extend within the horizontal limits of Federal Navigation Projects (FNPs) and moorings associated with a new boating facility.

Self-Verification (SV) Eligible	Pre-Construction Notification (PCN) Required
1. Private, non-commercial, non-rental, single-boat moorings. 2. Minor relocation of previously authorized moorings.	1. Work not eligible for SV. 2. New moorings associated with an existing boating facility.

GP 4. PILE-SUPPORTED STRUCTURES & FLOATS, INCLUDING BOAT LIFTS/HOISTS & OTHER MISCELLANEOUS STRUCTURES & TEMPORARY RECREATIONAL STRUCTURES (Section 10) (a) New, expansions, reconfigurations, or modifications of structures for navigation access including docks, decks, floats, stairs, and boat/float lifts; and (b) Temporary buoys, markers, and similar structures placed for recreational use during specific events such as water skiing competitions and boat races or seasonal use.

Not authorized under GP 4: (a) Fill or excavation; (b) Structures within Federal Navigation Projects (FNPs); or (c) Structures associated with a new boating facility.

Self-Verification (SV) Eligible	Pre-Construction Notification (PCN) Required
<p>1. Reconfiguration of existing authorized docks with no additional slips and no expansion, provided those structures do not extend beyond the existing perimeter of the facility.</p> <p>2. Seasonal private, residential pile- or float-supported structures for navigational access extending no further waterward than 50 FT beyond mean high water (MHW), not >4 FT wide, and a dock deck area <500 SF.</p> <p>3. Private, bottom-anchored floats and seasonal swim floats <400 SF.</p> <p>4. Private boat & float lifts.</p> <p>5. Temporary buoys, markers, and similar structures: (a) placed for recreational use during specific events, provided that such structures are removed within 30 days after use has been discontinued and/or; (b) placed during winter events on ice and removed before spring thaw.</p> <p>Provided 1 - 4 above do not extend across >25% of the waterway width at mean low water (MLW).</p>	<p>1. Work not eligible for SV.</p> <p>2. Piers, docks, decks, floats, and similar structures that provide public, community or government recreational uses such as boating, fishing, swimming, access, etc.</p> <p>3. Structures or work in or affecting navigable waters of the U.S. that are not defined under any other GP activity.</p> <p>4. New structures within an existing boating facility, provided those structures do not extend beyond the existing perimeter of the boating facility.</p> <p>5. Temporary buoys, markers, and similar structures that will not be removed within 30 days after use has been discontinued.</p> <p>NOTE: The Corps may require a letter of no objection from the abutter if structure is to be within 25 feet of the property line.</p>

GP 5. BOAT RAMPS (Sections 10 and 404) Activities required for the construction of boat ramps including excavation and fill.

Not authorized under GP 5: (a) Permanent impacts $\geq 5,000$ SF in Lake Champlain, Lake Memphremagog and Wallace Pond and adjacent wetlands, and >1 acre in all other waterways and/or wetlands; (b) Temporary impacts >1 acre in waters of the U.S.; or (c) dredging in navigable waters of the U.S. (see GP 7).

Self-Verification (SV) Eligible	Pre-Construction Notification (PCN) Required
<p>1. $<5,000$ SF of permanent and temporary impacts in waterways and/or wetlands other than Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands.</p>	<p>1. Work not eligible for SV.</p> <p>2. <5000 SF permanent impact and <1 acre of temporary impact and excavation in Lake Champlain, Lake Memphremagog and Wallace Pond and adjacent wetlands.</p> <p>3. Permanent and temporary impacts $\geq 5,000$ SF and <1 acre in waterways and/or wetlands, other than Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands.</p> <p>NOTE: The Corps may require a letter of no objection from the abutter if structure is to be within 25 feet of the property line.</p>

GP 6. UTILITY LINE ACTIVITIES (Sections 10 & 404) Activities required for (a) The construction, maintenance, relocation, repair, & removal of utility lines, including outfall and intake structures, and the associated excavation, backfill, or bedding for utility lines; (b) The construction, maintenance or expansion of utility line substation facilities associated with a power/utility line in waters of the U.S.; and (c) The construction and maintenance of foundations for overhead utility line towers, poles, and anchors, provided the foundations are the minimum size necessary, and separate footings for each tower leg (rather than a larger single pad) are used where feasible. This GP authorizes the construction of access roads to facilitate construction of the above activities, provided the activity, in combination with all other activities included in one single and complete project, does not cause the permanent loss of greater than 1 acre of waters of the U.S. Impacts resulting from mechanized pushing, dragging or other similar activities that redeposit excavated soil material shall be figured into the area limit determination.

Not authorized under GP 6: Permanent and temporary impacts $\geq 5,000$ SF in Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands, and >1 acre in all other waterways and wetlands.

Self-Verification (SV) Eligible	Pre-Construction Notification (PCN) Required
<p>1. $<5,000$ SF of permanent and temporary impacts in waterways and/or wetlands other than Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands.</p> <p>2. Intake structures that are dry hydrants used exclusively for firefighting activities with no stream impoundments.</p> <p>NOTE: Construction mats of any area necessary to conduct activities do not count towards the 5,000 SF threshold and should be removed as soon as work is completed.</p>	<p>1. Work not eligible for SV.</p> <p>2. Overhead utility lines constructed over navigable waters of the U.S. and submarine utility lines that are routed in or under such waters.</p> <p>3. Permanent and temporary impacts are:</p> <ul style="list-style-type: none"> a. $<5,000$ SF in Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands. b. $\geq 5,000$ SF and <1 acre in waterways and/or wetlands other than Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands. <p>4. Work involves stream channelization, relocation or loss of streambed including impoundments.</p> <p>NOTE 1: Construction mats of any area necessary to conduct activities do not count towards the thresholds and should be removed as soon as work is completed.</p> <p>NOTE 2: Utility lines consisting of aerial electric power transmission lines crossing navigable waters of the U.S. must comply with the applicable minimum clearances specified in 33 CFR 322.5(i).</p>
<p>NOTE: A utility line is defined as any pipe or pipeline for the transportation of any gaseous, liquid, liquescent, or slurry substance, for any purpose, and any cable, line, or wire for the transmission for any purpose of electrical energy, telephone, data, and telegraph messages, and radio and television communication. The term utility line does not include activities that drain a water of the U.S., such as drainage tile or French drains, but it does apply to pipes conveying drainage from another area.</p>	

GP 7. DREDGING (Section 10), BEACH NOURISHMENT (Sections 10 & 404); ROCK REMOVAL (Section 10) & ROCK RELOCATION (Sections 10 & 404) (a) New and maintenance dredging, including disposal of dredged material for beach nourishment, provided the Corps finds the dredged material to be suitable for such disposal; (b) Beach nourishment not associated with dredging; and (c) Rock removal and relocation for navigation.

Not authorized under GP 7: (a) New and maintenance dredging $\geq 5,000$ CY; (b) Permanent fill $\geq 5,000$ SF in Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands, and >1 acre in all other waterways and/or wetlands; (c) Regulated discharges associated with excavation, and disposal $>1/2$ acre; and (d) Temporary fill >1 acre in all waterways and wetlands.

Self-Verification (SV) Eligible	Pre-Construction Notification (PCN) Required
<ol style="list-style-type: none"> 1. No new or maintenance dredging in navigable waters of the U.S. 2. $<5,000$ SF of temporary impact associated with dredging in waterways and/or wetlands. 3. Rock removal and relocation ≤ 200 SF of impacts. 	<ol style="list-style-type: none"> 1. Work not eligible for SV. 2. New and maintenance dredging up to 5,000 CY with upland disposal or beach nourishment in navigable waters of the U.S. 3. $\geq 5,000$ SF and <1 acre of temporary impact associated with dredging in all waterways and/or wetlands. 4. Disposal of dredged material for beach nourishment: <ol style="list-style-type: none"> a. $<5,000$ SF in Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands. b. $\geq 5,000$ SF and <1 acre in waterways and/or wetlands other than Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands.

GP 8. DISCHARGES OF DREDGED OR FILL MATERIAL INCIDENTAL TO THE CONSTRUCTION OF BRIDGES (Section 404 – navigable waters of the U.S. only) Discharges of dredged or fill material incidental to the construction and modification of bridges across navigable waters of the U.S., including cofferdams, abutments, foundation seals, piers, and temporary construction and access fills, **provided that the USCG authorizes the construction of the bridge structure under Section 9 of the Rivers and Harbors Act of 1899 or other applicable laws.** A USCG Authorization Act Exemption or a STURRA (144h) exemption do not constitute USCG authorization (see GP 18).

Not authorized under GP 8: Causeways and approach fills (see GP 18)

Self-Verification (SV) Eligible	Pre-Construction Notification (PCN) Required
Discharges of dredged or fill material incidental to the construction and modification of bridges.	

<p>GP 9. SHORELINE & BANK STABILIZATION PROJECTS (Sections 10 & 404) Bank stabilization activities necessary for erosion protection along the banks of lakes, ponds, streams, and any other open waters. Includes bulkheads, seawalls, riprap, revetments or slope protection & similar structures, as well as vegetative planting, soil bioengineering, or alternative techniques that are a combination of the two (e.g. living shorelines), specifically for the purpose of shoreline protection.</p> <p>Not authorized under GP 9: (a) Bank stabilization ≥ 500 LF in total length and/or involving more than an average of 1CY of fill per linear foot placed below the plane of the ordinary high water mark in Lake Champlain, Lake Memphremagog and Wallace Pond and adjacent wetlands; (b) Stream channelization or relocation activities; or (c) breakwaters, groins and jetties.</p>	
Self-Verification (SV) Eligible	Pre-Construction Notification (PCN) Required
<p>1. No fill in Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands.</p> <p>2. Bank stabilization <200 linear feet long and does not exceed an average of 1 CY of fill per linear foot placed below the plane of the ordinary high water mark in waterways and wetlands other than Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands.</p> <p>3. <5,000 SF of temporary fill associated with bank stabilization in waterways and/or wetlands, other than Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands.</p>	<p>1. Work not eligible for SV.</p> <p>2. Bank stabilization <500 linear feet and an average of <1 CY of fill per linear foot placed below the plane of the ordinary high water mark in Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands.</p>

GP 10. AQUATIC HABITAT RESTORATION, ESTABLISHMENT & ENHANCEMENT ACTIVITIES (Sections 10 and 404) Activities in waters of the United States associated with the restoration, enhancement, and establishment of wetlands and riparian areas; the restoration and enhancement of streams and other open waters; the relocation of non-navigable waters of the U.S., including streams & associated wetlands for reestablishment of a natural stream morphology and reconnection of the floodplain; and the restoration and enhancement of shellfish, finfish and wildlife, provided those activities result in net increases in aquatic resource functions and services.

Not authorized under GP 10: Stream channelization activities.

Self-Verification (SV) Eligible	Pre-Construction Notification (PCN) Required
<p>1. No fill in Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands.</p> <p>2. Permanent and temporary impacts are <5,000 SF in waterways and/or wetlands provided the activity is supported in writing by a state, or non-Corps Federal environmental agency.</p> <p>3. No conversion of a stream to wetland or vice versa, or wetland to a pond or uplands.</p> <p>4. Temporary structures in navigable waters of the U.S. not exceeding 30 days.</p>	<p>1. Work not eligible for SV.</p> <p>2. Permanent or temporary impacts are:</p> <ul style="list-style-type: none"> a. In Lake Champlain, Lake Memphremagog, Wallace Pond, adjacent wetlands; or b. ≥5,000 SF in all other waterways and/or wetlands. <p>3. Permanent structures in navigable waters of the U.S.</p> <p>4. Sea Lamprey control projects.</p> <p>5. Water impoundments.</p> <p>6. Dam removals.</p> <p>7. Restoration, establishment and/or enhancement activities approved for use by a Corps-approved In-Lieu Fee Program or Corps-approved mitigation bank, with impacts of any size.</p>

GP 11. FISH & WILDLIFE HARVESTING ACTIVITIES (Sections 10 and 404) Activities in waters of the United States associated with fish and wildlife harvesting devices, such as duck blinds, fish shanties, and small fish aggregating and attraction devices.

Not authorized by GP 11: (a) Artificial reefs; and (b) Permanent and temporary fill >5,000 SF in all waterways and/or wetlands.

Self-Verification (SV) Eligible	Pre-Construction Notification (PCN) Required
1. Non-fill activities associated with fish and wildlife harvesting devices including duck blinds, fish shanties and small fish aggregating and attraction devices.	1. Work not eligible for SV. 2. Permanent and temporary impacts <5,000 SF in all waterways and/or wetlands.

GP 12. OIL SPILL & HAZARDOUS MATERIAL CLEANUP (Sections 10 and 404): (a) Activities conducted in response to a discharge or release of oil and hazardous substances that are subject to the National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR 300) including containment, cleanup, and mitigation efforts, provided activities are done under either (i) The Spill Prevent, Control & Countermeasure Plan required by 40 CFR 112.3; (ii) The direction or oversight of the Federal on-site coordinator designated by 40 CFR 300; or (iii) Any approved existing State, regional or local contingency plan, provided that the Regional Response Team concurs with the proposed response efforts or does not object to the response effort; (b) Activities required for the cleanup of oil releases in waters of the U.S. from electrical equipment that are governed by EPA's polychlorinated biphenyl (PCB) spill response regulations at 40 CFR 761; (c) Booms placed in navigable waters of the U.S.; and (d) Use of structures & fills for spill response training exercises. Special Aquatic Sites (SAS) must be restored to their original condition and elevation.

Self-Verification (SV) Eligible	Pre-Construction Notification (PCN) Required
<ol style="list-style-type: none"> 1. Activities that are conducted in accordance with a. or b. above. 2. Booms placed in navigable waters of the U.S. for hazardous and toxic waste containment, absorption and prevention, provided they are removed upon completion of the cleanup. 3. Temporary impacts for spill response training exercises <1000 SF in navigable waters of the U.S. and <5000 SF in all other waters of the U.S., and in place ≤30 days. 	<ol style="list-style-type: none"> 1. Work not eligible for SV. 2. Permanent structures or impacts for spill response training exercises.

GP 13. CLEANUP OF HAZARDOUS & TOXIC WASTE (Sections 10 and 404) Specific activities to effect the containment, stabilization or removal of hazardous or toxic waste materials, including court ordered remedial action plans or related settlements which are performed, ordered or sponsored by a government agency with established legal or regulatory authority. SAS must be restored to their original condition and elevation.

Not authorized under GP 13: (a) the establishment of new disposal sites; or (b) the expansion of existing sites used for the disposal of hazardous or toxic waste.

Self-Verification (SV) Eligible	Pre-Construction Notification (PCN) Required
<ol style="list-style-type: none"> 1. Permanent and temporary impacts are <5,000 SF in waterways and wetlands. 2. No fill in navigable waters of the U.S. 3. Booms placed in navigable waters of the U.S. for oil and hazardous substance containment, absorption and prevention, provided they are removed upon completion of the cleanup. 	<ol style="list-style-type: none"> 1. Work not eligible for SV. 2. Permanent and temporary impacts: <ol style="list-style-type: none"> a. $\geq 5,000$ SF in all waterways and wetlands; or b. Located in navigable waters of the U.S. 3. Work involves stream channelization, relocation, impoundments or loss of streambed.

<p>GP 14. SCIENTIFIC MEASUREMENT DEVICES (Sections 10 and 404) Scientific devices for measuring and recording scientific data, such as staff gauges, tide and current gauges, meteorological stations, water recording and biological observation devices, water quality testing and improvement devices, and similar structures. Also eligible are small temporary weirs and flumes constructed primarily to record water quantity and velocity, provided the discharge is less than 25 cubic yards.</p> <p>Not authorized under GP 14: (a) Permanent and temporary impacts >1/2 acre in navigable waters of the U.S.; and (b) Permanent and temporary impacts >1 acre in all other waterways and wetlands.</p>	
Self-Verification (SV) Eligible	Pre-Construction Notification (PCN) Required
<p>1. Permanent and temporary impacts are ≤1,000 SF in waterways and wetlands.</p> <p>2. Temporary structures in navigable waters of the U.S.</p> <p>Provided the activity does not:</p> <ul style="list-style-type: none"> • Restrict or concentrate movement of aquatic organisms; • Result in a hazard to navigation. 	<p>1. Work not eligible for SV.</p> <p>2. Permanent and temporary impacts >1000 SF in waterways and wetlands.</p> <p>3. Permanent structures in navigable waters of the U.S.</p> <p>4. The activity involves permanent biological sampling devices in non-navigable waters of the U.S., temporary or permanent biological sampling devices in navigable waters of the U.S., or weirs and flumes.</p>
<p>NOTE: Upon completion of the use of the device to measure and record scientific data, the measuring device, and any other structures or fills associated with that device (e.g., foundations, anchors, buoys, lines, etc.), must be removed to the maximum extent practicable.</p>	

GP 15. SURVEY ACTIVITIES (Sections 10 and 404) Survey activities such as soil borings, core sampling, seismic exploratory operations, plugging of seismic shot holes, and other exploratory-type bore holes, exploratory trenching and historic resources surveys.	
Not authorized under GP 15: (a) Permanent impacts >5,000 SF in Lake Champlain, Lake Memphremagog and Wallace Pond, and >1 acre in all other waterways and/or wetlands, (b) Temporary impacts >1 acre in all waters of the U.S., excluding temporary mats.	
Self-Verification (SV) Eligible	Pre-Construction Notification (PCN) Required
1. No fill in Lake Champlain, Lake Memphremagog and Wallace Pond. 2. <5,000 SF of permanent and temporary impacts in waterways and/or wetlands other than Lake Champlain, Lake Memphremagog and Wallace pond. 3. No impacts, other than soil borings or core sampling, in navigable waters of the U.S. 4. No permanent structures or drilling and discharge of excavated material from test wells for oil and gas exploration allowed. NOTE: Construction mats of any area necessary to conduct activities do not count towards the 5,000 SF threshold and should be removed as soon as work is completed.	1. Work not eligible for SV. 2. <5000 SF permanent impact and <1 acre of temporary impact in Lake Champlain, Lake Memphremagog and Wallace Pond and adjacent wetlands. 3. Permanent and temporary impacts are \geq 5,000 SF and <1 acre of impact in waterways and/or wetlands, other than Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands. NOTE: Construction mats of any area necessary to conduct activities do not count towards the 1 acre threshold and should be removed as soon as work is completed.
NOTE: The area in which the exploratory trench is dug must be restored to its preconstruction elevation upon completion of the work and must not drain a water of the United States. In wetlands, the top 6 to 12 inches of the trench should normally be backfilled with topsoil from the trench.	

GP 16. MINING ACTIVITIES (Sections 10 and 404) Discharges of dredged or fill material into waters and wetlands for mining activities.	
Not authorized under GP 16: Permanent and temporary impacts >5,000 SF in Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands, and >1 acre in all other waterways and/or wetlands.	
Self-Verification (SV) Eligible	Pre-Construction Notification (PCN) Required
1. The activity does not occur in, over, or under navigable waters of the U.S. 2. <5,000 SF of permanent and temporary impacts in waterways and/or wetlands other than Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands.	1. Work not eligible for SV. 2. Permanent and temporary impacts are: a. <5,000 SF in Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands. b. ≥5,000 SF and <1 acre in waterways and/or wetlands other than Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands. 3. Work occurs in navigable waters of the U.S. 4. Work involves stream channelization, relocation, impoundment, loss of streambed, or discharge of tailings into streams.

<p>GP 17. NEW/EXPANDED DEVELOPMENT & RECREATIONAL FACILITIES (Sections 10 and 404) Discharges of dredged or fill material for the construction or expansion of developments and/or recreational facilities. This GP authorizes attendant features that are necessary for the use of the development. Attendant features may include but are not limited to roads, parking lots, garages, yards, utility lines, storm water management facilities, and septic fields. Fill area includes all temporary and permanent fill, and regulated discharges associated with excavation.</p> <p>Not authorized under GP 17: Permanent and temporary impacts >5,000 SF in Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands, and >1 acre in all other waterways and/or wetlands.</p>	
Self-Verification (SV) Eligible	Pre-Construction Notification (PCN) Required
<p>1. <5,000 SF of permanent and temporary impacts in waterways and/or wetlands other than Lake Champlain, Lake Memphremagog and Wallace pond and adjacent wetlands.</p> <p>NOTE: Construction mats of any area necessary to conduct activities do not count towards the 5,000 SF threshold and should be removed as soon as work is completed.</p>	<p>1. Work not eligible for SV.</p> <p>2. Permanent and temporary impacts are:</p> <ul style="list-style-type: none"> a. <5,000 SF in Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands. b. ≥5,000 SF and <1 acre in waterways and/or wetlands other than Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands. <p>3. Work involves stream channelization, relocation, or loss of streambed, including impoundments.</p> <p>NOTE: Construction mats of any area necessary to conduct activities do not count towards the thresholds and should be removed as soon as work is completed.</p>

GP 18. LINEAR TRANSPORTATION PROJECTS AND STREAM/WETLAND CROSSINGS (Sections 10 & 404) Activities required for the construction, expansion, modification, or improvement of linear transportation projects (e.g., driveways, roads, highways, railways, trails, airport runways, and taxiways), and attendant features. Any stream channel modification is limited to the minimum necessary to construct or protect the linear transportation project; such modifications must be in the immediate vicinity of the project.

Not authorized under GP 18: Permanent and temporary impacts >5,000 SF in Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands, and >1 acre in all other waterways and/or wetlands.

Self-Verification (SV) Eligible	Pre-Construction Notification (PCN) Required
<p>1. <5,000 SF of permanent and temporary impacts in waterways and/or wetlands other than Lake Champlain, Lake Memphremagog and Wallace pond and adjacent wetlands.</p> <p>2. Permanent and temporary stream crossings that comply with GC 20; and</p> <p>3. Existing crossings (e.g., culverts, elliptical or arch pipes, etc.) are not modified by (a) decreasing the diameter of the crossing or (b) changing the friction coefficient, such as through sliplining (retrofitting an existing culvert by inserting a smaller diameter pipe), culvert relining or invert lining.</p> <p>NOTE: Construction mats of any area necessary to conduct activities do not count towards the 5,000 SF threshold and should be removed as soon as work is completed.</p>	<p>1. Work not eligible for SV.</p> <p>2. Permanent and temporary impacts are:</p> <p>a. <5,000 SF in Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands.</p> <p>b. ≥5,000 SF and <1 acre in waterways and/or wetlands other than Lake Champlain, Lake Memphremagog, Wallace Pond and adjacent wetlands.</p> <p>3. Work involves stream channelization, relocation or loss of streambed including impoundments.</p> <p>NOTE: Construction mats of any area necessary to conduct activities do not count towards the thresholds and should be removed as soon as work is completed.</p>
<p>Note: Non-linear features commonly associated with transportation projects, such as vehicle maintenance or storage buildings, parking lots, train stations, or aircraft hangars may be authorized by GP 17.</p>	

GP 19. ENERGY GENERATION & RENEWABLE ENERGY GENERATION FACILITIES & HYDROPOWER PROJECTS (Sections 10 and 404) Structures and work in navigable waters of the U.S. and discharges of dredged or fill material into waters of the U.S. for the construction, expansion, modification or removal of: (a) Land-based renewable energy production facilities, including attendant features; (b) Water-based wind production facilities or hydrokinetic renewable energy generation projects and their attendant features; and (c) Discharges of dredged or fill material associated with hydropower projects.

Attendant features may include, but are not limited to, land-based collection and distribution facilities, control facilities, and parking lots. For each single and complete project in (b) above, no more than 10 generation units (e.g., wind turbines or hydrokinetic devices) are authorized in navigable waters of the U.S.

Not authorized under GP 19: Permanent and temporary impacts that are (a) >1 acre in non-Section 10 waterways and/or wetlands; (b) >5,000 SF in Section 10 waterways; and (c) >5,000 SF in wetlands adjacent to Lake Champlain, Lake Memphremagog, and Wallace Pond.

Self-Verification (SV) Eligible	Pre-Construction Notification (PCN) Required
<p>For land-based facilities:</p> <p>1. <5,000 SF of permanent and temporary impacts in non-Section 10 waterways and/or wetlands.</p> <p>NOTE: Construction mats of any area necessary to conduct activities do not count towards the 5,000 SF threshold and should be removed as soon as work is completed.</p>	<p>1. Work not eligible for SV.</p> <p>2. Permanent and temporary impacts are:</p> <p>a. ≥ 5000 SF and <1 acre in non-Section 10 waters and wetlands, and</p> <p>b. <5000 SF in navigable waters of the U.S.</p> <p>3. Work involves stream channelization, relocation or loss of streambed including impoundments.</p> <p>NOTE: Construction mats of any area necessary to conduct activities do not count towards the thresholds and should be removed as soon as work is completed.</p>
<p>Note: Utility lines constructed to transfer the energy from the land-based renewable generation or collection facility to a distribution system, regional grid, or other facility may be authorized by GP 6.</p>	

GP 20. TEMPORARY CONSTRUCTION, ACCESS, AND DEWATERING (Sections 10 and 404)

Temporary structures, work, and discharges, including cofferdams, necessary for construction activities or access fills or dewatering of construction sites that are not authorized under another GP activity.

Not authorized under GP 20: (a) Permanent structures or impacts; (b) Temporary impacts >1 acre in waters and/or wetlands; (c) use of cofferdams to dewater wetlands or other aquatic areas to change their use; or (d) Structures or fill left in place after construction is completed.

Self-Verification (SV) Eligible	Pre-Construction Notification (PCN) Required
1. Temporary impacts including land clearing in waters and/or wetlands are ≤ 5000 SF. NOTE: Construction mats of any area necessary to conduct activities do not count towards the 5,000 SF threshold and should be removed as soon as work is completed.	1. Work not eligible for SV. NOTE: Construction mats of any area necessary to conduct activities do not count towards the 1 acre threshold and should be removed as soon as work is completed.
Note: Temporary stream crossings may be authorized under GP 18.	

GP 21. AGRICULTURAL ACTIVITIES (Section 404) Discharges of dredged or fill material into waters of the U.S. for agricultural activities, including the construction of building pads for farm buildings. Authorized activities include: (a) installation, placement, or construction of drainage tiles, ditches, or levees; mechanized land clearing; land leveling; the relocation of existing serviceable drainage ditches; and similar activities; (b) discharges of dredged or fill material to relocate existing serviceable drainage ditches constructed in streams.

Not authorized under GP 21: (a) Permanent impacts >1 acre in non-Section 10 waterways and wetlands; (b) Work in Section 10 waterways; or (c) Construction of farm ponds in perennial streams.

Self-Verification (SV) Eligible	Pre-Construction Notification (PCN) Required
1. For those activities subject to Corps jurisdiction, <5,000 SF of permanent and temporary impacts.	1. $\geq 5,000$ SF to <1 acre of permanent and temporary impacts. 2. Work involves stream channelization, relocation or loss of streambed including impoundments.

APPENDIX B – GENERAL CONDITIONS

1. Other Permits. Permittees must obtain other Federal, State, or local authorizations required by law. Applicants are responsible for applying for and obtaining all required State or local approvals. Work that is not regulated by the State, but is subject to Corps jurisdiction, may be eligible for these General Permits (GPs).

2. Federal Jurisdictional Boundaries.

a. Applicability of these GPs shall be evaluated with reference to Federal jurisdictional boundaries. Activities shall be evaluated with reference to “waters of the U.S.” under the Clean Water Act (33 CFR 328) and “navigable waters of the U.S.” under §10 of the Rivers and Harbors Act of 1899 (33 CFR 329). Applicants are responsible for ensuring that the boundaries used satisfy the Federal criteria defined at 33 CFR 328-329. These sections prescribe the policy, practice and procedures to be used in determining the extent of the Corps’ jurisdiction. Note: Waters of the U.S. includes all waters pursuant to 33 CFR 328.3(a), and adjacent wetlands as that term is defined in 33 CFR 328.3(c).

b. Applicants shall identify all aquatic resources on the project site. They are all presumed to be waters of the U.S. unless an approved jurisdictional determination has been obtained from the Corps that determines otherwise. Wetlands shall be delineated in accordance with the Corps of Engineers Wetlands Delineation Manual and the most recent Northcentral/Northeast Regional Supplement.

3. Mitigation (Avoidance, Minimization, and Compensatory Mitigation).

a. Activities must be designed and constructed to avoid and minimize direct, indirect, secondary, and cumulative adverse effects, both temporary and permanent, to waters of the U.S. to the maximum extent practicable at the project site (i.e., on site). Consideration of mitigation (avoiding, minimizing, rectifying, reducing, or compensating) is required to the extent necessary to ensure that the adverse effects to the aquatic environment are no more than minimal.

b. Applicants should consider riparian/forested buffers for stormwater management and low impact development (LID) best management practices (BMPs) to reduce impervious cover and manage stormwater to minimize impacts to the maximum extent practicable.

c. Compensatory mitigation² for effects to waters of the U.S., including direct, secondary and temporal³, may be required for projects with permanent and temporary impacts that exceed the SV area limits to offset unavoidable impacts, which remain after all appropriate and practicable avoidance and minimization has been achieved, and to ensure that the adverse effects to the aquatic environment are no more than minimal. Proactive restoration projects or temporary impact work with no secondary effects may generally be excluded from this requirement.

4. Discretionary Authority. Notwithstanding compliance with the terms and conditions of this permit, the Corps retains discretionary authority to require an Individual Permit review based on concerns for the aquatic environment or for any other factor of the public interest (33 CFR 320.4(a)). This authority is invoked on a case-by-case basis whenever the Corps determines that the potential consequences of the proposal warrant Individual Permit review based on the concerns stated above. This authority may be invoked for projects with cumulative adverse environmental effects that are more than minimal, or if there is a special resource or concern associated with a particular project. Whenever the Corps notifies an applicant that an Individual Permit may be required, authorization under these GPs is voided and no

² Compensatory mitigation projects provided to offset losses of aquatic resources must comply with the applicable provisions of 33 CFR 332. Also reference the New England District Compensatory Mitigation Guidance at <http://www.nae.usace.army.mil/Missions/Regulatory/Mitigation.aspx>.

³ Temporal loss: The time lag between the losses of aquatic resource functions caused by the permitted impacts and the replacement of aquatic resource functions at the compensatory mitigation site(s) (33 CFR 332.2).

work may be conducted until a Corps Individual Permit is obtained or until the Corps notifies the applicant that further review has demonstrated that the work may be reviewed under these GPs.

5. Single and Complete Project. The term “single and complete project” is defined at 33 CFR 330.2(i) as the total project proposed or accomplished by one owner/developer or partnership or other association of owners/developers. The GPs shall not be used for piecemeal work and shall be applied to single and complete projects.

a. For non-linear projects, a single and complete project must have independent utility. Portions of a multi-phase project that depend upon other phases of the project do not have independent utility. Phases of a project that would be constructed even if the other phases were not built can be considered as separate single and complete projects with independent utility.

b. Unless the Corps determines the activity has independent utility, all components of a single project and/or all planned phases of a multi-phased project (e.g., subdivisions should include all work such as roads, utilities, and lot development) shall be treated together as constituting one single and complete project.

c. For linear projects such as power lines or pipelines with multiple crossings, a “single and complete project” is all crossings of a single water of the U.S. (i.e. single waterbody) at a specific location. For linear projects crossing a single waterbody several times at separate and distant locations, each crossing is considered a single and complete project. However, individual channels in a braided stream or river, or individual arms of a large, irregularly-shaped wetland or lake, etc., are not separate waterbodies, and crossings of such features cannot be considered separately. If any crossing requires a PCN review or an Individual Permit review, then the entire linear project shall be reviewed as one project under PCN or the Individual Permit procedures.

6. Use of Multiple General Permits. When a single and complete project requires the use of multiple GPs, the acreage of impacts (loss) to waters of the U.S. cannot exceed the acreage limit as specified. For example, if a road crossing over waters is constructed under GP 18, with an associated utility line crossing authorized by GP 6, the maximum acreage loss of waters of the United States for the total project cannot exceed 1 acre.

7. Corps Property and Federal Projects.

a. In addition to any authorization under these GPs, proponents must contact the Corps Real Estate Division at (978) 318-8585 for work occurring on or potentially affecting Corps properties and/or Corps-controlled easements to initiate reviews and determine what real estate instruments are necessary to perform work. Permittees may not commence work on Corps properties and/or Corps-controlled easements until they have received any required Corps real estate documents evidencing site-specific permission to work.

b. Any proposed alteration, modification, or use of a Federal project (including but not limited to a levee, dike, floodwall, channel, anchorage, seawall, bulkhead, jetty, wharf, pier or other work built but not necessarily owned by the United States), which could obstruct or impair the usefulness of the Federal project in any manner or be injurious to the public interest is not eligible for SV and will also require review and approval by the Corps pursuant to 33 USC 408. Where Section 408 is applicable, a decision on a Department of the Army general permit application will not be rendered prior to the decision on a Section 408 request.

8. National Lands. For non-Federal permittees, activities that impinge upon the value of any National Wildlife Refuge, National Forest, or any area administered by the National Park Service (NPS), U.S. Fish and Wildlife Service (USFWS) or U.S. Forest Service (USFS) are not eligible for SV.

9. Wild and Scenic Rivers

a. The following activities in designated rivers of the National Wild and Scenic River (WSR) System, or in a river designated by Congress as a “study river” for possible inclusion in the system, require a PCN unless the National Park Service (NPS) has determined in writing to the proponent that the proposed work will not adversely affect the WSR designation or study status:

- i. Activities that occur in WSR segments, in and 0.25 miles up or downstream of WSR segments, or in tributaries within 0.25 miles of WSR segments;
- ii. Activities that occur in wetlands within 0.25 miles of WSR segments;
- iii. Activities that have the potential to alter free-flowing characteristics in WSR segments.

b. As of December 19, 2014, affected rivers in Vermont include: the Missisquoi River, from its headwaters at the Lowell/Westfield town line to the Canadian border in Troy (20.5 miles) and from the Canadian border in East Richford to Enosburgh Falls (14.6 miles); and the Trout River.

10. Historic Properties.

a. No undertaking shall cause effects (defined at 33 CFR 325 Appendix C and 36 CFR 800) on properties listed on, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places⁴, including previously unknown historic properties within the permit area, unless the Corps or another Federal action agency has satisfied the consultation requirements of Section 106 of the National Historic Preservation Act (NHPA). The State Historic Preservation Officer (SHPO), Tribal Historic Preservation Officer (THPO) and the National Register of Historic Places can assist with locating information on: i) previously identified historic properties; and ii) areas with potential for the presence of historic resources, which may require identification and evaluation by qualified historic preservation and/or archaeological consultants in consultation with the Corps and the SHPO and/or THPO(s).

b. For activities eligible for SV, proponents must ensure and document that the activity will not cause effects as stated in 10(a).

c. Proponents must submit a PCN to the Corps as soon as possible if the authorized activity may cause effects as stated in 10(a) to notify the Corps of the potential effects and enable the Corps to fulfill the consultation requirements of Section 106 of NHPA.

d. If a project proponent discovers any previously unknown historic, cultural, or archeological remains or artifacts while accomplishing the activity authorized by this permit, they must immediately notify the District Engineer of what they have found, and to the maximum extent practicable, avoid construction activities that may affect the remains and artifacts until the required coordination has been completed. The District Engineer will initiate the Federal, Tribal and state coordination required to determine if the items or remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

11. Federal Threatened and Endangered Species.

a. No activity is authorized under any GP which: i) is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will directly or indirectly destroy or adversely modify the critical habitat of such species; or ii) “may affect” a listed species or critical habitat, unless ESA section 7 consultation addressing the effects of the proposed activity has been completed; or iii) violates the ESA.

b. For listed species or critical habitat under USFWS jurisdiction, project proponents must check the USFWS IPaC website <http://ecos.fws.gov/ipac> and submit a PCN if any listed species or critical habitat

⁴ The majority of historic properties are not listed on the National Register of Historic Places and may require identification and evaluation by qualified historic preservation and/or archaeological consultants in consultation with the Corps and the SHPO and/or THPO.

may be impacted. An activity is eligible for SV if the IPaC website indicates that only the northern long-eared bat (NLEB) (*Myotis septentrionalis*) is present BUT the activity:

- i) will not remove trees ≥ 3 inches dbh; and
- ii) is not within the “buffer” of a NLEB hibernacula or maternity roost tree; and
- iii) does not involve work on bridges or existing riprap associated with dams.

c. Federal applicants should follow their own procedures for complying with the requirements of the ESA. Work may be eligible for SV if another Federal agency has satisfied the requirements of Section 7 of the ESA. Upon request, permittees must provide the Corps with the appropriate documentation to demonstrate compliance with those requirements.

12. Navigation.

a. Any safety lights and signals prescribed by the U.S. Coast Guard, through regulations must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the U.S.

b. Any structure or work that extends closer to the horizontal limits of any Corps Federal Navigation Project than a distance of three times the project's authorized depth shall be subject to removal at the owner's expense prior to any future Corps dredging or the performance of periodic hydrographic surveys. This is applicable to SV eligible and PCN activities.

c. There shall be no unreasonable interference with navigation by the existence or use of the activity authorized herein, and no attempt shall be made by the permittee to prevent the full and free use by the public of all navigable waters at or adjacent to the activity authorized herein.

d. The permittee understands and agrees that if future U.S. operations require the removal, relocation, or other alteration of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the U.S. No claim shall be made against the U.S. on account of any such removal or alteration.

e. An application to the Corps is required for all work in, over or under an FNP or its buffer zone unless otherwise indicated in Appendix A.

13. Federal Liability.

In issuing these GPs, the Federal Government does not assume any liability for the following:

- a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes;
- b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the U.S. in the public interest;
- c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit;
- d. Design or construction deficiencies associated with the permitted work; or
- e. Damage claims associated with any future modification, suspension, or revocation of this permit.

14. Heavy Equipment in Wetlands. Operating heavy equipment (drill rigs, fixed cranes, etc.) within wetlands shall be minimized, and such equipment shall not be stored, maintained or repaired in wetlands, to the maximum extent practicable. Where construction requires heavy equipment operation in wetlands, the equipment shall: a) have low ground pressure (typically < 3 psi); b) be placed on swamp/construction/timber mats (herein referred to as “construction mats” or “mats”) that are adequate to support the equipment in such a way as to minimize disturbance of wetland soil and vegetation; or c) be operated on adequately dry or frozen wetlands such that shear pressure does not cause subsidence of

the wetlands immediately beneath equipment and upheaval of adjacent wetlands. Construction mats are to be placed in the wetland from the upland or from equipment positioned on swamp mats if working within a wetland. Construction mats should be carried, and not dragged, into position, where feasible. Other support structures that are capable of safely supporting equipment may be used with written Corps authorization. Similarly, the permittee may request written authorization from the Corps to waive use of mats during frozen or dry conditions. An adequate supply of spill containment equipment shall be maintained on site. Construction mats should be managed in accordance with the following construction mat best management practices:

- Mats should be in good condition to ensure proper installation, use and removal.
- Where feasible, mats should be carried and not dragged unless they are being used as a grading implement.
- Where feasible, place mats in a location that would minimize the amount needed for the wetland crossing.
- Minimize impacts to wetland areas during installation, use, and removal.
- Install adequate erosion and sediment controls at approaches to mats to promote a smooth transition to, and minimize sediment tracking onto, mats.
- In most cases, mats should be placed along the travel area so that the individual boards are resting perpendicular to the direction of traffic. No gaps should exist between mats. Mats should be placed far enough on either side of the resource area to rest on firm ground.

15. Temporary Fill.

a. Temporary fill, construction mats and corduroy roads shall be **entirely** removed as soon as they are no longer needed to construct the authorized work. Temporary fill shall be placed in its original location or disposed of at an upland site and suitably contained to prevent its subsequent erosion into waters of the U.S.

b. All temporary fill and disturbed soils shall be stabilized to prevent its eroding into waters of the U.S. where it is not authorized. Work shall include phased or staged development to ensure only areas under active development are exposed and to allow for stabilization practices as soon as practicable. Temporary fill must be placed in a manner that will prevent it from being eroded by expected high flows.

c. Unconfined temporary fill authorized for discharge into waters of the U.S. shall consist of material that minimizes impacts to water quality (e.g. washed stone, stone, etc.).

d. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable when temporary structures, work, and discharges of dredged or fill material, including cofferdams, are necessary for construction activities, access fills, or dewatering of construction sites. Materials shall be placed in a location and manner that does not adversely impact surface or subsurface water flow into or out of the wetland. Temporary fill authorized for discharge into wetlands shall be placed on geotextile fabric or other appropriate material laid on the pre-construction wetland grade where practicable to minimize impacts and to facilitate restoration to the original grade. Construction mats are excluded from this requirement.

e. Construction debris and/or deteriorated materials shall not be located in waters of the U.S.

16. Restoration of Wetland Areas.

a. Upon completion of construction, all disturbed wetland areas (the disturbance of these areas must be authorized) shall be stabilized with a wetland seed mix containing only plant species native to New England and shall not contain any species listed in the “Invasive and Other Unacceptable Plant Species” Appendix D in the “New England District Compensatory Mitigation Guidance” found at <http://www.nae.usace.army.mil/Missions/Regulatory/Mitigation.aspx>.

b. The introduction or spread of invasive plant species in disturbed areas shall be controlled. If construction mats are to be used, they shall be thoroughly cleaned before re-use.

c. In areas of authorized temporary disturbance, if trees are cut they shall be cut at or above ground level and not uprooted in order to prevent disruption to the wetland soil structure and to allow stump sprouts to revegetate the work area, unless otherwise authorized.

d. Wetland areas where permanent disturbance is not authorized shall be restored to their original condition and elevation, which under no circumstances shall be higher than the pre-construction elevation. Original condition means careful protection and/or removal of existing soil and vegetation, and replacement back to the original location such that the original soil layering and vegetation schemes are approximately the same, unless otherwise authorized.

17. Bank Stabilization. Projects involving construction or reconstruction/maintenance of bank stabilization structures within Corps jurisdiction should be designed to minimize environmental effects, effects to neighboring properties, scour, etc. to the maximum extent practicable. For example, vertical bulkheads should only be used in situations where reflected wave energy can be tolerated. This generally eliminates bodies of water where the reflected wave energy may interfere with or impact on harbors, marinas, or other developed shore areas. A revetment is sloped and is typically employed to absorb the direct impact of waves more effectively than a vertical seawall. It typically has a less adverse effect on the beach in front of it, abutting properties and wildlife.

18. Soil Erosion and Sediment Controls.

a. Appropriate soil erosion and sediment controls⁵ (hereinafter referred to as “controls”) must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark (OHW), must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the U.S. during periods of low-flow or no-flow. Areas of temporary fill and/or cofferdams must be included in total waterway/wetlands impacts to determine applicability of the GPs.

b. No dewatering shall occur with direct discharge to waters or wetlands. Excess water in isolated work areas shall be pumped or directed to a sedimentation basin, tank or other dewatering structures in an upland area adequately separated from waters or wetlands where suspended solids shall be removed prior to discharge back into waters or wetlands. All discharge points back into waters and wetlands shall use appropriate energy dissipaters and erosion and sedimentation control BMPs.

c. Controls shall be removed upon completion of work, but not until all exposed soil and other fills, as well as any work waterward of OHW, are permanently stabilized at the earliest practicable date. Sediment and debris collected by these devices shall be removed and placed at an upland location in a manner that will prevent its later erosion into a waterway or wetland. Controls may be left in place if they are biodegradable, and flows and aquatic life movements are not disrupted.

d. The material within sandbags shall not be released during their removal, and trenches must be backfilled as soon as practicable to reduce turbidity impact duration.

19. Aquatic Life Movements and Management of Water Flows.

a. No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity’s primary purpose is to impound water. Unless otherwise stated, activities

⁵ Appropriate soil erosion, sediment and turbidity controls include cofferdams, bypass pumping around barriers immediately up and downstream of the work footprint (i.e., dam and pump), installation of sediment control barriers (i.e., silt fence, vegetated filter strips, geotextile silt fences, filter tubes, erosion control mixes, hay bales or other devices) downhill of all exposed areas, stream fords, retention of existing vegetated buffers, application of temporary mulching during construction, phased construction, and permanent seeding and stabilization, etc.

permanently impounding water in a stream require a PCN to ensure impacts to aquatic life species are avoided and minimized. All permanent and temporary crossings of waterbodies and wetlands shall be:

- i. Suitably culverted, bridged, or otherwise designed and constructed to maintain low flows to sustain the movement of aquatic species; and
- ii. Properly aligned and constructed to prevent bank erosion or streambed scour both adjacent to and inside the crossing.

b. To avoid adverse impacts on aquatic organisms, the low flow channel/thalweg shall remain unobstructed during periods of low flow, except when it is necessary to perform the authorized work.

c. To the maximum extent practicable, the pre-construction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization and storm water management activities. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the preconstruction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

d. Activities that temporarily or permanently impact upstream or downstream flood conditions require a PCN.

20. Waterway/Wetland Work and Crossings.

a. All permanent crossings of rivers, streams, brooks, etc. (hereon referred to as “streams”) shall meet the following performance standards in order to qualify for SV:

- i. Design the structure to maintain a streambed composition and form throughout the culvert similar to and continuous with the adjacent reaches. To do this:
 - Design and install streambed material and bedforms if not adequately supplied and developed naturally,
 - Design profile and alignment through structure similar to those of adjacent stream reaches,
 - Design culvert elevation to remain embedded for the life of the structure and in consideration of future channel conditions.
- ii. Maintain velocities, turbulence and depths within the structure similar to those found in adjacent stream reaches across a range of desired flows.

b. The requirements to comply with the performance standards in GC 20a. above in order to proceed as a SV project do not apply to the following:

- i. Temporary crossings in place for less than 90 days. Temporary culverts must be embedded unless they're installed during low flow (Jul. 1 – Oct. 1) and it's placed on geotextile fabric laid on the stream bed to ensure restoration to the original grade.

c. Applicants proposing new crossings, or maintenance or replacement of serviceable crossings should refer to the Guidelines for the Design of Stream/Road Crossings for Passage of Aquatic Organisms in Vermont.

d. Applicants shall use the least intrusive and environmentally damaging method to construct the stream crossing, following this sequential minimization process: bridge spans, open bottom arches or embedded culverts.

e. Permanent and temporary crossings of waterbodies and wetlands shall be installed in such a manner as to preserve hydraulic and ecological connectivity, on either side of the crossing. The permittee shall take necessary measures to correct wetland damage due to lack of hydraulic connectivity.

f. Projects using retrofit methods increasing flow velocity or slip lining (retrofitting an existing culvert by inserting a smaller diameter pipe) require a PCN, either as new or maintenance activities.

g. No projects involving open trench excavation in flowing waters, except riprap installation, are allowed under SV. Open trench excavation projects may qualify for SV provided (1) the work doesn't

occur in flowing waters (requires using management techniques such as temporary flume pipes, culverts, cofferdams, etc.) and (2) normal flows are maintained upstream and downstream of the project area.

h. For projects that otherwise meet the terms of SV, in-stream construction work shall be conducted only during the low flow period of July 1 to October 1 in any year. Projects that are conducted outside that time period require a PCN, regardless of the waterway and/or wetland impact area.

21. Discharge of Pollutants. All activities involving any discharge of pollutants into waters of the U.S. authorized under these GPs shall comply with applicable water quality standards, effluent limitations, standards of performance, prohibitions, and pretreatment standards and management practices established pursuant to the CWA (33 U.S.C. 1251), and applicable state and local laws. If applicable water quality standards, limitations, etc., are revised or modified during the term of this permit, the authorized work shall be modified to conform with these standards within 6 months of the effective date of such revision or modification, or within a longer period of time deemed reasonable by the District Engineer in consultation with the Regional Administrator of the EPA. Applicants may presume that State Water Quality Standards are met with the issuance of a 401 WQC or waiver (Applicable only to the Section 404 activity).

22. Spawning, Breeding, and Migratory Areas.

a. Jurisdictional activities and impacts such as excavations, discharges of dredged or fill material, and/or suspended sediment producing activities in jurisdictional waters that provide value as fish migratory areas, fish and shellfish spawning or nursery areas, or amphibian and migratory bird breeding areas, during spawning or breeding seasons shall be avoided and minimized to the maximum extent practicable.

b. Jurisdictional activities in waters of the U.S. that provide value as breeding areas for migratory birds must be avoided to the maximum extent practicable. The permittee is responsible for obtaining any “take” permits required under the USFWS’s regulations governing compliance with the Migratory Bird Treaty Act or the Bald and Golden Eagle Protection Act. The permittee should contact the appropriate local office of the USFWS to determine if such “take” permits are required for a particular activity.

23. Floodplains and Floodways.

a. Appropriate measures must be taken to minimize flooding to the maximum extent practicable.

b. The permittee is responsible for complying with applicable Federal Emergency Management Agency (FEMA)-approved State and/or local floodplain management permitting requirements for projects located within the 100-Year Floodplain.

24. Storage of Seasonal Structures. Seasonal or recreational structures such as pier sections, floats, etc., that are removed from the waterway for a portion of the year shall be stored in an upland location, located above OHW and not in wetlands.

25. Vernal Pools.

a. On projects requiring a PCN, vernal pools must be identified on the plan showing aquatic resource delineations.

b. A PCN is required if a discharge of dredged or fill material is proposed in a vernal pool located within Federal jurisdictional boundaries.

c. Adverse impacts to vernal pools, vernal pool envelopes, and critical terrestrial habitats should be avoided and minimized to the maximum extent practicable.

d. GC 25(b) and (c) do not apply to projects that are within a municipality that meets the provisions of a Corps-approved VP Special Area Management Plan (VP SAMP) and are otherwise eligible for self-verification, and the applicant meets the requirements to utilize the VP SAMP.

26. Environmental Functions and Values. The permittee shall make every reasonable effort to carry out the construction or operation of the work authorized herein in a manner that minimizes any adverse impacts on existing fish, wildlife, and the environmental functions to the extent practicable. The permittee will discourage the establishment or spread of plant species identified as non-native invasive species by any Federal or State agency.

27. Invasive Species. The introduction, spread, or the increased risk of invasion of invasive plant or animal species on the project site, into new or disturbed areas, or areas adjacent to the project site caused by the site work shall be avoided. Hence, swamp and timber mats shall be thoroughly cleaned before reuse.

28. Permit/Authorization Letter On-Site. For PCN projects, the permittee shall ensure that a copy of these GPs and the accompanying authorization letter are at the work site (and the project office) whenever work is being performed, and that all personnel with operational control of the site ensure that all appropriate personnel performing work are fully aware of its terms and conditions. The entire permit authorization shall be made a part of any and all contracts and sub-contracts for work that affect areas of Corps jurisdiction at the site of the work authorized by these GPs. This shall be achieved by including the entire permit authorization in the specifications for work. The term “entire permit authorization” means these GPs, including general conditions and the authorization letter (including its drawings, plans, appendices and other attachments), and also includes permit modifications. If the authorization letter is issued after the construction specifications, but before receipt of bids or quotes, the entire permit authorization shall be included as an addendum to the specifications. If the authorization letter is issued after receipt of bids or quotes, the entire permit authorization shall be included in the contract or sub-contract as a change order. Although the permittee may assign various aspects of the work to different contractors or sub-contractors, all contractors and sub-contractors shall be obligated by contract to comply with all environmental protection provisions contained within the entire authorization letter, and no contract or sub-contract shall require or allow unauthorized work in areas of Corps jurisdiction.

29. Inspections. The permittee shall allow the Corps and VT ANR to make periodic inspections at any time deemed necessary in order to ensure that the work is being or has been performed in accordance with the terms and conditions of this permit. The Corps may also require post-construction engineering drawings for completed work or post-dredging survey drawings for any dredging work.

30. Maintenance. The permittee shall maintain the activity authorized by these GPs in good condition and in conformance with the terms and conditions of this permit. This does not include maintenance of dredging projects. Maintenance dredging is subject to the review thresholds in General Permit 7 in Appendix A, as well as any conditions included in a written Corps authorization. Maintenance dredging includes only those areas and depths previously authorized and dredged. Some maintenance activities may not be subject to regulation under Section 404 in accordance with 33 CFR 323.4(a)(2).

31. Property Rights. These GPs do not convey any property rights, either in real estate or material, or any exclusive privileges, nor does it authorize any injury to property or invasion of rights or any infringement of federal, state, or local laws or regulations.

32. Transfer of GP Verifications. If the structures or work authorized by these GPs are still in existence at the time the property is transferred, the terms and conditions, including any special conditions, will continue to be binding on the entity or individual who received the authorization, as well as the new owner(s) of the property. If the permittee sells or otherwise transfers the property associated with a GP authorization, the permittee may transfer the GP authorization to the new owner by submitting a letter to the Corps to validate the transfer. A copy of the GP authorization letter must be attached to the letter, and the letter must include the following statement: “The terms and conditions of these General Permits, including any special conditions, will continue to be binding on the new owner(s) of the property”. This letter should be signed by both the seller and new property owner(s).

33. Modification, Suspension, and Revocation. This permit and any individual authorizations issued thereof may be modified, suspended, or revoked in whole or in part pursuant to the policies and procedures of 33 CFR 325.7, and any such action shall not be the basis for any claim for damages against the United States.

34. Special Conditions. The Corps may impose other special conditions on a project authorized pursuant to these GPs that are determined necessary to minimize adverse navigational and/or environmental effects or based on any other factor of the public interest. These may be based on concerns from the Vermont Department of Environmental Conservation, SHPO, THPO or a Federal resource agency. Failure to comply with all conditions of the authorization, including special conditions, will constitute a permit violation and may subject the permittee to criminal, civil, or administrative penalties and/or restoration.

35. False or Incomplete Information. If the Corps makes a determination regarding the eligibility of a project under this permit and subsequently discovers that it has relied on false, incomplete, or inaccurate information provided by the permittee, the authorization will not be valid, and the U.S. government may institute appropriate legal proceedings.

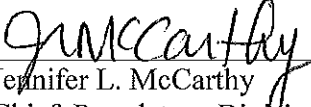
36. Abandonment. If the permittee decides to abandon the activity authorized under this GP, unless such abandonment is merely the transfer of property to a third party, he/she may be required to restore the area to the satisfaction of the Corps.

37. Enforcement cases. These GPs do not apply to any existing or proposed activity in Corps jurisdiction associated with an ongoing Corps or EPA enforcement action, until such time as the enforcement action is resolved or the Corps determines that the activity may proceed independently without compromising the enforcement action.

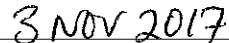
38. Duration of Authorization.

a. These GPs expire five years from the date issued as listed at the top of the cover sheet. Activities authorized by these GPs that have either commenced (i.e., are under construction) or are under contract to commence in reliance upon this authorization will have an additional year from the expiration date to complete the work. The permittee must be able to document to the Corps satisfaction that the project was under construction or under contract by the expiration date of these GPs. If work is not completed within the one year extended timeframe, the permittee must contact the Corps. The Corps may issue a new authorization, provided the project meets the terms and conditions of the Vermont GPs in effect at the time.

b. Activities authorized under these GPs will remain authorized until the GP expires, unless discretionary authority has been exercised on a case-by-case basis to modify, suspend, or revoke the authorization in accordance with 33 CFR 325.2(e)(2). Activities completed under the SV or PCN authorizations of these GPs will continue to be authorized after its expiration date.



Jennifer L. McCarthy
Chief, Regulatory Division



Date

APPENDIX C – CONTACTS FOR VERMONT GENERAL PERMIT

1. Federal

U.S. Army Corps of Engineers

New England District, Regulatory Division
Vermont Project Office
11 Lincoln Street, Room 210
Essex Junction, Vermont 05452
(802) 872-2893, (802) 879-7638 fax
www.nae.usace.army.mil/missions/regulatory

U.S. Environmental Protection Agency

5 Post Office Square, Suite 100
Boston, Massachusetts 02109
(617) 918-1692

U.S. Fish and Wildlife Service

70 Commercial Street, Suite 300
Concord, New Hampshire 03301-5087
(603) 223-2541

National Park Service

North Atlantic Region
15 State Street
Boston, Massachusetts 02109
(617) 223-5203

2. Historic Resources

State Historic Preservation Officer
Division for Historic Preservation
National Life Building
Drawer 20
Montpelier, Vermont 05620-0501
(802) 828-3211

Tribal Historic Preservation Officer
c/o Stockbridge-Munsee Community
65 1st Street
Troy, New York 12180
(518) 244-3164
Area of concern: Addison, Rutland and Bennington
Counties

3. Vermont Agency of Natural Resources

Department of Environmental Conservation

Wetlands Program
Watershed Management Division
1 National Life Drive, Main 2
Montpelier, VT 05620-3522

Department of Environmental Conservation

River Management Program
Watershed Management Division
1 National Life Drive, Main 2
Montpelier, VT 05620-3522

Department of Environmental Conservation

Lakes and Ponds Program
Watershed Management Division
1 National Life Drive, Main 2
Montpelier, VT 05620-3522

Department of Environmental Conservation

Dam Safety Program
Facilities Engineering Division
1 National Life Drive, Main 2
Montpelier, VT 05620-3522

Vermont Department of Fish and Wildlife

1 National Life Drive, Main 2
Montpelier, VT 05620-3522

State endangered species

Vermont Department of Fish and Wildlife

Nongame and Natural Heritage Program
1 National Life Drive, Main 2
Montpelier, VT 05620-3522

APPENDIX D – DEFINITIONS

Artificial Reef: A structure which is constructed or placed in waters for the purpose of enhancing fishery resources and commercial and recreational fishing opportunities.

Attendant Features: Occurring with or as a result of; accompanying.

Boating facilities: These provide, rent or sell mooring space, such as marinas, boat/yacht clubs, boat yards, dockominiums, town facilities, etc. Not classified as boating facilities are piers shared between two abutting properties or town mooring fields that charge an equitable user fee based on the actual costs incurred.

Construction mats: Construction, swamp and timber mats (herein referred to as “construction mats”) are generic terms used to describe structures that distribute equipment weight to prevent wetland damage while facilitating passage and providing work platforms for workers and equipment. They are comprised of sheets or mats made from a variety of materials in various sizes. A timber mat consists of large timbers bolted or cabled together.

Compensatory mitigation: The restoration (reestablishment or rehabilitation), establishment (creation), enhancement, and/or, in certain circumstances, preservation of aquatic resources for the purposes of offsetting unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved.

Currently serviceable: Useable as is or with some minor maintenance, but not so degraded as to essentially require reconstruction.

Direct effects: The loss of aquatic ecosystem within the footprint of the discharge of dredged or fill material. Direct effects are caused by the action and occur at the same time and place.

Dredged material & discharge of dredged material: These are defined at 33 CFR 323.2(c) and (d). The term “dredged material” means material that is excavated or dredged from waters of the United States.

Discharge: The term “discharge” means any discharge of dredged or fill material into waters of the United States.

Enhancement: The manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s). Enhancement results in the gain of selected aquatic resource function(s), but may also lead to a decline in other aquatic resource function(s). Enhancement does not result in a gain in aquatic resource area.

Ephemeral stream: An ephemeral stream has flowing water only during, and for a short duration after, precipitation events in a typical year. Ephemeral stream beds are located above the water table year-round. Groundwater is not a source of water for the stream. Runoff from rainfall is the primary source of water for stream flow.

Establishment (creation): The manipulation of the physical, chemical or biological characteristics present to develop an aquatic resource that did not previously exist at an upland site. Establishment results in a gain in aquatic resource area.

Expansions: Work that increases the footprint of fill, depth of basin or drainage feature, structures or floats, or slip capacity.

Fill material & discharge of fill material: These are defined at 33 CFR 323.2(e) and (f). The term fill material is defined as material placed in waters of the U.S. where the material has the effect of either replacing any portion of a water of the U.S. with dry land or changing the bottom elevation of any portion of a water of the U.S.

Federal navigation projects (FNPs): These areas are maintained by the Corps, authorized, constructed and maintained on the premise that they will be accessible and available to all on equal terms. They are comprised of Corps Federal anchorages, Federal channels and Federal turning basins. The following are

FNPs in VT, and more information, including the limits, is provided at www.nae.usace.army.mil/missions/navigation and www.nan.usace.army.mil/Missions/Civil-Works/Navigation Projects:

- Burlington Harbor
- Channel Between the North and South Hero Islands
- Gordons Landing
- Narrows of Lake Champlain
- Otter Creek
- St. Albans Harbor
- Swanton Harbor

Historic Property: Any prehistoric or historic district, site (including archaeological site), building, structure, or other object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria (36 CFR 60).

Intermittent stream: An intermittent stream has flowing water during certain times of the year, when groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water. Runoff from rainfall is a supplemental source of water for stream flow.

Indirect effects: Effects that are caused by the activity and are later in time or farther removed in distance, but are still reasonably foreseeable.

Individual Permit: A Department of the Army authorization that is issued following a case-by-case evaluation of a specific structure or work in accordance with the procedures of 33 CFR 322, or a specific project involving the proposed discharge(s) in accordance with the procedures of 33 CFR 323, and in accordance with the procedures of 33 CFR 325 and a determination that the proposed discharge is in the public interest pursuant to 33 CFR 320.

Maintenance: Maintenance does not include any modification that changes the character, scope, or size of the original fill design.

Mechanized land clearing: As a general rule, mechanized land clearing is a regulated activity (see [Regulatory Guidance Letter 90-05](#)).

Navigable waters of the United States: These are a subset of waters of the U.S., and are defined at 33 CFR 329. The jurisdictional limits (33 CFR 329.11) extend laterally to the entire water surface and bed of a navigable waterbody, which include all the land and waters below the ordinary high water mark. Jurisdiction thus extends to the edge (as determined above) of all such waterbodies, even though portions of the waterbody may be extremely shallow or obstructed by shoals, vegetation or other barriers. Marshlands and similar areas are thus considered navigable in law, but only so far as the area is subject to inundation by the ordinary high waters. In Vermont these waters are: the Connecticut River, Lake Champlain, Lake Memphremagog, Wallace Pond, Ompompanoosuc River (to mile 3.8), Waits River (to mile 0.9), the Black River (mouth to mile 25 in Craftsbury), the Battenkill River (to mile 50 in Manchester), the Lamoille River (mouth to mile 79 in Greensboro), the Missisquoi River (including the North Branch, from the mouth to mile 88.5 in Lowell), Otter Creek (mouth to mile 63.8 in Procter), Winooski River (mouth to Marshfield), Moose River (from Passumpsic River to the Victory Town Line), Nulhegan River (mouth to its source including the East Branch, the Black Branch and the Yellow Branch), Paul Stream (mouth to the source), East Branch of the Passumpsic River (from the confluence with the Passumpsic River to East Haven), Passumpsic River (mouth to confluence with the East Branch), White River (mouth to its source), Wells River (mouth to Groton Pond).

Ordinary High Water Mark (OHW): A line on the shore established by the fluctuations of water and indicated by physical characteristics, or by other appropriate means that consider the characteristics of the surrounding areas. See 33 CFR 328.3(e).

Perennial stream: A perennial stream has flowing water year-round during a typical year. The water table is located above the stream bed for most of the year. Groundwater is the primary source of water for stream flow. Runoff from rainfall is a supplemental source of water for stream flow.

Practicable: Available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes.

Permanent impacts: Permanent impacts means waters of the U.S. that are permanently affected by filling, flooding, excavation, or drainage because of the regulated activity. Permanent impacts include permanent discharges of dredged or fill material that change an aquatic area to dry land, increase the bottom elevation of a waterbody, or change the use of a waterbody.

Preservation: The removal of a threat to, or preventing the decline of, aquatic resources by an action in or near those aquatic resources. This term includes activities commonly associated with the protection and maintenance of aquatic resources through the implementation of appropriate legal and physical mechanisms. Preservation does not result in a gain of aquatic resource area or functions.

Re-establishment: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former aquatic resource. Reestablishment results in rebuilding a former aquatic resource and results in a gain in aquatic resource area.

Rehabilitation: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural/historic functions to a degraded aquatic resource. Rehabilitation results in a gain in aquatic resource function, but does not result in a gain in aquatic resource area.

Restoration: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former or degraded aquatic resource. For the purpose of tracking net gains in an aquatic resource area, restoration is divided into two categories: reestablishment and rehabilitation.

Secondary effects: These are effects on an aquatic ecosystem that are associated with a discharge of dredged or fill materials, but do not result from the actual placement of the dredged or fill material. Information about secondary effects on aquatic ecosystems shall be considered prior to the time final Section 404 action is taken by permitting authorities. Some examples of secondary effects on an aquatic ecosystem are a) aquatic areas drained, flooded, fragmented, or mechanically cleared, b) fluctuating water levels in an impoundment and downstream associated with the operation of a dam, c) septic tank leaching and surface runoff from residential or commercial developments on fill, and d) leachate and runoff from a sanitary landfill located in waters of the U.S. See 40 CFR 230.11(h).

Special aquatic sites (SAS): These include inland wetlands, mud flats, vegetated shallows (submerged aquatic vegetation), and riffle and pool complexes. These are defined at 40 CFR 230.3 and listed in 40 CFR 230 Subpart E.

Streambed: The substrate of the stream channel between the OHW marks. The substrate may be bedrock or inorganic particles that range in size from clay to boulders. Wetlands contiguous to the streambed, but outside of the OHW marks, are not considered part of the streambed.

Stream channelization: The manipulation of a stream's course, condition, capacity, or location that causes more than minimal interruption of normal stream processes. A channelized stream remains a water of the United States.

Structure: An object that is arranged in a definite pattern of organization. Examples of structures include, without limitation, any pier, boat dock, boat ramp, wharf, dolphin, weir, boom, breakwater, bulkhead, revetment, riprap, jetty, artificial island, artificial reef, permanent mooring structure, power transmission line, permanently moored floating vessel, piling, aid to navigation, or any other manmade obstacle or obstruction.

Temporary impacts: Temporary impacts include, but are not limited to, waters of the U.S. that are temporarily filled, flooded, excavated, drained or mechanically cleared because of the regulated activity.

Utility Line: Any pipe or pipeline for the transportation of any gaseous, liquid, liquescent, or slurry substance, for any purpose, and any cable, line, or wire for the transmission for any purpose of electrical energy, telephone, data, and telegraph messages, and radio and television communication. The term “utility line” does not include activities that drain a water of the U.S., such as drainage tile or French drains, but it does apply to pipes conveying drainage from another area.

Vegetated shallows: Permanently inundated areas that under normal circumstances support communities of rooted aquatic vegetation in rivers and lakes. Note: These areas are also commonly referred to as submerged aquatic vegetation (SAV).

Vernal pools (VPs): For the purposes of these GPs, VPs are depressional wetland basins that typically go dry in most years and may contain inlets or outlets, typically of intermittent flow. Vernal pools range in both size and depth depending upon landscape position and parent material(s). In most years, VPs support one or more of the following obligate indicator species: wood frog, spotted salamander, blue-spotted salamander, marbled salamander, Jefferson’s salamander and fairy shrimp. However, they should preclude sustainable populations of predatory fish.

Water diversions: Water diversions are activities such as bypass pumping (e.g., “dam and pump”) or water withdrawals. Temporary flume pipes, culverts or cofferdams where normal flows are maintained within the stream boundary’s confines aren’t water diversions. “Normal flows” are defined as no change in flow from pre-project conditions.

Weir: A barrier across a river designed to alter the flow characteristics. In most cases, weirs take the form of a barrier, smaller than most conventional dams, across a river that causes water to pool behind the structure (not unlike a dam) and allows water to flow over the top. Weirs are commonly used to alter the flow regime of the river, prevent flooding, measure discharge and help render a river navigable.

Waters of the United States: Waters of the United States are defined in 33 CFR 328.3. These waters include more than navigable waters of the U.S. and are the waters where permits are required for the discharge of dredged or fill material pursuant to Section 404 of the Clean Water Act. Waters of the U.S. include jurisdictional wetlands.

EXHIBIT C – BID FORM

PROJECT: East WWTF Outfall Repairs

Contractor: _____

Address: _____

Contact: _____

Telephone/Email: _____

Estimated Start Date: _____

Estimated End Date: _____

ITEM NO.	DESCRIPTION	UNIT	SUBTOTAL
1 - Base Bid	WWTF effluent outfall repairs, complete	Lump Sum	
Bid Alternate A	Stormwater outfall repairs, complete	Lump Sum	

Base Bid: \$ _____

Total Bid: \$ _____

BY SIGNING THIS BID FORM, THE CONTRATOR AGREES TO ABIDE BY ALL SPECIFICATIONS AND CONDITIONS IN THE CONTRACT DOCUMENTS, INCLUDING THE FOLLOWING:

- 1) Perform work in accordance with applicable permit conditions, rules, regulations, codes, and ordinances of local, state and federal authority;
- 2) Obtain and pay for necessary permits, licenses and certificates and give notices as required during the performance of work; and
- 3) Coordinate work with City WWTF staff to minimize disruption to the operation and maintenance of the East WWTF.

SIGNATURE & DATE

NAME

TITLE

CITY OF BURLINGTON
DRAFT CONSTRUCTION CONTRACT

This Construction Contract (“Contract”) is entered into by and between the City of Burlington, Vermont (“the City”), and _____ (“Contractor”), a Vermont corporation located at _____.

Contractor and the City agree to the terms and conditions of this Contract.

1. DEFINITIONS

The following terms shall be construed and interpreted as follows:

- A. “Contract Documents”** means all the documents identified in Section 4 (Scope of Work) of this Contract.
- B. “Effective Date”** means the date on which this Contract is approved and signed by the City, as shown on the signature page.
- C. “Party”** means the City or Contractor and “Parties” means the City and Contractor.
- D. “Project”** means the East Wastewater Treatment Facility Outfall Repair.
- E. “Work”** means the services described in Section 5 (Payment for Services) of this Contract, along with the specifications contained in the Contract Documents as defined in Section 4 (Scope of Work) below.

2. RECITALS

- A. Authority.** Each Party represents and warrants to the other that the execution and delivery of this Contract and the performance of such Party’s obligations have been duly authorized.
- B. Consideration.** The Parties acknowledge that the mutual promises and covenants contained herein and other good and valuable consideration are sufficient and adequate to support this Contract.
- C. Purpose.** The City seeks to complete the East Wastewater Treatment Facility Outfall Repairs per the contract documents.

3. EFFECTIVE DATE & TERM

- A. Effective Date.** This Contract shall not be valid or enforceable until the Effective Date. The City shall not be bound by any provision of this Contract before the Effective Date and shall have no obligation to pay Contractor for any performance or expense incurred before the Effective Date or after the expiration or termination of this Contract.

B. Term. This Contract and the Parties' respective performance shall commence on the Effective Date and expire on 6/30/22 or upon the satisfaction of the City, unless sooner terminated as provided herein.

4. SCOPE OF WORK

The Contractor shall perform the services listed in Attachments A (Request for Proposals) and B (Contractor's Response to Request for Proposals).

5. PAYMENT FOR SERVICES

A. Amount. The City shall pay the Contractor for completion of the Work in accordance with Attachment B (Contractor's Response to Request for Proposals).

Contractor agrees to accept this payment as full compensation for performance of all services and expenses incurred under this Contract.

B. Payment Schedule. The City shall pay the Contractor in the manner and at such times as set forth in the Contract Documents. The City seeks to make payment within thirty days of receipt of an invoice and any backup documentation requested under subsection D (Invoice) below.

C. Maximum Limiting Amount. The total amount that may be paid to the Contractor for all services and expenses under this Contract shall not exceed the maximum limiting amount of _____. The City shall not be liable to Contractor for any amount exceeding the maximum limiting amount without duly authorized written approval.

D. Invoice. Contractor shall submit one copy of each invoice, including rates and a detailed breakdown by task for each individual providing services, and backup documentation for any equipment or other expenses to the following:

Martin Lee, PE
Water Resources Engineer
DPW, Water Resources Division
mlee@burlingtonvt.gov

The City reserves the right to request supplemental information prior to payment. Contractor shall not be entitled to payment under this Contract without providing sufficient backup documentation satisfactory to the City.

6. SECTION & ATTACHMENT HEADINGS

The article and attachment headings and throughout this Contract are for the convenience of City and Contractor and are not intended nor shall they be used to construe the intent of this

Contract or any part hereof, or to modify, amplify, or aid in the interpretation or construction of any of the provisions hereof.

7. CONTRACT DOCUMENTS & ORDER OF PRECEDENT

- A. Contract Documents.** The Contract Documents are hereby adopted, incorporated by reference, and made part of this Contract. The intention of the Contract Documents is to establish the necessary terms, conditions, labor, materials, equipment, and other items necessary for the proper execution and completion of the Work to ensure the intended results.

The following documents constitute the Contract Documents:

Attachment A: Request for Proposals

Attachment B: Technical Specifications

Attachment C: Consultant's Bid Drawings

Attachment D: Bid Form

Attachment E: Burlington Standard Contract Conditions for Construction Contractors

Attachment F: Burlington Livable Wage Ordinance Certification

Attachment G: Burlington Outsourcing Ordinance Certification

Attachment H: Burlington Union Deterrence Ordinance Certification

Attachment I: Consultant's Certificate of Insurance

- B. Order of Precedent.** To the extent a conflict or inconsistency exists between the Contract Documents, or provisions therein, then the Contract takes precedent. Any Invitation for Bids, Additional Contract Provisions, and the City Ordinance Certifications shall prevail over any inconsistency with the Contractor's Scope of Work and Cost Proposal.

8. [Reserved]

— Signatures follow on the next page —

SIGNATURE

Persons signing for the Parties hereby swear and affirm that they are authorized to act on behalf of their respective Party and acknowledge that the other Party is relying on their representations to that effect.

Contractor

By: _____
Name & Signature

Date: _____

City of Burlington Department of Public Works

By: _____
Director

Date: _____

**ATTACHMENT C:
BURLINGTON STANDARD CONTRACT CONDITIONS
FOR CONSTRUCTION CONTRACTORS**

1. DEFINITIONS:

- A. The “Contract” shall mean the Contract between Contractor and the City to which these conditions apply and includes this Attachment C.
- B. The “Contractor” shall mean _____.
- C. The “City” shall mean the City of Burlington, Vermont or any of its departments.
- D. The “Effective Date” shall mean the date on which the Contract becomes effective according to its terms, or if no effective date is stated, the date that all parties to it have signed.
- E. The “Parties” shall mean the parties to this Contract.
- F. The “Work” shall mean the services being provided by the Contractor, as provided in the Contract.

2. REGISTRATION: The Contractor agrees to be registered with the Vermont Secretary of State’s office as a business entity doing business in the State of Vermont at all times this contract is effective. This registration must be complete prior to contract execution.

3. INSURANCE: Prior to beginning any work, the Contractor shall obtain the following insurance coverage from an insurance company registered and licensed to do business in the State of Vermont and having an A.M. Best insurance rating of at least A-, financial size category VII or greater (www.ambest.com). The certificate of insurance coverage shall be documented on forms acceptable to the City. Compliance with minimum limits and coverage, evidenced by a certificate of insurance showing policies and carriers that are acceptable to the City, must be received prior to the Effective Date of the Contract. The insurance policies shall provide that insurance coverage cannot be canceled or revised without thirty (30) days prior notice to the City. If this Contract extends to more than one year, evidence of continuing coverage must be submitted to the City on an annual basis. Copies of any insurance policies may be required. Each policy (with the exception of professional liability and worker’s compensation) shall name the City as an additional insured for the possible liabilities resulting from the Contractor’s actions or omissions. The liability insurance furnished by the Contractor is primary and non-contributory for all the additional insured.

The Contractor is responsible to verify and confirm in writing to the City that: (i) all subcontractors must comply with the same insurance requirements as the Contractor; (ii) all coverage shall include adequate protection for activities involving hazardous materials; and (iii) all work activities related to the Contract shall meet minimum coverage and limits.

No warranty is made that the coverage and limits listed herein are adequate to cover and protect the interests of the Contractor for the Contractor’s operations. These are solely minimums that have been developed and must be met to protect the interests of the City.

- A. General Liability And Property Damage: With respect to all operations performed by the Contractor, subcontractors, agents or workers, it is the Contractor’s responsibility to ensure

that general liability insurance coverage, on an occurrence form, provides all major divisions of coverage including, but not limited to:

1. Premises Operations
2. Independent Contractors' Protective
3. Products and Completed Operations
4. Personal Injury Liability
5. Medical Expenses

Coverage limits shall not be less than:

- | | | |
|----|-------------------------------|-------------|
| 1. | General Aggregate | \$2,000,000 |
| 2. | Products-Completed/Operations | \$2,000,000 |
| 3. | Personal & Advertising Injury | \$1,000,000 |
| 4. | Each Occurrence | \$1,000,000 |
| 5. | Damage to Rented Premises | \$ 250,000 |
| 6. | Med. Expense (Any one person) | \$ 5,000 |

B. Workers' Compensation: With respect to all operations performed, the Contractor shall carry workers' compensation insurance in accordance with the laws of the State of Vermont and ensure that all subcontractors carry the same workers' compensation insurance for all work performed by them under this contract. Minimum limits for Employer's Liability:

1. Bodily Injury by Accident: \$500,000 each accident
2. Bodily Injury by Disease: \$500,000 policy limit,
\$500,000 each employee

C. Automobile Liability: The Contractor shall carry commercial automobile liability insurance covering all motor vehicles, including owned, non-owned and hired, used in connection with the Contract. Each policy shall provide coverage with a limit not less than: \$1,000,000 - Combined Single Limit for each occurrence.

D. Umbrella Liability:

1. \$1,000,000 Each Event Limit
2. \$1,000,000 General Aggregate Limit

- 4. CONFLICT OF INTEREST:** The Contractor shall disclose in writing to the City any actual or potential conflicts of interest or any appearance of a conflict of interest by the Contractor, its employees or agents, or its subcontractors, if any.
- 5. PERSONNEL REQUIREMENTS AND CONDITIONS:** A Contractor shall employ only qualified personnel with responsible authority to supervise the work. The City shall have the right to approve or disapprove key personnel assigned to administer activities related to the

Contract.

Except with the approval of the City, during the life of the Contract, the Contractor shall not employ:

1. Any City employees who are directly involved with the awarding, administration, monitoring, or performance of the Contract or any project(s) that are the subjects of the Contract.
2. Any City employees so involved within one (1) year of termination of employment with the City.

The Contractor warrants that no company or person has been employed or retained (other than a bona fide employee working solely for the Contractor) to solicit or secure this Contract, and that no company or person has been paid or has a contract with the Contractor to be paid, other than a bona fide employee working solely for the Contractor, any fee, commission, percentage, brokerage fee, gift, or any other consideration, contingent upon or resulting from the award or making of the Contract. For breach or violation of this warranty, the City shall have the right to annul the Contract, without liability to the City, and to regain all costs incurred by the City in the performance of the Contract.

The City reserves the right to require removal of any person employed by a Contractor from work related to the Contract, for misconduct, incompetence, or negligence, in the opinion of the City, in the due and proper performance of Contractor's duties, or who neglects or refuses to comply with the requirements of the Contract.

6. **PERFORMANCE:** Contractor warrants that performance of Work will conform to the requirements of this Contract. Contractor shall use that degree of ordinary care and reasonable diligence that an experienced and qualified provider of similar services would use acting in like circumstances and experience in such matters and in accordance with the standards, practices and procedures established by Contractor for its own business.
7. **RESPONSIBILITY FOR SUPERVISION:** The Contractor shall assume primary responsibility for general supervision of Contractor employees and any subcontractors for all work performed under the Contract and shall be solely responsible for all procedures, methods of analysis, interpretation, conclusions, and contents of work performed under the Contract. The Contractor shall be responsible to the City for all acts or omissions of its subcontractors and any other person performing work under this Contract.
8. **INSPECTION OF WORK:** The City shall, at all times, have access to the Contractor's work for the purposes of inspection, accounting, and auditing, and the Contractor shall provide whatever access is considered necessary to accomplish such inspections. At any time, the Contractor shall permit the City or representative for the City the opportunity to inspect any plans, drawings, estimates, specifications, or other materials prepared or undertaken by the Contractor pursuant to the Contract, as well as any preparatory work, work-in-progress, or completed work at a field site.

Conferences, visits to a site, or an inspection of the work, may be held at the request of any involved party or by representatives of the City.

- 9. UTILITIES & ACCESS:** Whenever a facility or component of a private, public, or cooperatively-owned utility will be affected by any proposed construction, the Contractor will counsel with the City and will enter into any necessary contacts and discussions with the affected owners regarding any requirement necessary for revisions of facilities or existing installations, both above and below ground. Any such installations must be completely and accurately exhibited on any detail sheets or plans. The Contractor shall inform the City, in writing, of any such contacts and the results thereof.

The City shall provide the land and/or construction easements for the land upon which the Work under this Contract is to be done, and will, so far as is convenient, permit the Contractor to use as much of the land as is required for the erection of temporary construction facilities and storage of materials, together with the right of access to same, but beyond this, the Contractor shall provide at the Contractor's cost and expense any additional land required.

10. PROTECTION OF PROPERTY:

- A. In General:** Contractor shall avoid damage, as a result of its operations, to trees, plant life, existing sidewalks, curbs, streets, alleys, pavements, utilities, adjoining property, the work of other contractors, and the property of the City and others. Contractor shall, at its own expense, repair any damage to any property caused by Contractor's operations.
- B. Underpinning and Shoring:** Contractor shall become familiar with the requirements of local and state laws applicable to underpinning, shoring and other work affecting adjoining property, and wherever required by law Contractor shall shore up, brace, underpin, secure and protect as may be necessary all foundations and other parts of existing structures adjacent to, adjoining, and in the vicinity of the site, which may be affected in any way by the excavations or other operations connected with the work to be performed under this Contract.
- C. Damage to Utilities:** Contractor shall be responsible for all damage to any utility equipment or structures caused by its acts or omissions to act, whether negligent or otherwise, and shall leave the utility equipment or structures in as good condition as they were in prior to the commencement of operations under this contract. However, any utility equipment or structures damaged as a result of any act, or omission to act, of the contractor may, at the option of the city department, utility company, or other party owning or operating the utility equipment or structures damaged, be repaired by the city department, utility company, or other party, and in that event, the cost of repairs shall be borne by Contractor.

- 11. PUBLIC RELATIONS:** Throughout the performance of the Contract, the Contractor will endeavor to maintain good relations with the public and any affected property owners.

Personnel employed by or representing the Contractor shall conduct themselves with propriety. The Contractor agrees to inform property owners and/or tenants, in a timely manner, if there is need for entering upon private property as an agent of the City, in accordance with 19 V.S.A. § 35 and §.503, to accomplish the work under the Contract. The Contractor agrees that any work will be done with minimum damage to the property and disturbance to the owner. Upon request of the Contractor, the City shall furnish a letter of introduction to property owners soliciting their cooperation and explaining that the Contractor is acting as an agent of the City.

- 12. ACKNOWLEDGEMENTS:** Acknowledgment of the City's support must be included in any and all publications, renderings and project publicity, including audio/visual materials developed under this contract.

13. APPEARANCES:

- A. Hearings and Conferences: The Contractor shall provide services required by the City and necessary for furtherance of any work covered under the Contract. These services shall include appropriate representation at design conferences, public gatherings and hearings, and appearances before any legislative body, commission, board, or court, to justify, explain and defend its contractual services covered under the Contract.

The Contractor shall perform any liaison that the City deems necessary for the furtherance of the work and participate in conferences with the City, at any reasonable time, concerning interpretation and evaluation of all aspects covered under the Contract.

The Contractor further agrees to participate in meetings with the City and any other interested or affected participant, for the purpose of review or resolution of any conflicts pertaining to the Contract.

The Contractor shall be equitably paid for such services and for any reasonable expenses incurred in relation thereto in accordance with the Contract.

- B. Appearance as Witness: If and when required by the City, the Contractor, or an appropriate representative, shall prepare and appear for any litigation concerning any relevant project or related contract, on behalf of the City. The Contractor shall be equitably paid, to the extent permitted by law, for such services and for any reasonable expenses incurred in relation thereto, in accordance with the Contract.

- 14. RESPONSIBILITY OF COST:** The Contractor shall furnish and pay the cost, including taxes (except tax-exempt entities) and all applicable fees, of all the necessary materials and shall furnish and pay for full time on-site superintendence during any construction activity, labor, tools, equipment, and transportation. The Contractor shall perform all the Work required for the construction of all items listed and itemized under Attachment A (Request for Proposals) and Attachment B (Contractor's Response to Request for Proposals) and in strict accordance with the Contract Documents and any amendments thereto and any approved supplemental plans and specifications. The Contractor agrees to pay all claims for labor,

materials, services and supplies and agrees to allow no such charge, including no mechanic's lien, to be fixed on the property of the City.

- 15. PAYMENT PROCEDURES:** The City shall pay or cause to be paid to the Contractor or the Contractor's legal representative payments in accordance with the Contract. When applicable, for the type of payment specified in the Contract, a progress report shall summarize actual costs and any earned portion of fixed fee. All payments will be made in reliance upon the accuracy of all representations made by the Contractor, whether in invoices, progress reports, emails, or other proof of work.

All invoices and correspondence shall indicate the applicable project name, project number and the Contract number. When relevant, the invoice shall further be broken down in detail between projects.

When applicable, for the type of payment specified in the Contract, expenses for meals and travel shall be limited to the current approved in-state rates, as determined by the State of Vermont's labor contract, and need not be receipted. All other expenses are subject to approval by the City and must be accompanied by documentation to substantiate their charges.

No approval given or payment made under the Contract shall be conclusive evidence of the performance of the Contract, either wholly or in part, and no payment shall be construed to be acceptance of defective work or improper materials.

The City agrees to pay the Contractor and the Contractor agrees to accept as full compensation, for performance of all services rendered and expenses encompassed in conformance therewith, the fee specified in the Contract.

- 16. DUTY TO INFORM CITY OF CONTRACT DOCUMENT ERRORS:** If Contractor knows, or has reasonable cause to believe, that a clearly identifiable error or omission exists in the Contract Documents, including but not limited to unit prices and rate calculations, Contractor shall immediately give the City written notice thereof. Contractor shall not cause or permit any Work to be conducted which may relate to the error or omission without first receiving written notice by the City that City representatives understand the possible error or omission and have approved of modifications to the Contract Documents or that Contractor may proceed without any modification being made to Contract Documents.

- 17. NON-APPROPRIATION:** The obligations of the City under this Contract are subject to annual appropriation by the Burlington City Council. If no funds or insufficient funds are appropriated or budgeted to support continuation of payments due under this Contract, the Contract shall terminate automatically on the first day of the fiscal year for which funds have not been appropriated. The Parties understand and agree that the obligations of the City to make payments under this Contract shall constitute a current expense of the City and shall not be construed to be a debt or a pledge of the credit of the City. The decision whether or not to budget and appropriate funds during each fiscal year of the City is within the discretion of the Mayor and City Council of the City. The City shall deliver written notice to Contractor as soon as practicable of any non-appropriation, and Contractor shall not be entitled to

any payment or compensation of any kind for work performed after the City has delivered written notice of non-appropriation.

18. CHANGE ORDERS & AMENDMENTS: No changes or amendments to the Contract shall be effective unless documented in writing and signed by authorized representatives of the City and the Contractor. All changes affecting the Project's construction cost, length of time, or modifications of the terms or conditions of the Contract, must be authorized by means of a written Contract Change Order which is mutually agreed to by the City and Contractor. The Contract Change Order will include extra Work, Work for which quantities have been altered from those shown in the Bid Schedule, as well as decreases or increases in the quantities of installed units from those shown in the Bid Schedule because of final measurements. All changes must be recorded on a Contract Change Order (which form is part of these Contract Documents) and fully executed before they can be included in a partial payment estimate. Changes for Work, quantities, and/or conditions will include any respective time adjustment, if justified. Time adjustments will require an updated Project Schedule with the Change Order.

19. EXTENSION OF TIME: The Contractor agrees to prosecute the work continuously and diligently, and no charges or claims for damages shall be made by the Contractor for delays or hindrances, from any cause whatsoever, during the progress of any portion of services specified in the Contract. The Contractor may request an extension of time for such delays or hindrances, if any.

Time extensions may be granted by amendment only for excusable delays, such as delays beyond the control of the Contractor and without the fault or negligence of the Contractor.

The City may suspend the work or any portion thereof for a period of not more than ninety (90) days at its discretion or such further time as agreed by the Contractor. The Contractor will be allowed an extension of contract time directly attributable to any suspension.

20. PUBLIC HEALTH EMERGENCY:

A. Compliance with Mandates and Guidance: The Contractor is advised that public health emergencies—meaning public health emergencies, as declared by the City, the State of Vermont, or the Federal Government—may introduce significant uncertainty into the project. The Contractor must comply with all local, state, federal orders, directives, regulations, guidance, advisories during a public health emergency. Contractor shall adhere to the below provisions and consider public health emergencies as it develops project schedules and advances the Work.

B. Creation of Public Health Emergency Plan: For any work performed on-site at a City location, the Contractor shall create a public health emergency plan acceptable to the City, if there is a public health emergency. The Contractor shall be responsible for following this plan and ensuring that the project or site is stable and in a safe and maintainable condition.

- a. Public Health Emergency Plan: The Public Health Emergency Plan will contain:
 - i. Measures to manage risk and mitigate potential impacts to the health and safety of the public, the City and Contractor's workers;
 - ii. Explicit reference to any health and safety performance standards and mandates provided by the City, the State of Vermont, the Federal government, or other relevant governmental entities;
 - iii. A schedule for possible updates to the plan as standards and mandates change; and
 - iv. Means to adjust the schedule and sequence of work should the emergency change in nature or duration.
 - b. Review and Acceptance of Plan:
 - i. Contractor must provide the plan to the City by the Effective Date of this Contract or by one (1) week prior to the commencement of on-site activities, whichever is later.
 - ii. The City shall have sole discretion to require changes to the plan.
 - iii. The City may revisit the plan at any time to verify compliance with obligations that arise under a state of emergency.
- C. Enforcement & Stoppage of Work:** Contractor fails to comply with either 1) the approved public health emergency plan, or 2) any local, state, federal orders, directives, regulations, guidance, or advisories during a public health emergency, the City may stop Work under the Contract until such failure is corrected. Such failure to comply shall constitute a breach of the Contract.
- Upon stoppage of work, the City may allow Work to resume, at a time determined by the City, under this Contract if such failure to comply is adequately corrected. The City shall have sole discretion in determining if Contractor has adequately corrected its failure to comply with the above.
- If Contractor's breach of Contract has not been cured within seven (7) days after notice to stop Work from the City, then City may terminate this Contract, at its discretion.
- D. City Liability Relating to Potential Delays:** If a public health emergency is declared, the City will not be responsible for any delays related to the sequence of operations or any expenses or losses incurred as a result of any delays. Any delays related to a public health emergency will be excusable, but will not be compensable.

21. FORCE MAJEURE: Neither Party to this Contract shall be liable to the other for any failure or delay of performance of any obligation under this Contract to the extent the failure or delay is caused by acts of God, public health emergencies, epidemics, acts of the public enemy, acts of superior governmental authority, weather conditions, riots, rebellion, sabotage, or any other circumstances for which it is not responsible or which is not under its

control ("Force Majeure"). To assert Force Majeure, the nonperforming party must prove that a) it made all reasonable efforts to remove, eliminate, or minimize the cause of delay or damage, b) diligently pursued performance of its obligations, c) substantially fulfilled all obligations that could be fulfilled, and d) timely notified the other part of the likelihood or actual occurrence of a Force Majeure event. If any such causes for delay are of such magnitude as to prevent the complete performance of the Contract within two (2) years of the originally scheduled completion date, either Party may by written notice request to amend or terminate the Contract. The suspension of any obligations under this section shall not cause the term of this Contract to be extended and shall not affect any rights accrued under this Contract prior to the occurrence of the Force Majeure. The Party giving notice of the Force Majeure shall also give notice of its cessation.

22. PAYMENT FOR EXTRA WORK, ADDITIONAL SERVICES OR CHANGES: The City may, in writing, require or agree to changes, or additions to or deletions from the originally contemplated scope of work.

The value of such changes, to the extent not reflected in other payments to the Contractor, shall be incorporated in an amendment and be determined by mutual agreement, by one or more of the following:

1. Fixed Price. By a price that is not subject to any adjustment on the basis of the Contractor's expenses experienced in performing the work. The Contractor is fully responsible for all costs and resulting profit or loss.
2. Rate Schedule. By unit prices designated in the Contract, or by unit prices covered under any subsequent contracts.
3. Actual Cost. By amounts determined on the basis of actual costs incurred, as distinguished from forecasted expenditures.

No changes for which additional fee payment is claimed shall be made unless pursuant to a written order from the City, and no claim for payment shall be valid unless so ordered.

The Contractor agrees to maintain complete and accurate records of all change work, in a form satisfactory to the City. The City reserves the right to audit the records of the Contractor related to any extra work or additional services. Any such services rendered shall be subject, in all other respects, to the terms of the Contract. When changes are so ordered, no additional work shall be performed by the Contractor until a Contract amendment has been fully executed, unless written notice to proceed is issued by the City. Any claim for extension of time that may be necessitated as a result of extra work or additional services and changes shall be given consideration and evaluated insofar as it directly relates to the change.

23. FAILURE TO COMPLY WITH TIME SCHEDULE: If the City is dissatisfied because of slow progress or incompetence in the performance of the Work in accordance with the schedule for completion of the various aspects of construction, the City shall give the Contractor written notice in which the City shall specify in detail the cause of dissatisfaction. Should the

Contractor fail or refuse to remedy the matters complained of within five days after the written notice is received by the Contractor, the City shall have the right to take control of the Work and either make good the deficiencies of the Contractor itself or direct the activities of the Contractor in doing so, employing such additional help as the City deems advisable. In such events, the City shall be entitled to collect from the Contractor any expenses in completing the Work. In addition, the City may withhold from the amount payable to the Contractor an amount approximately equal to any interest lost or charges incurred by the City for each calendar day that the Contractor is in default after the time of completion stipulated in the Contract Documents.

24. RETURN OF MATERIALS: Contractor agrees that at the expiration or termination of this Contract, it shall return to City all materials provided to it during its engagement on behalf of City.

25. ACCEPTANCE OF FINAL PAYMENT; RELEASE: Contractor's acceptance of the final payment shall be a release in full of all claims against the City or its agents arising out of or by reason of the Work. Any payment, however, final or otherwise, shall not release the Contractor or its sureties from any obligations under the Contract Documents or any performance or payment bond.

26. OWNERSHIP OF THE WORK: The Contractor agrees that the ownership of all studies, data sheets, survey notes, subsoil information, drawings, tracings, estimates, specifications, proposals, diagrams, calculations, EDM and other material prepared or collected by the Contractor, hereafter referred to as "instruments of professional service", shall become the property of the City as they are prepared and/or developed in the course of the Contract. The Contractor agrees to allow the City access to all "instruments of professional service" at any time. The Contractor shall not copyright any material originating under the Contract without prior written approval of the City. No publications or publicity of the work, in part or in total, shall be made without the express written agreement of the City, except that Contractor may in general terms use previously developed instruments of professional service to describe its abilities for a project in promotional materials.

27. PROPRIETARY RIGHTS: The Parties under the Contract hereby mutually agree that, if patentable discoveries or inventions should result from work performed by the Contractor under the Contract, all rights accruing from such discoveries or inventions shall be the sole property of the Contractor. The Contractor, however, agrees to and does hereby grant to the City an irrevocable, nonexclusive, non-transferable, and royalty-free license to the manufacture, use, and disposition of any discovery or invention that may be developed as a part of the Work under the Contract.

28. PUBLIC RECORDS: The Contractor understands that any and all records related to and acquired by the City, whether electronic, paper, or otherwise recorded, are subject to the Vermont Public Records Act and that the determination of how those records must be handled is solely within the purview of City. The Contractor shall identify all records that it considers to be trade secrets as that term is defined by subsection 317(c)(9) of the Vermont Public Records Act and shall also identify all other records it considers to be exempt under the Act.

It is not sufficient to merely state generally that the record is proprietary or a trade secret or is otherwise exempt. Particular records, pages or section which are believed to be exempt must be specifically identified as such and must be separated from other records with a convincing explanation and rationale sufficient to justify each exemption from release consistent with Section 317 of Title 1 of the Vermont Statutes Annotated.

29. RECORDS RETENTION AND ACCESS: The Contractor agrees to retain, in its files, and to produce to the City—within the time periods requested—all books, documents, electronic data media (EDM), accounting records, and other records produced or acquired by the Contractor in the performance of this Contract which are related to the City, at any time during this Contract and for a period of at least three (3) years after its completion or termination. In addition, if any audit, claim, or litigation is commenced before the expiration of that three (3) year period, the records shall be retained until all related audits, claims, or litigation are resolved. The Contractor further agrees that the City shall have access to all the above information for the purpose of review and audit during the Contract period and any time within the aforementioned retention period. Copies of all of the above referenced information shall be provided to the City, if requested, in the format in which the records were obtained, created, or maintained, such that their original use and purpose can be achieved. Contractor, subcontractors, or their representatives performing work related to the Contract, are responsible to ensure that all data and information created or stored on EDM is secure and can be duplicated and used if the EDM mechanism is subjected to power outage, obsolescence, or damage.

30. WARRANTY: In addition to any warranty provided by the manufacturer or distributor, Contractor guarantees the Work performed, and all materials or equipment furnished, to be free from defects in material and workmanship for a minimum period of one (1) year from the date of the City's acceptance of completion. The Contractor's warranty is not intended and shall not be interpreted as a limitation upon the City's rights or a waiver of manufacturer and distributor warranties, any subcontractor warranties, or any other warranties provided in connection with the Work.

Contractor, at its own expense, shall make any repairs, or replacement necessary to correct these defects to the satisfaction of the City.

This warranty of material and workmanship applies only:

1. To the property only as long as it remains in the possession of the City.
2. To the Work that has not been subject to accident, misuse, or abuse by someone other than the Contractor.
3. To the Work that has not been modified, altered, defaced, or had repairs made or attempted by someone other than the Contractor.
4. If the Contractor is immediately notified in writing within ten (10) days of first knowledge of the defect by the City.

5. If the Contractor is given the first opportunity to make any repairs, replacements, or corrections to the defective construction at no cost to the City within a reasonable period of time.

Under no circumstances shall Contractor be liable by virtue of this warranty or otherwise for damage to any person or property whatsoever for any special, indirect, secondary or consequential damages of any nature however arising out of the use or inability to use because of the construction defect.

If the Contractor is unable, after receipt of two (2) written notices given to Contractor by the City, to successfully repair or replace the labor, equipment, or materials within six (6) months of the second notice, then the District's repair and replace warranty shall be deemed to have failed and the City's rights and remedies shall not be limited by the provisions of this section.

31. CONTRACT DISPUTES: In the event of a dispute between the parties to this Contract, each party will continue to perform its obligations unless the Contract is terminated in accordance with these terms.

32. SETTLEMENTS OF MISUNDERSTANDINGS: To avoid misunderstandings and litigation, it is mutually agreed by all Parties that the Director of Public Works shall act as referee on all questions arising under the terms of the Contract and that the decision of the Director of Public Works in such cases shall be binding upon both Parties.

33. CITY'S OPTION TO TERMINATE: The Contract may be terminated in accordance with the following provisions, which are not exclusive:

A. Termination for Convenience: At any time prior to completion of services specified under the Contract, the City may terminate the Contract for any reason by submitting written notice via certified or registered mail to the Contractor, not less than fifteen (15) days prior to the termination date, of its intention to do so. If the termination is for the City's convenience, payment to the Contractor will be made promptly for the amount of any fees earned to the date of the notice of termination and costs of materials obtained in preparation for Work but not yet installed or delivered, less any payments previously made. However, if a notice of termination is given to a Contractor prior to completion of twenty (20) percent of the estimated services, as set forth in the approved Work Schedule and Progress Report, the Contractor will be reimbursed for that portion of any reasonable and necessary expenses incurred to date of the notice of termination that are in excess of the amount earned under its approved fee to the date of said termination. Such requests for reimbursement shall be supported with factual data and shall be subject to the City's approval. The Contractor shall make no claim for additional compensation against the City by reason of such termination.

B. Termination for Cause:

- i. Breach: Contractor shall be in default if Contractor fails in any manner to fully perform and carry out each and all conditions of this Contract, including, but

not limited to, Contractor's failure to begin or to prosecute the Work in a timely manner or to make progress as to endanger performance of this Contract; failure to supply a sufficient number of properly skilled employees or a sufficient quantity of materials of proper quality; failure to perform the Work unsatisfactorily as determined by the City; failure to neglect or refuse to remove materials; or in the event of a breach of warranty with respect to any materials, workmanship, or performance guaranty. Contractor will not be in default for any excusable delays as provided in Sections 18-20.

The City may give Contractor written notice of such default. If Contractor does not cure such default or provide a plan to cure such default which is acceptable to the City within the time permitted by the City, then the City may terminate this contract for cause.

- ii. Dishonest Conduct: If Contractor engages in any dishonest conduct related to the performance or administration of this Contract then the City may immediately terminate this contract.
- iii. Cover: In the event the City terminates this contract as provided in this section, the City may procure, upon such terms and in such manner as the City may deem appropriate, services similar in scope and level of effort to those so terminated, and Contractor shall be liable to the City for all of its costs and damages, including, but not limited to, any excess costs for such services, interest, or other charges the City incurs to cover.
- iv. Rights and Remedies Not Exclusive: The rights and remedies of the City provided in this section shall not be exclusive and are in addition to any other rights and remedies provided by law or under this Contract.

34. GENERAL COMPLIANCE WITH LAWS: The Contractor and any subcontractor approved under this Contract shall comply with all applicable Federal, State and local laws, including but not limited to the Burlington Livable Wage Ordinance, the Non-Outsourcing Ordinance, and the Union-Deterrence Ordinance and shall provide the required certifications attesting to compliance with these ordinances (see attached ordinances and certifications).

35. SAFETY REQUIREMENTS: The Contractor shall comply with all pertinent provisions of the Occupational Safety and Health Administration (OSHA) and any VOSHA (Vermont OSHA) Safety and Health requirements, including the provision and use of appropriate safety equipment and practices.

The Contractor, and not the City, shall be responsible for the safety, efficiency, and adequacy of Contractor's or its subcontractors' plant, appliances, equipment, vehicles, and methods, and for any damages, which may result from their failure or their improper construction, maintenance or operation.

36. CIVIL RIGHTS AND EQUAL EMPLOYMENT OPPORTUNITY: During performance of the Contract, the Contractor will not discriminate against any employee or applicant for employment because of religious affiliation, race, color, national origin, place of birth, ancestry, age, sex, sexual orientation, gender identity, marital status, veteran status, disability, HIV positive status, crime victim status, or genetic information. Contractor, and any subcontractors, shall comply with any Federal, State, or local law, statute, regulation, executive order, or rule that applies to it or the services to be provided under this contract concerning equal employment, fair employment practices, affirmative action, or prohibitions on discrimination or harassment in employment.

37. CHILD SUPPORT PAYMENTS: By signing the Contract, the Contractor certifies, as of the date of signing the Contract, that the Contractor (a) is not under an obligation to pay child support; or (b) is under such an obligation and is in good standing with respect to that obligation; or (c) has agreed to a payment plan with the Vermont Office of Child Support Services and is in full compliance with that plan. If the Contractor is a sole proprietorship, the Contractor's statement applies only to the proprietor. If the Contractor is a partnership, the Contractor's statement applies to all general partners with a permanent residence in Vermont. If the Contractor is a corporation, this provision does not apply.

38. TAX REQUIREMENTS: By signing the Contract, the Contractor certifies, as required by law under 32 VSA, Section 3113, that under the pains and penalties of perjury, the Contractor is in good standing with respect to payment, or in full compliance with a plan to pay, any and all taxes due the State of Vermont as of the date of signature on the Contract.

39. INDEMNIFICATION:

A. Indemnification by Contractor: Except for the gross negligence or willful misconduct by the City, or any of its boards, officers, agents, employees, assigns and successors in interest, contractor undertakes and agrees to defend, indemnify and hold harmless the City and any of its boards, officers, agents, employees, assigns, and Successors in Interest from and against all suits and causes of action, claims, losses, demands and expenses, including, but not limited to, attorney's fees (both in house and outside counsel) and cost of litigation (including all actual litigation costs incurred by the City, including but not limited to, costs of experts and consultants), damages or liability of any nature whatsoever, for death or injury to any person, including Contractor's employees and agents, or damage or destruction of any property of either party hereto or of third parties, arising in any manner by reason of the negligent acts, errors, omissions or willful misconduct incident to the performance of this Contract by Contractor or its subcontractors of any tier.

B. Notice of Claims & City's Right to Participate: If the City, its officers, agents, or employees are notified of any claims asserted against it to which this indemnification provision may apply, the City shall immediately thereafter notify the Contractor in writing that a claim to which the indemnification provision may apply has been filed. Contractor shall immediately retain counsel and otherwise provide a complete defense against the entire

claim or suit. The City retains the right to participate, at its own expense, in the defense of any claim, and to approve all proposed settlements of claims to which this provision applies.

C. City's Rights and Remedies: Rights and remedies available to the City under this provision are cumulative of those provided for elsewhere in this Contract and those allowed under the laws of the United States and the State of Vermont.

D. No Indemnification by City: Under no conditions shall the City be obligated to indemnify the Contractor or any third party, nor shall the City be otherwise liable for expenses or reimbursement including attorney's fees, collection costs, or other costs of the Contractor or any third party.

40. NO GIFTS OR GRATUITIES: The Contractor shall not make any payment or gift or donation of substantial value to any elected official, officer, employee, or agent of the City during the term of this Contract.

41. ASSIGNMENT: Contractor shall not sublet or assign this Work, or any part of it, without the written consent of the City. If any subcontractor is approved, Contractor shall be responsible and liable for all acts or omissions of that subcontractor for any Work performed. If any subcontractor is approved, Contractor shall be responsible to ensure that the subcontractor is paid as agreed and that no lien is placed on any City property.

42. TRANSFERS, SUBLETTING, ASSIGNMENTS, ETC: Contractor shall not assign, sublet, or transfer any interest in the work, covered by this Contract, without prior written consent of the City and further, if any subcontractor participates in any work involving additional services, the estimated extent and cost of the contemplated work must receive prior written consent of the City. The approval or consent to assign or sublet any portion of the work, shall in no way relieve the Contractor of responsibility for the performance of that portion of the work so transferred. The form of the subcontractor's contract shall be as developed by the Contractor and approved by the City. The Contractor shall ensure that insurance coverage exists for any operations to be performed by any subcontractor as specified in the insurance requirements section of this Contract.

The services of the Contractor, to be performed under the Contract, shall not be transferred without written authorization of the City. Any authorized sub-contracts shall contain all of the same provisions contained in and attached to the original Contract with the City.

43. CONTINUING OBLIGATIONS: The Contractor agrees that if because of death, disability, or other occurrences, it becomes impossible to effectively perform its services in compliance with the Contract, neither the Contractor nor its surviving members shall be relieved of their obligations to complete the Contract unless the City agrees to terminate the Contract because it determines that the Contractor is unable to satisfactorily execute the Contract.

44. INTERPRETATION & IMPLEMENTATION: Provisions of the Contract shall be interpreted and implemented in a manner consistent with each other and using procedures that will achieve the intent of both Parties.

45. ARM'S LENGTH: This Contract has been negotiated at arm's length, and any ambiguity in any of its terms or provisions shall be interpreted in accordance with the intent of the Parties and not against or in favor of either the City or Contractor.

46. RELATIONSHIP: The Contractor is an independent contractor and shall act in an independent capacity and not as officers or employees of the City. To that end, the Contractor shall determine the method, details, and means of performing the work, but will comply with all legal requirements in doing so. The Contractor shall provide its own tools, materials, or equipment. The Parties agree that neither the Contractor nor its principal(s) or employees are entitled to any employee benefits from the City. Contractor understands and agrees that it and its principal(s) or employees have no right to claim any benefits under the Burlington Employee Retirement System, the City's worker's compensation benefits, health insurance, dental insurance, life insurance, or any other employee benefit plan offered by the City. The Contractor agrees to execute any certifications or other documents and provide any certificates of insurance required by the City and understands that this Contract is conditioned on its doing so, if requested.

The Contractor understands and agrees that it is responsible for the payment of all taxes on the above sums and that the City will not withhold or pay for Social Security, Medicare, or other taxes or benefits or be responsible for any unemployment benefits.

47. CHOICE OF LAW: Vermont law, and rules and regulations issued pursuant thereto, shall be applied in the interpretation, execution, and enforcement of this Contract. Any provision included or incorporated herein by reference which conflicts with said laws, rules, and regulations shall be null and void. Any provision rendered null and void by operation of this provision shall not invalidate the remainder of this Contract to the extent capable of execution.

48. JURISDICTION: All suits or actions related to this Contract shall be filed and proceedings held in the State of Vermont.

49. BINDING EFFECT AND CONTINUITY: This Contract shall be binding upon and shall inure to the benefit of the Parties, their' respective heirs, successors, representatives, and assigns. If a dispute arises between the Parties, each Party will continue to perform its obligations under this Contract during the resolution of the dispute, until the Contract is terminated in accordance with its terms.

50. SEVERABILITY: The invalidity or unenforceability of any provision of this Contract or the Contract Documents shall not affect the validity or enforceability of any other provision, which shall remain in full force and effect, provided that the Parties can continue to perform their obligations under this Contract in accordance with the intent of this Contract.

51. ENTIRE CONTRACT & AGREEMENT: This Contract, including the Contract Documents, constitutes the entire Contract, agreement, and understanding of the Parties with respect to the subject matter of this Contract. Prior or contemporaneous additions, deletions, or other changes to this Contract shall not have any force or effect whatsoever, unless embodied herein.

52. APPENDICES: The City may attach, to these specifications, appendices containing various forms and typical sample sheets for guidance and assistance to the Contractor in the performance of the work. It is understood, however, that such forms and samples may be modified, altered, and augmented from time to time by the City as occasions may require. It is the responsibility of the Contractor to ensure that they have the latest versions applicable to the Contract.

53. NO THIRD PARTY BENEFICIARIES: This Contract does not and is not intended to confer any rights or remedies upon any person or entity other than the Parties. Enforcement of this Contract and all rights and obligations hereunder are reserved solely to the Parties. Any services or benefits which third parties receive as a result of this Contract are incidental to this Contract, and do not create any rights for such third parties.

54. WAIVER: A Party's failure or delay in exercising any right, power, or privilege under this Contract, whether explicit or by lack of enforcement, shall not operate as a waiver, nor shall any single or partial exercise of any right, power, or privilege preclude any other or further exercise of such right, power, or privilege.

ARTICLE VI. LIVABLE WAGES¹

21-80 Findings and purpose.

In enacting this article, the city council states the following findings and purposes:

- (a) Income from full-time work should be sufficient to meet an individual's basic needs;
- (b) The City of Burlington is committed to ensuring that its employees have an opportunity for a decent quality of life and are compensated such that they are not dependent on public assistance to meet their basic needs;
- (c) The City of Burlington is committed, through its contracts with vendors and provision of financial assistance, to encourage the private sector to pay its employees a livable wage and contribute to employee health care benefits;
- (d) The creation of jobs that pay livable wages promotes the prosperity and general welfare of the City of Burlington and its residents, increases consumer spending with local businesses, improves the economic welfare and security of affected employees and reduces expenditures for public assistance;
- (e) It is the intention of the city council in passing this article to provide a minimum level of compensation for employees of the City of Burlington and employees of entities that enter into service contracts or receive financial assistance from the City of Burlington.

(Ord. of 11-19-01; Ord. of 10-21-13)

21-81 Definitions.

As used in this article, the following terms shall be defined as follows:

- (a) *Contractor or vendor* is a person or entity that has a service contract with the City of Burlington where the total amount of the service contract or service contracts exceeds fifteen thousand dollars (\$15,000.00) for any twelve (12) month period, including any subcontractors of such contractor or vendor.
- (b) *Grantee* is a person or entity that is the recipient of financial assistance from the City of Burlington in the form of grants, including any contractors or subgrantees of the grantee, that exceed fifteen thousand dollars (\$15,000.00) for any twelve (12) month period.

(c) *Covered employer* means the City of Burlington, a contractor or vendor or a grantee as defined above. The primary contractor, vendor, or grantee shall be responsible for the compliance of each of its subcontractors (or of each subgrantee) that is a covered employer.

(d) *Covered employee* means an "employee" as defined below, who is employed by a "covered employer," subject to the following:

(1) An employee who is employed by a contractor or vendor is a "covered employee" during the period of time he or she expends on furnishing services under a service contract with the City of Burlington, notwithstanding that the employee may be a temporary or seasonal employee;

(2) An employee who is employed by a grantee who expends at least half of his or her time on activities funded by the City of Burlington is a "covered employee."

(e) *Designated accountability monitor* shall mean a nonprofit corporation which has established and maintains valid nonprofit status under Section [501\(c\)\(3\)](#) of the United States Internal Revenue Code of 1986, as amended, and that is independent of the parties it is monitoring.

(f) *Employee* means a person who is employed on a full-time or part-time regular basis. In addition, commencing with the next fiscal year, a seasonal or temporary employee of the City of Burlington who works ten (10) or more hours per week and has been employed by the City of Burlington for a period of four (4) years shall be considered a covered employee commencing in the fifth year of employment. "Employee" shall not refer to volunteers working without pay or for a nominal stipend, persons working in an approved apprenticeship program, persons who are hired for a prescribed period of six (6) months or less to fulfill the requirements to obtain a professional license as an attorney, persons who are hired through youth employment programs or student workers or interns participating in established educational internship programs.

(g) *Employer-assisted health care* means health care benefits provided by employers for employees (or employees and their dependents) at the employer's cost or at an employer contribution towards the purchase of such health care benefits, provided that the employer cost or contribution consists of at least one dollar and twenty cents (\$1.20) per hour. (Said amount shall be adjusted every two (2) years for inflation, by the chief administrative officer of the city.)

(h) *Livable wage* has the meaning set forth in Section [21-82](#).

(i) *Retaliation* shall mean the denial of any right guaranteed under this article, and any threat, discipline, discharge, demotion, suspension, reduction of hours, or any other adverse action against an employee for exercising any right guaranteed under this article. Retaliation shall also include coercion, intimidation, threat, harassment, or interference in any manner with any investigation, proceeding, or hearing under this article.

(j) *Service contract* means a contract primarily for the furnishing of services to the City of Burlington (as opposed to the purchasing or leasing of goods or property). A contract involving the furnishing of financial products, insurance products, or software, even if that contract also includes some support or other services related to the provision of the products, shall not be considered a service contract.

(Ord. of 11-19-01; Ord. of 10-21-13)

21-82 Livable wages required.

(a) Every covered employer shall pay each and every covered employee at least a livable wage no less than:

(1) For a covered employer that provides employer-assisted health care, the livable wage shall be at least fifteen dollars and thirty-five cents (\$15.35) per hour on the effective date of the amendments to this article.

(2) For a covered employer that does not provide employer-assisted health care, the livable wage shall be at least sixteen dollars and seventy-four cents (\$16.74) per hour on the effective date of the amendments to this article.

(3) Covered employees whose wage compensation consists of more or other than hourly wages, including, but not limited to, tips, commissions, flat fees or bonuses, shall be paid so that the total of all wage compensation will at least equal the livable wage as established under this article.

(b) The amount of the livable wage established in this section shall be adjusted by the chief administrative officer of the city as of July 1 of each year based upon a report of the Joint Fiscal Office of the State of Vermont that describes the basic needs budget for a single person but utilizes a model of two (2) adults residing in a two (2) bedroom living unit in an urban area with the moderate cost food plan. Should there be no such report from the Joint Fiscal Office, the chief administrative officer shall obtain and utilize a basic needs budget that applies a similar methodology. The livable wage rates derived from utilizing a model of two (2) adults residing in a two (2) bedroom living unit in an urban area with a moderate cost food plan shall not become effective until rates meet or exceed the 2010 posted livable wage rates. Prior to May 1 preceding any such adjustment and prior to

May 1 of each calendar year thereafter, the chief administrative officer will provide public notice of this adjustment by posting a written notice in a prominent place in City Hall by sending written notice to the city council and, in the case of covered employers that have requested individual notice and provided contact information to the chief administrative officer, by notice to each such covered employer. However, once a livable wage is applied to an individual employee, no reduction in that employee's pay rate is permissible due to this annual adjustment.

(c) Covered employers shall provide at least twelve (12) compensated days off per year for full-time covered employees, and a proportionate amount for part-time covered employees, for sick leave, vacation, personal, or combined time off leave.

(Ord. of 11-19-01; Ord. of 5-2-11; Ord. of 6-13-11; Ord. of 10-21-13)

21-83 Applicability.

(a) This article shall apply to any service contract or grant, as provided by this article that is awarded or entered into after the effective date of the article. After the effective date of the article, entering into any agreement or an extension, renewal or amendment of any contract or grant as defined herein shall be subject to compliance with this article.

(b) The requirements of this article shall apply during the term of any service contract subject to the article. Covered employers who receive grants shall comply with this article during the period of time the funds awarded by the City of Burlington are being expended by the covered employer.

(Ord. of 11-19-01; Ord. of 10-21-13)

21-84 Enforcement.

(a) Each service contract or grant covered by this article shall contain provisions requiring that the covered employer or grantee submit a written certification, under oath, during each year during the term of the service contract or grant, that the covered employer or grantee (including all of its subcontractors and subgrantees, if any) is in compliance with this article. The failure of a contract to contain such provisions does not excuse a covered employer from its obligations under this article. The covered employer shall agree to post a notice regarding the applicability of this section in any workplace or other location where employees or other persons contracted for employment are working. The covered employer shall agree to provide payroll records or other documentation for itself and any subcontractors or subgrantees, as deemed necessary by the chief

administrative officer of the City of Burlington, within ten (10) business days from receipt of the City of Burlington's request.

(b) The chief administrative officer of the City of Burlington may require that a covered employer submit proof of compliance with this article at any time, including but not limited to:

- (1) Verification of an individual employee's compensation;
- (2) Production of payroll, health insurance enrollment records, or other relevant documentation; or
- (3) Evidence of proper posting of notice.

If a covered employer is not able to provide that information within ten (10) business days of the request, the chief administrative officer may turn the matter over to the city attorney's office for further enforcement proceedings.

(c) The City of Burlington shall appoint a designated accountability monitor that shall have the authority:

- (1) To inform and educate employees of all applicable provisions of this article and other applicable laws, codes, and regulations;
- (2) To create a telephonic and electronic accountability system under this article that shall be available at all times to receive complaints under this article;
- (3) To establish and implement a system for processing employees' complaints under this article, including a system for investigating complaints and determining their initial credibility; and
- (4) To refer credible complaints to the city attorney's office for potential enforcement action under this article.

The designated accountability monitor shall forward to the City of Burlington all credible complaints of violations within ten (10) days of their receipt.

(d) Any covered employee who believes his or her covered employer is not complying with this article may file a complaint in writing with the city attorney's office within one (1) year after the alleged violation. The city attorney's office shall conduct an investigation of the complaint, during which it may require from the covered employer evidence such as may be required to determine whether the covered employer has been compliant, and shall make a finding of compliance or noncompliance within a reasonable time after receiving the

complaint. Prior to ordering any penalty provided in subsection (e), (f), or (g) of this section, the city attorney's office shall give notice to the covered employer. The covered employer may request a hearing within thirty (30) days of receipt of such notice. The hearing shall be conducted by a hearing officer appointed by the city attorney's office, who shall affirm or reverse the finding or the penalty based upon evidence presented by the city attorney's office and the covered employer.

(e) The City of Burlington shall have the right to modify, terminate and/or seek specific performance of any contract or grant with a covered employer from any court of competent jurisdiction, if the covered employer has not complied with this article.

(f) Any covered employer who violates this article may be barred from receiving a contract or grant from the city for a period up to two (2) years from the date of the finding of violation.

(g) A violation of this article shall be a civil offense subject to a civil penalty of from two hundred dollars (\$200.00) to five hundred dollars (\$500.00). All law enforcement officers and any other duly authorized municipal officials are authorized to issue a municipal complaint for a violation of this article. Each day any covered employee is not compensated as required by this article shall constitute a separate violation.

(h) If a complaint is received that implicates any City of Burlington employee in a possible violation of this article, that complaint will be handled through the City's personnel procedures, not through the process outlined in this article.

(i) Any covered employee aggrieved by a violation of this article may bring a civil action in a court of competent jurisdiction against the covered employer within two (2) years after discovery of the alleged violation. The court may award any covered employee who files suit pursuant to this section, as to the relevant period of time, the following:

(1) The difference between the livable wage required under this article and the amount actually paid to the covered employee;

(2) Equitable payment for any compensated days off that were unlawfully denied or were not properly compensated;

(3) Liquidated damages in an amount equal to the amount of back wages and/or compensated days off unlawfully withheld or fifty dollars (\$50.00) for each employee or person whose rights under this article were violated for each day that the violation occurred or continued, whichever is greater;

(4) Reinstatement in employment and/or injunctive relief; and

(5) Reasonable attorneys' fees and costs.

(j) It shall be unlawful for an employer or any other person to interfere with, restrain, or deny the exercise of, or the attempt to exercise, any right protected under this article. No person shall engage in retaliation against an employee or threaten to do so because such employee has exercised rights or is planning to exercise rights protected under this article or has cooperated in any investigation conducted pursuant to this article.

(Ord. of 11-19-01; Ord. of 2-17-04; Ord. of 5-2-11; Ord. of 10-21-13)

21-85 Other provisions.

(a) No covered employer shall reduce the compensation, wages, fringe benefits or leave available to any covered employee in order to pay the livable wage required by this article. Any action in violation of this subsection shall be deemed a violation of this article subject to the remedies of Section [21-84](#).

(b) No covered employer with a current contract, as of the effective date of this provision, with the City of Burlington for the use of property located at the Burlington International Airport may reduce, during the term of that contract, the wages of a covered employee below the livable wage as a result of amendments to this article.

(c) Where pursuant to a contract for services with the city, the contractor or subcontractor incurs a contractual obligation to pay its employees certain wage rates, in no case except as stated in subsection (d) of this section, shall the wage rates paid pursuant to that contract be less than the minimum livable wage paid pursuant to this article.

(d) Notwithstanding subsection (c) of this section, where employees are represented by a bargaining unit or labor union pursuant to rights conferred by state or federal law and a collective bargaining labor agreement is in effect governing the terms and conditions of employment of those employees, this chapter shall not apply to those employees, and the collective bargaining labor agreement shall control.

(e) Covered employers shall inform employees making less than twelve dollars (\$12.00) per hour of their possible right to the Earned Income Tax Credit under federal and state law.

(f) The chief administrative officer of the city shall have the authority to promulgate rules as necessary to administer the provisions of this article, which shall become effective upon approval by the city council.

(Ord. of 11-19-01; Ord. of 10-21-13)

21-86 Exemptions.

An exemption from any requirement of this article may be requested for a period not to exceed two (2) years:

- (a) By a covered employer where payment of the livable wage would cause substantial economic hardship;
and
- (b) By the City of Burlington where application of this article to a particular contract or grant is found to violate specific state or federal statutory, regulatory or constitutional provisions or where granting the exemption would be in the best interests of the City.

A covered employer or grantee granted an exemption under this section may reapply for an exemption upon the expiration of the exemption. Requests for exemption may be granted by majority vote of the city council. All requests for exemption shall be submitted to the chief administrative officer. The finance committee of the City of Burlington shall first consider such request and make a recommendation to the city council. The decision of the city council shall be final.

(Ord. of 11-19-01; Ord. of 10-21-13)

21-87 Severability.

If any part or parts or application of any part of this article is held invalid, such holding shall not affect the validity of the remaining parts of this article.

(Ord. of 11-19-01; Ord. of 10-21-13)

21-88 Annual reporting.

On or before April 15 of each year, the city attorney's office shall submit a report to the city council that provides the following information:

- (a) A list of all covered employers broken down by department;
- (b) A list of all covered employers whose service contract did not contain the language required by this article;
and
- (c) All complaints filed and investigated by the city attorney's office and the results of such investigation.

(Ord. of 10-21-13)

21-89 Effective date.

The amendments to this article shall take effect on January 1, 2014, and shall not be retroactively applied.

(Ord. of 10-21-13)

Burlington's Livable Wage Ordinance

\$15.64

WHEN

employer offers employer assisted health insurance

\$16.66

WHEN

employer **does not** offer employer assisted health insurance

and 12 days of paid time off per year*

*for full time employees

MORE INFORMATION:

Which workplaces are covered?

Any employer that gets paid at least \$15,000 by the City of Burlington for services rendered in a 12-month period are covered.

Employers that have a collective bargaining agreement with their employees are exempt.

What should employees covered by the Livable Wage Ordinance expect?

Livable wages, 12 days paid time off per year for vacation, illness or personal time (pro-rated for part time employees), and adherence to other applicable state and federal laws.

You have the right to file a complaint if you believe your rights under this ordinance have been violated. Employers found to be in violation of the Livable Wage Ordinance may have to pay back wages and fines, and may be at risk of losing contracts with the City of Burlington, depending on the severity of the violation.

To file a complaint, contact:

Livable Wage Monitor

Call (802) 865-7000, option 1 or

Email:

livablewage@burlingtonvt.org



Livable Wage July 2021 – June 2022

Effective July 1, 2021

Certification of Compliance with the City of Burlington's Livable Wage Ordinance

I, _____, on behalf of _____ ("the Contractor") in connection with a contract for _____ services that we provide to the City, hereby certify under oath that the Contractor (and any subcontractors under this contract) is and will remain in compliance with the City of Burlington's Livable Wage Ordinance, B.C.O. 21-80 et seq., and that

(1) as a condition of entering into this contract or grant, we confirm that all covered employees as defined by Burlington's Livable Wage Ordinance (including the covered employees of subcontractors) shall be paid a livable wage (as determined, or adjusted, annually by the City of Burlington's chief administrative officer) and provided appropriate time off for the term of the contract;

(2) a notice regarding the applicability of the Livable Wage Ordinance shall be posted in the workplace(s) or other location(s) where covered employees work;

(3) we will provide verification of an employee's compensation, produce payroll or health insurance enrollment records or provide other relevant documentation (including that of any subcontractor), as deemed necessary by the chief administrative officer, within ten (10) business days from receipt of a request by the City;

(4) we will cooperate in any investigation conducted by the City of Burlington's City Attorney's office pursuant to this ordinance; and

(5) we will not retaliate (nor allow any subcontractor to retaliate) against an employee or other person because an employee has exercised rights or the person has cooperated in an investigation conducted pursuant to this ordinance.

Date _____ By: Contractor _____

Subscribed and sworn to before me:

Date _____ Notary _____

ARTICLE VII. OUTSOURCING

21-90 Policy.

It is the policy of the City of Burlington to let service contracts to contractors, subcontractors and vendors who perform work in the United States.

(Ord. of 11-21-05/12-21-05)

21-91 Definitions.

(a) *Contractor or vendor.* A person or entity that has a contract with the City of Burlington primarily for the furnishing of services (as opposed to the purchasing of goods), including any subcontractors of such contractor or vendor.

(b) *Government funded project.* Any contract for services which involves any city funds and the total amount of the contract is fifty thousand dollars (\$50,000.00) or more. Burlington School Department contracts shall not be considered government funded projects under this article.

(c) *Outsourcing.* The assigning or reassigning, directly, or indirectly through subcontracting, of services under a government funded project to workers performing the work outside of the United States.

(Ord. of 11-21-05/12-21-05)

21-92 Implementation.

(a) No contract for a government funded project shall be let to any contractor, subcontractor, or vendor who is outsourcing, or causing the work to be performed outside of the United States or Canada.

(b) Prior to the commencement of work on a government funded project a contractor, subcontractor or vendor shall provide written certification that the services provided under the contract will be performed in the United States or Canada.

(Ord. of 11-21-05/12-21-05)

21-93 Exemption.

An exemption from requirements of this article may be authorized by the chief administrative officer based upon a determination that the services to be performed for the government funded project are not available in the United States or Canada at a reasonable cost. Any such exemption decision by the chief administrative officer

shall be reported to the board of finance in writing within five (5) days. The board of finance may, if it should vote to do so, override the exemption decision if such vote occurs within fourteen (14) days of the date of the chief administrative officer's communication to such board.

(Ord. of 11-21-05/12-21-05)

21-94 Enforcement.

(a) Any contractor, subcontractor or vendor who files false or materially misleading information in connection with an application, certification or request for information pursuant to the provisions of this article or outsources work on a government funded project shall be deemed to be in violation of this article.

(b) A violation of this article shall be a civil offense subject to a civil penalty of from one hundred dollars (\$100.00) to five hundred (\$500.00). All law enforcement officers and any other duly authorized municipal officials are authorized to issue a municipal complaint for a violation of this article. Each day any violation of any provision of this article shall continue shall constitute a separate violation.

(c) The City of Burlington shall have the right to modify, terminate and or seek specific performance of any contract for a government funded project if the contractor, subcontractor or vendor has not complied with this article.

(Ord. of 11-21-05/12-21-05)

21-95—21-99 Reserved.

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(b) A violation of this article shall be a civil offense subject to a civil penalty of from one hundred dollars (\$100.00) to five hundred (\$500.00). All law enforcement officers and any other duly authorized municipal officials are authorized to issue a municipal complaint for a violation of this article. Each day any violation of any provision of this article shall continue shall constitute a separate violation.

(c) The City of Burlington shall have the right to modify, terminate and or seek specific performance of any contract for a government funded project if the contractor, subcontractor or vendor has not complied with this article.

(Ord. of 11-21-05/12-21-05)

21-95—21-99 Reserved.

ARTICLE VIII. UNION DETERRENCE

21-100 Policy.

It is the policy of the City of Burlington to limit letting contracts to organizations that provide union deterrence services to other companies.

(Ord. of 3-27-06/4-26-06)

21-101 Definitions.

(a) *Contractor or vendor.* A person or entity that has a contract with the City of Burlington primarily for the furnishing of services (as opposed to the purchasing of goods), including any subcontractors of such contractor or vendor.

(b) *Government funded project.* Any contract for services which involves any City funds and the total amount of the contract is fifteen thousand dollars (\$15,000.00) or more. Burlington School Department contracts shall not be considered government funded projects under this article.

(c) *Union deterrence services.* Services provided by a contractor, subcontractor or vendor that are not restricted to advice concerning what activities by an employer are prohibited and permitted by applicable laws and regulations, but extend beyond such legal advice to encouraging an employer to do any of the following:

- 1) Hold captive audience, (i.e., mandatory) meetings with employees encouraging employees to vote against the union;
- 2) Have supervisors force workers to meet individually with them to discuss the union;
- 3) Imply to employees, whether through written or oral communication, that their employer may have to shut down or lay people off if the union wins the election;
- 4) Discipline or fire workers for union activity;
- 5) Train managers on how to dissuade employees from supporting the union.

(d) *Substantial portion of income.* For the purposes of this article, substantial portion of income shall mean greater than ten (10) percent of annual gross revenues or one hundred thousand dollars (\$100,000.00), whichever is less.

(Ord. of 3-27-06/4-26-06)

21-102 Implementation.

- (a) No contract for a government funded project shall be let to any contractor, subcontractor, or vendor who
 - 1) Advises or has advised an employer to conduct any illegal activity in its dealings with a union.
 - 2) Advertises union deterrence services as specialty services;
 - 3) Earns a substantial portion of its income by providing union deterrence services to other companies in order to defeat union organizing efforts.
- (b) Prior to the commencement of work on a government funded project a contractor, subcontractor or vendor shall provide written certification that it has not advised the conduct of any illegal activity, it does not currently, nor will it over the life of the contract provide union deterrence services in violation of this article.

(Ord. of 3-27-06/4-26-06)

21-103 Enforcement.

- (a) Any contractor, subcontractor or vendor who files false or materially misleading information in connection with an application, certification or request for information pursuant to the provisions of this article or provided union deterrence services during the life of a contract for a government funded project shall be deemed to be in violation of this article.
- (b) The City of Burlington shall have the right to modify, terminate and or seek specific performance of any contract for a government funded project if the contractor, subcontractor or vendor has not complied with this article.

(Ord. of 3-27-06/4-26-06)

21-104—21-110 Reserved.

Certification of Compliance with the City of Burlington's
Union Deterrence Ordinance

I, _____, on behalf of _____
(Contractor) and in connection with _____ (City
contract/project/grant), hereby certify under oath that _____
(Contractor) has not advised the conduct of any illegal activity, and it does not currently, nor will
it over the life of the contract advertise or provide union deterrence services in violation of the
City's union deterrence ordinance.

Dated at _____, Vermont this ____ day of _____, 20__.

By: _____
Duly Authorized Agent